B6

Consult Date: 03-09-2018

Patient Details

B6 - Male Neutered

Canine Golden Retriever

7 years 7 months

Client Details

B6

Referring Vet Details

B6

History

B6 presents today for a cardiac evaluation and taurine level. B6 is B6 in the B6 Last October, he had an echocardiogram in B6 which showed a mildly elevated left ventricle with decreased function. His taurine level, at that time, was low. B6 Owners have since changed his diet from FROMM Lamb and Lentil to Farmina, with a higher amount of taurine. He has been doing well at home, with no cough or labored breathing, normal appetite and exercise tolerance. He does pant heavily but typically after walks or playing.

No current medications.

Current body weight: 75.6 lb

Physical Exam

Mucous Membranes: Pink
CRT: Normal
Heart rate: 90; respiratory sinus arrhythmia
Murmur: None
Respiratory rate: Pant
Lung auscultation: Lungs auscult clear bilaterally
Respiratory effort: Normal rate and effort
Abdomen: Normal palpation, non-painful

Diagnostic Result

Taurine(S16755) (Ref: US10398-DR6914)

Outcome

B6

Test	Results	Unit	Lowest Value	Highest Value	Qualifier
Taurine	B6				

Patient Details B6 **Client Details** B6

Test	Results	Unit	Lowest Value	Highest Value	Qualifier

Normal Values (nmols/ml)
Normal Range Critical Level
Cat Plasma 60-120 Less than 40
Whole Blood 300-600 Less than 200

Dog Plasma 60-120 Less than 40
Whole Blood 200-350 Less than 150
TEST PERFORMED AT B6

Doppler Blood Pressure (Ref: US10398-DR6913)

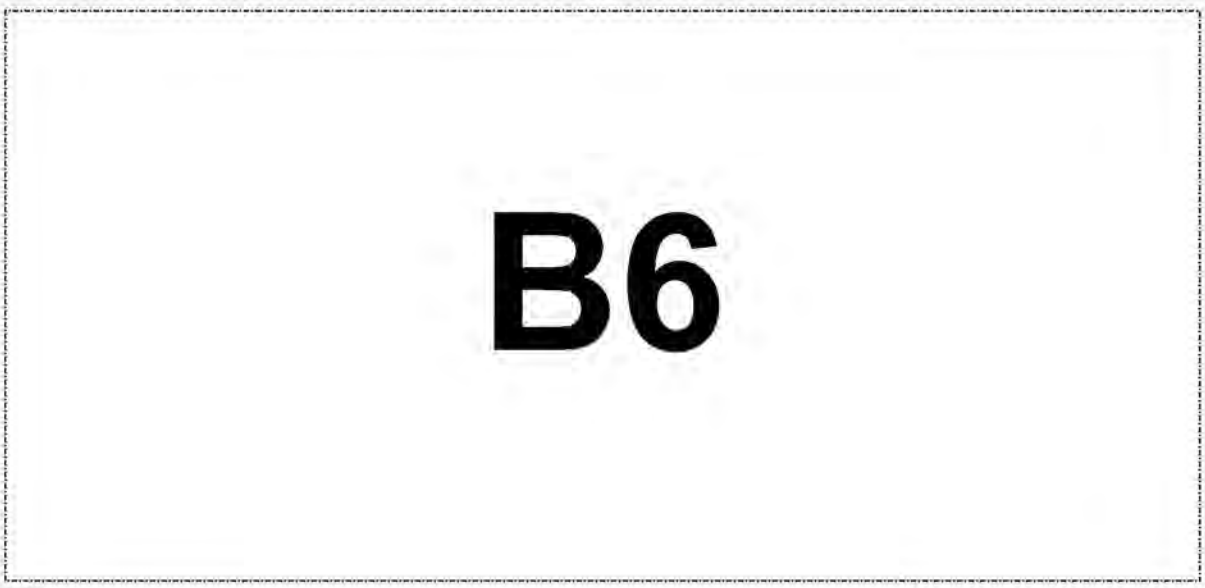
Outcome
Non-invasive Doppler blood pressure measurement performed on the antebrachium using a # 8 cuff.
Three successive readings performed: 140mmHg, 142mmHg, 142mmHg.
Mild stress, sternal recumbency.

ECG - Echocardiogram Extended rhythm ECG (Ref: US10398-DR6912)

Outcome
A respiratory sinus arrhythmia was noted during the echocardiogram. No ectopic beats, tachy or bradyarrhythmias were noted.

Echocardiogram-CompleteDiagnostic (Ref: US10398-DR6911)

Outcome
Moderate decline in LV myocardial function. LVFS 21%. Moderate LV dilation. LVIDd 5.86cm. Increased EPSS 1.10cm. Trace mitral regurgitation detected with color flow Doppler. No left atrial enlargement. LA:Ao 1.28. No tricuspid regurgitation detected with color flow Doppler. No right atrial enlargement. Normal pulmonic and aortic outflow velocities.



Assessments

Suspect early dilated cardiomyopathy; cannot rule out taurine-deficiency as a contributing factor.

Plans

B6 today's echocardiogram documents a decline in LV myocardial function in addition to dilation of the left ventricle.

Patient Details B6 **Client Details** B6

Compared to the study done previously, there is approximately 1cm increase in both LV dimensions (systolic and diastolic). The function remains decreased although unchanged overall (20%). This information is concerning for true early DCM, whether it is due to something dietary or hereditary/primary remains to be seen. We did discuss different ultrasonographers make it hard to compare directly, however the change is significant. We submitted blood for a taurine level today and results are pending. At this point we have recommended supplementing the taurine at home (1000mg twice daily) regardless of the results. We will contact you in approximately 2 weeks when the results are available.

We also discussed the use of B6 in these cases, and the results of the PROTECT study. Given unchanged systolic function and a normal LA dimension, I have not instituted this today. We will revisit in the future depending on progression. In the interim, a normal LA translates to a relatively low current risk for onset of congestive heart failure at this time.

Reassessment is recommended in 6 months. If issues arise in the interim (labored breathing, collapse episodes, etc) we recommended B6 as a local option or the summer.

The owner is aware of the need to seek urgent medical attention if onset of a cough, labored breathing, or exercise intolerance. We request a cardiology recheck in 6 months, sooner if problems arise.

Thank you for your trust in the care of this patient. Please call if you have any questions or concerns.

B6

B6

Owner Name: B6
Patient Name: B6
DOB: B6 **Breed:** Australian Cattledog **Gender:** Male, neutered

Admitted: May 25, 2018 **Discharged:** May 25, 2018 **Follow up:** B6

Medication	Size	Amount	Instructions
B6			Give 1/2 twice daily by mouth
			Give 1 three times daily by mouth
			Give 1 twice daily by mouth
			Give 1 three times daily by mouth if his cough is interfering with eating or sleep.

Diet: Unrestricted: Add 1/4 Tums and 1/4 adult multivitamin daily (if chicken and rice is fed)

Diagnosis:

Dilated Cardiomyopathy (DCM) - one episode of syncope/episodic SVT

Home Instructions:

B6

B6

B6

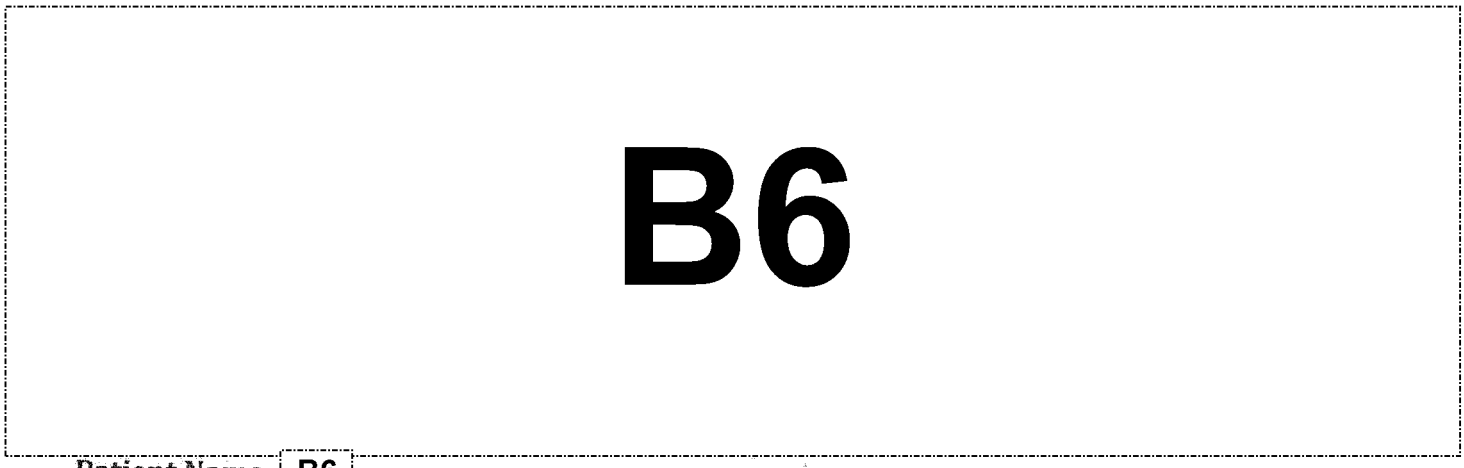
Specialist

B6

B6

B6

B6



Patient Name: B6
DOB: B6 **Breed:** Australian Cattledog **Gender:** Male, neutered

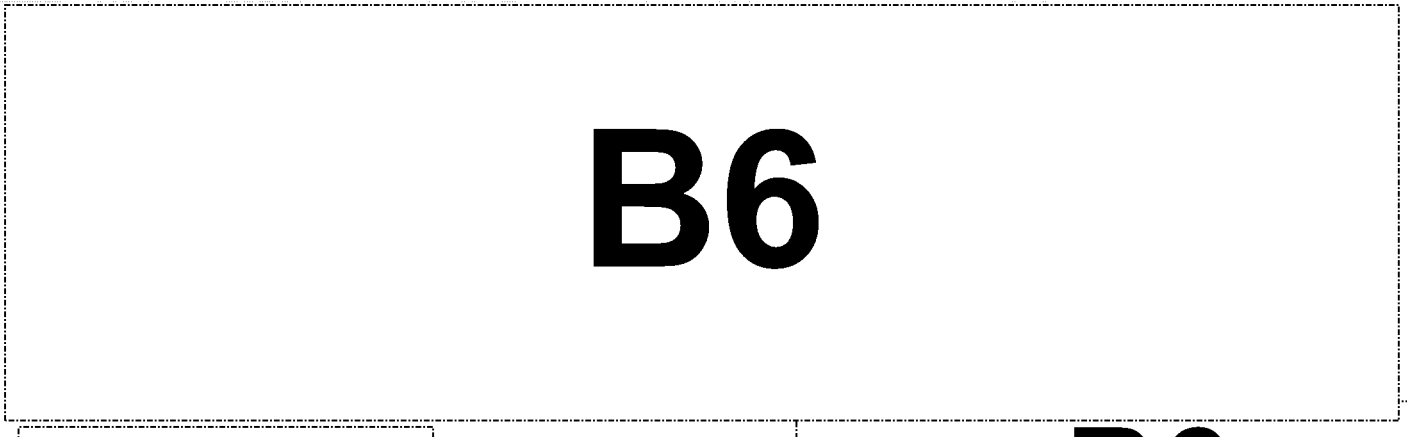
Admitted: February 23, 2018 **Discharged:** February 23, 2018 **Follow up:** B6 3 m

Medication	Size	Amount	Instructions
B6			Give 1/2 twice daily by mouth
			Give 1 three times daily by mouth
			Give 1 twice daily by mouth
			Give 1 three times daily by mouth
B6			Administer if his cough is interfering with eating or sleep.

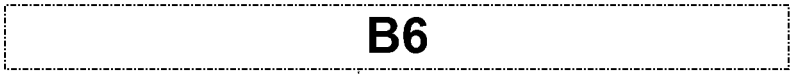
Diet: Unrestricted: Add 1/4 Tums and 1/4 adult multivitamin daily (if chicken and rice is fed)

Diagnosis:
Dilated Cardiomyopathy (DCM)
One episode of syncope/episodic SVT

Home Instructions:
1. B6 was presented for the investigation of cardiomyopathy



Specialist



B6

B6

2/23

B6

2.5.

B6

B6

Patient Name: B6
DOB: B6 Breed: Aust Cattle Dog Gender: Male, neutered

Admitted: October 24, 2017 Discharged: October 24, 2017 Follow up: B6 1 m

Medication	Size	Amount	Instructions
B6		60	Give 1 twice daily by mouth
			Give 1 three times daily by mouth
			Give 1 twice daily by mouth
			Give 1 three times daily by mouth
B6			Administer if his cough is interfering with eating or sleep.

Diet: Unrestricted: Add 1/4 Tums and 1/4 adult multivitamin daily (if chicken and rice is fed)

Diagnosis:

Dilated Cardiomyopathy (DCM)
One episode of syncope.

Home Instructions:

1. B6 was presented for the investigation of cardiomyopathy

B6

B6

B6

3. Please call with any questions or concerns.

Client

B6

Client: B6
Patient Name: B6
Species: Canine
Breed:

Gender: Female/Spayed
Weight:
Age: 9 Years
Doctor: B6

Test	Results	Reference Interval	LOW	NORMAL	HIGH
Catalyst Dx (October 24, 2017 1:18 PM)					
GLU		70 - 143			
CREA		0.5 - 1.8			
BUN		7 - 27			
BUN/CREA					
PHOS		2.5 - 6.8			
CA		7.9 - 12.0			
TP		5.2 - 8.2			
ALB		2.2 - 3.9			
GLOB		2.5 - 4.5			
ALB/GLOB					
ALT	B6	10 - 125	HIGH		
ALKP		23 - 212	LOW		
GGT		0 - 11			
TBIL		0.0 - 0.9			
CHOL		110 - 320			
AMYL		500 - 1500			
LIPA		200 - 1800			
Na		144 - 160			
K		3.5 - 5.8			
Na/K					
Cl		109 - 122			
Osm Calc					

B6

Printed: October 24, 2017 1:18 PM

B5

B6

DOB: B6 **Breed:** Aust Cattle Dog **Gender:** Male, neutered

Admitted: October 10, 2017 **Discharged:** October 10, 2017 **Follow up:** B6 2 weeks

Medication	Size	Amount	Instructions
B6		50	Give 1 three times daily by mouth
			Give 1 twice daily by mouth
			Give 1 three times daily by mouth
B6			Administer if his cough is interfering with eating or sleep.

Diet: Unrestricted: Add 1/4 Tums and 1/4 adult multivitamin daily (if chicken and rice is fed)

Diagnosis:

Dilated Cardiomyopathy (DCM)
One episode of syncope.

Home Instructions:

1. B6 was presented for the investigation of cardiomyopathy

B6

3. Please call with any questions or concerns.

B6

C

Specialist

B6

B6

B6

CLINICAL SUMMARY

B6

Record Date 06-25-2018
Attending Vet(s) B6
Referring Vet
Referring Clinic
Printed At 06-25-2018
Printed By B6

Client Details

Name B6
Address B6
Phone B6

Patient Details

Name B6
Species Canine
Breed Poodle
Age B6
Sex Female Spayed
Referral B6

Monday the 25th of June 2018

Presenting Problem(s)

New murmur. Had murmur when she was a puppy, but it went away. After spay in January, rdvm heard it about a month ago.

History

Cardiovascular >> General

B6 presents for a cardiology consultation and echocardiogram. She had a heart murmur when she was first adopted, but that seemed to go away with time. She was spayed earlier this year and it was not heard. She went back to her primary care veterinarian last month and the heart murmur was heard again, so they recommended a cardiac workup to look for any underlying heart disease.
O notes pt is doing well at home. Pt is very active and does very well during that time - breathing seems completely fine.
No c/v/d. Pt sneezes once every morning which is normal for her. Over the past couple weeks, pt occasionally seems to drink excessively and then vomit right afterwards. O is limiting her amount of water intake at one time which seems to help.
Pt on no medications.

Physical Exam(s)

General Appearance: Bright, alert and responsive

Body Condition Score: Ideal

Cardiovascular: sinus arrhythmia There is a grade II out of VI systolic murmur heard best at the left apex. The femoral arterial pulse quality is normal.

Respiratory: There is a normal respiratory pattern. Auscultation reveals normal lung sounds.

Attending Veterinarian: B6

B6

CLINICAL SUMMARY

B6

Record Date 06-25-2018

Attending Vet(s) B6

Referring Vet

Referring Clinic

Printed At 06-25-2018

Printed By B6

Assessment(s)

Screening ECG interpretation

HR= 90

Rhythm: sinus arrhythmia

Blood Pressure Assessment

B6

ECHOCARDIOGRAPHIC PARAMETERS

B6

B6

CLINICAL SUMMARY

B6

Record Date	06-25-2018
Attending Vet(s)	B6
Referring Vet	
Referring Clinic	
Printed At	06-25-2018
Printed By	B6

ECHOCARDIOGRAPHIC ASSESSMENT:
The left ventricle is moderately eccentrically hypertrophied with severely depressed systolic function.
The mitral valve is normal in appearance. The chordal attachments appear normal. There is mild posteriorly directed mitral regurgitation. The left atrium is moderately enlarged. The pulmonary veins are normal in size. The aortic valve appears normal. There is no aortic insufficiency. The aortic velocity is normal. The right ventricle is normal. The tricuspid valve is normal in appearance. There is no tricuspid regurgitation. The right atrium is normal in appearance. The pulmonic valve is normal in appearance. The pulmonic forward flow is normal. The pulmonary arteries are normal in appearance.

DILATED CARDIOMYOPATHY

Dilated cardiomyopathy (DCM) is characterized by primary systolic dysfunction with secondary eccentric hypertrophy (dilatation) of the heart. DCM is typically idiopathic (likely genetic), although taurine deficiency, tachyarrhythmias, myocarditis and severe hypothyroidism can appear clinically like DCM in less common cases. More recently grain free diets have been implicated in dilated cardiomyopathic like states.

In general, DCM tends to affect middle aged, large and medium sized dogs, most commonly Doberman Pinschers, Irish Wolfhounds, and Great Danes.

A 24 hour Holter monitor could be considered to evaluate for an arrhythmic cause of this condition but is deemed low yield at this time.

Because B6 is an unusual presentation for this disease I am hopeful there is a nutrition component that can be reversed.

Abstract from ACVIM Forum 2018:

Echocardiographic Phenotype of Canine Dilated Cardiomyopathy Differs Based on Diet (Abstract C11)
ACVIM 2018
Darcy Adin; Teresa DeFrancesco; Bruce Keene; Sandra B. Tou; Kathryn Meurs; Clarke B. Atkins; Brent B. Aona; Kari B. Kurtz; Lara B. Barron
North Carolina State University, Raleigh, NC, USA

Taurine and carnitine deficiencies are associated with dilated cardiomyopathy (DCM) in dogs, but little is known about other diet-related etiologies. Recognition of DCM in atypical breeds fed grain-free diets (GFD) prompted this study.

Diet histories and echocardiograms from dogs diagnosed with DCM at NCSU from 2015-2017 were evaluated. Dogs were grouped by diet into GFD and non-grain-free (NGFD) groups. The GFD group was subdivided into dogs fed the most common brand (GFD-1) or other brands (GFD-o). Echocardiographic parameters were compared between groups.

Of 22 dogs with DCM fed GFD, 10 received GFD-1, including 2 pairs of unrelated housemates. No taurine or carnitine deficiencies were identified among the GFD dogs tested (11 taurine, 4 carnitine). Twenty-seven dogs with DCM were fed NGFD. Of these, 5 of 11 tested were taurine deficient (3 vegetarian). Dogs eating GFD-1 weighed less (23.1±11.5kg); had greater normalized LV diameter in diastole (LVIDdN), 2.55±0.26; and systole (LVIDsN) 2.05±0.30; and lower sphericity index (SI) 1.24±0.09 compared to dogs eating GFD-o (weight 35.9±13.0kg, p=0.03; LVIDdN 2.26±0.33, p=0.04; LVIDsN 1.79±0.28, p=0.05; SI 1.38±0.18, p=0.03) and compared to dogs eating NGFD (weight 33.5±13.7, p=0.04; LVIDdN 2.13±0.23, p<0.0001; LVIDsN 1.71±0.21, p=0.0006; SI 1.43±0.20, p=0.001). Dogs eating GFD regardless of brand had greater LVIDdN (p=0.0019), greater LVIDsN (p=0.012) and lower SI (P=0.016) than dogs eating NGFD. Prevalence of congestive heart failure was not different between GFD and NGFD groups.

B6

CLINICAL SUMMARY

B6

Record Date	06-25-2018
Attending Vet(s)	B6
Referring Vet	
Referring Clinic	
Printed At	06-25-2018
Printed By	B6

Echocardiograms of dogs with DCM fed GFD, and specifically GFD-1, suggest more advanced disease or a diet-enhanced pathophysiology compared to dogs eating NGFD.

Plan(s)

We submitted taurine levels and troponin levels in an attempt to explore for an underlying cause.

B6

Sleeping Respiratory Rate Monitoring

When B6 is sleeping or resting soundly, count the number of times his/her chest goes up and down over 15 seconds. Multiply this number by 4, this is breaths per minute. If you are having difficulty counting the breaths while keeping time, there are several phone apps available to help you. If you have an iPhone, the Cardalis app can be easily downloaded for free.

A normal sleeping respiratory rate is <30 breaths per minute. Respiratory rates between 40 and 50 breaths per minute likely indicate congestive heart failure and B6 should be evaluated. Sleeping respiratory rates >50 breaths per minute, or increased effort may indicate an emergency and B6 should be evaluated by a veterinarian immediately.

Therapeutic(s) / Procedure(s)

New Consult
Specifics:

Invoiced 403288

Medication(s)

Prescribed By: B6

B6

Master Problem(s)

Mild Mitral Regurgitation

B6

CLINICAL SUMMARY

B6

Record Date	06-25-2018
Attending Vet(s)	B6
Referring Vet	
Referring Clinic	
Printed At	06-25-2018
Printed By	B6

Master Problem(s)

Dilated Cardiomyopathy

CARDIOLOGY DIET HISTORY FORM

Please answer the following questions about your pet

Pet's name: B6 Owner's name : B6 Today's date: 6/25/2018

1. How would you assess your pet's appetite? (mark the point on the line below that best represents your pet's appetite)

Example: Poor ——— Excellent

Poor ——— Excellent

2. Have you noticed a change in your pet's appetite over the last 1-2 weeks? (check all that apply)
☒ Eats about the same amount as usual ☐ Eats less than usual ☐ Eats more than usual
☐ Seems to prefer different foods than usual ☐ Other ———

3. Over the last few weeks, has your pet (check one)
☐ Lost weight ☐ Gained weight ☒ Stayed about the same weight ☐ Don't know

4. Please list below ALL pet foods, people food, treats, snack, dental chews, rawhides, and any other food item that your pet currently eats. Please include the brand, specific product, and flavor so we know exactly what you pet is eating.

Food (include specific product and flavor) Form Amount How often? Fed since
Examples are shown in the table – please provide enough detail that we could go to the store and buy the exact same food

Food (include specific product and flavor)	Form	Amount	How often?	Fed since
Nutro Grain Free Chicken, Lentil, & Sweet Potato Adult	*dry*	*1 ½ cup*	*2x/day*	*Jan 2018*
85% lean hamburger	*microwaved*	*3 oz*	*1x/week*	*Jan 2015*
Pupperoni original beef flavor	*treat*	*½*	*1x/day*	*Aug 2015*
Rawhide	*treat*	*6 inch twist*	*1x/week*	*Dec 2015*
Acana Singles Lamb & Apple Formula	dry	1 1/2 cup	2x/day	June 2017
Soyce Good Dog Foods Chicken Kibble	treat	15-20 #/day	daily	March 2017

**Any additional diet information can be listed on the back of this sheet*

5. Do you give any dietary supplements to your pet (for example: vitamins, glucosamine, fatty acids, or any other supplements)? ☐ Yes ☒ No If yes, please list which ones and give brands and amounts:

		Brand/Concentration	Amount per day
Taurine	☐ Yes ☒ No		
Carnitine	☐ Yes ☒ No		
Antioxidants	☐ Yes ☒ No		
Multivitamin	☐ Yes ☒ No		
Fish oil	☐ Yes ☒ No		
Coenzyme Q10	☐ Yes ☒ No		
Other (please list):			
Example: Vitamin C		*Nature's Bounty*	*500 mg tablets – 1 per day*

6. How do you administer pills to your pet?
☒ I do not give any medications ☐ I put them directly in my pet's mouth without food
☐ I put them in my pet's dog/cat food ☐ I put them in a Pill Pocket or similar product
☐ I put them in foods (list foods): ———

Information below to be completed by the veterinarian:

Current body weight: 23.50 kg Current body condition score (1-9): 5 /9

Muscle Condition Score: ☒ normal muscle ☐ mild muscle loss ☐ moderate muscle loss ☐ severe muscle loss

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: 'Freeman, Lisa'; Darcy Adin
CC: Joshua A Stern; B6
Sent: 8/15/2018 6:49:14 PM
Subject: RE: a few NCSU cases

Thank you, Darcy! We'll be on the lookout for the cases.

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
U.S. FOOD & DRUG ADMINISTRATION

From: Freeman, Lisa [mailto:Lisa.Freeman@tufts.edu]
Sent: Wednesday, August 15, 2018 8:50 AM
To: Darcy Adin <dbadin@ncsu.edu>; Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Joshua A Stern <jstern@ucdavis.edu>; B6
Subject: RE: a few NCSU cases

That's really interesting, Darcy!
I wonder how many of these cases we chalk up to being genetic DCMs may have a dietary component.
Thanks for sharing
Lisa

From: Darcy Adin <dbadin@ncsu.edu>
Sent: Tuesday, August 14, 2018 8:00 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Cc: Freeman, Lisa <lisa.freeman@tufts.edu>; Joshua A Stern <jstern@ucdavis.edu>; B6
B6
Subject: a few NCSU cases

Hi Jennifer,

I wanted to follow up on the case where NCSU sent you necropsy samples (B6 3 yr Fs Great Dane). I've attached her whole blood and plasma taurine concentrations for your records, which were normal.

One of my residents saw a littermate pair of Dobermans back for their 3 month recheck after being diagnosed with DCM while eating Acana. Taurines were normal on these dogs back in April and I honestly didn't have a ton of hope for these dogs (WB B6 and B6 because they were dobermans and their genetic tests were abnormal (the female is B6 the male was heterozygous positive for one mutation and negative for a 2nd). But, 3 months after a diet change to Purina grain-based (and no taurine supplementation), they both have shown significant improvement (the less severely affected female has near normalized and the severely affected male (who was in heart failure) has also significantly improved.

I have asked our resident to report these dogs to the FDA using the portal B6 so hopefully you will see these soon. She will also be submitting a taurine deficient Golden eating Acana (WB B6 maybe the lowest I've ever seen).

Thank you!
Darcy

--

Darcy B. Adin, DVM, DACVIM (Cardiology)
Clinical Assistant Professor of Cardiology
North Carolina State University
NC State Veterinary Hospital
1060 William Moore Drive
Raleigh, NC 27607
919-513-6032

From: Peloquin, Sarah </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=8607f880df2b494aa639e6d9a3874132-Sarah.Peloq>
To: B6
Sent: 9/21/2018 6:17:11 PM
Subject: 800.267 FDA Case Investigation for B6 (EON-364568)
Attachments: 03-Vet-LIRN-Network ProceduresOwners-12.22.2015.pdf

Good afternoon B6
We received a consumer complaint from your veterinarian about B6 heart disease after eating a commercial diet. I have reviewed the medical records and would like to request a phone interview with you. **Please send me 3 times when you would be available to speak (for ~30 minutes) during the week of 9/24-9/28.** My normal office hours are Monday-Friday, 7:00 am to 3:00 pm EST.
Also, we received the Tufts medical records pertaining to B6 heart disease, but I would like to request previous health records from your primary veterinarian, if possible. **Please contact your veterinarian and ask them to email (preferred) or fax (301-210-4685) a copy of B6 entire medical history (not just this event).**

I have attached a copy of our Vet-LIRN network procedures. The procedures describe how Vet-LIRN operates and how owners help with our case investigations.
Thank you kindly,
Dr. Peloquin

Sarah K. Peloquin, DVM
Veterinary Medical Officer

U.S. Food & Drug Administration
Center for Veterinary Medicine
Veterinary Laboratory Investigation and Response Network
tel: 240-402-1218
fax: 301-210-4685
e-mail: sarah.peloquin@fda.hhs.gov

Network Procedures for Veterinary Laboratory Investigation and Response Network Case Investigations

Network Procedures for Owners

The purpose of this Network Procedure is to help you, the owner, understand how the Veterinary Laboratory Investigation and Response Network (Vet-LIRN) Program Office conducts case investigations (follow up to consumer complaints).

The following items are explained below:

- General Introduction
- Billing
- Step by Step Process
- Types of Services and Tests

1. General Introduction:

1.1. What is the goal of the case investigation?

The goal of the case investigation is to determine if the product is causing your pet's illness. Our case investigation MAY NOT provide a definitive diagnosis for your pet's illness, although we may rule out several other potential reasons for your pet's illness.

1.2. What is the focus of a case investigation?

Most case investigations focus on diagnostic samples (such as blood, urine or tissue from the pet), although we occasionally request and test pet food samples.

1.3. What is my veterinarian's role during the case investigation?

Your veterinarian helps our investigation into FDA- regulated products by providing information about your pet's medical history and by obtaining any diagnostic samples like blood, urine or tissue.

1.4. What will Vet-LIRN ask of me during a case investigation?

We may ask that your veterinarian perform certain tests or services or provide diagnostic samples to FDA or a Vet-LIRN cooperating laboratory.

1.5. Will Vet-LIRN pay for tests or services requested?

Yes, we will pay veterinarians or laboratories *for tests or services requested by Vet-LIRN* and approved through our government purchasing system. We cannot, however, reimburse owners for tests already performed or not specifically requested by Vet-LIRN. We recommend that you discuss with your veterinarian which tests and services will be billed to you and which will be covered by Vet-LIRN. For instance, Vet-LIRN may request that your veterinarian perform a urinalysis on your pet while he or she is hospitalized. Vet-LIRN will pay for the collection and testing of the sample, but would not cover the cost of your pet's stay in the hospital.

1.6. Is the information received in the consumer complaint confidential?

Generally, the information received in the consumer complaint is not kept confidential. In most cases, only protected personal information (such as names and addresses) is withheld in an effort to prevent the complaint from being traced back to the individual who submitted it.

2. Billing:

2.1. Will Vet-LIRN pay for bills related to the case investigation?

Vet-LIRN will cover the cost of services and testing that we specifically request. You should understand that Vet-LIRN *CANNOT* reimburse owners for any veterinary bills. Services *MUST* be pre-authorized and paid directly to the veterinarian.

2.2. Will Vet-LIRN pay for testing that was not requested by Vet-LIRN?

No, we will only pay for testing that we request and authorize.

2.3. Will Vet-LIRN pay for treatments or private cremation?

No, we cannot pay for treatment or cremation.

2.4. If I allow my veterinarian to submit my pet's body for testing, will I be able to have back his or her remains?

Each Vet-LIRN member laboratory has its own procedures for handling remains. Some Vet-LIRN member laboratories offer private cremation services for a fee payable directly to the laboratory. We advise you to discuss directly with the member laboratory the possibilities and costs for obtaining your pet's remains after examination are complete.

3. Step by Step Process:

Vet-LIRN will do the following during a case investigation:

3.1. Assign a case number which MUST be included in all correspondences
3.2. Discuss the case with you and your veterinarian
3.3. Request medical records from your veterinarian
3.4. Coordinate with your veterinarian and you to obtain and submit samples for testing
3.5. Provide results to your veterinarian who will discuss the results with you.

Vet-LIRN requests that:

3.6. Any follow-up veterinary visits related to the investigation are reported to Vet-LIRN
3.7. Additional laboratory reports are reported to Vet-LIRN by your veterinarian.

4. Types of Services and Tests:

4.1. What may a veterinary examination include once the case investigation is started?

A veterinary examination may include:

- an office visit and physical examination to assess your animals current health
- collection of clinical samples from your animal (blood, urine, feces).

4.2. Will your animal be tested more than once?

It is possible that Vet-LIRN may request additional tests or examinations depending on results from initial testing.

4.3. Will Vet-LIRN need to conduct a necropsy in the event of an animal death?

Yes, if you are willing, we may request that your veterinarian or another Vet-LIRN cooperating laboratory to conduct a necropsy to collect samples for testing. The samples collected may be tested right away or may be held for future testing or archiving. If the veterinarian completes the necropsy then the remains will be handled according the veterinarians normal procedures. If a Vet-LIRN cooperative laboratory completes the necropsy the remains are usually disposed of by that laboratory. Vet-LIRN cannot pay for private cremation. You are welcome to discuss normal procedures with the laboratory.

4.4. Will Vet-LIRN ask for a food sample?

Our main focus is on testing diagnostic tissue or fluid samples from the animal, but we may need to test the food. Please hold all food samples once the consumer complaint is submitted. If needed, we will make arrangements to collect the food.

4.5. What are some general tests that Vet-LIRN may request?

General tests that we may request include, but are not limited to:

- Hematology
- Microbial cultures
- Urinalysis
- Fecal examination
- Necropsy/Histology/Toxicology

4.6. Will I get results from Vet-LIRN requested tests?

Results of testing on your animal's diagnostic tissue or fluid samples will be forwarded to your veterinarian who will be asked to share the results with you.

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Jones, Jennifer L
Sent: 9/13/2018 9:14:17 PM
Subject: updates
Attachments: B6 echo 9-5-18.pdf

Hi Jen
Here are some updates:

1. We did an echo on B6 last week. Apparently, the owner submitted a report to FDA after the dog was echoed at B6 in July. WB taurine was B6 although that's from B6 so I'm suspicious. Anyway, B6 was eating Taste of the Wild and Blue Buffalo originally and changed diet to Pro Plan Sensitive Skin and Stomach salmon after diagnosis and has improved significantly on the echo.
2. Owner of B6 just sent me a sample of food if you'd like me to submit that (or I can wait until I have a few collected and then submit all at once.
3. We have a new Great Dane with DCM and CHF in the hospital (eating Taste of the Wild). Littermate also has DCM. Once I collect all the info, I'll get them submitted.
4. Related to the taurine, B5 B5 I've asked B6 to do this but they seem unwilling. This B5 B5 I could easily collect samples from 10 dogs to submit to both B6 B6 I'm hearing more concerns of B5 B5

Thanks
Lisa

Lisa M. Freeman, DVM, PhD, DACVN
Board Certified Veterinary Nutritionist™
Professor
Cummings School of Veterinary Medicine
Friedman School of Nutrition Science and Policy
Tufts Clinical and Translational Science Institute
Tufts University
www.petfoodology.org

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Cardiology Liaison: 508-887-4696

B6

Patient ID: B6

B6 Canine

B6 Years Old Female Great Dane

Blonde

Cardiology Appointment Report

Date: 9/5/2018

Attending Cardiologist:

☐ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: B6 V19

Presenting Complaint:

6/6/18 - MVDysplasia diagnosis, low grade

7/6/18 - CHF, DCM

Here to establish B6 as new veterinarian. Wants an echo and a renal panel today.

Concurrent Diseases:

Hx B6

General Medical History:

Clinically well, eating, drinking, defecating, urinating. Good energy level.

PU/PD from lasix

Diet and Supplements:

Purina proplan sensitive skin & stomach Salmon and Rice 2.5 cups BID

B6

Hx of feeding grain free (Taste of the Wild pacific, angus freedom) Diet changed 7/8

Cardiovascular History:

Prior CHF diagnosis? 7/7/18

Prior heart murmur? Grade II 6/6/18

Prior ATE? no

Prior arrhythmia? no

Monitoring respiratory rate and effort at home? yes
Cough? Intermittent between 6/6- 7/6
Shortness of breath or difficulty breathing? no
Syncope or collapse? no
Sudden onset lameness? no
Exercise intolerance? no

Current Medications Pertinent to CV System:

B6

Cardiac Physical Examination:

B6

B6

Arrhythmia:

- ☐ None
- ☑ Sinus arrhythmia
- ☐ Premature beats
- ☐ Bradycardia
- ☐ Tachycardia

Gallop:

- ☐ Yes
- ☑ No
- ☐ Intermittent
- ☐ Pronounced
- ☑ Other: mid systolic click

Pulmonary assessments:

- ☑ Eupneic
- ☐ Mild dyspnea
- ☐ Marked dyspnea
- ☑ Normal BV sounds
- ☐ Pulmonary crackles
- ☐ Wheezes
- ☐ Upper airway stridor

Abdominal exam:

- ☑ Normal
- ☐ Hepatomegaly
- ☐ Abdominal distension
- ☐ Mild ascites
- ☐ Marked ascites

Problems:

MVD
Hx CHF

Differential Diagnoses:

Previous diagnosis MVD

Diagnostic plan:

- ☑ Echocardiogram
- ☐ Chemistry profile
- ☐ ECG
- ☑ Renal profile
- ☐ Blood pressure
- ☐ Dialysis profile
- ☐ Thoracic radiographs
- ☑ NT-proBNP
- ☐ Troponin I
- ☐ Other tests:

Echocardiogram Findings:

B6

Mitral inflow:

- ☐ Summated
- ☐ Normal
- ☐ Delayed relaxation
- ☑ Pseudonormal
- ☐ Restrictive

ECG finding: B6

Assessment and recommendations: Today's echocardiogram shows improvement compared to the exam

from July, with improved contractile function and some decrease in the LA size, however LV contractile function is not back to normal at this time. Given the documented taurine deficiency and history of eating a grain free diet, nutritional secondary dilated cardiomyopathy superimposed on pre-existing mitral valve dysplasia is the primary differential. However the acute worsening of LV dilation and contractile function and acute decompensation to CHF between June and July raise concern for another more acute disease process, such as myocarditis compicating the underlying cardiac disease. An NTproBNP was submitted today to obtain a baseline value to allow for further monitoring. B6 seems to be doing very well clinically on her taurine supplementation and current cardiac medications. A renal profile was submitted today to determine whether any modifications to the B6 dose are needed at this time. If NTproBNP value is markedly elevated the addition of B6 may also be considered. Recommend recheck echocardiogram in 2 months to assess for any continued improvement with resolving taurine deficiency.

Final Diagnosis: Dilated cardiomyopathy with history of episode of CHF - suspected taurine deficiency secondary to long term feeding of grain free diet; Suspect mitral valve dyplasia

Heart Failure Classification Score:

ISACHC Classification:

- ☐ Ia
- ☐ Ib
- ☑ II
- ☐ IIIa
- ☐ IIIb

ACVIM Classification:

- ☐ A
- ☐ B1
- ☐ B2
- ☑ C
- ☐ D

M-Mode

B6

IVSd		cm
LVIDd		cm
LVPWd		cm
IVSs		cm
LVIDs		cm
LVPWs		cm
%FS		%
Ao Diam		cm
LA Diam		cm
LA/Ao		
Max LA		cm
EPSS		cm

M-Mode Normalized

B6

IVSdN		(0.29 - 0.52) !
LVIDdN		(1.35 - 1.73) !
LVPWdN		(0.33 - 0.53)
IVSsN		(0.43 - 0.71)
LVIDsN		(0.79 - 1.14) !
LVPWsN		(0.53 - 0.78)
Ao Diam N		(0.68 - 0.89)
LA Diam N		(0.64 - 0.90)

2D		
SA LA	B6	cm
Ao Diam		cm
SA LA / Ao Diam		
IVSd		cm
LVIDd		cm
LVPWd		cm
EDV(Teich)		ml
IVSs		cm
LVIDs		cm
LVPWs		cm
ESV(Teich)		ml
EF(Teich)		%
%FS		%
SV(Teich)		ml
Doppler		
MR Vmax	B6	m/s
MR maxPG		mmHg
MV E Vel		m/s
MV DecT		ms
MV A Vel		m/s
MV E/A Ratio		
PV Vmax		m/s
PV maxPG		mmHg
AV Vmax		m/s
AV maxPG		mmHg

Vet-LIRN Final Case Report

A. Case Identification:

Case Number: 800.218

Vet-LIRN Director: Renate Reimschuessel, VMD, PhD

Program: Vet-LIRN

Division Code: HFV – 500

Other Investigators:

Jennifer Jones, DVM	Vet-LIRN
Sarah Nemser, MS	Vet-LIRN
Olgica Ceric, DVM, PhD	Vet-LIRN
Jake Guag, MPH	Vet-LIRN
David Rotstein, DVM, MPH	OS&C CERT
Lee Anne Palmer, VMD, MPH	OS&C DVPS
Lauren Carey, DVM	OS&C DVPS

B. Descriptive Title of Case:

Investigation of two dogs with dilated cardiomyopathy after consuming California Natural Venison and Green Lentil food and California Natural Kangaroo and Lentil dog foods.

Address of Vet-LIRN Program Office:

Mod II
Center for Veterinary Medicine
Office of Research
8401 Muirkirk Road
Laurel, MD 20708

C. Initiation and Completion Date: Initiation Date: 7/13/2017
Completion Date: 8/22/2017
Final Report Submission Date: 11/1/2017

Case Summary

Complaint: July 13, 2017, Vet-LIRN received consumer complaint, EON-323515, reporting dilated cardiomyopathy in two dogs after consuming California Natural Venison and Green Lentil food and California Natural Kangaroo and Lentil dog foods.

Signalment:

- B6 7 yr MC Miniature Schnauzer
- B6 2 yr MC Miniature Schnauzer-deceased

Signs: syncopal episodes, dyspnea, cough, heart failure

Medical Records: Vet-LIRN collected and reviewed medical records.

Name	Clinical Signs	Physical Exam	Lab Work	Significant Medical History
B6	syncopal episodes, hyporexia	B6	suspected DCM, taurine & carnitine normal; negative infectious disease & nutritional disease testing	
B6	dyspnea, cough, inappetance, regurgitation,		B6	B6
			hepatomegaly, biventricular heart failure, cardiogenic edema; Necropsy: B6	
			B6	

Owner Interview: Vet-LIRN did not conduct an owner interview. However, the veterinarian mentioned:

- The owner alternated feedings between the two products
- The owner did not feed anchovies, sardines, or seafood in February or chronically
- The two dogs were from genetically different lineages
- B6 had clinical signs at the time B6 was treated but didn't present with CHF for several months

Response: Vet-LIRN collected medical records for review and leftover open product (Kangaroo flavor) for taurine, carnitine, and B6 esting.

Results: The food tested negative fo B6 The food taurine level (B6 estimated Dry Matter Basis) was above the minimum level in cats (no AAFCO minimum for dogs). The food carnitine level is 0.0077% estimated on a Dry Matter Basis. There is no AAFCO carnitine minimum for dogs or cats. It is unclear whether or not the food carnitine is low, normal, or high.

Conclusion: Dilated cardiomyopathy (DCM) can be caused by a variety of etiologies including, genetic[2] (breed related), toxic[3,4] (fumonisin, acrolein[5], domoic acid, doxorubicin, lily of valley, digitalis, ionophores, sicklepod, gossypol, white snake root, ethyl alcohol, foxglove, buttercups), infectious (Bartonellosis, *Trypanosoma cruzi*), and nutritional deficiency[1] (e.g. taurine, protein restricted diets with stones, carnitine deficiency). The two genetically unrelated dogs were fed the same foods and began to experience clinical signs approximately the same time. The medical records indicate infectious disease and nutritional deficiency are unlikely etiologies. B6 records indicated elevated liver enzymes and CK values, which could support a hepatotoxic and myotoxic (cardio +/- muscle) exposure. Because B6 presented six months after B6 it is unknown if B6 also had elevated liver enzymes when B6 was ill. The history also suggested no exposure to doxorubicin or domoic acid. Vet-LIRN tested the leftover bag of food from B6 illness time (June 2017), but not from January, when both dogs were initially ill. A test for acrolein was not available.

The cause of the two dogs' DCM is unclear, but is likely an environmental toxin exposure. Based on the dogs' blood taurine B6 levels and the dry dog food test results, it is unlikely that B6 taurine, o B6 evels in the food caused the dogs' illness.

References:

1. Sanderson SL. Taurine and Carnitine in Canine Myopathy. Vet Clin Small Anim 36 (2006) 1325–1343.
2. Borde D, Calvert CA, Darien BJ, Guerrero J, and Wall M. Acquired Heart and Blood Vessel Disorders in Dogs. Merck Veterinary Manual. Found at: http://www.merckvetmanual.com/dog-owners/heart-and-blood-vessel-disorders-of-dogs/acquired-heart-and-blood-vessel-disorders-in-dogs
3. Valberg SJ. Toxic Myopathies in Ruminants and Pigs. Merck Veterinary Manual. Found at: http://www.merckvetmanual.com/musculoskeletal-system/myopathies-in-ruminants-and-pigs/toxic-myopathies-in-ruminants-and-pigs
4. Garland T. Overview of Gossypol Poisoning. Merck Veterinary Manual. Found at: http://www.merckvetmanual.com/toxicology/gossypol-poisoning/overview-of-gossypol-poisoning
5. Ismahil MA, Hamid T, Haberzettl P, Gu Y, Chandrasekar B, Srivastava S, Bhatnagar A, and Prabhu SD. Chronic oral exposure to the aldehyde pollutant acrolein induces dilated cardiomyopathy. Am J Physiol Heart Circ Physiol 301: H2050–H2060, 2011.

Supplemental Information:

01-800.218-EON-323515 B6 -CC: Consumer Complaint
02-800.218-EON-323515 -MedRec: Medical Records
03-800.218-EON-323515 -Results: Testing Results
04-800.218-EON-323515 -Summary: Vet-LIRN Summary

SIGNATURES

Mary E. Allen -S

Digitally signed by Mary E. Allen -S
DN: c=US, o=U.S. Government, ou=HHS, ou=FDA, ou=People, cn=Mary E. Allen -S, 0.9.2342.19200300.100.1.1=1300365061
Date: 2017.11.17 14:21:13 -05'00'

Deputy Director OR Date

John Graham -S

Digitally signed by John Graham -S
DN: c=US, o=U.S. Government, ou=HHS, ou=FDA, ou=People, cn=John Graham -S, 0.9.2342.19200300.100.1.1=2001387754
Date: 2017.11.17 18:07:25 -05'00'

Director OR Date

B6

Digitally signed by Renate Reimschuessel -S
DN: c=US, o=U.S. Government, ou=HHS, ou=FDA, ou=People, 0.9.2342.19200300.100.1.1=1300140413, cn=Renate Reimschuessel -S
Date: 2017.11.20 14:27:01 -05'00'

Vet-LIRN Director Date

NC State University
Veterinary Hospital
Fax: Admin
Fax: Referral
1052 William Moore Drive
Raleigh, NC 27607
Small Animal (919) 513-6500
Large Animal (919) 513-6630

Discharge Comments

Client	Patient			
B6	B6 SCHNAUZER MC BLACK CANINE	Case # 212267 8.2 kg	Attending DVM Student Discharging DVM Referring DVM	B6 B6

Admission Date/Time: B6 **Discharge Date/Time:** B6 **Discharge Status:**

**********NOTICE OF EUTHANSIA**********

Case Summary

Diagnosis:

1) Biventricular congestive heart failure (left significantly worse than right)
2) Cardiomyopathy (suspect secondary) vs. myocarditis vs. tachycardia-induced cardiomyopathy vs. other

History:
B6 is a 2 and ½ year old male castrated Miniature Schnauzer who presented the NCSU ER of B6 for labored breathing and was subsequently transferred to NCSU Cardiology. B6 initially developed a cough three weeks ago; Dr. B6 describes the cough as a wheezing-type cough that occurred more frequently at night. When B6 showed no signs of improvement, B6 presented to his primary veterinarian on B6. Kennel cough was suspected as the underlying cause of his cough and B6 and B6 were prescribed. On Monday B6 became uninterested in his food and began vomiting. The following day B6 continued vomiting and developed labored breathing and subsequently re-presented to the rDVM for evaluation. Bloodwork and thoracic radiographs were performed. Bloodwork was reportedly unremarkable at this time and there was concern for aspiration pneumonia on his radiographs. Nebulization was performed and subcutaneous fluids, B6 B6 and B6 were administered for treatment. While in-hospital, B6 regurgitated. On B6 had improvement in respiratory effort but he still was not eating; subcutaneous fluids, B6, B6, and B6 were performed again on an outpatient basis. The day of presentation (B6 B6 syringe fed B6, but as she attempted he immediately regurgitated. B6 developed marked labored breathing following this and was presented to an emergency hospital. Thoracic radiographs were performed (uploaded in eFilm) and revealed cardiomegaly; a diffuse, severe mixed interstitial to alveolar pattern that is most severe caudodorsally; hepatomegaly; and decreased abdominal serosal contrast B6 was referred to NCSU for further care and ventilation if indicated.

B6 has a history of B6 after strenuous activity when it is hot outside. The discolored urine typically develops after the activity and lasts 24-36 hours before clearing up. A urinalysis was performed and B6 primary veterinarian detected crystals in the urine. B6 diet was changed to an unknown diet to decrease the amount of crystals prevent stone formation; this diet was ultimately discontinued. Other than this, prior to the coughing that began 3 weeks ago B6 was a normal, healthy dog with no significant medical history. He previously had no respiratory signs or changes in drinking/appetite/urination/defecation. B6 lives with one other dog (not a relative) who is healthy and is currently up to date on his vaccinations. B6 is not current on any flea/tick prevention but receives heartworm prevention. B6 is fed California Natural dog food.

Physical Exam Findings (on presentation):

B6

CV/R: Grade I-II/VI left apical systolic murmur, femoral pulses hypokinetic but synchronous; jugular venous distention present; normal, albeit tachycardic, rhythm auscultes; dyspneic, inspiratory crackles in all lung fields on bilateral auscultation

B6

B6

Main Diagnostics B6

B6

8. B6 pending
9. B6 - pending
10. B6 pending
11. B6 - pending
12. Echocardiogram - Severely dilated and hypocontractile left and right ventricles, severely dilated left and right atria. Changes consistent with DCM (primary vs. secondary) vs. myocarditis vs. pacing-induced vs. other

B6

2. Chest radiographs (9:15 AM) - final report pending - Severe generalized cardiomegaly with biventricular heart failure; improved from rDVM radiographs taken prior to presentation
3. Chest radiographs (5:00 PM) - final report pending - Progressive severe diffuse alveolar pattern consistent with worsening cardiogenic pulmonary edema; cannot exclude ventilator - induced lung injury and/or pneumonia

Main Diagnostics (B6

B6

Brief Daily Summary:

B6 presented late in the evening on B6 to the ER and after a TFAST was performed showing severe cardiomegaly with hypocontractility of the ventricles in addition to reviewing the rDVM radiographs, pimobendan and B6 were given. An

echocardiogram was then performed (performed sternally cage-side given patient status) and a diagnosis of severe cardiomyopathy (primary vs. secondary DCM vs. myocarditis, vs. pacing-induced cardiomyopathy vs. other) and he was quickly given another dose of B6.

B6: He remained tachycardic throughout the night at approximately 180bpm and the following morning he showed signs of atrial tachycardia at a rate of 190bpm. He was weaned off his B6 and started on B6 followed by a B6 which resolved the atrial tach and a sinus tach at 150bpm persisted. He clinically was worse than the day before and repeat chest radiographs were performed that showed severe worsening of his pulmonary infiltrates. After discussion with the owner, we elected to continue even more aggressive diuretic therapy (multiple boluses of B6 on top of the B6 mg/kg/hr B6 he had been on almost since presentation) but by 3:00 PM after only further worsening the decision for euthanasia was made. The owners elected for necropsy with B6

I am sorry for the loss of your patient. Both B6 and B6 were absolutely wonderful to work with. If you have any questions at all, please do not hesitate to call us at 919-513-6694.

B6

COVANCE
SOLUTIONS MADE REAL

Report Number:	**1894242-0**
Report Date:	**15-Aug-2017**
Report Status:	**Final**

Certificate of Analysis

Food and Drug Administration - CVM - Invoice Denise Durham

8401 Muirkirk Rd.
Laurel Maryland 20708 United States

Sample Name:	**800.218**	**Covance Sample:**	**6406524**
Project ID	FDA_CVM-20170804-0007	**Receipt Date**	04-Aug-2017
PO Number	HHSF223201610005I/HHSF22301002T	**Receipt Condition**	Ambient temperature
Sample Serving Size	100 g	**Login Date**	04-Aug-2017
		Online Order	20

Analysis	Result
L-Carnitine *	
L-Carnitine	69900 ppb
Taurine	
Taurine	231 mg/Serving Size

Method References	Testing Location
L-Carnitine (CARNITNE_S)	**Covance Laboratories - Madison**
STAREY ET AL.: JOURNAL OF AOAC INTERNATIONAL VOL. 91, NO.1, 2008. (Modified).	
Taurine (TAUR_LC_S)	**Covance Laboratories - Madison**
R. Schuster, "Determination of Amino Acids in Biological, Pharmaceutical, Plant and Food Samples by Automated Precolumn Deravitization and HPLC", Journal of Chromatography., 1988, 431, 271-284, Henderson, J.W., Ricker, R.D. Bidlingmeyer, B.A., Woodward, C., "Rapid, Accurate, Sensitive, and Reproducible HPLC Analysis of Amino Acids, Amino Acid Analysis Using Zorbax Eclipse-AAA columns and the Agilent 1100 HPLC," Agilent Publication, 2000, and Barkholt and Jensen, , "Amino Acid Analysis: Determination of Cysteine plus Half-Cystine in Proteins after Hydrochloric Acid Hydrolysis with a Disulfide Compound as Additive," Analytical Biochemistry, 177, 318-322 (1989).	

Testing Location(s)	Released on Behalf of Covance by
Covance Laboratories - Madison	**Edward Ladwig - Director**
Covance Laboratories Inc. 3301 Kinsman Blvd Madison WI 53704 800-675-8375	ilac-MRA A2LA ACCREDITED 2918.01

These results apply only to the items tested. This certificate of analysis shall not be reproduced, except in its entirety, without the written approval of Covance.

*** This analysis is not ISO accredited.**

Selenium bioavailability: current knowledge and future research requirements[1–5]

Susan J Fairweather-Tait, Rachel Collings, and Rachel Hurst

ABSTRACT

Information on selenium bioavailability is required to derive dietary recommendations and to evaluate and improve the quality of food products. The need for robust data is particularly important in light of recent suggestions of potential health benefits associated with different intakes of selenium. The issue is not straightforward, however, because of large variations in the selenium content of foods (determined by a combination of geologic/environmental factors and selenium supplementation of fertilizers and animal feedstuffs) and the chemical forms of the element, which are absorbed and metabolized differently. Although most dietary selenium is absorbed efficiently, the retention of organic forms is higher than that of inorganic forms. There are also complications in the assessment and quantification of selenium species within foodstuffs. Often, extraction is only partial, and the process can alter the form or forms present in the food. Efforts to improve, standardize, and make more widely available techniques for species quantification are required. Similarly, reliable and sensitive functional biomarkers of selenium status are required, together with improvements in current biomarker methods. This requirement is particularly important for the assessment of bioavailability, because some functional biomarkers respond differently to the various selenium species. The effect of genotype adds a potential further dimension to the process of deriving bioavailability estimates and underlines the need for further research to facilitate the process of deriving dietary recommendations in the future. *Am J Clin Nutr* 2010;91(suppl):1484S–91S.

Am J Clin Nutr 2010;91(suppl):1484S–91S. Printed in USA.

B4

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The American Journal of Clinical Nutrition

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B4

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Am J Physiol Heart Circ Physiol 301: H2050–H2060, 2011.
First published September 9, 2011; doi:10.1152/ajpheart.00120.2011.

Chronic oral exposure to the aldehyde pollutant acrolein induces dilated cardiomyopathy

Mohamed Ameen Ismahil,[1] Tariq Hamid,[1] Petra Haberzettl,[1] Yan Gu,[1,3] Bysani Chandrasekar,[2] Sanjay Srivastava,[1] Aruni Bhatnagar,[1] and Sumanth D. Prabhu[1,3]

[1]*Department of Medicine, Institute of Molecular Cardiology, University of Louisville, Louisville,* [2]*Heart and Vascular Institute, Tulane University School of Medicine and Southeast Louisiana Veterans Health Care System, New Orleans; and* [3]*Medical Service, Louisville Veterans Affairs Medical Center, Louisville, Kentucky*

Submitted 3 February 2011; accepted in final form 24 August 2011

Ismahil MA, Hamid T, Haberzettl P, Gu Y, Chandrasekar B, Srivastava S, Bhatnagar A, Prabhu SD. Chronic oral exposure to the aldehyde pollutant acrolein induces dilated cardiomyopathy. *Am J Physiol Heart Circ Physiol* 301: H2050–H2060, 2011. First published September 9, 2011; doi:10.1152/ajpheart.00120.2011.—Environmental triggers of dilated cardiomyopathy are poorly understood. Acute exposure to acrolein, a ubiquitous aldehyde pollutant, impairs cardiac function and cardioprotective responses in mice. Here, we tested the hypothesis that chronic oral exposure to acrolein induces inflammation and cardiomyopathy. C57BL/6 mice were gavage-fed acrolein (1 mg/kg) or water (vehicle) daily for 48 days. The dose was chosen based on estimates of human daily unsaturated aldehyde consumption. Compared with vehicle-fed mice, acrolein-fed mice exhibited significant ($P < 0.05$) left ventricular (LV) dilatation (LV end-diastolic volume 36 ± 8 vs. 17 ± 5 μl), contractile dysfunction (dP/dt_{max} 4,697 ± 1,498 vs. 7,016 ± 1,757 mmHg/s), and impaired relaxation (tau 15.4 ± 4.3 vs. 10.4 ± 2.2 ms). Histological and biochemical evaluation revealed myocardial oxidative stress (membrane-localized protein-4-hydroxy-*trans*-2-nonenal adducts) and nitrative stress (increased protein-nitrotyrosine) and varying degrees of plasma and myocardial protein-acrolein adduct formation indicative of physical translocation of ingested acrolein to the heart. Acrolein also induced myocyte hypertrophy (~2.2-fold increased myocyte area, $P < 0.05$), increased apoptosis (~7.5-fold), and disrupted endothelial nitric oxide synthase in the heart. DNA binding studies, immunohistochemistry, and PCR revealed significant ($P < 0.05$) activation of nuclear factor-κB in acrolein-exposed hearts, along with upregulated gene expression of proinflammatory cytokines tumor necrosis factor-α and interleukin-1β. Long-term oral exposure to acrolein, at an amount within the range of human unsaturated aldehyde intake, induces a phenotype of dilated cardiomyopathy in the mouse. Human exposure to acrolein may have analogous effects and raise consideration of an environmental, aldehyde-mediated basis for heart failure.

acrolein; oxidative stress; cardiomyopathy; environmental pollution

IDIOPATHIC DILATED CARDIOMYOPATHY (DCM) is the underlying diagnosis in approximately one-third of cases of heart failure (HF) (15). While often attributed to remote infectious, metabolic, or toxic injury to the heart, in most circumstances the etiological factors responsible for DCM are difficult to identify. Epidemiological studies have established that pollution exposure is associated with increased mortality from several cardiovascular diseases, including HF (3, 5, 28). The biological mechanisms proposed to explain these adverse effects have included pollutant-induced alterations in autonomic tone, the elaboration of proinflammatory and prooxidant mediators, and the physical translocation of soluble constituents of pollutants into the circulation that have direct effects on the heart and vasculature. Theoretically, all of these broad mechanisms can unfavorably impact pathogenetic alterations and/or modifiers of DCM and HF (16). Nonetheless, little is known about the potential environmental triggers of DCM and the specific effects induced by individual constituents of the pollutant mix.

Aldehydes are ubiquitous pollutants in air and water generated by burning fossil fuels (10). They are also readily found in food and are natural products of lipid peroxidation and glucose oxidation (10). More than 300 different aldehydes have been identified in various foods, and at least 36 are present in water, often at levels exceeding maximal recommended concentrations (2, 10). Unsaturated aldehydes are highly reactive; form adducts with cell thiols and amine groups in sugars, phospholipids, proteins, and DNA bases (9, 25); and provoke oxidative stress and proinflammatory responses in tissue (30, 38). Nonetheless, the in vivo cardiovascular effects of exposure to aldehyde pollutants are not well defined.

Because toxicological profiles of environmental aldehyde mixtures are difficult to determine, we have previously focused on the cardiac effects of acrolein, a prototypical reactive α,β-unsaturated aldehyde classified by the Environmental Protection Agency (EPA) as a high-priority air and water toxic (7). These studies demonstrated that acute exposure to acrolein at concentrations documented in human disease, or doses approximating human oral total aldehyde intake, impaired cardiac function and intrinsic cardioprotective responses in mice (19, 42). However, the cardiac effects of long-term acrolein exposure, an issue with greater implications for public health, remain unknown. Notably, the abundance of acrolein and other aldehydes derived endogenously from lipid peroxidation (and their protein-aldehyde adducts) are known to be elevated in the failing heart (14, 33, 40, 41). In the current study, we evaluated whether long-term oral exposure to acrolein would engender inflammation, oxidant stress, and cardiomyopathy.

METHODS

Eight-week-old male C57BL/6 mice weighing ~20 g were used. All animal studies were performed in compliance with the National Institutes of Health (NIH) *Guide for the Care and Use of Laboratory Animals* [Department of Health and Human Services Publication No. (NIH) 85-23, revised 1996] and were approved by the University of Louisville Institutional Animal Care and Use Committee.

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Acrolein dosage and administration. Acrolein was prepared daily from the acid hydrolysis of diethyl acetal acrolein as previously described (19, 42) and used within 4 h. In our previous study, we estimated the maximal human daily unsaturated aldehyde consumption to be 5 $mg \cdot kg^{-1} \cdot day^{-1}$ and maximal acrolein exposure to be 0.1–0.2 $mg \cdot kg^{-1} \cdot day^{-1}$ (42). Based on these estimates, and with the intent of using acrolein as a representative unsaturated aldehyde, we tested the chronic effects of 1 $mg \cdot kg^{-1} \cdot day^{-1}$ acrolein, representing a 5- to 10-fold greater dose than the expected human acrolein intake but only 20% of the expected overall unsaturated aldehyde intake. Animals were gavage-fed acrolein (in 200 μl water, $n = 15$) or the same volume of water (vehicle, $n = 18$) daily for 48 days.

Echocardiography. M-mode, two-dimensional, and Doppler echocardiography in mice were performed under tribromoethanol sedation (0.25 mg/g ip) using a Philips Sonos 5500 machine and 15-MHz linear array transducer as previously described (14, 41). The two echocardiographers performing the study were blinded as to the assigned experimental group of each mouse. Measured parameters included end-diastolic (ED) and end-systolic (ES) diameter (D), end-diastolic anterior and posterior wall thickness (AWT and PWT, respectively), and the ejection time (ET) and heart rate as determined from the aortic Doppler trace. Left ventricular (LV) systolic function was indexed by the fractional shortening [FS = (EDD − ESD)/EDD] and the mean velocity of circumferential fiber shortening (V_{cf} = FS/ET) (34, 35). LV hypertrophy and/or wall thinning was assessed by the relative wall thickness [RWT = (AWT + PWT)/LVEDD]. Echocardiographic imaging was performed at baseline and after 48 days of acrolein feeding.

LV pressure-volume studies. Closed-chest LV pressure-volume (P-V) studies were performed in adult C57/BL6 mice ($n = 8$/group) anesthetized with 80 μg/g ip pentobarbital and mechanically ventilated (155–160 breaths/min, tidal volume 15 μl/g) as previously described (19). Body temperature was maintained at 37°C using a heating pad and lamps. A Millar 1.4-Fr conductance catheter (SPR-839) was inserted in the LV via the carotid artery, and pressure and conductance signals were visualized on-line using the ARIA-1 system (Millar). A small (<1-cm) abdominal incision was made to gain access to the subdiaphragmatic inferior vena cava (IVC). After hemodynamic stabilization for 15 min, recordings of pressure and conductance were performed under steady-state conditions and during transient mechanical IVC occlusion [to vary load and allow determination of the end-systolic pressure-volume relation (ESPVR)]. Intravenous hypertonic saline (0.5–1 μl/g) was then given to determine parallel conductance, and LV volume (μl) was derived from the parallel conductance and ex vivo cuvette calibration with heparinized, warm blood. LV systolic function was indexed by dP/dt_{max}, stroke work (area bounded by the P-V loop), maximal power (peak value of the product of LV pressure and flow), and end-systolic elastance (E_{es}, the slope of the ESPVR) (19, 41). LV diastolic function was assessed by the LVEDP, dP/dt_{min}, and tau, the time constant of LV relaxation (ms) (19, 33, 41).

Immunohistological studies. Formalin-fixed, paraffin-embedded short-axis LV sections (5 μm) were deparaffinized and rehydrated for histological and immunohistochemical staining using standard techniques as previously described (14, 34, 41). Hematoxylin and eosin-stained sections were used to evaluate cardiomyocyte cross-sectional area. In separate studies, immunostaining was performed for the activated p65 subunit of nuclear factor (NF)-κB using anti-p65 antibody (Chemicon) as described previously (31). Nuclear staining intensity was quantified with a MetaMorph 4.5 imaging system and software (Universal Imaging). Digital images were acquired from six fields at standard intervals in each of five short-axis sections from each group. The threshold for p65 staining was predetermined and held constant for all sections analyzed.

Immunohistochemical staining for protein-nitrotyrosine was performed to index peroxynitrite generation in the heart. Deparaffinized and rehydrated tissue sections were incubated for 20 min with 10 mmol/l citric acid (pH 6.0) and then treated with enzymatic antigen retrieval to recover antigenicity. Nonspecific binding was blocked with 5% normal goat serum and 0.05% saponin (Sigma) in PBS (pH 7.4) for 30 min, followed by incubation with monoclonal anti-nitrotyrosine antibody (1:200; Santa Cruz Biotechnology) in PBS with 1% BSA and 0.05% saponin for 1 h at 37°C. Tissue sections were then incubated for 30 min at room temperature with Alexa fluor-555 anti-mouse IgG (1:500) secondary antibody (Invitrogen), which labeled nitrotyrosinated protein residues red, and counterstained with 4′,6-diamidino-2-phenylindole (DAPI) (Invitrogen), which labels nuclei blue. Images were made with a ×40 objective lens at 12 different locations in each tissue section. Mean fluorescence intensity was evaluated using MetaMorph software in 12 images/heart. Sections treated with peroxynitrite (1 mmol/l) were used as positive controls.

Western blotting. Total protein extraction, SDS-PAGE Western blotting, and immunodetection using electrochemiluminescence protocols (Amersham Biosciences) were performed as previously described (19). IgG-purified polyclonal 1:2,000 anti-KLH-acrolein primary antibody and horseradish peroxidase-linked secondary antibody were used to evaluate protein-acrolein adducts (19). Protein adducts with 4-hydroxy-*trans*-2-nonenal (HNE) in the membrane fraction (isolated using differential centrifugation) were probed using both dot blots and Western blotting. Polyclonal anti-KLH-HNE primary antibody was used as previously described (34). For dot blots, protein (1.0 μg) was loaded in the wells of a Bio-Dot apparatus (Bio-Rad) and microfiltered through nitrocellulose membranes under vacuum. Primary antibodies for the detection of endothelial nitric oxide (NO) synthase (eNOS), phospho-eNOS-Ser^{1177}, inhibitor of κBα (IκBα), and α-tubulin were obtained from Santa Cruz Biotechnology.

For immunoblot analysis of the monomeric and dimeric forms of eNOS, equal amounts of total protein lysates were subjected to low-temperature SDS-PAGE (LT-PAGE) (43). Briefly, the gel running buffer, 6% SDS-containing polyacrylamide gels, and the gel assembly were equilibrated to 4°C before running the samples. The samples were mixed with SDS containing gel-loading buffer and were not heated. The temperature of the gels was maintained below 10°C during electrophoresis by immersing the gel tanks in ice. Following LT-PAGE, the gels were transferred, and the blots were probed with anti-eNOS antibody and the corresponding secondary antibody. The intensity of the immunoreactive bands was quantified by ImageQuant TL software.

Electrophoretic mobility shift assay. NF-κB DNA binding activity was quantified by electrophoretic mobility shift assay (EMSA). Nuclear protein extraction from frozen myocardium, the EMSA protocol, autoradiography, and densitometry were all performed as previously described (14). ^{32}P-labeled consensus double-stranded oligonucleotides (sense, 5′-AGTTGAGGGGACTTTCCCAGGC-3′) containing the NF-κB binding site were used as probes. Specificity of NF-κB DNA binding activity was confirmed in competition studies using cold consensus or mutant oligonucleotides.

Real-time PCR and mRNA quantitation. Total RNA isolation from LV tissue, cDNA synthesis, and quantitative real-time PCR were performed as previously described (14). mRNA transcripts for atrial natriuretic factor (ANF), tumor necrosis factor-α (TNF-α), and interleukin (IL)-1β were determined and normalized to glyceraldehyde-3-phosphate dehydrogenase expression using primer pairs previously described (14).

Apoptosis quantitation. Myocardial apoptosis was assessed by using the DeadEnd Fluorometric terminal deoxytransferase-mediated dUTP nick-end labeling (TUNEL) assay kit from Promega, which catalytically incorporates fluorescein-12-dUTP at the 3′-ends of fragmented DNA in apoptotic cells using recombinant terminal deoxynucleotidyl transferase (rTdT). Deparaffinized and rehydrated tissue sections were treated with Proteinase K (20 μg/ml) for 15 min at 37°C and then fixed with 4% methanol-free formaldehyde solution in PBS.

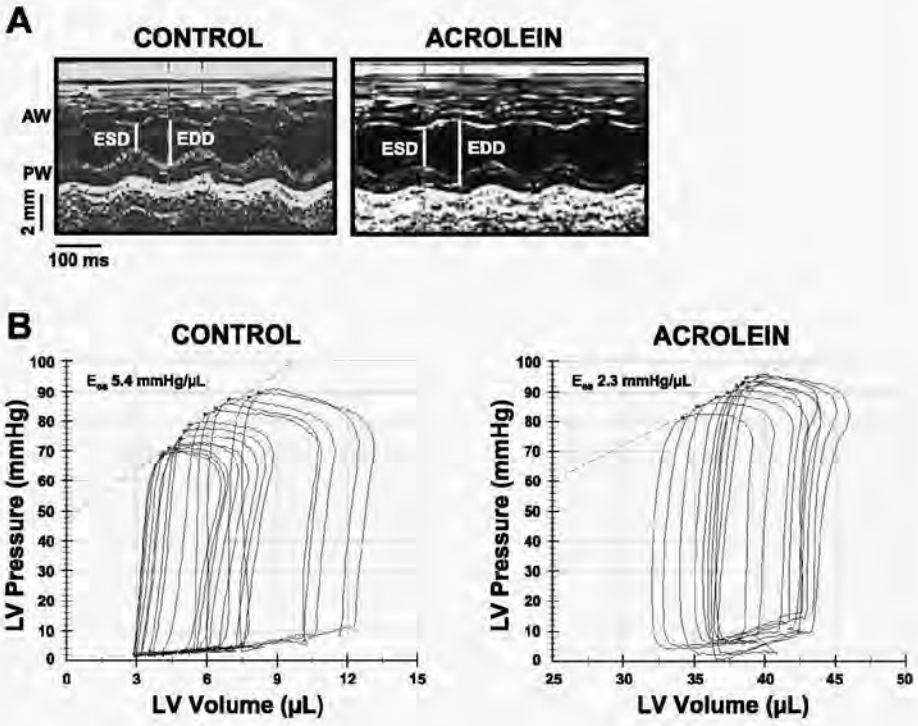

Fig. 1. Chronic acrolein exposure depresses left ventricular (LV) function. *A*: M-mode echocardiograms from two mice, one acrolein-fed and the other vehicle-fed (control). AW and PW, anterior and posterior wall, respectively; ESD and EDD, end-systolic and end-diastolic diameter, respectively. *B*: LV pressure-volume loops and the corresponding end-systolic pressure-volume relations in representative control and acrolein-fed mice. E_{es}, end-systolic elastance.

All subsequent steps were performed following the manufacturer's instructions. All sections were counterstained with DAPI to label nuclei. Cardiomyocytes were identified by staining with anti-troponin I antibody (Santa Cruz Biotechnology) followed by Alexa Fluor 555-conjugated secondary antibody (Invitrogen). TUNEL-positive nuclei (cyan staining) were visualized directly by confocal microscopy (Zeiss LSM510) with nuclear staining confirmed by *z*-axis sections. Images were taken with a ×63 objective lens at six different locations in each tissue section, and nine sections per heart were evaluated to determine the overall apoptotic rate (total 54 fields/heart). DNase (10 U/ml)-treated sections were used as positive controls. Sections without rTdT treatment were considered as negative controls.

Statistical analysis. Continuous variables are presented as means ± SD. Two-group comparisons were performed using an unpaired *t*-test. A P value <0.05 was considered significant.

RESULTS

Chronic acrolein consumption induces LV remodeling and dysfunction. Mice gavage-fed acrolein at 1 mg·kg^{-1}·day^{-1} for 48 days displayed no overt abnormalities or distress and no significant mortality. Body weight was similar between vehicle-fed and acrolein-fed animals after 48 days (control 26.1 ± 2.3 g; acrolein 26.0 ± 2.0 g). Baseline echocardiographic variables (before the start of feeding) were similar between the two groups. M-mode echocardiographic images obtained after the 48-day feeding period are shown in Fig. 1*A*. The acrolein-exposed mouse exhibited increased LV size and decreased FS compared with control. Group echocardiographic data (Table 1) indicate that acrolein exposure induced LV dilatation (increased EDD and ESD), LV systolic dysfunction (reduced FS and V_{cf}), and wall thinning (decreased RWT) consistent with a phenotype of DCM. While these changes were not severe (generally between ~8 and 20% change), they were highly consistent and statistically significant. To evaluate LV function more precisely, P-V analysis was performed. Figure 1*B* shows representative P-V loops from control and acrolein-exposed mice during IVC occlusion, together with the corresponding ESPVRs. Consistent with the echocardiographic results, acrolein exposure induced LV dilatation with increased end-diastolic volume and end-systolic volume and depressed LV systolic function as indicated by the smaller E_{es}. Group data (Table 2) demonstrated consistent LV enlargement and more profound reductions in systolic function with diminished dP/dt_{max}, maximal power, E_{es}, and stroke work. Also evident was impairment of LV relaxation with decreased dP/dt_{min} and increased tau. Hence, chronic acrolein exposure induced pathological remodeling and LV dysfunction.

Chronic acrolein exposure generates myocardial oxidative stress and protein-acrolein adducts. α,β-Unsaturated aldehydes are products of lipid-peroxidation and as such are sensitive markers of oxidative stress (8, 37, 40). Moreover, reac-

Table 1. *Echocardiography in control and acrolein-exposed mice*

	Control (n = 16)	Acrolein (n = 14)	P Value
HR, beats/min	469 ± 60	481 ± 62	0.585
LVEDD, mm	3.7 ± 0.1	4.0 ± 0.2*	<0.001
LVESD, mm	2.1 ± 0.2	2.5 ± 0.2*	<0.001
FS,%	43 ± 4	36 ± 3*	<0.001
ET, ms	51 ± 4	52 ± 7	0.771
V_{cf}, circ/s	8.5 ± 1.1	7.1 ± 1.0*	0.0022
AWT, mm	0.78 ± 0.04	0.74 ± 0.06	0.060
PWT, mm	0.79 ± 0.03	0.76 ± 0.03*	0.0089
RWT	0.42 ± 0.02	0.38 ± 0.02*	<0.001

Values are means ± SD; n, no. of mice. HR, heart rate; LV, left ventricular; EDD, end-diastolic diameter; ESD, end-systolic diameter; FS, fractional shortening; ET, ejection time; V_{cf}, velocity of circumferential fiber shortening; AWT and PWT, anterior and posterior wall thickness at end-diastole, especively; RWT, relative wall thickness. *Statistical significance.

Table 2. *Pressure-volume parameters in control and acrolein-exposed mice*

	Control (n = 8)	Acrolein (n = 8)	P Value
HR, beats/min	501 ± 63	451 ± 45	0.073
LVEDV, μl	17 ± 5	36 ± 8*	<0.001
LVESV, μl	8 ± 2	29 ± 7*	<0.001
LVPSP, mmHg	94 ± 9	80 ± 14*	0.028
LVEDP, mmHg	7 ± 3	11 ± 6	0.134
SW, mmHg·μl	601 ± 214	378 ± 153*	0.025
dP/dt_{max}, mmHg/s	7,016 ± 1,757	4,697 ± 1,498*	0.010
Maximal power, mW	3.45 ± 1.61	1.98 ± 0.81*	0.029
E_{es}, mmHg/μl	4.93 ± 1.16	3.35 ± 0.98*	0.049
dP/dt_{min}, mmHg/s	−8,002 ± 1,995	−5,291 ± 1,957*	0.013
Tau, ms	10.4 ± 2.2	15.4 ± 4.3*	0.0094

Values are means ± SD; n, no. of mice. EDV, end-diastolic volume; ESV, end-systolic volume; PSP, peak systolic pressure; EDP, end-diastolic pressure; SW, stroke work; dP/dt_{max} and dP/dt_{min}, maximal and minimal rate of change in LV pressure, respectively; E_{es}, end-systolic elastance; tau, time constant of LV relaxation. *Statistical significance.

tive aldehydes can induce cellular toxicity by adducting with cysteine, histidine, and lysine residues on proteins (9, 37). To index oxidative stress in the hearts of control and acrolein-exposed mice, we measured protein-HNE adducts. The abundance of protein-HNE adducts in total heart homogenates did not change in acrolein-exposed mice (data not shown). However, examination of the membrane fraction of the cardiac homogenates revealed robust augmentation of protein-HNE adducts as assessed by dot blot and Western blotting (Fig. 2*A*), indicating membrane-localized oxidative stress. We next determined whether acrolein-exposed mice exhibited greater formation of acrolein-protein adducts in serum and heart tissue. Hearts harvested from mice chronically fed acrolein did not exhibit appreciable increases in the abundance of protein-acrolein adducts over control (data not shown). Because these results were not striking, we further examined the abundance of plasma and myocardial acrolein adducts 1 and 24 h after a single oral dose. Plasma protein-acrolein adducts (~150 kDa) increased markedly at both time points with the highest levels seen at 1 h (Fig. 2*B*), suggesting that ingested acrolein reaches the blood. Myocardial protein-acrolein adducts, involving proteins of varying molecular weight, were more modestly increased at 1 h but returned to baseline by 24 h (Fig. 2*C*), approximating the adduct levels observed in the hearts from chronically fed mice. These results suggest that, following oral exposure, sufficient acrolein translocates via the circulation to the heart to modify proteins. However, these adducts accumulate transiently and are then metabolically removed or degraded. Presumably, adduct formation is less pronounced after chronic exposure because of the metabolic disposition of extant tissue adducts.

Chronic acrolein exposure disrupts myocardial eNOS function and induces nitrative stress. We next examined whether acrolein disrupts eNOS function and promotes nitrative stress in the heart. As shown in Fig. 3*A*, a single oral dose of acrolein (5 mg/kg) profoundly suppressed eNOS phosphorylation at Ser^{1177}, an indicator of eNOS activation (4), without affecting overall eNOS abundance in the heart. In contrast, chronic exposure to acrolein significantly diminished eNOS dimers and increased relative levels of eNOS monomers (Fig. 3*B*), suggestive of eNOS uncoupling (36). Uncoupling of eNOS would be expected to promote the generation of reactive oxygen species (ROS) and peroxynitrite (36, 39). Indeed, hearts from mice chronically fed acrolein exhibited significantly greater staining for protein nitrotyrosine, an index of peroxynitrite generation (Fig. 3*C*). These results indicate that chronic acrolein exposure disrupted and uncoupled eNOS and induced nitrative stress in the heart.

Chronic acrolein exposure induces myocyte hypertrophy and apoptosis. As shown in Fig. 4*A*, histological evaluation of acrolein-exposed hearts revealed myocyte hypertrophy, with a twofold increase in myocyte cross-sectional area compared with control hearts. There was no substantial difference in interstitial fibrosis (data not shown). Gene expression of the hypertrophic marker ANF was similarly augmented over twofold in acrolein-exposed hearts compared with control (Fig. 4*B*). Despite these observations, gravimetric analysis of the LV and whole heart did not reveal differences in LV or whole heart weight (normalized to body wt) between the groups. This suggested that the increase in myocyte size was offset by myocyte loss. Indeed, as shown in Fig. 5, we observed a greater frequency of TUNEL-positive nuclei in the hearts of acrolein-exposed mice; these were primarily in cardiomyocytes. Quantitation of the apoptotic rate revealed a more than sixfold increase in TUNEL-positive nuclei compared with control. Hence, chronic oral acrolein exposure induced prohypertrophic and proapoptotic effects in the heart.

Chronic acrolein exposure promotes myocardial inflammation. Reactive aldehydes are known to promote inflammation (30, 38), which is a hallmark of chronic HF (14, 22). NF-κB is a central transcriptional regulator of proinflammatory mediators such as TNF-α and IL-1β. To evaluate NF-κB activation, we performed EMSA using pooled cardiac tissue from animals with either acute (24 h after single dose of 1 mg/kg) or chronic oral acrolein exposure, along with appropriate controls. As seen in Fig. 6*A*, heart tissue from chronically exposed (but not acutely exposed) mice demonstrated robust activation of NF-κB. Figure 6*B* depicts activated NF-κB p65 subunit immunostaining and quantitation of nuclear immunoreactivity from control and acrolein-exposed hearts. Consistent with the DNA binding studies, the hearts from acrolein-exposed mice exhibited a robust (~5-fold) increase in the nuclear localization of p65. Additionally, protein levels of IκBα (which binds cytoplasmic NF-κB thereby preventing its nuclear translocation) were decreased in hearts from acrolein-exposed mice (Fig. 6*C*). Moreover, in parallel with NF-κB activation, hearts from acrolein-exposed mice also exhibited significant (~2-fold) upregulation of TNF-α and IL-1β mRNA expression compared with controls (Fig. 6*D*), which is indicative of sustained inflammation.

DISCUSSION

In this study, we demonstrate for the first time that oral exposure to acrolein, a prototypical α,β-unsaturated aldehyde pollutant, at concentrations within the estimated range of human total unsaturated aldehyde exposure, induces a phenotype of DCM in the mouse. Specifically, 48 days of acrolein exposure induced: *1*) LV dilatation, wall thinning, impairment of LV relaxation, and depressed contractility; *2*) chronic membrane-localized oxidative stress associated with varying degrees of systemic and myocardial protein-acrolein adduct for-

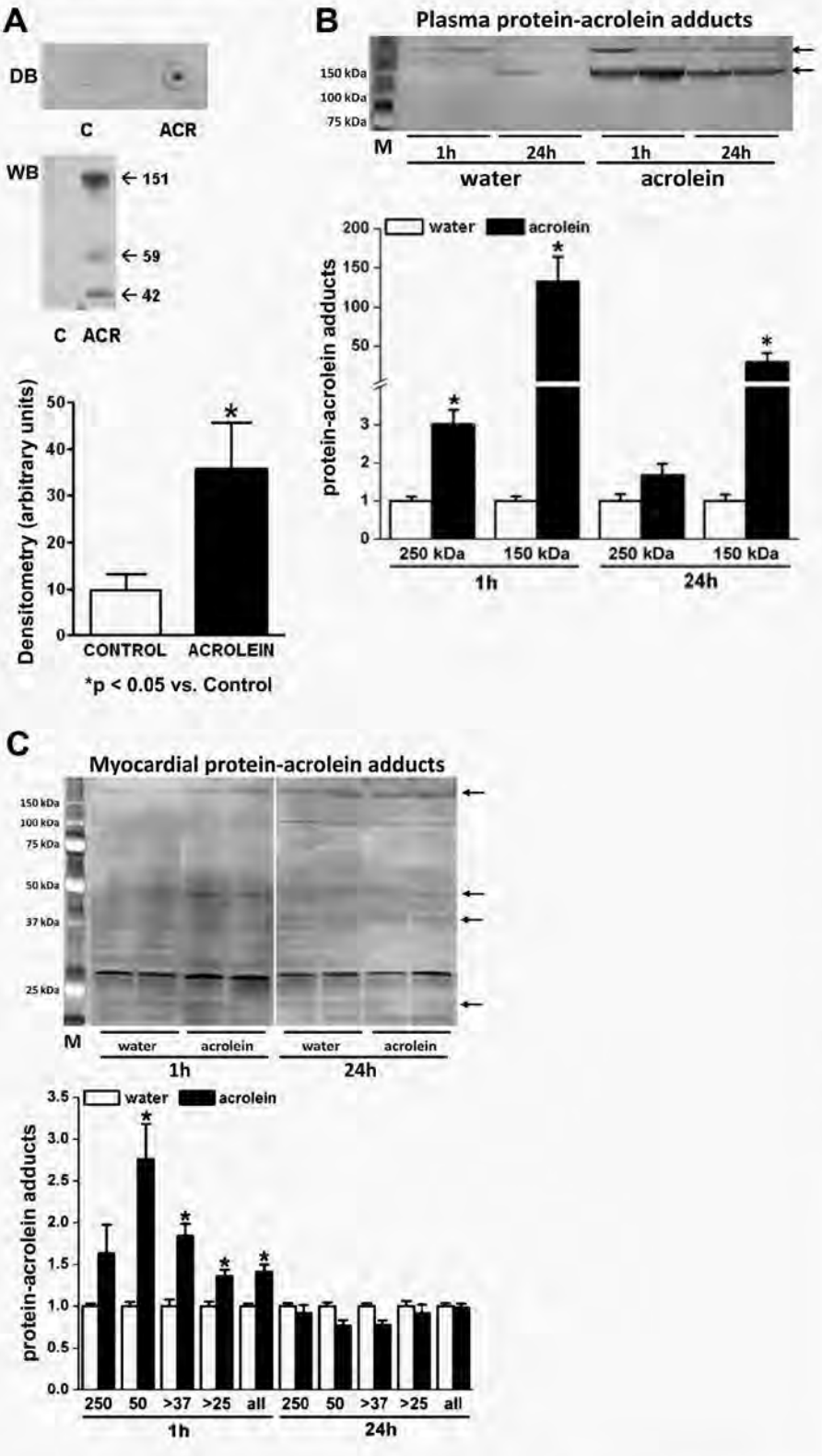

Fig. 2. Chronic acrolein exposure induces cardiac oxidative stress and protein modification. *A*: representative dot blot (DB) and Western blot (WB) performed on the membrane fractions of cardiac homogenates derived from acrolein (ACR)-fed and vehicle-fed [control (C)] mice and corresponding WB densitometry. *B* and C: WB and densitometry for protein-acrolein adducts in plasma (*B*) and myocardium (*C*) from mice fed a single dose of acrolein (1 mg/kg) or water 1 and 24 h after exposure. Augmented protein bands at different molecular weights are indicated by the arrows. M, molecular weight markers. $^*P < 0.05$ vs. control; $n = 4$ mice/group.

mation; *3*) diminished levels and uncoupling of eNOS with associated myocardial nitrative stress; *4*) myocyte hypertrophy and apoptosis without fibrosis; and *5*) myocardial inflammation with activation of NF-κB and upregulation of TNF-α and IL-1β. The features of oxidant stress, hypertrophy, apoptosis, and inflammation are pathological hallmarks of the failing heart. Taken together, the results suggest that analogous environmental exposure to acrolein in humans can contribute to the development of DCM and/or exacerbate pathological remodeling in humans with preexisting disease. Our results further

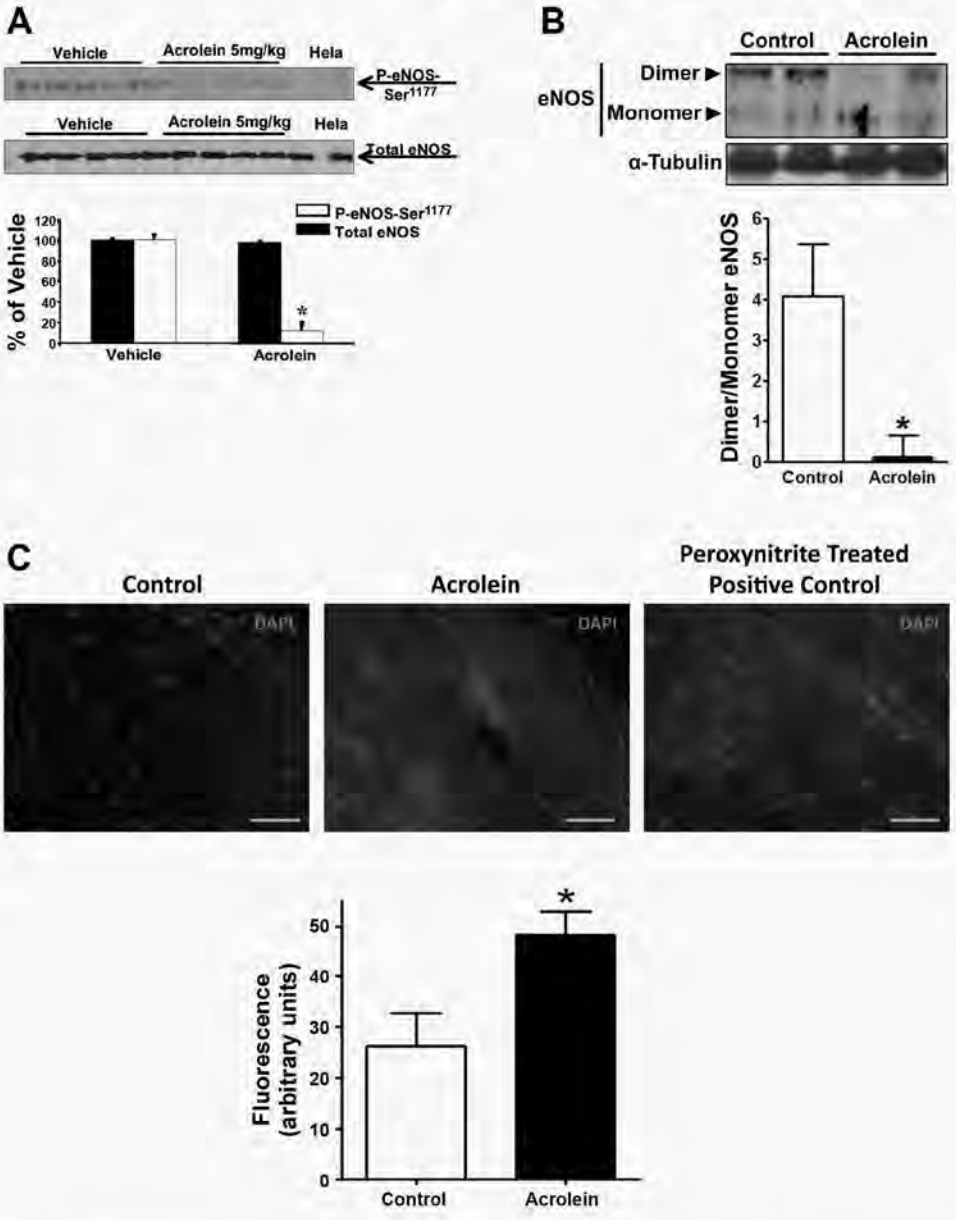

Fig. 3. Acrolein increases myocardial nitrative stress. *A*: WB and quantitation for phospho (P)-endothelial nitric oxide synthase (eNOS)-Ser^{1177} and total eNOS performed on total cardiac homogenates from mice 24 h after a single oral dose of acrolein (5 mg/kg) or vehicle (n = 5/group). Hela, Hela cell lysate. *B*: WB and densitometry for eNOS dimer and monomer performed on cardiac homogenates derived from mice chronically fed acrolein or water for 48 days (n = 4–5/group). *C*: immunofluorescent stains for protein-nitrotyrosine (NT, red) with 4′,6-diamidino-2-phenylindole (DAPI) costain for nuclei (blue) in hearts harvested from acrolein-fed and control-fed mice as in *B*, along with fluorescence quantitation (control, n = 3; acrolein, n = 5). Peroxynitrite-treated sections were used as a positive control. *P < 0.05 vs. control.

suggest the possibility that acrolein (and potentially other unsaturated aldehydes) can serve as a dietary xenobiotic mediator and/or modulator of cardiomyopathy.

Epidemiological data indicate that pollution exposure increases cardiovascular morbidity and mortality (3, 5, 28), with the most robust associations related to ischemic heart disease, dysrhythmias, HF, and cardiac arrest (28). A recent study of elderly survivors of acute myocardial infarction revealed that air pollution exposure increased both the risk of mortality and the risk for new-onset HF within four to five years (44). Because the development of new-onset HF following infarction is related to the progression of underlying LV remodeling over time (16), this suggests that exposure to one or a variety of constituent pollutants can exacerbate underlying structural remodeling. One proposed mechanism of pollution-related cardiovascular risk is the physical translocation of soluble pollutant constituents into the heart and vasculature via the circulation (5). However, little is known about the specific pathophysiological responses to individual constituents of source mixtures of environmental pollutants.

Acrolein is a ubiquitous aldehyde pollutant of considerable importance to public health (7). High levels of acrolein have been detected in several foods (ranging from 10 to 600 μg/kg), cigarette smoke (10–140 μg/cigarette), water samples, heated oils, automobile exhaust, coal, and industrial waste (10, 11, 42). Volatile aldehydes such as acrolein are important constituents of the vapor phase of urban air pollution and diesel exhaust and are considered hazardous air pollutants by the EPA (7, 29). Given the large number of environmental sources of acrolein and its potential for long-term toxicity, we sought to determine the effects of chronic acrolein exposure on the heart. In this study, we chose to examine the effects of ingested (as opposed to inhaled) acrolein because, in humans, even in smokers, the highest level of acrolein exposure is through food

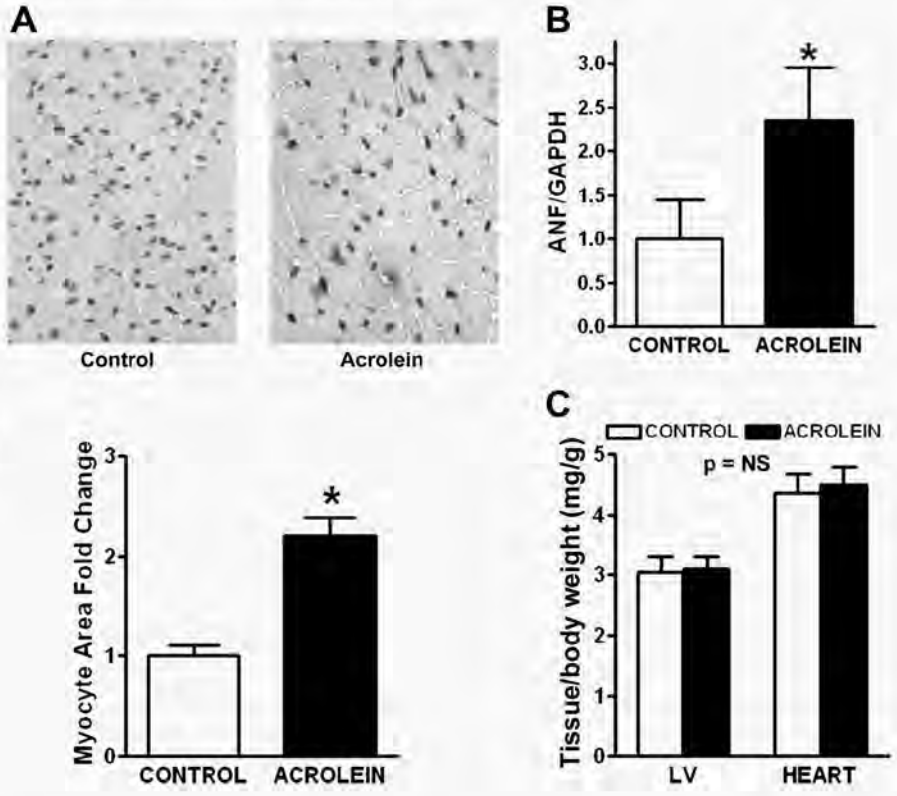

Fig. 4. Chronic acrolein exposure induces myocyte hypertrophy. *A*: representative histomicrographs of heart tissue from control and acrolein-fed mice demonstrating myocytes in cross section and corresponding quantitation of myocyte cross-sectional area. Also shown is the expression of the atrial natriuretic factor (ANF) gene in the heart by quantitative real-time PCR (*B*) and tissue gravimetric data (*C*) from the same experimental groups. GAPDH, glyceraldehyde-3-phosphate dehydrogenase; NS, not significant. $^*P < 0.05$ vs. control.

substances (42). Nevertheless, our findings that acrolein translocates to plasma and heart tissue following exposure (evidenced by the formation of adducts) and induces chronic changes in cardiac gene expression suggest the possibility that analogous exposure to acrolein in ambient air may, via physical transport in blood, produce similar responses. This is consistent with the high cardiovascular toxicity associated with the aldehyde-containing components of air pollution, diesel exhaust, and cigarette smoke (3, 18).

We have previously estimated the maximal human acrolein exposure from food and water to be 0.1 mg·kg $^{-1}$·day $^{-1}$ (with an additional 0.1 mg·kg^{-1}·day^{-1} from cigarette smoking) and the maximal human unsaturated aldehyde consumption to be 5 mg·kg^{-1}·day^{-1} (42). In the current study, we evaluated the chronic effects of 1 mg·kg^{-1}·day^{-1} acrolein, a dose fivefold lower than in our acute studies (42), representing a level 5- to 10-fold greater than maximal human acrolein consumption but only ~20% of total estimated unsaturated aldehyde intake. We chose this intermediate dose given that the sensitivity to acrolein varies among experimental animals; compared with rabbits (LD_{50} 7 mg/kg), mice are relatively less sensitive (LD_{50} 40 mg/kg acrolein) (10). Human sensitivity to acrolein, however, has not been assessed. Whether different acrolein dosing regimens (e.g., lower but more frequent doses) would influence the results differently should be explored in future investigations.

Our results establish that environmental exposure to acrolein, via the oral route, induces a state of inflammation and oxidant stress in the heart, along with LV systolic dysfunction, myocyte hypertrophy, and apoptosis, all consistent with xenobiotic-mediated DCM. These effects are consistent with the known prooxidant and proinflammatory effects of α,β-unsaturated aldehydes, which have been shown to activate inflammatory genes and signaling (including NF-κB) (27, 30, 38) and promote monocyte adhesion to endothelial cells (13). Similarly, in our study, acrolein-exposed hearts exhibited NF-κB activation, proinflammatory cytokine (TNF-α, IL-1β) gene expression, and oxidative and nitrative stress. Furthermore, in our prior study (19), we have shown that oxidative stress is required for acrolein-induced contractile dysfunction, since such effects were prevented by the antioxidant *N*-acetylcysteine. These findings are of significance, since chronic inflammation and oxidant stress are hallmarks of HF and considered to be important mediators of pathological LV remodeling (12, 16, 22). Plasma TNF-α is an independent predictor of patient mortality in HF (6), and, in experimental models, TNF-α induces many aspects of HF, including contractile depression, hypertrophy, apoptosis, matrix metalloproteinase activation, and oxidative stress (14, 22). Similarly, systemic oxidant stress in human HF correlates with the degree of ventricular dysfunction (21). Signaling related to ROS has been strongly implicated in the induction of pathological cardiac hypertrophy, and ROS can also mediate apoptosis, alter calcium channels and calcium flux, and reduce myofilament calcium sensitivity (12, 20, 32). Moreover, in vivo treatment with ROS scavengers improves pathological LV remodeling (17).

The stimulus for inflammatory cytokines and oxidative stress in HF is generally thought to reflect a response to injury, hemodynamic abnormalities, neurohormonal activation, and alterations in tissue perfusion. Our data suggest that environmental triggers may also contribute to this process and thereby exacerbate the course and progression of HF, and that those with preexisting LV dysfunction may be especially sensitive to environmental acrolein exposure. Interestingly, epidemiologi-

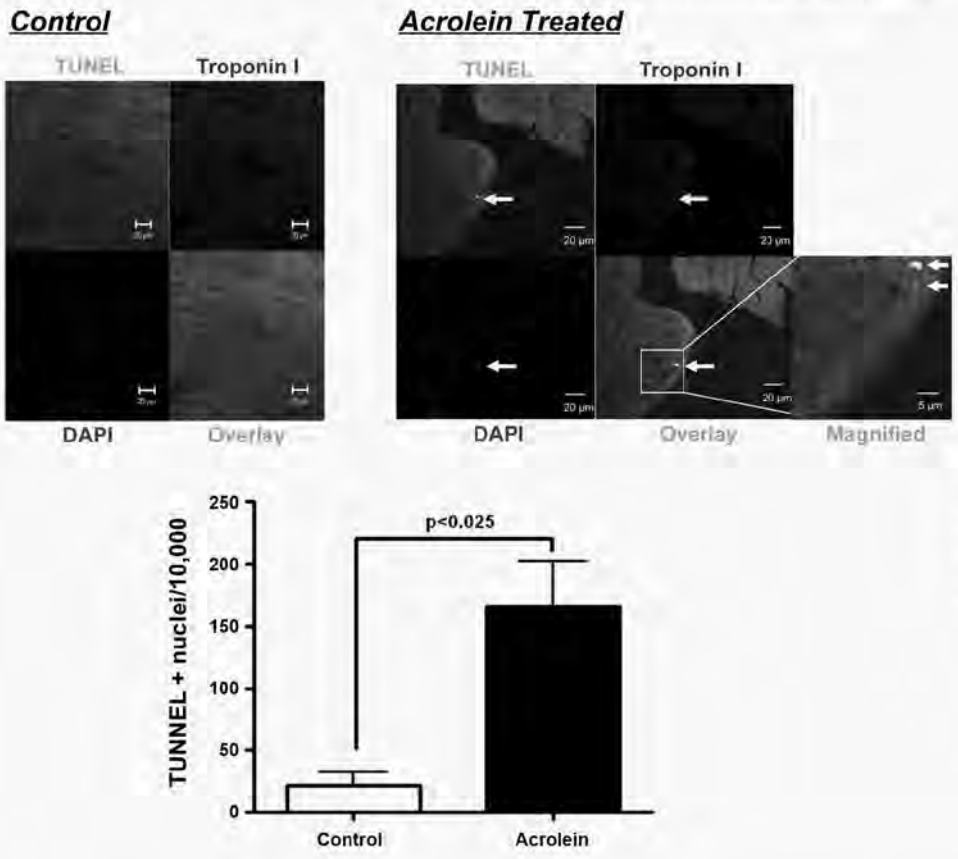

Fig. 5. Confocal microscopic images of terminal deoxytransferase-mediated dUTP nick-end labeling (TUNEL) staining in hearts from mice chronically fed acrolein or vehicle (control) and quantitation of TUNEL-positive nuclei. Myocytes were stained with anti-troponin I (red), and nuclei were stained with DAPI (blue). TUNEL-positive nuclei appear green-cyan on the overlaid images from the acrolein-exposed heart as shown in the magnified (zoom) image. Arrows denote a TUNEL-positive nucleus. Scale bar: standard magnification 20 μm; zoomed magnification 5 μm. n = 5/group.

cal studies have established that human subjects with HF are more vulnerable to the adverse cardiovascular effects of pollution exposure (5). Moreover, similar to our results obtained with acrolein exposure, environmental carbon monoxide also induces pathological remodeling in hearts of normal rats (1), supporting the idea that pollutant exposure could also lead to adverse changes in the heart in the absence of underlying cardiomyopathy.

One underlying mechanism for acrolein-mediated cardiac remodeling may be related to the induced abnormalities in eNOS function. Alterations in eNOS coupling and NO synthesis can contribute substantially to pathological cardiac remodeling (24, 36, 39). When electron transfer from its reductase to oxidase domains is normally coupled, eNOS is generally cardioprotective and antihypertrophic (39). However, during pathological hypertrophy and HF, both eNOS downregulation and uncoupling can occur, thereby augmenting superoxide generation, diminishing NO bioavailability, and increasing peroxynitrite formation (12, 24, 36, 39). In our study, acute acrolein exposure suppressed eNOS activation, whereas chronic acrolein exposure decreased overall eNOS abundance and reduced the eNOS dimer-to-monomer ratio, consistent with eNOS uncoupling. The biological relevance of these changes was demonstrated by the approximately twofold increase in protein-nitrotyrosine levels in the heart, indicative of increased peroxynitrite generation. Hence, disruption of eNOS function may be in part responsible for increased free radicals and oxidant stress induced by acrolein.

The observed cardiomyopathic phenotype may have resulted from both direct and indirect effects of acrolein. We have demonstrated that oral acrolein exposure induces protein-acrolein adducts in both plasma and myocardium with adduct abundance decreasing in a time-dependent manner following exposure. This suggests that consumed acrolein physically circulates to remote sites such as the heart to directly disrupt protein function, thereby secondarily inducing cardiac injury and inflammation. In our previous studies, we demonstrated that acrolein primarily modifies sarcomeric, cytoskeletal, and mitochondrial proteins in the context of acute exposure (19, 42). The time dependence of adduct levels in the current study suggests ongoing metabolic disposition and turnover of protein-acrolein adducts both systemically and in the heart. This is consistent with prior studies that have demonstrated lability of aldehyde-adducted proteins and degradation by the proteasome and lysosomes in minutes to hours (23, 26). Long-term exposure and/or reduced metabolic capacity for aldehyde detoxification may therefore enhance the adverse effects of acrolein. In this regard, we have previously shown that aldose reductase, the main aldehyde-reducing enzyme in the heart, is significantly downregulated in HF (33). Hence, the cardiotoxic effects of environmental acrolein may be heightened in subjects with preexisting HF.

In summary, we have shown that long-term environmental exposure to acrolein, at an amount within the range of human unsaturated aldehyde intake, induces DCM in the mouse. Primary features included the induction of myocardial inflam-

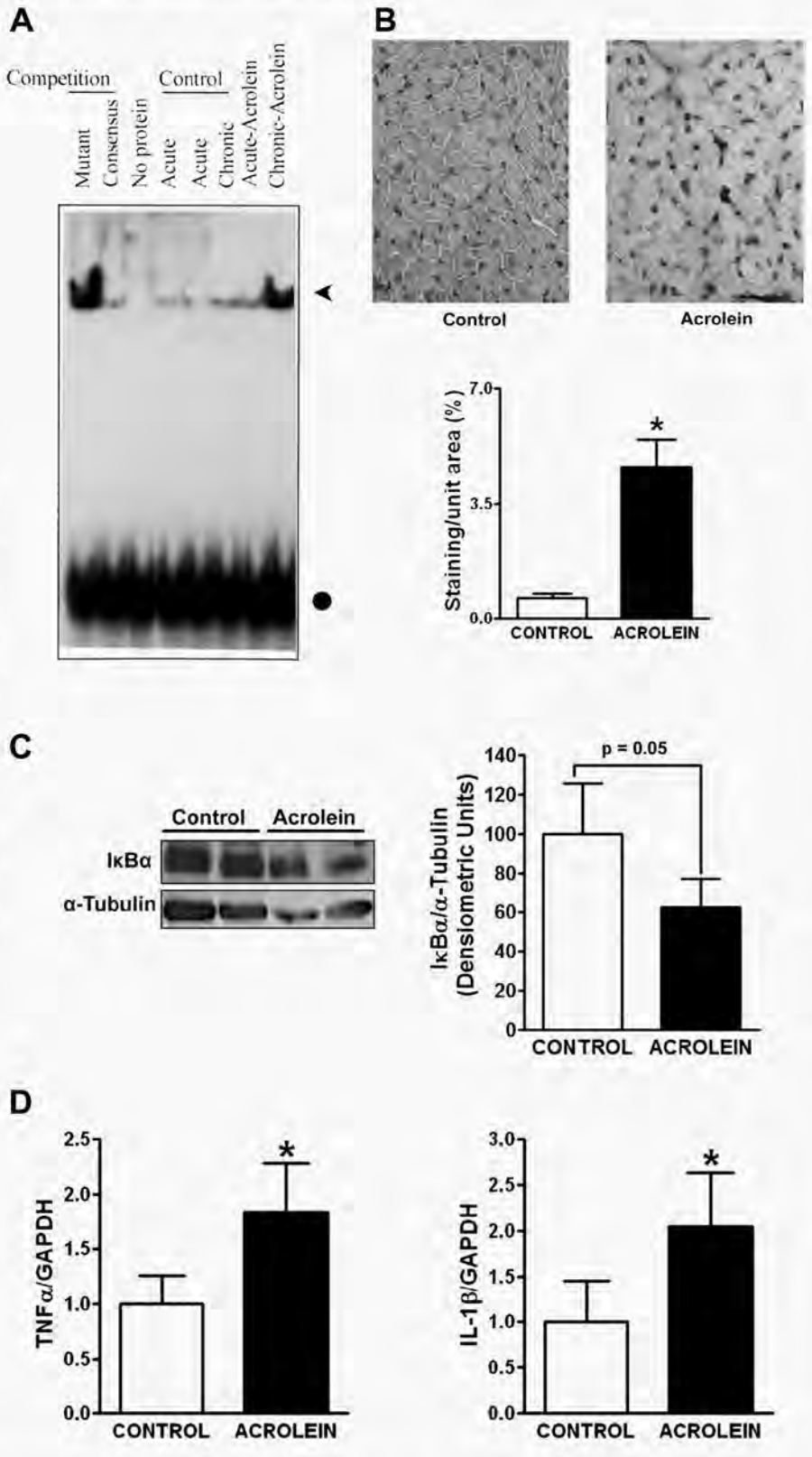

Fig. 6. Chronic acrolein exposure induces inflammation in the heart. *A*: EMSA to determine nuclear factor (NF)-κB DNA binding activity of pooled myocardial nuclear protein extracts from control and acrolein-fed mice. Acute control and acrolein-fed mice were given a single dose of 1 mg/kg vehicle or acrolein, and tissue was harvested at 24 h. Chronic control and acrolein-fed mice were administered daily vehicle or acrolein (1 mg/kg) for 48 days, and tissue was harvested 24 h after the final dose. NF-κB DNA binding is indicated by the arrowhead. The circle indicates unbound oligonucleotide probe. *B*: representative immunohistochemical stains for the activated p65 subunit of NF-κB in hearts from control mice and mice chronically fed acrolein, together with quantitation of staining intensity by image analysis. Note the nuclear localization of p65 in the acrolein-exposed mouse heart. *C*: WB and densitometry for inhibitor of κBα (IκBα) in hearts from control mice and mice chronically fed acrolein as in *A*. *D*: myocardial gene expression of tumor necrosis factor (TNF) and interleukin (IL)-1β by real-time PCR in the same hearts as in *B*. $^*P < 0.05$ vs. control.

mation and oxidative/nitrative stress, which may represent responses to the formation of detrimental acrolein-protein adducts in the heart, together with myocyte hypertrophy and apoptosis. These results suggest that human exposure to acrolein can have analogous deleterious effects, especially in those with preexisting structural heart disease and/or reduced capacity for aldehyde detoxification. Moreover, our findings raise consideration of an underrecognized environmental basis for

idiopathic DCM related to aldehyde constituents of natural food and the pollutant mix.

GRANTS

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DISCLOSURES

There are no conflicts of interest to disclose.

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EXPERT REVIEWS

Nutritional and micronutrient determinants of idiopathic dilated cardiomyopathy: diagnostic and therapeutic implications

Expert Rev. Cardiovasc. Ther. 9(9), 1161–1170 (2011)

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Idiopathic dilated cardiomyopathy (IDCM) is the term used to describe a group of myocardial diseases of unknown cause whose common clinical presentation is heart failure. The prevalence of IDCM is estimated to be between 7 and 13% of patients with systolic heart failure. Throughout medical history, several nutrient-deficient states have been identified as the root cause of IDCMs, Keshan's disease being one such example, where selenium deficiency-induced heart failure is now well documented. This raises the question of whether a micro- or macro-nutrient imbalance can provide the milieu for inefficient energy expenditure and cardiac metabolism in the context of IDCMs, either causing or exacerbating the condition. To date, there is insufficient evidence in the literature to support this theory, although numerous studies suggest a link between nutrient deficiencies, inefficient energy expenditure and subsequent heart failure. Given the unique metabolic needs of the failing heart, the role of micronutrient testing and supplementation in IDCMs warrants further well-designed studies.

KEYWORDS: heart failure • idiopathic dilated cardiomyopathy • macrominerals • metabolic cardiology • micronutrients • multinutrient supplementation • vitamins

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 10.1586/ERC.11.95 ISSN 1477-9072

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From: PFR Event <pfreventcreation@fda.hhs.gov>

To: Cleary, Michael *; HQ Pet Food Report Notification B6

Sent: 1/22/2018 11:12:15 PM

Subject: California Natural Grain-Free Kangaroo and Red Lentils Recipe B6 - EON-345831

Attachments: 2040528-report.pdf; 2040528-attachments.zip

A PFR Report has been received and PFR Event [EON-345831] has been created in the EON System.

A "PDF" report by name "2040528-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2040528-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-345831
ICSR #: 2040528
EON Title: PFR Event created for California Natural Grain-Free Kangaroo and Red Lentils Recipe; 2040528

AE Date	01/20/2017	**Number Fed/Exposed**	4
Best By Date		**Number Reacted**	4
Animal Species	Dog	**Outcome to Date**	Better/Improved/Recovering
Breed	Retriever - Labrador		
Age	8 Years		
District Involved	PFR B6 DO		

Product information
Individual Case Safety Report Number: 2040528
Product Group: Pet Food
Product Name: California Natural Grain-Free Kangaroo and Red Lentils Recipe
Description: One week prior to presentation at a local emergency and specialty clinic, owners noted B6 to be tiring more quickly when playing catch. On the day of her initial presentation to the ER clinic, she had been coughing more than usual and sank to the ground when attempting to chase a ball, but recovered quickly. At the ER clinic she was diagnosed with atrial fibrillation and early congestive heart failure. Treatment was initiated there B6 she was transferred to our clinic on B6 for further evaluation and care. Her

arrhythmia converted back to a normal sinus rhythm on January 20th prior to transfer and her congestive heart failure resolved with treatment. She had a second collapse episode prior to referral. Echocardiogram showed evidence of dilated cardiomyopathy with concurrent chronic degenerative valve disease.
Submission Type: Initial
Report Type: Adverse Event (a symptom, reaction or disease associated with the product)
Outcome of reaction/event at the time of last observation: Better/Improved/Recovering
Number of Animals Treated With Product: 4
Number of Animals Reacted With Product: 4

Product Name	Lot Number or ID	Best By Date
California Natural Grain-Free Kangaroo and Red Lentils Recipe		

Sender information

B6

USA

Owner information

B6 USA

To view this PFR Event, please click the link below:
https://eon.fda.gov/eon//browse/EON-345831

To view the PFR Event Report, please click the link below:
https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=362019

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through your local district FDA office.

Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAReportableFoods@fda.hhs.gov immediately.

From:	Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To:	Rotstein, David; Nemser, Sarah; Reimschuessel, Renate; Glover, Mark; Palmer, Lee Anne; Queen, Jackie L; Carey, Lauren
Sent:	1/23/2018 12:01:01 PM
Subject:	RE: California Natural and Zignature- Kangaroo Diets and DCM EON-345833-345835-345831-345822

I wasn't-However, I bet it's related to our contact from NCSU. She had a cardiologist friend in **B6** with a few cases. We can get MRx, to start!

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
U.S. FOOD & DRUG ADMINISTRATION

From: Rotstein, David
Sent: Monday, January 22, 2018 10:06 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>; Nemser, Sarah <Sarah.Nemser@fda.hhs.gov>; Reimschuessel, Renate <Renate.Reimschuessel@fda.hhs.gov>; Glover, Mark <Mark.Glover@fda.hhs.gov>; Palmer, Lee Anne <LeeAnne.Palmer@fda.hhs.gov>; Queen, Jackie L <Jackie.Queen@fda.hhs.gov>; Carey, Lauren <Lauren.Carey@fda.hhs.gov>
Cc: Rotstein, David <David.Rotstein@fda.hhs.gov>
Subject: California Natural and Zignature- Kangaroo Diets and DCM EON-345833-345835-345831-345822

Not sure if you were expecting these at Vet-LIRN

Report Details - EON-345965

ICSR:	2040808	
Type Of Submission:	Initial	
Report Version:	FPSR.FDA.PETF.V.V1	
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)	
Reporting Type:	Voluntary	
Report Submission Date:	2018-01-25 12:18:44 EST	
Reported Problem:	**Problem Description:**	At his scheduled visit to my clinic, thoracic radiographs showed generalized cardiomegaly which had been progressive compared to prior chest radiographs from his regular veterinarian but there was no evidence of cardiogenic edema. Echocardiogram was performed which showed dilated cardiomyopathy. Fundic exam was abnormal with a suspected partial retinal detachment OS. Diet history revealed that B6 was eating a kangaroo based diet. At this time the patient was continued on the B6 B6 were started. Taurine was discontinued after a normal taurine level was received. Cough persisted despite these changes and a course of B6 was prescribed B6 The cough improved significantly but did not completely resolve so the B6 was continued an additional 14 days. The dog has since been lost to follow-up. I have attempted to contact the owner and am waiting for a response. I did contact the referring veterinarian and to their knowledge the dog is still alive.
	Date Problem Started:	04/24/2017
	Concurrent Medical Problem:	Yes
	Pre Existing Conditions:	B6 was presented to me for evaluation of lethargy and progressive cough of 6 months duration. He had been treated with a cough suppressant B6 B6 prior to presentation with no response.
	Outcome to Date:	Unknown
Product Information:	**Product Name:**	limited ingredient diet with kangaroo as protein source - manufacturer not specified in written history (we have attempted to contact the owner but they do not return phone calls)
	Product Type:	Pet Food
	Lot Number:	
	Possess Unopened Product:	Unknown
	Possess Opened Product:	Unknown
	Storage Conditions:	Unknown
	Product Use Information:	**Description:** History in medical record describes diet but does not indicate duration of administration.
		Product Use Stopped After the Onset of the Adverse Event: No
		Perceived Relatedness to Adverse Event: Probably related
	Manufacturer /Distributor Information:	
	Purchase Location Information:	
Animal Information:	**Name:**	B6
	Type Of Species:	Dog
	Type Of Breed:	Shih Tzu
	Gender:	Male

	Reproductive Status:	Neutered
	Weight:	6.08 Kilogram
	Age:	8 Years
	Assessment of Prior Health:	Good
	Number of Animals Given the Product:	5
	Number of Animals Reacted:	5
	Owner Information:	**Owner Information provided:** Yes
		Contact: **Name:** B6 **Phone:** **Other Phone:** **Email:**
		Address: B6 United States
	Healthcare Professional Information:	**Practice Name:** B6
		Contact: **Name:** B6 **Phone:** **Other Phone:** **Email:**
		Address: B6 United States
Sender Information:	**Name:**	
	Address:	B6 United States
	Contact:	**Phone:** **Other Phone:** B6 **Email:**
	Permission To Contact Sender:	Yes
	Preferred Method Of Contact:	Email
	Reported to Other Parties:	Other
Additional Documents:		
	Attachment:	cardio0030.pdf
	Description:	Labwork including CBC, profile, taurine level and radiology report
	Type:	Laboratory Report
	Attachment:	cardio0029.pdf
	Description:	Medical records from initial and follow-up visit
	Type:	Medical Records

Vet-LIRN Case Summary Document

Vet-LIRN Case Number:	800.261
EON/CC #:	EON-350158
Owner LAST Name:	B6
Vet LAST Name:	B6
Vet-LIRN Initiation Date:	3/28/2018
MedRec: Requested:	Received with Complaint
MedRec: Received:	
MedRec: Significant finding:	

Vet-LIRN Tests (planned):	• MSU
	  ○ Iodine
	• Covance
	  ○ Cys-Met-Tau

Vet-LIRN Test Results:	• Iodine < 10 ppm-no suspicion of exogenous thyroid tissue • Tau
Result Interpretation:	
IF NFA, justification:	

COMPLAINT Narrative: At the time of diagnosis (10/31/17), B6 was a 13 year old female spayed Labrador retriever who had been maintained on a Zignature Kangaroo formula. She presented with a history of a progressive cough which, prior to presentation, became productive and she coughed up a small volume of pink foam (possible pulmonary edema). On examination she had a 2/6 left apical systolic heart murmur and on echo diagnosed with advanced dilated cardiomyopathy with severe left ventricular dilation, moderate to severe left ventricular systolic dysfunction, and moderate to severe left atrial dilation. Thoracic radiographs were suspicious for early congestive heart failure. A whole blood taurine level was submitted and was low at B6 She was treatment with B6 B6 and her diet was changed to Royal Canin Early Cardiac. At her recheck in 2/26/18, B6 heart had improved significantly with now mild dilated cardiomyopathy with normalized left atrial dimensions, mild left ventricular dilation and low normal left ventricular systolic function. The furosemide was able to be discontinued at this time.

Signalment: B6 13 yr FS Lab

Signs: productive, progressive cough

Food Product: Zignature Kangaroo Formula

Plan:

- MRx
- Open product fc B5

MRx summary:

Presenting complaint B6 to rDVM: developed a cough or B6 cough for 3-4 days, not lethargic, normal eating/drinking, no vomiting or diarrhea, worse when lying down, dog didn't cough while in clinic except for a tracheal cough when pulling on the leash→ treated with B6 B6 → stopped all 3 drugs Monday b/c cough worsened → to ER on B6 after coughing up pink tinged foam; no lethargy, continues to eat and drink; UTD on vaccines and HWP, no drugs → treat with B6 and **vet recommended a diet change** →labwork done 11/14 → to rDVM 11/16: doing well → recheck 2/26/18: intermittent cough, related to excitement, change diet to RC Early Cardiac → on recheck improved → suspect Tau responsive DCM-mild, suspect cough secondary to bronchial or primary respiratory disease → recheck 3/13: resting RR B6, minimal coughing only when excited, since switching to cardiac food BMs are dense and tenesmus, owner Is weaning dog off B6

PE 10/27 @ rDVM: numerous lipomatous & dermal masses, no audible murmur or arrhythmia, shallow breathing

PE 10/31 @ specialist: LS-OU, HR B6, mild periodontal disease, Gr II/VI, left apical protosystolic murmur, questionable mild inc bronchovesicular sounds bilaterally, SC mass left ventrum, mildly tense cranial abdominal palpation

B6

hepatomegaly

B6

Rads 10/27: generalized cardiomegaly, left atrial enlargement, slight left auricular bulge, increased sternal contact & rounded heart, dorsal tracheal deviation, prominent pulmonary vasculature with questionably mild inc interstitial opacity in caudal-dorsal lungs, suggesting early CHF/PE

10/31 Echo: severe LV hypertrophy, mild-mod MV regurgitation, mod-sev LA dilation, mild TV regurg, mild RV & RA dilation, mod-sev lower systolic function values

-2/26: mild LV dilation, mild MV regurg, normal LA, mild TV regurg, normal RV & RA, low normal systolic functional indices of LV

10/31 ECG: normal sinus rhythm

Prior MHx: 7/2017: doing well at home-occasionally coughs, several SQ masses, no murmur or cough on tracheal palpation; 10/23/2017-vaccines, doing well per O, no murmur ausculted, not been getting HWP consistently,

An article about beta-alanine: https://academic.oup.com/alcalc/article/36/1/29/138000

B5

I emailed the vet to request the full MRx and see if lot/best by information available for the leftover food.

4/4/2018
JJ-Vet sent the full MRx available and does not have any leftover food. We will purchase the food for testing. A dog from a previous case without food (800.218- B6 , Cocker Spaniel with Low Tau and also eating Zignature Essentials Kangaroo.

MRx added to above summary.

4/10/18
JG – Received the sample. Treat-sub1 (Zignature, Kangaroo formula)

4/11/2018
JJ-JG received the sample. I prepared the lab submission forms and will aliquot the sample today for testing.

4/12/2018
JJ-I prepared the samples and sent them to MSU for iodine screening and Covance for Tau/Cys/Met screening.

5/4/2018
JJ-The MSU iodine results were < 10 ppm and not suspicious for exogenous thyroid tissue.

The Covance results came back for Taurine, Cystine, and Methionine.

- Taurine = 45.5 mg/100g = 0.0455g/100g = 0.046% As Is Basis
  If we assume a max of 10% moisture per the label (= 90% DMB),
  then 0.0455 / 0.90 = 0.05% DMB, which is less than the AAFCO minimum for cats eating extruded foods (0.1% DMB.)
- Cystine = 293 mg/100g = 0.293 g/100g = 0.29% As Is Basis
  If we assume a max of 10% moisture per the label (= 90% DMB), then 0.293 / 0.90 = 0.33% DMB
- Methionine = 358mg/100g = 0.358 g/100g = 0.36% As Is Basis
  If we assume a max of 10% moisture per the label (= 90% DMB),
  then 0.358 / 0.90 = 0.4% DMB, which is greater than the AAFCO minimum for growth & reproduction of 0.35% DMB.
  The Methionine-cystine % = 0.4% + 0.33% = 0.73% DMB, which is greater than the AAFCO minimum for growth & reproduction of 0.7% DMB.

BLUF: Taurine was low based on the AAFCO minimum for feline extruded foods.

Document properties

Author: Reimschuessel, Renate
Company: US FDA
Template: Normal.dotm
Page count: 2
Paragraph count: 80
Line count: 142
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Character count (spaces included): 6511

Report Details - EON-350158

ICSR:	2044632		
Type Of Submission:	Initial		
Report Version:	FPSR.FDA.PETF.V.V1		
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)		
Reporting Type:	Voluntary		
Report Submission Date:	2018-03-27 15:12:36 EDT		
Reported Problem:	**Problem Description:**	At the time of diagnosis (10/31/17), B6 was a 13 year old female spayed Labrador retriever who had been maintained on a Zignature Kangaroo formula. She presented with a history of a progressive cough which, prior to presentation, became productive and she coughed up a small volume of pink foam (possible pulmonary edema). On examination she had a 2/6 left apical systolic heart murmur and on echo diagnosed with advanced dilated cardiomyopathy with severe left ventricular dilation, moderate to severe left ventricular systolic dysfunction, and moderate to severe left atrial dilation. Thoracic radiographs were suspicious for early congestive heart failure. A whole blood taurine level was submitted and was low at B6 She was treatment with B6 B6 and her diet was changed to Royal Canin Early Cardiac. At her recheck in 2/26/18, B6 heart had improved significantly with now mild dilated cardiomyopathy with normalized left atrial dimensions, mild left ventricular dilation and low normal left ventricular systolic function. The B6 was able to be discontinued at this time.
	Date Problem Started:	10/31/2017	
	Concurrent Medical Problem:	No	
	Outcome to Date:	Better/Improved/Recovering	
Product Information:	**Product Name:**	Zignature Kangaroo Formula	
	Product Type:	Pet Food	
	Lot Number:		
	Package Type:	BAG	
	Possess Unopened Product:	Unknown	
	Possess Opened Product:	Unknown	
	Product Use Information:	**Product Use Stopped After the Onset of the Adverse Event:**	Yes
		Adverse Event Abate After Product Stop:	Yes
		Product Use Started Again:	No
		Perceived Relatedness to Adverse Event:	Probably related
		Other Foods or Products Given to the Animal During This Time Period:	Unknown
	Manufacturer /Distributor Information:	**Name:**	Pets Global - Zignature
		Type(s):	Manufacturer
		Address:	28334 Industry Dr Valencia California 91355 United States

		Contact:	Phone:	(661) 309-1235
			Web Address:	www.zignature.com
		Possess One or More Labels from This Product:		Yes
	Purchase Location Information:			
Animal Information:	Name:	B6		
	Type Of Species:	Dog		
	Type Of Breed:	Retriever - Labrador		
	Gender:	Female		
	Reproductive Status:	Neutered		
	Weight:	33.18 Kilogram		
	Age:	13 Years		
	Assessment of Prior Health:	Good		
	Number of Animals Given the Product:	1		
	Number of Animals Reacted:	1		
	Owner Information:	Owner Information provided:		Yes
		Contact:	Name:	B6
			Phone:	
			Other Phone:	
			Email:	
		Address:	B6	
			United States	
	Healthcare Professional Information:	Practice Name:		CVCA Cardiac Care for Pets
		Contact:	Name:	B6
			Phone:	
			Email:	
		Address:	B6	
			United States	
		Practice Name:		CVCA Cardiac Care for Pets
		Contact:	Name:	B6
			Phone:	
			Email:	
		Address:	B6	
			United States	
		Type of Veterinarian:		Referred veterinarian
		Permission to Release Records		Yes

		to FDA:
Sender Information:	**Name:**	
	Address:	B6 United States
	Contact:	**Phone:** **Email:** B6
	Permission To Contact Sender:	Yes
	Preferred Method Of Contact:	Email
	Reported to Other Parties:	Other
Additional Documents:		
	Attachment:	B6 Echo Report 2017-10-31.pdf
	Description:	Echocardiogram 10-31-2017
	Type:	Echocardiogram
	Attachment:	B6 Echo Report 2018-02-26.pdf
	Description:	Echocardiogram 2-26-2018
	Type:	Echocardiogram
	Attachment:	B6 Taurine Level 2017-11-03.pdf
	Description:	BW Taurine Level 11-3-2017
	Type:	Laboratory Report

CVCA, Cardiac Care for Pets

B6

www.cvcavets.com

CVCA
Cardiac Care for Pets

Client: B6
Co-owner:
Patient name: B6
Species: Canine
Breed: Labrador Retriever
Sex: FS
Age: B6
Weight: 33.18kg. / 73.15 lbs

Primary Care Veterinarian: B6
Primary Care Hospital: B6
Phone: B6
Fax: B6
Email:

Cardiac Evaluation Report
Exam Date: 10/31/2017

Diagnosis

- Advanced dilated cardiomyopathy - ruleout idiopathic vs. taurine-responsive
- Mild to moderate mitral valve regurgitation as cause of heart murmur
- Trace tricuspid valve regurgitation
- Moderate to severe left atrial chamber dilation
- Severe eccentric left ventricular chamber dilation
- Moderate to severe decrease in contractility/heart muscle function
- Mild left ventricular wall thinning
- Mild right atrial and right ventricular chamber dilation
- Progressive cough - rule out: early left sided congestive heart failure vs. mainstem bronchial compression

Medications

B6

In 2 weeks, if B6 is eating and feeling well:

B6

B6

• You may purchase B6 at any health food or nutrition store or www.puritanspride.com. You may also obtain the B6 in bulk powder form from North Carolina State University by calling 919-513-6325.

Please allow 24-48 hours for CVCA to process prescription refill requests.
Refill all medications indefinitely unless directed by CVCA or your primary care veterinarian.

- **Please check all medications and dosages on your discharge report against the pharmacy labels.**

Please Note

• Please see our website www.cvcavets.com for more information about B6 dilated cardiomyopathy.

Nutrition Recommendations:

B6

• For more information about sodium content of various foods, please visit:
  - Dog: http://vet.tufts.edu/wp-content/uploads/reduced_sodium_diet_for_dogs.pdf
  - Treats: http://vet.tufts.edu/wp-content/uploads/treats_for_dogs_with_heart_disease.pdf

B6

Activity Recommendations:

B6

At Home Monitoring:

B6

Future Anesthesia/Fluid Recommendations:

B6

Reevaluation

- Please recheck with B6 in the next day or two to obtain taurine levels. Please forward these results when available.
- Please recheck with B6 in 2 weeks for a follow up examination and blood chemistry profile with electrolytes and as recommended by B6 Please forward these results when available.
- Please recheck with B6 every 4-6 months for a follow up examination and blood chemistry profile with electrolytes and as recommended by B6 Please forward these results when available.
- Please recheck with CVCA in 5 months for a follow up consultation/examination, blood pressure, and echocardiogram. Please contact us or schedule an earlier appointment if B6 has any problems or symptoms indicative of worsening heart disease or if recommended by B6

Visit Summary

Heart Rate: B6 **BP**: B6 (based on MR gradient)

History:

B6, developed a cough last Wednesday (10/25/17). Radiographs and blood work were performed by B6 B6 The lab work (which is unavailable for review) reportedly showed an elevated ALP B6 and GGT B6 and mild lymphopenia. Thoracic radiographs were performed which revealed cardiomegaly. B6 was treated with B6 All medications were stopped on Monday as her cough had worsened and she was presented to the B6 for a cardiac evaluation as her coughing had worsened and she had brought up a small volume of pink-tinged foam after a coughing fit. During this time there has been no evidence of lethargy and she continues to eat and drink normally at home.

PPHx: None
Meds: None
Other: B6
Diet: Zignature (Kangaroo)

Physical Exam Findings:

BAR, sweet but nervous
OP/EENT: B6
B6
PLN: WNL
H/L: Grade 2/6 left apical protosystolic heart murmur, regular rhythm, strong synchronous femoral pulses, RR: 36 breaths/min, questionable mild increase in bronchovesicular sounds bilaterally, no crackles or wheezes ausculted, eupneic
Abd: B6
MS/Neuro: B6
Integ: B6

Other Diagnostics:

10/27/17 pDVM CXR: Generalized cardiomegaly characterized by widening of the cardiac silhouette and loss of the caudal cardiac waist consistent with left atrial enlargement. Slight left auricular bulge. Increased sternal contact and rounding of the right heart on the VD radiograph. Dorsal deviation of the trachea. Prominent pulmonary vasculature with a questionable mild increase in interstitial opacity in the caudodorsal lung fields which may suggest early congestive heart failure/pulmonary edema.

Echocardiographic Findings

Severe left ventricular eccentric hypertrophy with apical rounding and increased spherocity, mild-moderate centrally

located mitral regurgitant jet, moderate-severe secondary left atrial dilation on 2D imaging and moderately-severely increased LA:Ao ratio on M-mode imaging, mild eccentric low velocity tricuspid regurgitation with mildly elevated estimated right ventricular pressures consistent with mild pulmonary hypertension, mild right ventricular and right atrial dilation, normal left and right ventricular outflow velocities, moderately to severely depressed indices of systolic function (FS% and EF% by modified Simpson's - LVE B6 , increased EPSS, elevated transmitral inflow velocities and E:A wave ratio on spectral Doppler tracings, normal TDI E':A' ratio of the lateral mitral annulus, no masses, effusions or heartworms observed.
ECG during echocardiogram: Normal sinus rhythm. No ventricular ectopy noted.

Comments

Dear B6 ,

Thank you for sending B6 to see us with B6 today. Sadly, B6 has dilated cardiomyopathy with moderate to severe systolic dysfunction and moderate to severe left atrial dilation. This places her at a high risk of developing congestive heart failure and with the progression in her cough I am concerned that we may be dealing with congestive heart failure at this time. We have begun therapy to control congestive heart failure, support cardiac function, slow down the progression of the heart disease and improve survival. We are now seeing more dogs on specialized diets that are developing taurine deficiency and we have discussed submission of taurine levels to evaluate whether this may be a contributing factor to B6 condition. B6 is interested in pursuing this test at your clinic, taurine levels should be drawn and placed in a heparinized tube (green top) and should be frozen and submitted to Idexx (who sends it to UC Davis). It will be interesting to see if this is a contributing factor to B6 condition.

We will continue to closely monitor B6 heart disease via serial echocardiography and institute further therapy when progression is noted. While on this course of medication, it is important to monitor the chemistry profiles and blood pressures. Dogs with dilated cardiomyopathy are at a higher risk of developing ventricular arrhythmias. None were noted today; however, it will be important to monitor for arrhythmias periodically in the future. Unfortunately, the prognosis is guarded after the onset of congestive heart failure, and we discussed with the B6 family that the average survival is ~ 6-12 months.[1,2] Survival time is highly individually variable depending on response to therapy.

We appreciate your continued referrals and the trust you place in CVCA to co-manage your cardiac patients. We look forward to working with you on this case and others. In an effort to continue to improve CVCA's service to both you and your clients, please visit our website at www.cvcavets.com and complete our online referring veterinarian survey.

Sincerely,
B6 - Cardiology

CVCA, Cardiac Care for Pets

B6

www.cvcavets.com

CVCA
Cardiac Care for Pets

Client: B6
Co-owner:
Patient name: B6
Species: Canine
Breed: Labrador Retriever
Sex: FS
Age: B6
Weight: 33.18kg. / 73.15 lbs

Primary Care Veterinarian: B6
Primary Care Hospital: B6
Phone: B6
Fax: B6
Email:

Cardiac Evaluation Report
Exam Date: 02/26/2018

Diagnosis

- Mild, improved dilated cardiomyopathy - suspect taurine-responsive
- Mild, improved mitral and very mild tricuspid valve regurgitation as cause of heart murmur
- Normal, improved left atrial chamber dilation
- Mild, improved eccentric left ventricular chamber dilation
- Low normal, improved left ventricular contractility/heart muscle function
- Cough - suspect bronchial/primary respiratory disease

Medications

B6

- You may purchase B6 at any health food or nutrition store or www.puritanspride.com. You may also obtain B6 in bulk powder form from North Carolina State University by calling 919-513-6325.
- Continue with monthly heartworm and flea/tick control as prescribed by B6

Please allow 24-48 hours for CVCA to process prescription refill requests.
Refill all medications indefinitely unless directed by CVCA or your primary care veterinarian.

- **Please check all medications and dosages on your discharge report against the pharmacy labels.**

Please Note

- Please see our website www.cvcavets.com for more information about B6 dilated cardiomyopathy.

Nutrition Recommendations:

B6

For more information about fish oils, please visit -- http://vet.tufts.edu/heartsmart/diet/important-nutrients-for-pets-with-heart-disease/

B6

Activity Recommendations:

B6

At Home Monitoring:

B6

Future Anesthesia/Fluid Recommendations:

B6

Reevaluation

- Recheck with B6 in the next 2-4 weeks and every 6 months for wellness care as directed, close auscultation, blood pressure and complete lab tests including blood and urine testing (CBC/Chemistry/Urinalysis/ Thyroid evaluation). Please forward these results when available.
- Please recheck with CVCA in 6 months for a follow up consultation/examination, blood pressure, and echocardiogram. Please contact us or schedule an earlier appointment if B6 has any problems or symptoms indicative of worsening heart disease or if recommended by B6

We thank you for trusting in CVCA to care for B6 today. Please do not hesitate to call us with any questions or concerns.

Sincerely,

B6

Visit Summary

Heart Rate: B6 **BP**: B6 **Cuff Size/Location:** B6

History: Recheck DCM, suspected early CHF; doing well; RRR - B6 increased B6 in January due to increased cough; cough seems to be intermittent and related to excitement; good appetite; 3 kg weight gain since 10/2017; walks 30-45 minutes per day - slow pace, at times winded but recovers very quickly.

B6 developed a cough last Wednesday (10/25/17). Radiographs and blood work were performed by B6 B6. The lab work (which is unavailable for review) reportedly showed an elevated ALP B6 and GGT B6 and mild lymphopenia. Thoracic radiographs were performed which revealed cardiomegaly. B6 was treated with B6. All medications were stopped on Monday as her cough had worsened and she was presented to the B6 for a cardiac evaluation as her coughing had worsened and she had brought up a small volume of pink-tinged foam after a coughing fit. During this time there has been no evidence of lethargy and she continues to eat and drink normally at home.

PPHx: None
Meds: None
Other: B6
Diet: changed from Zignature (Kangaroo) to Royal Canin Early Cardiac

Physical Exam Findings: B6

B6

Echocardiographic Findings

Mild left ventricular eccentric dilation - significant improvement compared to previous exam; mild, improved centrally located mitral regurgitant jet, normal, improved left atrial dimensions on 2D imaging and on M-mode imaging, mild, low velocity eccentric low velocity tricuspid regurgitation, subjectively normal right ventricular and right atrial dimensions, normal left and right ventricular outflow velocities, low normal, improved indices of systolic function (FS% and EF% by modified Simpson's, normal EPSS, normal transmitral inflow velocities and E:A wave ratio on spectral Doppler tracings, normal TDI E':A' ratio of the lateral mitral annulus, no masses, effusions or heartworms observed.

Comments

Dear B6

Thank you for sending B6 to see us with B6 today. I am quite pleased with B6 exam today. She has had remarkable improvement in her echocardiogram with the cardiac medications, change in diet and supplementation with Taurine and L-carnitine. Her risk for congestive heart failure at this point is very low so we will be weaning B6 off the B6 while B6 monitors B6 respiratory rate. Her current cough is likely due to respiratory disease and if the cough progresses/worsens, we will consider adding in a B6. Right now, with the marked improvement, B6 long-term prognosis has improved considerably. I suspect we will be able to further discontinue cardiac medications if her heart remains stable. We will continue to closely monitor B6 heart disease via serial echocardiography and institute further therapy when progression is noted. While on this course of medication, it is important to monitor the chemistry profiles and blood pressures. Hopefully, B6 will continue to do so well - she's a sweety!

We appreciate your continued referrals and the trust you place in CVCA to co-manage your cardiac patients. We look forward to working with you on this case and others. In an effort to continue to improve CVCA's service to both you and your clients, please visit our website atwww.cvcavets.com and complete our online referring veterinarian survey.

Sincerely,

B6

Patient Demographics

B6

Study Date: 11/01/2017

Patient ID: 121217B | Accession #: | Alt ID:

DOB: | Age: | Gender: | Ht: | Wt: 67lb 4oz | BSA:

Institution: CVCA B6

Referring Physician:

Physician of Record: | Performed By:

Comments:

Adult Echo: Measurements and Calculations

2D

LVIDd (2D)	B6	LVAd (A4C)	B6	IVSd (2D)	B6
LVPWd (2D)		LVAs (A4C)		RVIDd/LVIDd	
EDV (2D-Teich)		EDV (A4C)		RVIDd (2D)	
EDV (2D-Cubed)		ESV (A4C)		LA Area	
A4Cd		LV Mass (Cubed)		LA Dimen (2D)	
LV Vol					
LV Length					
LV Area					
A4Cs		IVS/LVPW (2D		LA/Ao (2D)	
LV Vol					
LV Length					
LV Area					
LVLd (A4C)		SV (A4C)		AoR Diam (2D)	
LVLs (A4C)		EF (A4C)			

MMode

IVSd (MM)	B6	SV (MM-Teich)	B6	LVPW % (MM)	B6
LVIDd (MM)		FS (MM-Teich)		RVIDd (MM)	
LVPWd (MM		EF (MM-Teich)		LA Dimen (MM)	
IVSs (MM)		EDV (MM-Cubed)		AoR Diam (MM)	
LVIDs (MM)		ESV (MM-Cubed)		LA/Ao (MM)	
LVPWs (MM)		SV (MM-Cubed)		MV D-E Exc Dist	
IVS/LVPW (MM)		EF (MM-Cubed)		MV D-E Slope	

EDV (MM-Teich) ESV (MM-Teich)	B6	FS (MM-Cubed) IVS % (MM)	B6	MV E-F Slope MV EPSS	B6

Doppler

LVOT Vmax Max PG Vmax RVOT Vmax Max PG Vmax MR Vmax Max PG Vmax MV Peak E V Vel PG	B6	MV Peak A Ve Vel PG MV E/A Lat E` Vel  E/Lat E`	B6	Lat A` Vel  E`/A` Lateral TR Vmax Max PG Vmax	B6

Other Measurements

Dimensions: 2D LAX
LA lax (2D)

Dimensions: Diameters
LVID/Ao (2D)

EF & Volume: Simpson's
Sphericity Id

Dimensions: Diameters
LVEDDN
LVID/Ao (2D)

B6

Images

B6

B6

B6

Signature

Signature:
Name(Print):

Date:

Patient Demographics

B6				Study Date: 02/26/2018
Patient ID: 121217B02262018	Accession #:			Alt ID:
DOB: Age:	Gender:	Ht:	Wt: 73lb 0oz	BSA:
Institution: B6				
Referring Physician:				
Physician of Record:			Performed By: B6	
Comments:				

Adult Echo: Measurements and Calculations

2D

LVIDd (2D)	B6	LVAd (A4C)	B6	IVSd (2D)	B6
LVPWd (2D)		LVAs (A4C)		RVIDd/LVIDd	
EDV (2D-Teich)		EDV (A4C)		RVIDd (2D)	
EDV (2D-Cubed)		ESV (A4C)		LA Area	
A4Cd		LV Mass (Cubed)		LA Dimen (2D)	
LV Vol					
LV Length					
LV Area					
A4Cs		IVS/LVPW (2		LA/Ao (2D)	
LV Vol					
LV Length					
LV Area					
LVLd (A4C)		SV (A4C)		AoR Diam (2D	
LVLs (A4C)		EF (A4C)		HR - AV	

MMode

IVSd (MM)	B6	SV (MM-Teich)	B6	LVPW % (MM)	B6
LVIDd (MM)		FS (MM-Teich		RVIDd (MM)	
LVPWd (MM)		EF (MM-Teich		LA Dimen (MM)	
IVSs (MM)		EDV (MM-Cubed)		AoR Diam (MM)	
LVIDs (MM)		ESV (MM-Cubed)		LA/Ao (MM)	
LVPWs (MM)		SV (MM-Cubed)		MV D-E Slope	
IVS/LVPW (MM)		EF (MM-Cubed)		MV E-F Slope	

EDV (MM-Teich) ESV (MM-Teich)	B6	FS (MM-Cubed) IVS % (MM)	B6	MV EPSS	B6

Doppler

LVOT Vmax Max PG Vmax RVOT Vmax Max PG Vmax MV Peak E V Vel PG MV Peak A V Vel PG	B6	MV E/A Med E` Vel E/Med E` Med A` Vel	B6	E`/A` Medial TR Vmax Max PG Vmax	B6

Other Measurements

Dimensions: Diameters
LVID/Ao (2D)
EDVI
ESVI

EF & Volume: Simpson's
Sphericity Id

Dimensions: Diameters
LVEDDN
LVID/Ao (2D)

B6

Images

B6

B6

Signature

Signature:

Name(Print):

Date:

Center for Veterinary Medicine
U.S. Food and Drug Administration
8401 Muirkirk Rd. Laurel, MD 20708
Tel: 240-402-0892
Fax: 301-210-4685

Veterinary Laboratory Investigation and Response Network

DIAGNOSTIC SAMPLE SUBMISSION FORM
for VET-LIRN LABORATORIES

Vet-LIRN Case #: 800.218-261

(Include this number in ALL communications with VET-LIRN: billing, reporting, emails.)

Date: 4/11/2018

Veterinarian:	Jennifer Jones	Animal Name/ID:	800.218 & 800.261
Address:	8401 Muirkirk RD, Laurel, MD 20708	Species:	Canine
Phone:	240-402-5421	Breed:	
Fax:	301-210-4685	Age:	
Email:	jennifer.jones@fda.hhs.gov	Sex:	

Tests recommended by VET-LIRN

Product iodine quantification

Please bill Vet-LIRN infrastructure grant.

Please send copy of results to jennifer.jones@fda.hhs.gov

Sample Information (check all that apply):

Body:

fresh ☐ frozen ☐

Organs:

thyroid ☐ thymus ☐ lung ☐ heart ☐ liver ☐ spleen ☐ adrenal ☐ kidney ☐ pancreas ☐ stomach ☐
duodenum ☐ jejunum ☐ ileum ☐ colon ☐ urinary ☐ bladder ☐ skeletal muscle ☐ brain ☐
other, list: _____

Clinical Samples:

serum ☐ blood ☐ urine ☐ feces ☐ biopsy samples ☐ cultures ☐ other list: _____

Food samples:

Veterinary Laboratory Investigation and Response Network

Open product from home (name of product) : See inventory

Name of the person preparing the package : Jennifer Jones

Note: please use a currier and follow their guidelines for shipping medical samples.

History/ Clinical Signs/ Medications Administered/ Additional Comments: (or attach copies of chart)

GENERAL INFORMATION FOR SAMPLE SUBMITTIONS

Histological samples should NOT be frozen
(please send in a separate package if also submitting frozen tissues;
Samples other than histological samples should be placed on ice/cold packs;
Submit all tissues as individual samples (do not place liver/kidney/etc. into the same bag);
Ship with tracking information;
Ship in the beginning of the week for weekday deliveries;
If advice is needed regarding sample collection or appropriate tests to request, please call:

Dr. Ceric 240-402-5419
Ms. Nemser 240-402-0892
Dr. Jones 240-402-5421
Dr. Reimschuessel 240-402-5404

From: Palmer, Lee Anne </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=CF7C8BD53B6C45A39318A596ACEA7C53-LPALMER>
To: Jones, Jennifer L
CC: Rotstein, David; Carey, Lauren
Sent: 3/27/2018 7:25:29 PM
Subject: FW: Zignature Kangaroo Formula: B6 - EON-350158
Attachments: 2044632-report.pdf; 2044632-attachments.zip

In case of interest – taurine level low?

From: PFR Event [mailto:pfreventcreation@fda.hhs.gov]
Sent: Tuesday, March 27, 2018 3:20 PM
To: Cleary, Michael * <Michael.Cleary@fda.hhs.gov>; HQ Pet Food Report Notification <HQPetFoodReportNotification@fda.hhs.gov>; B6
Subject: Zignature Kangaroo Formula: B6 - EON-350158

A PFR Report has been received and PFR Event [EON-350158] has been created in the EON System.

A "PDF" report by name "2044632-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2044632-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-350158
ICSR #: 2044632
EON Title: PFR Event created for Zignature Kangaroo Formula; 2044632

AE Date	10/31/2017	**Number Fed/Exposed**	1
Best By Date		**Number Reacted**	1
Animal Species	Dog	**Outcome to Date**	Better/Improved/Recovering
Breed	Retriever - Labrador		
Age	13 Years		
District Involved	PFR-Baltimore DO		

Product information
Individual Case Safety Report Number: 2044632
Product Group: Pet Food
Product Name: Zignature Kangaroo Formula
Description: At the time of diagnosis (10/31/17) B6 was a 13 year old female spayed Labrador retriever who had been maintained on a Zignature Kangaroo formula. She presented with a history of a progressive cough

which, prior to presentation, became productive and she coughed up a small volume of pink foam (possible pulmonary edema). On examination she had a 2/6 left apical systolic heart murmur and on echo diagnosed with advanced dilated cardiomyopathy with severe left ventricular dilation, moderate to severe left ventricular systolic dysfunction, and moderate to severe left atrial dilation. Thoracic radiographs were suspicious for early congestive heart failure. A whole blood taurine level was submitted and was low at B6. She was treatment with B6 B6 and her diet was changed to Royal Canin Early Cardiac. At her recheck in 2/26/18 B6 heart had improved significantly with now mild dilated cardiomyopathy with normalized left atrial dimensions, mild left ventricular dilation and low normal left ventricular systolic function. The B6 was able to be discontinued at this time.

Submission Type: Initial

Report Type: Adverse Event (a symptom, reaction or disease associated with the product)

Outcome of reaction/event at the time of last observation: Better/Improved/Recovering

Number of Animals Treated With Product: 1

Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Zignature Kangaroo Formula		

Sender information

B6

USA

Owner information

B6 USA

To view this PFR Event, please click the link below:
https://eon.fda.gov/eon//browse/EON-350158

To view the PFR Event Report, please click the link below:
https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=366527

==========

The information is provided as part of the Federal-State Integration initiative. As a Commissioned Official and state government official, you are reminded of your obligation to protect non-public information, including trade secret and confidential commercial information that you receive from the U.S. Food and Drug Administration from further disclosure. The information in the report is intended for situational awareness and should not be shared or acted upon independently. Any and all actions regarding this information should be coordinated through your local district FDA office.

Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAReportableFoods@fda.hhs.gov immediately.

Report Details - EON-350158

ICSR:	2044632		
Type Of Submission:	Initial		
Report Version:	FPSR.FDA.PETF.V.V1		
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)		
Reporting Type:	Voluntary		
Report Submission Date:	2018-03-27 15:12:36 EDT		
Reported Problem:	**Problem Description:**	At the time of diagnosis (10/31/17), B6 was a 13 year old female spayed Labrador retriever who had been maintained on a Zignature Kangaroo formula. She presented with a history of a progressive cough which, prior to presentation, became productive and she coughed up a small volume of pink foam (possible pulmonary edema). On examination she had a 2/6 left apical systolic heart murmur and on echo diagnosed with advanced dilated cardiomyopathy with severe left ventricular dilation, moderate to severe left ventricular systolic dysfunction, and moderate to severe left atrial dilation. Thoracic radiographs were suspicious for early congestive heart failure. A whole blood taurine level was submitted and was low at B6. She was treatment with B6 B6 and her diet was changed to Royal Canin Early Cardiac. At her recheck in 2/26/18, B6 heart had improved significantly with now mild dilated cardiomyopathy with normalized left atrial dimensions, mild left ventricular dilation and low normal left ventricular systolic function. The B6 was able to be discontinued at this time.
	Date Problem Started:	10/31/2017	
	Concurrent Medical Problem:	No	
	Outcome to Date:	Better/Improved/Recovering	
Product Information:	**Product Name:**	Zignature Kangaroo Formula	
	Product Type:	Pet Food	
	Lot Number:		
	Package Type:	BAG	
	Possess Unopened Product:	Unknown	
	Possess Opened Product:	Unknown	
	Product Use Information:	**Product Use Stopped After the Onset of the Adverse Event:**	Yes
		Adverse Event Abate After Product Stop:	Yes
		Product Use Started Again:	No
		Perceived Relatedness to Adverse Event:	Probably related
		Other Foods or Products Given to the Animal During This Time Period:	Unknown
	Manufacturer /Distributor Information:	**Name:**	Pets Global - Zignature
		Type(s):	Manufacturer
		Address:	28334 Industry Dr Valencia California 91355 United States

		Contact:	Phone:	(661) 309-1235
			Web Address:	www.zignature.com
		Possess One or More Labels from This Product:	Yes	
	Purchase Location Information:			
Animal Information:	Name:	B6		
	Type Of Species:	Dog		
	Type Of Breed:	Retriever - Labrador		
	Gender:	Female		
	Reproductive Status:	Neutered		
	Weight:	33.18 Kilogram		
	Age:	13 Years		
	Assessment of Prior Health:	Good		
	Number of Animals Given the Product:	1		
	Number of Animals Reacted:	1		
	Owner Information:	Owner Information provided:	Yes	
		Contact:	Name:	B6
			Phone:	
			Other Phone:	
			Email:	
		Address:	B6	
			United States	
	Healthcare Professional Information:	Practice Name:	CVCA Cardiac Care for Pets	
		Contact:	Name:	B6
			Phone:	
			Email:	
		Address:	B6	
			United States	
		Practice Name:	CVCA Cardiac Care for Pets	
		Contact:	Name:	B6
			Phone:	
			Email:	
		Address:	B6	
			United States	
		Type of Veterinarian:	Referred veterinarian	
		Permission to Release Records	Yes	

		to FDA:
Sender Information:	**Name:**	B6
	Address:	B6 United States
	Contact:	**Phone:** B6 **Email:** B6
	Permission To Contact Sender:	Yes
	Preferred Method Of Contact:	Email
	Reported to Other Parties:	Other
Additional Documents:		
	Attachment:	B6 Echo Report 2017-10-31.pdf
	Description:	Echocardiogram 10-31-2017
	Type:	Echocardiogram
	Attachment:	B6 Echo Report 2018-02-26.pdf
	Description:	Echocardiogram 2-26-2018
	Type:	Echocardiogram
	Attachment:	B6 Taurine Level 2017-11-03.pdf
	Description:	BW Taurine Level 11-3-2017
	Type:	Laboratory Report

B6

Case Summary:
B6 a 13 Yrs. 0 Mos. old, spayed female, Labrador Retriever presented on Tuesday, October 31, 2017 to the B6 for a coughing.

History: B6 started coughing last Wednesday. She was brought to a primary veterinarian. Radiographs and blood work were performed. Radiographs revealed suspected cardiomegaly. Blood work showed mild ALP and GGT elevations. Prescribed B6 which was stopped on Monday because her coughing got worse with those medications.
The owner made an appointment with a CVCA on Friday(11-1-2017). However her cough got worse with pink tinged foam so B6 was brought to B6 for a cardiology consultation.
B6 has been a healthy dog with no current medications. She is up to date on vaccination and heartworm preventative.

B6

Physical Exam:

Vital Sign	10/31/2017 1:47 PM
Weight	B6
Temp	
HR	
Resp	
Muc_Membrane	
CRT	
Mentation	
Pain Scale	

B6

B6

B6

Initial Diagnostics:
Echocardiogram

Differential Diagnosis:
Coughs -R/O heart vs lung

Client Communication:

Plan:

Please call if you have any questions or concerns.

Thank you,

B6

B6

10/31/2017 Initial PE

B6

IDEXX LABORATORIES

B6

1-888-433-9987
Click the RED BANNER on
VetConnectPLUS.com for a new view

Account: B6

Owner: B6
Patient:
Species: CANINE
Breed: LABRADOR_RETRIE
Age: 11Y
Gender: FS

Requisition #: 29169588-C
Accession #: B6
Order recv'd: 07/11/2017
Ordered by: B6
Reported: 07/11/2017

OVA AND PARASITES 3 OR MORE	
OVA & PARASITES	
NO OVA OR PARASITES SEEN	
In cases of acute or chronic diarrhea in addition to a fecal floatation and antigen testing for ova and parasites consider testing for viral, bacterial and protozoal infectious agents using RealPCR (canine diarrhea panel: test code 2625; feline diarrhea panel: test code 2627).	

B6
07/11/2017

FINAL REPORT

B6

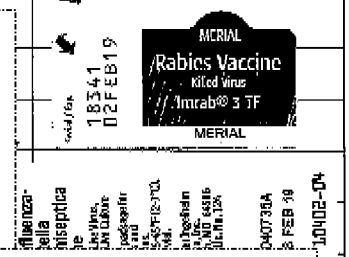
B6	Name:	Species:	Breed:	Color:	DOB:	SEX:
	B6	Canine	Lab/Red	BLK	B6	F(S)

Date:

10/23/17 42.0 lbs. Imrab 3TF 3yr tox #

B6

B6



B6

B6

B6

11/16/17 42.0 lbs.

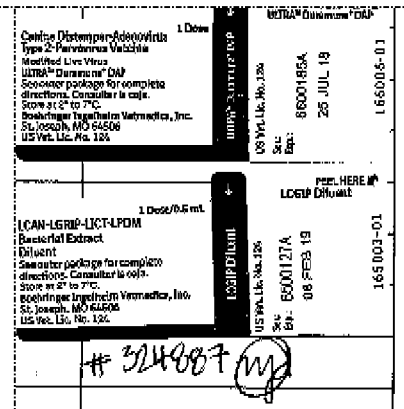
P: 160

R: part

mm: P/1

B6

B6



324887

B6

B6

B6

Species:	Breed:	Color:	DOB:	SEX:
Canine	Lab Retro	Yellow	B6	F(S)

Date: 7/10/17

B6

#30558 B6

7/12/17

10/23/17

10/27/17

↑ 100.7°

B6

B6

B6

Species:	Breed:		Color:	DOB:	SEX:
Canine	Lab	Ret	Yellow	B6	F(S)

Date 10/27/17

SENT:

B6

FDA-CVM-FOIA-2019-1704-016287

Client: B6
Patient Name: B6
Species: Canine
Breed: Labrador Retriever

Gender: Female/Spayed
Weight: 72.00 lbs
Age: 11 Years
Doctor: B6

B6

Test	Results	Reference Interval	LOW	NORMAL	HIGH
Catalyst Dx (October 27, 2017 10:05 AM)					
GLU	B6	70 - 143			
CREA		0.5 - 1.8			
BUN		7 - 27			
BUN/CREA					
PHOS		2.5 - 6.8			
CA		7.9 - 12.0			
TP		5.2 - 8.2			
ALB		2.2 - 3.9			
GLOB		2.5 - 4.5			
ALB/GLOB					
ALT		10 - 125			
ALKP		23 - 212			HIGH
GGT		0 - 11			HIGH
TBIL		0.0 - 0.9			
CHOL		110 - 320			
AMYL		500 - 1500			
LIPA		200 - 1800			
Na		144 - 160			
K		3.5 - 5.8			
Na/K					
Cl		109 - 122			
Osm Calc					

B6

IDEXX

Client: B6
Patient Name: B6
Species: Canine
Breed: Labrador Retriever

Gender: Female/Spayed
Weight: 72.00 lbs
Age: 11 Years
Doctor: B6

B6

Test	Results	Reference Interval	LOW	NORMAL	HIGH
ProCyte Dx (October 27, 2017 9:57 AM)					
RBC	B6	5.65 - 8.87			
HCT		37.3 - 61.7			
HGB		13.1 - 20.5			
MCV		61.6 - 73.5			
MCH		21.2 - 25.9			
MCHC		32.0 - 37.9			
RDW		13.6 - 21.7			
%RETIC					
RETIC		10.0 - 110.0			
WBC		5.05 - 16.76			
%NEU					
%LYM					
%MONO					
%EOS					
%BASO					
NEU		2.95 - 11.64			
LYM		1.05 - 5.10	LOW		
MONO		0.16 - 1.12			
EOS		0.06 - 1.23			
BASO		0.00 - 0.10			
PLT		148 - 484			
MPV		8.7 - 13.2			
PDW		9.1 - 19.4			
PCT		0.14 - 0.46			

B6

RBC Run

B6

Fluorescence

RBC RETICS PLT RBC Frags WBC

Granularity

NEU LYM MONO EOS BASO URBC

IDEXX

IDEXX Reference Laboratories
Division of IDEXX Laboratories
www.idexx.com

One IDEXX Drive
Westbrook, Maine 04092
United States

IDEXX Reference Laboratories
Customer Support
888 433 9987

B6

PET OWNER: B6

B6

ACCESSION #: B6
REQUISITION #: 33171286-C
DATE OF COLLECTION: 03/14/2018
DATE OF RECEIPT: 03/14/2018
DATE OF REPORT: 03/14/2018

SPECIES: CANINE
BREED: LABRADOR RETRIEVER
GENDER: FEMALE SPAYED
AGE: 12Y

ACCOUNT #: 21467
ORDERED BY: B6

IDEXX SERVICES: 865 SENIOR SCREEN

HEMATOLOGY

TEST	RESULT	REF. RANGE
RBC	B6	(5.39 - 8.79) M/uL
Hematocrit		(38.3 - 56.5) %
Hemoglobin		(13.4 - 20.7) g/dL
MCV		(58 - 76) fL
L MCH		(21.9 - 28.1) pg
MCHC		(32.6 - 38.2) g/dL
% Reticulocyte		%
Reticulocyte		(10 - 110) K/uL
WBC		(4.9 - 17.6) K/uL
% Neutrophil		%
% Lymphocyte		%
% Monocyte		%
% Eosinophil		%
% Basophil		%
Neutrophil		(2940 - 12670)
L Lymphocyte		(1060 - 4950) /uL
Monocyte		(130 - 1150) /uL
Eosinophil		(70 - 1490) /uL
Basophil		(0 - 100) /uL
H Platelet		(143 - 448) K/uL
Platelet Comments	B6	
Remarks		

CHEMISTRY

TEST	RESULT	REF. RANGE
Glucose	B6	(63 - 114) mg/dL
IDEXX SDMA [a]		(0 - 14) ug/dL
Creatinine		(0.5 - 1.5) mg/dL
BUN		(9 - 31) mg/dL
BUN:Creatinine Ratio		
Phosphorus		(2.5 - 6.1) mg/dL
Calcium		(6.4 - 11.8) mg/dL
Sodium		(142 - 152)
Potassium		(4.0 - 5.4) mmol/L
L Na:K Ratio		(28 - 37)
Chloride		(108 - 118)
TCO2 (Bicarbonate)		(13 - 27) mmol/L
Anion Gap		(11 - 26) mmol/L
Total Protein		(5.5 - 7.5) g/dL
Albumin		(2.7 - 3.9) g/dL
Globulin		(2.4 - 4.0) g/dL
Alb:Glob Ratio		(0.7 - 1.5)
ALT		(18 - 121) U/L
AST		(16 - 55) U/L
H ALP		(5 - 160) U/L
H GGT [b]		(0 - 13) U/L
Bilirubin - Total		(0.0 - 0.3) mg/dL
Bilirubin - Unconjugated		(0.0 - 0.2) mg/dL
Bilirubin - Conjugat		(0.0 - 0.1) mg/dL
Cholesterol		(131 - 345) mg/dL
Creatine Kinase		(10 - 200) U/L
Hemolysis Index [c]		
Lipemia Index [d]		

URINALYSIS

TEST	RESULT	REF. RANGE
Collection	B6	
Color		
Clarity		
Specific Gravity		
pH		
Urine Protein [e]		
Glucose		
Ketones		
Blood / Hemoglobin		
Bilirubin		
Urobilinogen		
White Blood Cells		(0 - 5) HPF
Red Blood Cells		HPF
Bacteria		
Epithelial Cells		
Mucus		
Casts		

Get deeper insights: For complete access to this patient's diagnostic results, including historic values and images, login to www.Vetconnectplus.com

Final report generated March 14, 2018

IDEXX Reference Laboratories
Division of IDEXX Laboratories
www.idexx.com

One IDEXX Drive
Westbrook, Maine 04092
United States

IDEXX Reference Laboratories
Customer Support
888 433 9887

LUCY PET OWNER: B6 DATE OF REPORT: 03/14/2018 ACCESSION #: B6

IDEXX SERVICES: 865 SENIOR SCREEN

URINALYSIS

TEST	RESULT	REF. RANGE
Crystals	B6	

ENDOCRINOLOGY

TEST	RESULT	REF. RANGE
L Total T4 f	B6	(1.0 - 4.0) ug/dL

NOTES

CHEMISTRY

a BOTH SDMA AND CREATININE ARE WITHIN THE REFERENCE INTERVAL which indicates kidney function is likely good. Evaluate a complete urinalysis and confirm there is no other evidence of kidney disease.

b RESULT VERIFIED BY REPEAT ANALYSIS

c Index of N, 1+, 2+ exhibits no significant effect on chemistry values.

d Index of N, 1+, 2+ exhibits no significant effect on chemistry values.

URINALYSIS

e Protein test is performed and confirmed by the sulfosalicylic acid test.

ENDOCRINOLOGY

f Interpretive ranges:

<1.0	Low
1.0-4.0	Normal
>4.0	High
2.1-5.4	Therapeutic

Dogs with no clinical signs of hypothyroidism and results within the normal reference range are likely euthyroid. Dogs with low T4 concentrations may be hypothyroid or "euthyroid sick". Occasionally, hypothyroid dogs can have T4 concentrations that are low normal. Dogs with clinical signs of hypothyroidism and low or low normal T4 concentrations may be evaluated further by submission of free T4 and canine TSH. A high T4 concentration in a clinically normal dog is likely variation of normal; however elevations may occur secondary to thyroid autoantibodies or rarely thyroid neoplasia. For dogs on thyroid supplement, acceptable 4-6 hour post pill total T4 concentrations generally fall within the higher end or slightly above the reference range.

IDEXX LABORATORIES

B6

1-888-433-9987
Click the RED BANNER on
VetConnectPLUS.com for a new view

Account: 21467

Owner: B6
Patient:
Species: CANINE
Breed: LABRADOR_RETRIE
Age: 11Y
Gender: FS

Requisition #: 107481388
Accession #: B6
Order recv'd: 11/09/2017
Ordered by: B6
Reported: 11/10/2017

TAURINE (WHOLE BLOOD)

Test	Result				
TAURINE	B6		(200 - 360)	L	B6

Testing performed at University of California, Davis

B6
11/10/2017

FINAL REPORT

From: Jones, Jennifer L </o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0f6ca12eaa9348959a4cbb1e829af244-Jennifer.Jo>
To: 'CVCA - Cardiac Care for Pets B6
Sent: 3/30/2018 12:28:24 PM
Subject: RE: FDA Case investigation for B6 (EON-350158)

Thank you for sending the records and reporting the case, B6
I hope you have a nice holiday and weekend,
Jennifer

Jennifer Jones, DVM
Veterinary Medical Officer
Tel: 240-402-5421
U.S. FOOD & DRUG ADMINISTRATION

From: CVCA - Cardiac Care for Pets B6 @cvcavets.com]
Sent: Wednesday, March 28, 2018 6:27 PM
To: Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov>
Subject: Re: FDA Case investigation for B6 (EON-350158)

Attached is entire medical records for B6 Please let us know if you need anything else-
Thank-

On Wed, Mar 28, 2018 at 6:08 PM, CVCA - Cardiac Care for Pets B6 @cvcavets.com> wrote:
Dear Dr. Jones,
Thank you for following up on our patient, B6 . We will be sending you our complete records for B6 including the primary veterinarian history that we have and the history from her previous emergency room visit. Unfortunately, the diagnosis was made in October and the client has disposed of the diet. We will certainly keep this in mind for future patients with dilated cardiomyopathy which could potentially be diet-related and have those owners keep a sample and record the lot number for future testing/tracking. Thank you again for looking into this issue for our patients.

Sincerely,
B6 VMD, DACVIM - Cardiology

On Wed, Mar 28, 2018 at 2:40 PM, Jones, Jennifer L <Jennifer.Jones@fda.hhs.gov> wrote:
Good afternoon B6
Thank you for submitting your consumer complaint to FDA. I'm sorry to hear about B6 illness.
As part of our investigation, we'd like to request:

- **Full Medical Records**
  - Please email (preferred) or fax (301-210-4685) a copy of B6 **entire** medical history (not just this event).
  - Do you have records from her referring veterinarian?
- **Potentially Test Remaining OPEN product**
  - Do you have any remaining product left?
  - Is there a lot number or best by date for the leftover food?

- **Hold any remaining UNOPENED product** for potential collection.

I attached a copy of our Vet-LIRN network procedures. The procedures describe how Vet-LIRN operates and how veterinarians help with our case investigations.

Please respond to this email so that we can initiate our investigation.

Thank you kindly,

Dr. Jones

Jennifer L. A. Jones, DVM
Veterinary Medical Officer
U.S. Food & Drug Administration
Center for Veterinary Medicine
Office of Research
Veterinary Laboratory Investigation and Response Network (Vet-LIRN)
8401 Muirkirk Road, G704
Laurel, Maryland 20708
new tel: 240-402-5421
fax: 301-210-4685
e-mail: *jennifer.jones@fda.hhs.gov*
Web: http://www.fda.gov/AnimalVeterinary/ScienceResearch/ucm247334.htm

U.S. FOOD & DRUG ADMINISTRATION

--

CVCA - Cardiac Care for Pets

B6

Email: B6 @cvcavets.com
Visit our website at: www.cvcavets.com
"Like" us on Facebook at: www.facebook.com/CVCAVETS
"Follow" us on Instagram at: www.instagram.com/CVCAVETS

We want to hear from you! Access our online survey by clicking here.

If there is anything that we can do to improve our service for you, please do not hesitate to contact us directly. We would greatly appreciate your feedback and invite you to fill out a survey based on your experience with CVCA.

Share your photos with us!

If you have a photo that you would like to share, we would love to post it on our Facebook page. Like us on Facebook and post to our wall or you can email the image with a fun fact to cvcainfo@cvcavets.com and we will forward it to our Facebook administrator.

Please note -- Images are usually posted within 1 month of submission.

--

CVCA - Cardiac Care for Pets

B6

Email: B6 @cvcavets.com
Visit our website at: www.cvcavets.com
"Like" us on Facebook at: www.facebook.com/CVCAVETS
"Follow" us on Instagram at: www.instagram.com/CVCAVETS

We want to hear from you! Access our online survey by clicking here.
If there is anything that we can do to improve our service for you, please do not hesitate to contact us directly. We would greatly appreciate your feedback and invite you to fill out a survey based on your experience with CVCA.

Share your photos with us!
If you have a photo that you would like to share, we would love to post it on our Facebook page. Like us on Facebook and post to our wall or you can email the image with a fun fact to cvcainfo@cvcavets.com and we will forward it to our Facebook administrator.
Please note -- Images are usually posted within 1 month of submission.

From: Rotstein, David </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS /CN=0A3B17EBFCF14A6CB8E94F322906BADD-DROTSTEI>

To: Jones, Jennifer L; Peloquin, Sarah; Palmer, Lee Anne; Carey, Lauren; Queen, Jackie L

Sent: 9/16/2018 3:54:16 PM

Subject: Fwd: Taste of the Wild Prey Beef dry (will provide full diet history): Lisa Freeman - EON-365610

Attachments: 2054966-report.pdf; 2054966-attachments.zip

From: PFR Event <pfreventcreation@fda.hhs.gov>
Date: September 16, 2018 at 11:44:32 AM EDT
To: Cleary, Michael * <Michael.Cleary@fda.hhs.gov>, HQ Pet Food Report Notification <HQPetFoodReportNotification@fda.hhs.gov>, B6
Subject: Taste of the Wild Prey Beef dry (will provide full diet history): Lisa Freeman - EON-365610

A PFR Report has been received and PFR Event [EON-365610] has been created in the EON System.

A "PDF" report by name "2054966-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2054966-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-365610
ICSR #: 2054966
EON Title: PFR Event created for Taste of the Wild Prey Beef dry (will provide full diet history), 4Health beef stew canned; 2054966

AE Date	09/12/2018	**Number Fed/Exposed**	2
Best By Date		**Number Reacted**	1
Animal Species	Dog	**Outcome to Date**	Stable
Breed	Great Dane		
Age	B6 Years		

District Involved	PFR-New England DO		

Product information
Individual Case Safety Report Number: 2054966
Product Group: Pet Food
Product Name: Taste of the Wild Prey Beef dry (will provide full diet history), 4Health beef stew canned
Description: DCM and CHF - had been having respiratory signs for ~1 month prior to diagnosis at Tufts Littermate is B6 (already reported by owner after being diagnosed with DCM and CHF in July 2018) Owner has another Great Dane at home (~1 year of age) eating the same diet that will be screened soon Owner approved submission of this report and talking to FDA Will send rest of medical records by email (sorry - too many to upload)
Submission Type: Initial
Report Type: Adverse Event (a symptom, reaction or disease associated with the product)
Outcome of reaction/event at the time of last observation: Stable
Number of Animals Treated With Product: 2
Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Taste of the Wild Prey Beef dry (will provide full diet history)		
4Health beef stew canned		

Sender information
Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information
B6
USA

To view this PFR Event, please click the link below:
https://eon.fda.gov/eon//browse/EON-365610

To view the PFR Event Report, please click the link below:
https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=382429

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Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAReportableFoods@fda.hhs.gov immediately.

From: PFR Event <pfreventcreation@fda.hhs.gov>

To: Cleary, Michael *; HQ Pet Food Report Notification; B6

Sent: 10/25/2018 11:36:41 AM

Subject: Purina One Lamb and Rice: Lisa Freeman - EON-369323

Attachments: 2057943-report.pdf; 2057943-attachments.zip

A PFR Report has been received and PFR Event [EON-369323] has been created in the EON System.

A "PDF" report by name "2057943-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2057943-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-369323
ICSR #: 2057943
EON Title: PFR Event created for Purina One Lamb and Rice; 2057943

AE Date	02/23/2018	**Number Fed/Exposed**	1
Best By Date		**Number Reacted**	1
Animal Species	Dog	**Outcome to Date**	Stable
Breed	Pit Bull		
Age	7 Years		
District Involved	PFR-New England DO		

Product information
Individual Case Safety Report Number: 2057943
Product Group: Pet Food
Product Name: Purina One Lamb and Rice
Description: DCM and CHF with ventricular tachycardia Taurine within normal limits Unclear if diet associated but reporting since lamb and rice diet Diet not initially changed but recommending that owner change diet and will recheck
Submission Type: Initial
Report Type: Adverse Event (a symptom, reaction or disease associated with the product)
Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 1
Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Purina One Lamb and Rice		

Sender information
Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information
B6
USA

To view this PFR Event, please click the link below:
https://eon.fda.gov/eon//browse/EON-369323

To view the PFR Event Report, please click the link below:
https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=386245

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This email and attached document are being provided to you in your capacity as a Commissioned Official with the U.S. Department of Health and Human Services as authorized by law. You are being provided with this information pursuant to your signed Acceptance of Commission.

This email message is intended for the exclusive use of the recipient(s) named above. It may contain information that is protected, privileged, or confidential. Any dissemination, distribution, or copying is strictly prohibited.

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Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAReportableFoods@fda.hhs.gov immediately.

Report Details - EON-369323

ICSR:	2057943	
Type Of Submission:	Initial	
Report Version:	FPSR.FDA.PETF.V.V1	
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)	
Reporting Type:	Voluntary	
Report Submission Date:	2018-10-25 07:32:53 EDT	
Reported Problem:	**Problem Description:**	DCM and CHF with ventricular tachycardia Taurine within normal limits Unclear if diet associated but reporting since lamb and rice diet Diet not initially changed but recommending that owner change diet and will recheck
	Date Problem Started:	02/23/2018
	Concurrent Medical Problem:	No
	Outcome to Date:	Stable
Product Information:	**Product Name:**	Purina One Lamb and Rice
	Product Type:	Pet Food
	Lot Number:	
	Package Type:	BAG
	Product Use Information:	
	Manufacturer /Distributor Information:	
	Purchase Location Information:	
Animal Information:	**Name:**	B6
	Type Of Species:	Dog
	Type Of Breed:	Pit Bull
	Gender:	Male
	Reproductive Status:	Neutered
	Weight:	36.2 Kilogram
	Age:	7 Years
	Assessment of Prior Health:	Excellent
	Number of Animals Given the Product:	1
	Number of Animals Reacted:	1
	Owner Information:	**Owner Information provided:** Yes
		Contact: **Name:** B6 **Phone:**
		Address: B6 United States
	Healthcare Professional Information:	**Practice Name:** Tufts Cummings School of Veterinary Medicine
		Contact: **Name:** Lisa Freeman
		Phone: (508) 887-4523
		Email: lisa.freeman@tufts.edu
		Address: 200 Westboro Rd

			North Grafton Massachusetts 01536 United States
Sender Information:	**Name:**	Lisa Freeman	
	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States	
	Contact:	**Phone:**	5088874523
		Email:	lisa.freeman@tufts.edu
	Permission To Contact Sender:	Yes	
	Preferred Method Of Contact:	Email	
Additional Documents:			
	Attachment:	compiled medical record.pdf	
	Description:	Records	
	Type:	Medical Records	

{

Report Details - EON-369324

ICSR:	2057944
Type Of Submission:	Followup
Report Version:	FPSR.FDA.PETF.V.V1
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)
Reporting Type:	Voluntary
Report Submission Date:	2018-10-25 07:37:49 EDT
Initial Report Date:	10/25/2018
Parent ICSR:	2057943
Follow-up Report to FDA Request:	Yes

Reported Problem:

Problem Description:	DCM and CHF with ventricular tachycardia Taurine within normal limits Unclear if diet associated but reporting since lamb and rice diet Clarification: Owner confirmed that dog was eating Purina One Lamb and Rice when diagnosed but changed after diagnosis (and before recheck) to Purina One Beef or Chicken only. We will recheck in Jan to see if any improvement
Date Problem Started:	02/23/2018
Concurrent Medical Problem:	No
Outcome to Date:	Stable

Product Information:

Product Name:	Purina One Lamb and Rice
Product Type:	Pet Food
Lot Number:	
Package Type:	BAG
Product Use Information:	
Manufacturer /Distributor Information:	
Purchase Location Information:	

Animal Information:

Name:	B6
Type Of Species:	Dog
Type Of Breed:	Pit Bull
Gender:	Male
Reproductive Status:	Neutered
Weight:	36.2 Kilogram
Age:	7 Years
Assessment of Prior Health:	Excellent
Number of Animals Given the Product:	1
Number of Animals Reacted:	1

Owner Information:

Owner Information provided:	Yes
Contact:	**Name:** B6
	Phone:
Address:	B6
	United States

	Healthcare Professional Information:	**Practice Name:**	Tufts Cummings School of Veterinary Medicine	
		Contact:	**Name:**	Lisa Freeman
			Phone:	(508) 887-4523
			Email:	lisa.freeman@tufts.edu
		Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States	
Sender Information:	**Name:**	Lisa Freeman		
	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States		
	Contact:	**Phone:**	5088874523	
		Email:	lisa.freeman@tufts.edu	
	Permission To Contact Sender:	Yes		
	Preferred Method Of Contact:	Email		
Additional Documents:				

From: PFR Event <pfreventcreation@fda.hhs.gov>

To: Cleary, Michael *; HQ Pet Food Report Notification; B6

Sent: 10/25/2018 11:36:41 AM

Subject: Purina One Lamb and Rice: Lisa Freeman - EON-369323

Attachments: 2057943-report.pdf; 2057943-attachments.zip

A PFR Report has been received and PFR Event [EON-369323] has been created in the EON System.

A "PDF" report by name "2057943-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2057943-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-369323
ICSR #: 2057943
EON Title: PFR Event created for Purina One Lamb and Rice; 2057943

AE Date	02/23/2018	**Number Fed/Exposed**	1
Best By Date		**Number Reacted**	1
Animal Species	Dog	**Outcome to Date**	Stable
Breed	Pit Bull		
Age	7 Years		
District Involved	PFR-New England DO		

Product information
Individual Case Safety Report Number: 2057943
Product Group: Pet Food
Product Name: Purina One Lamb and Rice
Description: DCM and CHF with ventricular tachycardia Taurine within normal limits Unclear if diet associated but reporting since lamb and rice diet Diet not initially changed but recommending that owner change diet and will recheck
Submission Type: Initial
Report Type: Adverse Event (a symptom, reaction or disease associated with the product)
Outcome of reaction/event at the time of last observation: Stable

Number of Animals Treated With Product: 1
Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Purina One Lamb and Rice		

Sender information
Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information
B6
USA

To view this PFR Event, please click the link below:
https://eon.fda.gov/eon//browse/EON-369323

To view the PFR Event Report, please click the link below:
https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=386245

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Report Details - EON-369323

ICSR:	2057943	
Type Of Submission:	Initial	
Report Version:	FPSR.FDA.PETF.V.V1	
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)	
Reporting Type:	Voluntary	
Report Submission Date:	2018-10-25 07:32:53 EDT	
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Product Information:	**Product Name:**	Purina One Lamb and Rice
	Product Type:	Pet Food
	Lot Number:	
	Package Type:	BAG
	Product Use Information:	
	Manufacturer /Distributor Information:	
	Purchase Location Information:	
Animal Information:	**Name:**	B6
	Type Of Species:	Dog
	Type Of Breed:	Pit Bull
	Gender:	Male
	Reproductive Status:	Neutered
	Weight:	36.2 Kilogram
	Age:	7 Years
	Assessment of Prior Health:	Excellent
	Number of Animals Given the Product:	1
	Number of Animals Reacted:	1
	Owner Information:	**Owner Information provided:** Yes
		Contact: **Name:** B6 **Phone:**
		Address: B6 United States
	Healthcare Professional Information:	**Practice Name:** Tufts Cummings School of Veterinary Medicine
		Contact: **Name:** Lisa Freeman
		Phone: (508) 887-4523
		Email: lisa.freeman@tufts.edu
		Address: 200 Westboro Rd

			North Grafton Massachusetts 01536 United States
Sender Information:	**Name:**	Lisa Freeman	
	Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States	
	Contact:	**Phone:**	5088874523
		Email:	lisa.freeman@tufts.edu
	Permission To Contact Sender:	Yes	
	Preferred Method Of Contact:	Email	
Additional Documents:			
	Attachment:	compiled medical record.pdf	
	Description:	Records	
	Type:	Medical Records	

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
(508) 839-5395

All Medical Records

Client: B6
Address: B6

Patient: B6
Breed: Pit Bull
DOB: B6

Species: Canine
Sex: Male (Neutered)

Home Phone: B6
Work Phone: (___) _-____
Cell Phone: (___) _-____

Referring Information

B6

Client: B6
Patient:

Initial Complaint:
Emergency

SOAP Text B6 **1:04PM -** B6

Subjective
NEW VISIT (ER)

Presenting complaint: tachyarrhythmia
Referral visit?: yes
Diagnostics completed prior to visit: CBC/chem, CXR,

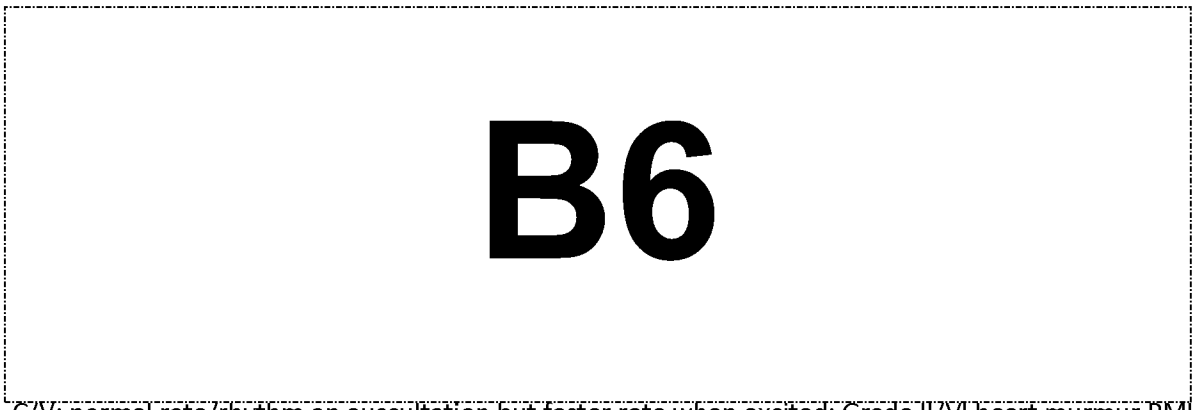
HISTORY:
- choking sounds at home ~1 months ago, ~2/10 had some coughing
- went to rDVM 2/12, xrays performed reportedly showed cardiomegaly; had BW with no abnormalities noted per owner
- Seen at B6 for echocardiogram; a heart murmur, was detected unclear what disease; started medication B6
- 2/22 recheck BW rDVM , some concern with B6 per owner, unsure of details; did EKG, B6 BPM
- doing well at home, good energy/appetite, no weakness/collapse, PU/PD since B6 started
- HWT x2 recently negative
- Purina One lamb and rice dry food, +/- hamburger or cold cuts

Signalment: ~7yo MN Pitbull mix
Prior medical history:

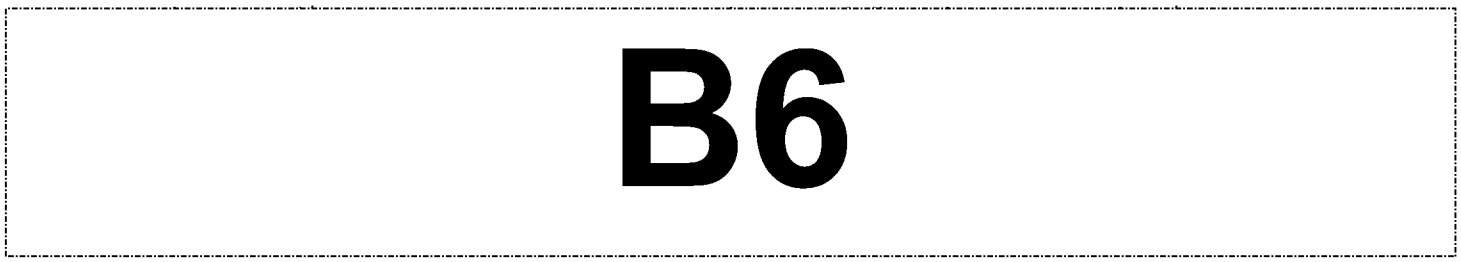
- owned for past 2 years, no prior medical history known
Current medications:
- B6

Vaccination status/flea & tick preventative use: no F/T/HWP in past
Travel history: NE only

EXAM:



C/V: normal rate/rhythm on auscultation but faster rate when excited; Grade II/VI heart murmur PMI left apex ausculted; no arrhytmias appreciated during exam; s/s femoral pulses bilaterally.



DIAGNOSTIC TESTING:

PROBLEM LIST:
- Grade II/VI heart murmur
- History of suspected structural cardiac disease
-
- B6

ASSESSMENT:
B6 is suspected of having DCM, and has had reported tachyarrhythmias. After admission to Tufts, EKG noted runs of v-tach - suspect due to underlying structural cardiac disease. Plan for cardiology consult and continuous EKG monitoring in hospital for at least one night.

PLAN:
Diagnostics: cardiology consultation with echo; +/- CBC/chem, +/- BNP

Pending: none
Treatments:
- Placed IVC, admit to ICU
- Start telemetry monitoring, record rate/rhythm q1h
- B6
-
Monitoring: telemetry, RR/RE, vitals, comfort, appetite

CLIENT COMMUNICATION:
Discussed concerns with owner of underlying cardiac disease, for which he was started on B6 but newer concern for arrhythmia, particularly tachyarrhythmia. No arrhythmias noted on ER cursory EKG, but can be intermittent, and top considerations for SVT vs. ventricular arrhythmias vs. other. Can be due to underlying structural cardiac disease vs. other such as adrenal or splenic disease. Recommend admission for EKG monitoring and cardio consult. Discussed that if due to cardiac disease, can often treat with oral medications, but depending on arrhythmia and control with medication, likely at increased risk of sudden cardiac death. Owners understand, are able to admit overnight, but depending on other diagnostics that may be recommended may need to discuss financial resources.

Resuscitation code (if admitting to ICU): B6

B6 DVM

ADDENDUM:
Cardiology consult confirmed suspected DCM, frqeuent v-tach noted during exam. Plan to start B6 B6 Plan to start taurine supplementation @ 1000 mg PO BID with blood sample pulled prior. Called owner to discuss, B6 B6 We will otherwise update tomorrow morning if no other major changes overnight.
B6

Overnight Update:
- B6
-
-
-

B6
SOAP Text B6 5:49PM - B6

HISTORY:
- choking sounds at home ~1 months ago, ~2/10 had some coughing
- went to rDVM 2/12, xrays performed reportedly showed cardiomegaly; had BW with no abnormalities noted per owner
- Seen at B6 for echocardiogram; a heart murmur, was detected unclear what disease; started medication B6
- 2/22 recheck BW rDVM , some concern with kidneys per owner, unsure of details; did EKG, B6 BPM
- doing well at home, good energy/appetite, no weakness/collapse, PU/PD sinc B6 started
- HWT x2 recently negative
- Purina One lamb and rice dry food, +/- hamburger or cold cuts

Client:
Patient: B6

Current medications:
- B6

DIAGNOSTIC TESTING:
B6

B6

Cardiology Consult

EXAM:

B6

C/V: normal rate/rhythm on auscultation but faster rate when excited; Grade I-II/VI heart murmur PMI left apex ausculted; no arrhytmias appreciated during exam; SSFP.

B6

PLAN:
- Telemetry monitoring, record rate/rhythm q1h
-
-
-
-
-
-

B6

Resuscitation code (if admitting to ICU) B6

B6 DVM (ECC Resident)

Initial Complaint:

Recheck - B6 - DCM protocol

SOAP Text Aug 31 2018 5:08PM - B6

Disposition/Recommendations

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
(508) 839-5395

Client:	B6
Veterinarian:	
Patient ID:	B6
Visit ID:	

Patient:	B6
Species:	Canine
Breed:	Pit Bull
Sex:	Male (Neutered)
Age:	B6 Years Old

Lab Results Report

Nova Full Panel-ICU B6 **2:15:25 PM** **Accession ID:** B6

Test	Results	Reference Range	Units
SO2%	B6	94 - 100	%
HCT (POC)		38 - 48	%
HB (POC)		12.6 - 16	g/dL
NA (POC)		140 - 154	mmol/L
K (POC)		3.6 - 4.8	mmol/L
CL(POC)		109 - 120	mmol/L
CA (ionized)		1.17 - 1.38	mmol/L
MG (POC)		0.1 - 0.4	mmol/L
GLUCOSE (POC)		80 - 120	mg/dL
LACTATE		0 - 2	mmol/L
BUN (POC)		12 - 28	mg/dL
CREAT (POC)		0.2 - 2.1	mg/dL
TCO2 (POC)		0 - 0	mmol/L
nCA		0 - 0	mmol/L
nMG		0 - 0	mmol/L
GAP		0 - 0	mmol/L
CA/MG		0 - 0	mol/mol
BEecf		0 - 0	mmol/L
BEb		0 - 0	mmol/L
A		0 - 0	mmHg
NOVA SAMPLE		0 - 0	

Client:
Patient: B6

FiO2	B6	0 - 0	%
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
PH		7.337 - 7.467	
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
HCO3		18 - 24	mmol/L

Nova Full Panel-ICU B6 2:20:26 PM **Accession ID:** B6

Test	Results	Reference Range	Units
TS (FHSA)		0 - 0	g/dl
PCV **	B6	0 - 0	%
TS (FHSA)		0 - 0	g/dl

Nova Full Panel-ICU B6 12:43:32 PM **Accession ID:** B6

Test	Results	Reference Range	Units
4DX (omnicell)- FHSA	B6	0 - 0	

Nova Full Panel-ICU 8/31/2018 5:09:20 PM **Accession ID:** B6

Test	Results	Reference Range	Units
GLUCOSE		67 - 135	mg/dL
UREA		8 - 30	mg/dL
CREATININE		0.6 - 2	mg/dL
PHOSPHORUS		2.6 - 7.2	mg/dL
CALCIUM2		9.4 - 11.3	mg/dL
T. PROTEIN		5.5 - 7.8	g/dL
ALBUMIN		2.8 - 4	g/dL
GLOBULINS		2.3 - 4.2	g/dL
A/G RATIO		0.7 - 1.6	
SODIUM		140 - 150	mEq/L
CHLORIDE	B6	106 - 116	mEq/L
POTASSIUM		3.7 - 5.4	mEq/L
NA/K		29 - 40	
T BILIRUBIN		0.1 - 0.3	mg/dL
D.BILIRUBIN		0 - 0.1	mg/dL
I BILIRUBIN		0 - 0.2	mg/dL
ALK PHOS		12 - 127	U/L
ALT		14 - 86	U/L
AST		9 - 54	U/L
CHOLESTEROL		82 - 355	mg/dL
OSMOLALITY (CALCULATED)		291 - 315	mmol/L

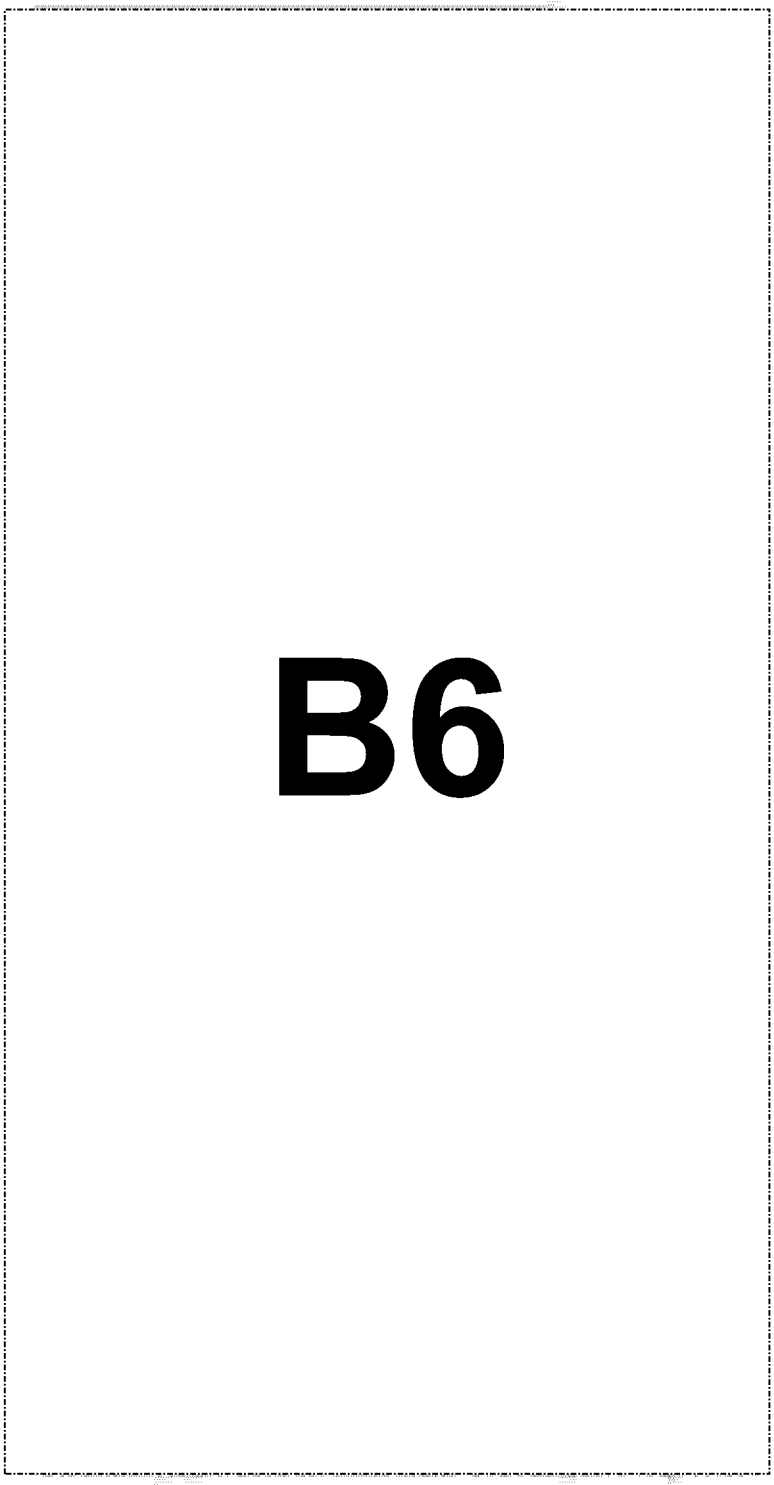
Pathology Report B6

B6

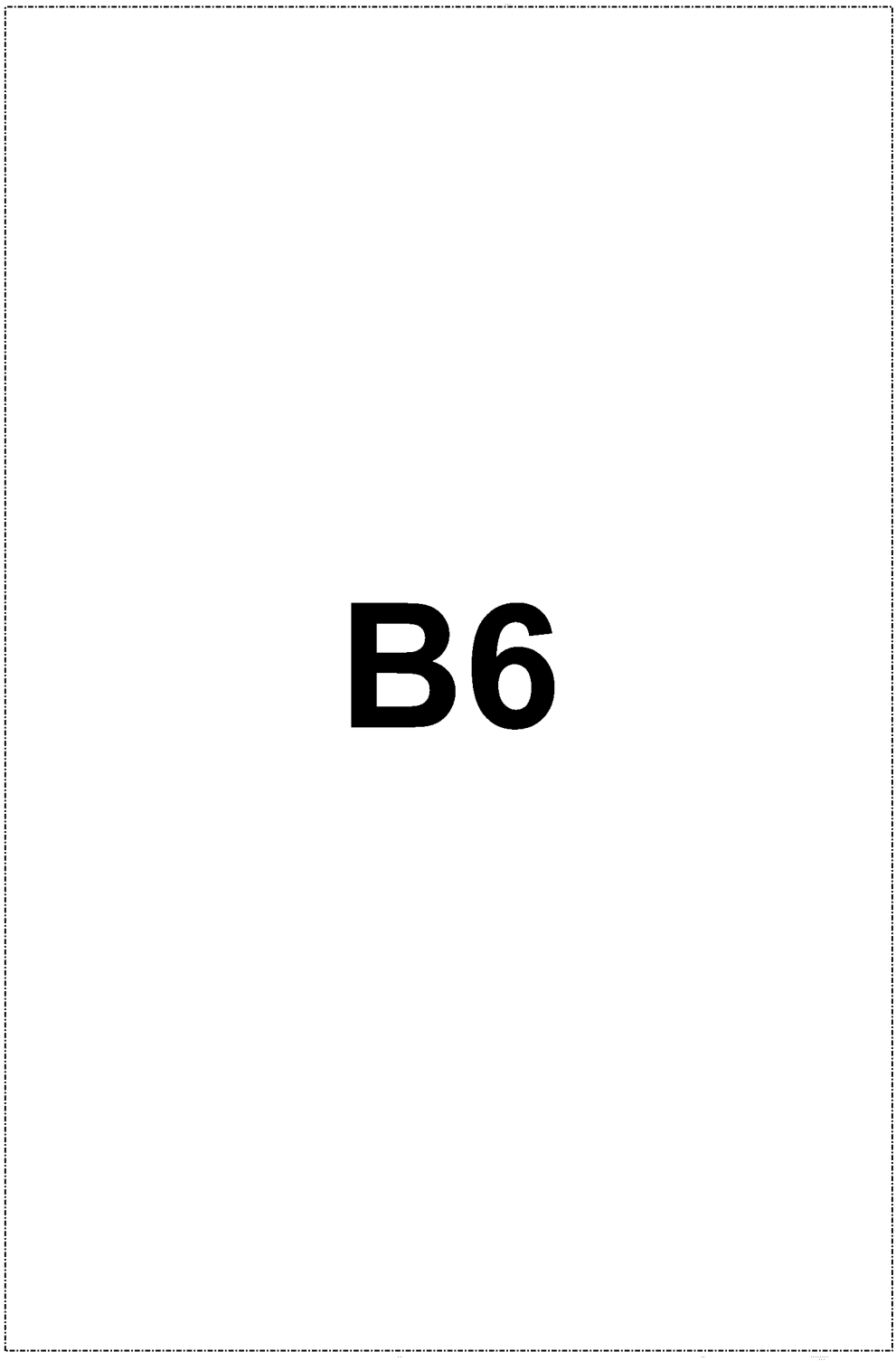
B6

B6

B6



B6



B6

B6

B6

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B6

B6

B6

B6

B6

Patient History Report

Client:	B6	Patient:	B6	Breed:	[illegible]
Phone:		Species:	Canine	Sex:	[illegible]
Address:		Age:	B6	Color:	[illegible]
		Birthdate:		Weight:	[illegible] kg

B6

B6 [illegible]

B6

HISTORY:

B6

B6 **Echo/ER Report -** B6

Patient History Report

B6

B6

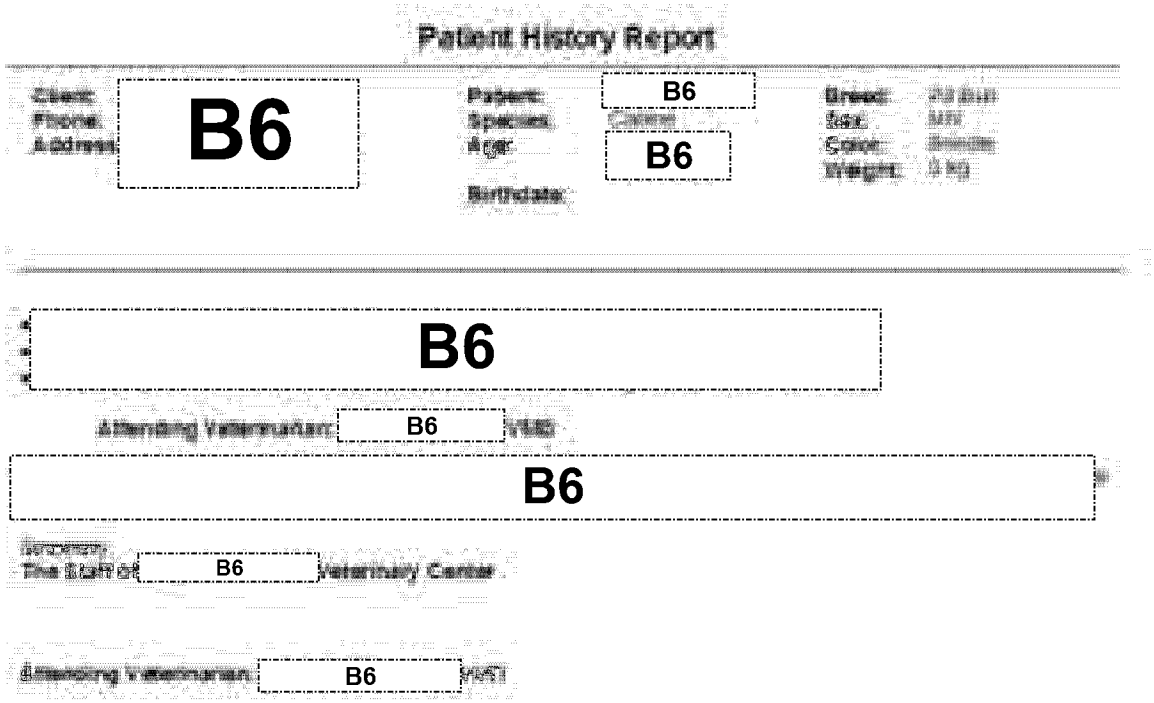
B6

B6

B6

B6

B6



Client: B6
Patient:

NOVA B6 2:15pm

Sample Profile

B6

Patient ID	B6
Patient Name	
Analyzed	B6 02:17:28 PM
Analyzer ID	B6
Sample Type	Venous
Panel	Critical Care
Operator	B6
Released	auto

Required Fields

Optional Fields 54% / B6 ~~ll

B6

Client: B6
Patient:

RDVM B6 med hx B6

Patient History Report

Client: B6
Phone:
Address:

Patient: B6
Species:
Age:
Birthdate:

Breed:
Sex:
Colour:
Weight:

B6

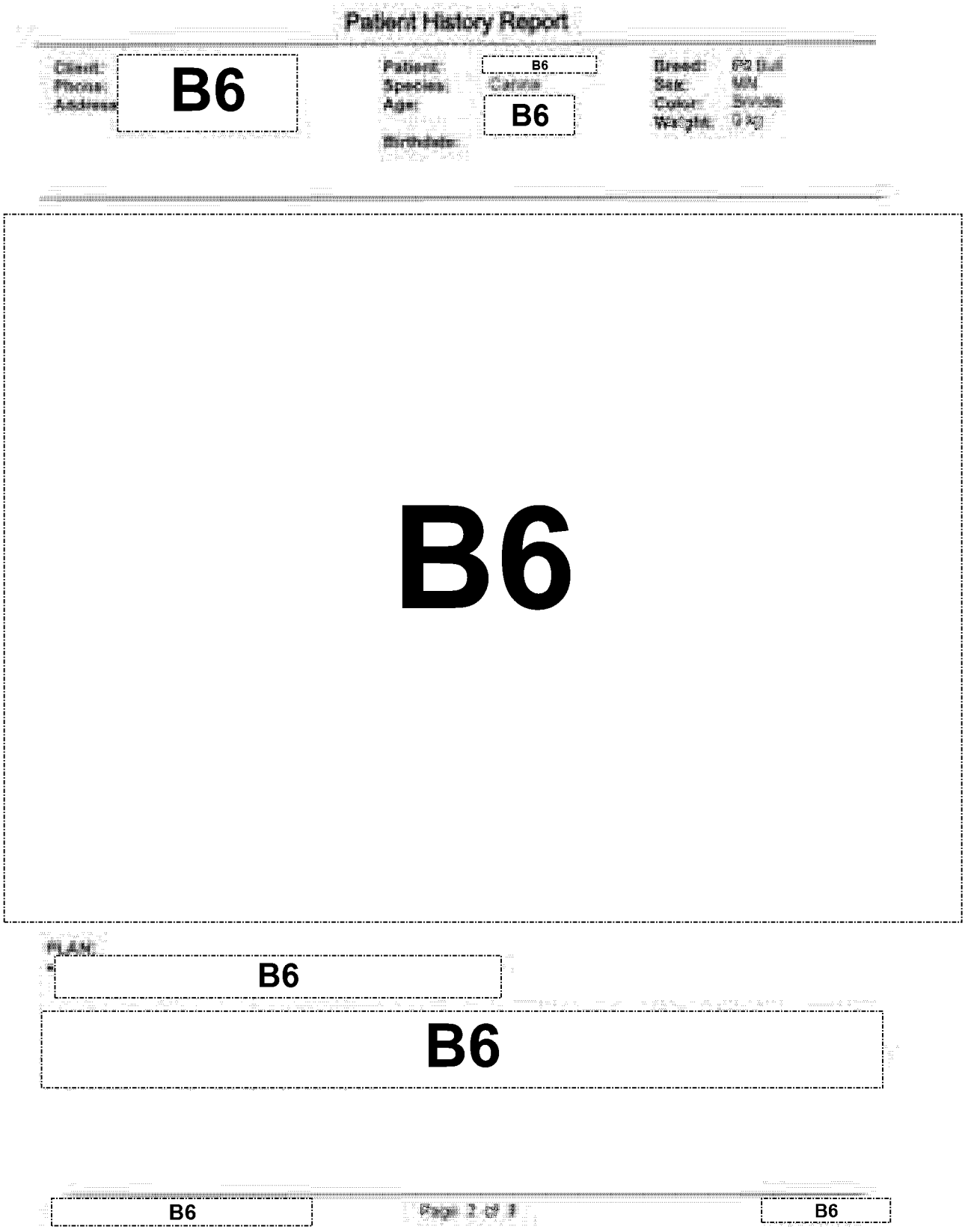
B6

rDVM B6

B6 Page 1 of 3 B6

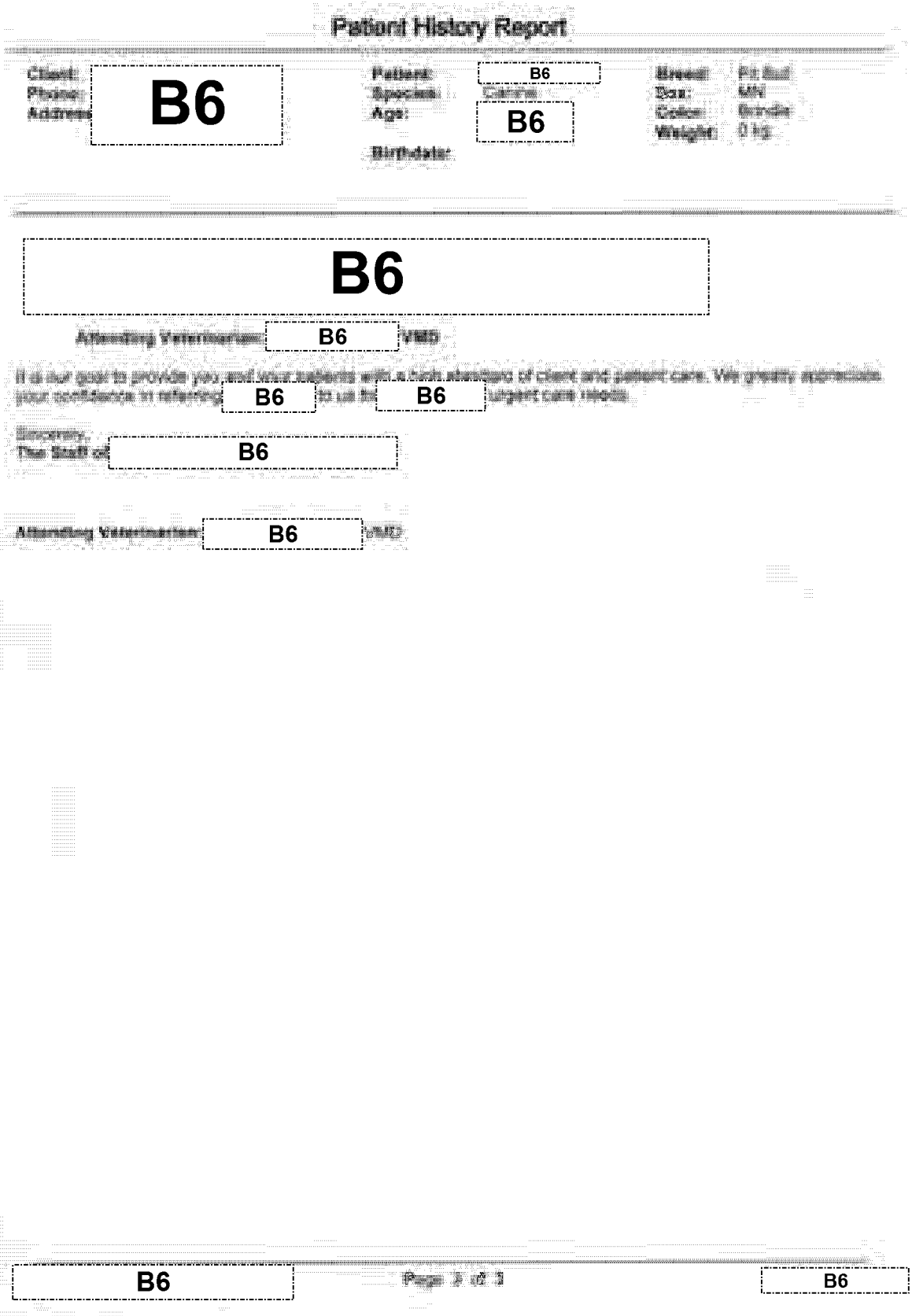
Client: B6
Patient:

RDVM B6 **med hx 2/15/18**



Client: B6
Patient:

RDVM B6 **med hx 2/15/18**



Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6

B6

Policy B6

B6

B6

B6

B6

Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6

B6 B6

Fax Transmission

B6 B6

B6

Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals

Invoice

B6

B6

B6

B6

Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6

B6

B6

B6

B6

B6

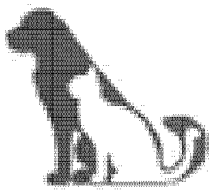
B6

Client: B6
Patient:

RDVM B6 **AH records.**

B6 B6 B6

413298



Date: B6
Number of pages including cover sheet: 10

FAX

To: B6
Phone Number:
Fax: B6

From: B6

Remind ☒ Urgent ☒ For your review ☐ Reply ASAP ☐ Please comment ☐

B6

B6 had Bladder Cardiac Ultrasound done here at this hospital.

Thank you.

B6

B6

RDVM B6 AH records.

B6 B6 B6

Patient History Report B6

B6

B6

B6

B6

B6

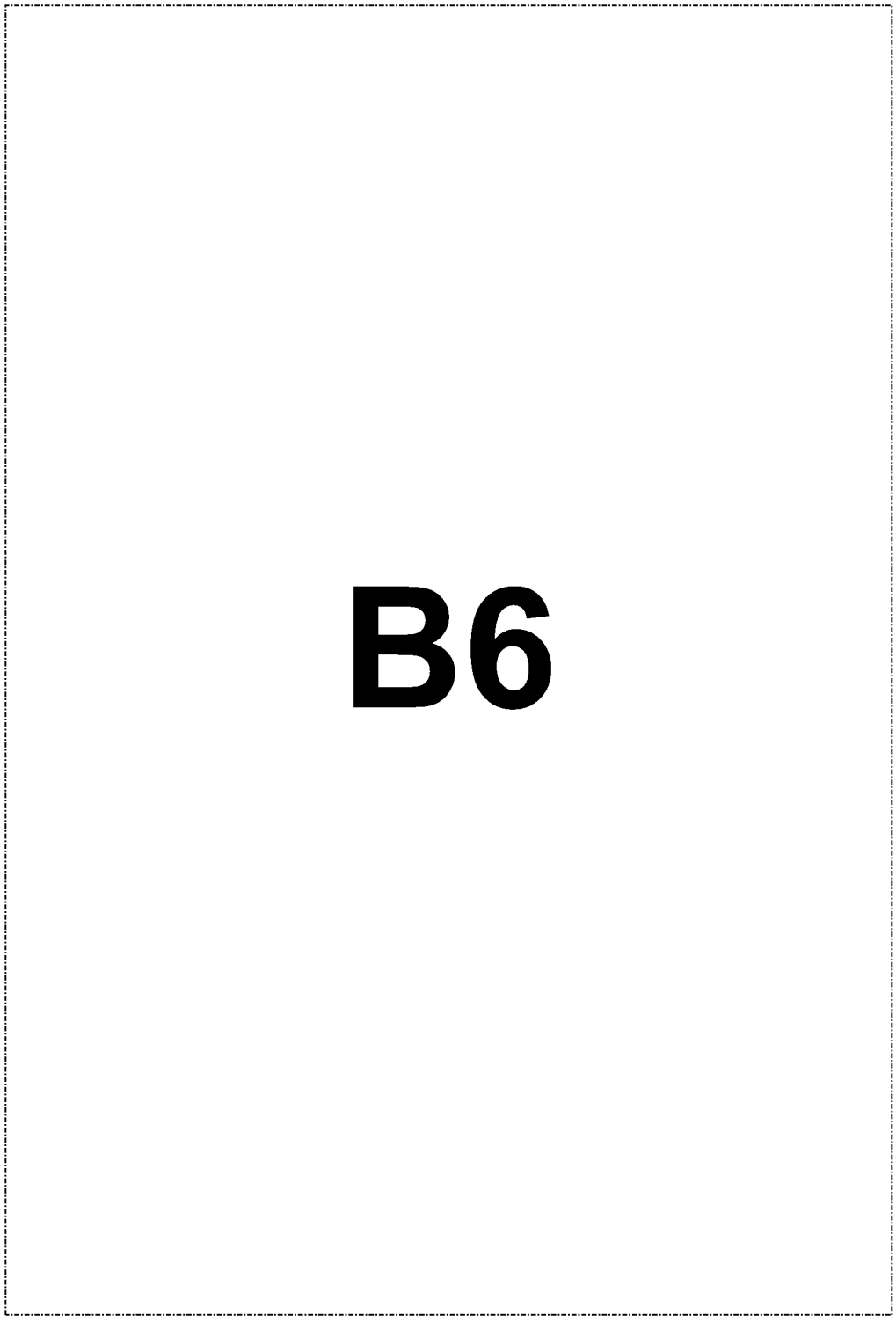
B6

B6

Client: B6
Patient:

RDVM B6 **AH records.**

B6 B6 B6



Client: B6
Patient:

RDVM B6 AH records.

B6 B6 B6

B6

Client: B6
Patient:

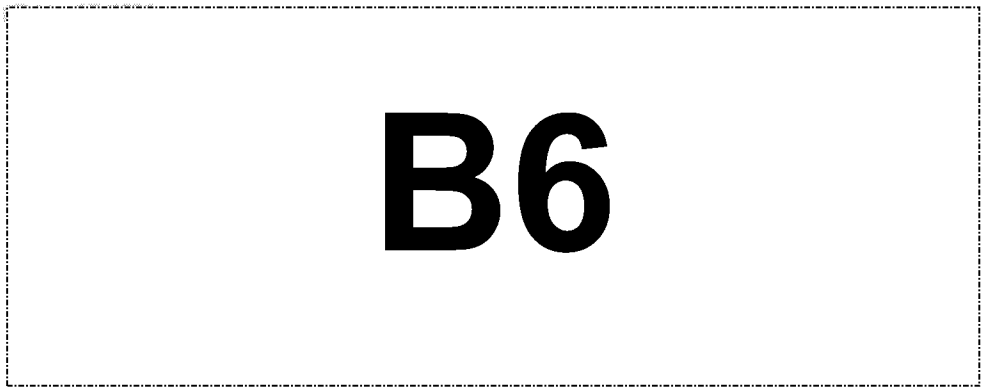
RDVM B6 **AH records.**

B6 B6 B6

B6

RDVM B6 AH records.

B6 B6 B6



B6

Client: B6
Patient:

RDVM B6 AH records.

B6 B6 B6

B6

B6

B6

B6

B6

Client:
Patient: B6

Vitals Results

B6

2:09:53 PM	Notes	
3:30:10 PM	Nursing note	
3:41:34 PM	Weight (kg)	
3:41:47 PM	Respiratory Rate	
3:43:28 PM	Catheter Assessment	
3:43:36 PM	Temperature (F)	
3:43:47 PM	Cardiac rhythm	
3:43:48 PM	Heart Rate (/min)	
4:02:49 PM	Blood Pressure (mmHg)	
4:44:44 PM	Cardiac rhythm	
4:44:45 PM	Heart Rate (/min)	
5:25:10 PM	Eliminations	
5:25:15 PM	Respiratory Rate	
5:45:37 PM	Cardiac rhythm	
5:55:08 PM	Quantify IV Fluids (CRI) in mls	
5:55:09 PM	Catheter Assessment	
5:57:11 PM	Cardiac rhythm	
5:57:12 PM	Heart Rate (/min)	
6:54:35 PM	Cardiac rhythm	
6:54:36 PM	Heart Rate (/min)	
7:30:01 PM	Cardiac rhythm	
7:58:28 PM	Quantify IV Fluids (CRI) in mls	
7:58:29 PM	Catheter Assessment	
7:58:53 PM	Cardiac rhythm	
7:58:54 PM	Heart Rate (/min)	
7:59:07 PM	Respiratory Rate	
8:45:43 PM	Cardiac rhythm	
8:45:44 PM	Heart Rate (/min)	
9:10:01 PM	Cardiac rhythm	
9:46:06 PM	Cardiac rhythm	
9:46:07 PM	Heart Rate (/min)	
9:46:14 PM	Respiratory Rate	
10:40:51 PM	Cardiac rhythm	
10:40:52 PM	Heart Rate (/min)	
11:18:19 PM	Respiratory Rate	
11:19:53 PM	Catheter Assessment	
11:20:08 PM	Quantify IV Fluids (CRI) in mls	
11:20:09 PM	Catheter Assessment	
11:22:17 PM	Nursing note	

B6

Client: B6
Patient:

Vitals Results

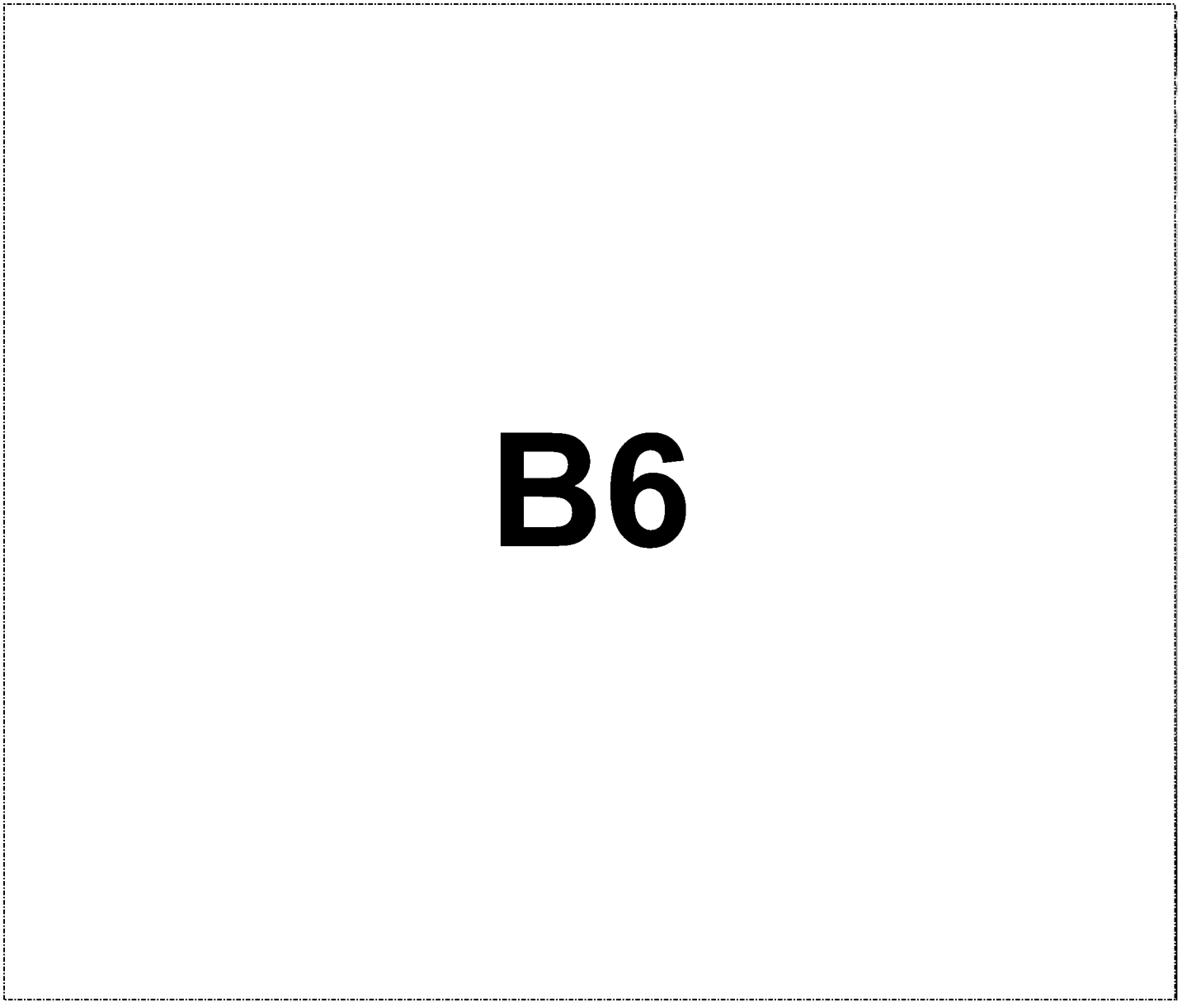
B6	11:56:15 PM	Cardiac rhythm
	11:56:16 PM	Heart Rate (/min)
	12:01:14 AM	Eliminations
	12:07:09 AM	Nursing note
	12:42:35 AM	Cardiac rhythm
	12:42:36 AM	Heart Rate (/min)
	1:16:25 AM	Respiratory Rate
	1:41:21 AM	Cardiac rhythm
	1:41:22 AM	Heart Rate (/min)
	2:41:29 AM	EKG: Note rate and rythm.
	3:24:05 AM	Catheter Assessment
	3:30:30 AM	Quantify IV Fluids (CRI) in mls
	3:30:31 AM	Catheter Assessment
	3:31:02 AM	Nursing note
	3:53:47 AM	Respiratory Rate
	3:53:56 AM	Cardiac rhythm
	3:53:57 AM	Heart Rate (/min)
	4:45:07 AM	Eliminations
	4:45:17 AM	Cardiac rhythm
	4:45:18 AM	Heart Rate (/min)
	5:55:10 AM	Cardiac rhythm
	5:55:11 AM	Heart Rate (/min)
	6:02:24 AM	Respiratory Rate
	6:05:44 AM	Nursing note
	6:08:49 AM	Nursing note
	6:35:37 AM	Cardiac rhythm
	6:35:38 AM	Heart Rate (/min)
	7:54:13 AM	Respiratory Rate
	7:54:37 AM	Cardiac rhythm
	7:54:38 AM	Heart Rate (/min)
	7:57:26 AM	Catheter Assessment
	8:07:31 AM	Eliminations
	8:07:58 AM	Weight (kg)
	8:38:09 AM	Nursing note
	8:39:08 AM	Cardiac rhythm
	8:39:09 AM	Heart Rate (/min)
	8:51:20 AM	Notes
	10:17:19 AM	Quantify IV Fluids (CRI) in mls
	10:17:20 AM	Catheter Assessment

B6

Client: B6
Patient:

Vitals Results

B6	11:11:00 AM	Eliminations	B6
	12:22:54 PM	Amount eaten	
	1:33:46 PM	Quantify IV Fluids (CRI) in mls	
	1:33:47 PM	Catheter Assessment	
8/31/2018 5:14:22 PM		Weight (kg)	



B6

B6

Telemetry

B6

Telemetry

B6

Telemetry

B6

Client:
Patient: B6

Alivecor ECG

B6

B6

B6

Client: B6
Patient:

Alivecor ECG

B6

B6

B6

Client: B6
Patient:

ECG from Cardio

B6

B6

B6

Client: B6
Patient:

ECG from Cardio

B6

B6

B6

Client: B6
Patient:

ECG from Cardio

B6

B6

B6

Client: B6
Patient:

Patient History

B6

12:58 PM	UserForm
01:34 PM	UserForm
01:41 PM	UserForm
02:08 PM	Purchase
02:08 PM	Purchase
02:09 PM	Purchase
02:09 PM	Purchase
02:09 PM	Purchase
02:09 PM	Purchase
02:09 PM	Vitals
02:15 PM	Purchase
02:20 PM	Labwork
03:07 PM	Treatment
03:30 PM	Vitals
03:30 PM	Purchase
03:30 PM	Purchase
03:30 PM	Treatment
03:41 PM	Treatment
03:41 PM	Vitals
03:41 PM	Treatment
03:41 PM	Vitals
03:43 PM	Treatment
03:43 PM	Vitals
03:43 PM	Treatment
03:43 PM	Vitals
03:43 PM	Treatment
03:43 PM	Vitals
03:43 PM	Vitals
03:43 PM	Vitals
04:02 PM	Vitals
04:03 PM	Purchase
04:05 PM	Treatment
04:44 PM	Treatment
04:44 PM	Vitals
04:44 PM	Vitals
04:47 PM	UserForm
05:01 PM	Purchase
05:01 PM	Treatment
05:12 PM	Treatment
05:23 PM	Treatment

B6

Patient History

B6

05:23 PM	Treatment
05:25 PM	Treatment
05:25 PM	Vitals
05:25 PM	Treatment
05:25 PM	Vitals
05:45 PM	Vitals
05:55 PM	Treatment
05:55 PM	Vitals
05:55 PM	Vitals
05:55 PM	Treatment
05:55 PM	Prescription
05:57 PM	Treatment
05:57 PM	Vitals
05:57 PM	Vitals
06:54 PM	Treatment
06:54 PM	Vitals
06:54 PM	Vitals
07:27 PM	Prescription
07:30 PM	Vitals
07:58 PM	Treatment
07:58 PM	Vitals
07:58 PM	Vitals
07:58 PM	Treatment
07:58 PM	Vitals
07:58 PM	Vitals
07:59 PM	Treatment
07:59 PM	Vitals
08:00 PM	Treatment
08:45 PM	Treatment
08:45 PM	Vitals
08:45 PM	Vitals
09:10 PM	Vitals
09:19 PM	Vitals
09:32 PM	Treatment
09:46 PM	Treatment
09:46 PM	Vitals
09:46 PM	Vitals
09:46 PM	Treatment
09:46 PM	Vitals
10:40 PM	Treatment

B6

Patient History

B6

10:40 PM	Vitals
10:40 PM	Vitals
11:18 PM	Treatment
11:18 PM	Treatment
11:18 PM	Vitals
11:19 PM	Treatment
11:19 PM	Vitals
11:20 PM	Treatment
11:20 PM	Vitals
11:20 PM	Vitals
11:22 PM	Vitals
11:56 PM	Treatment
11:56 PM	Vitals
11:56 PM	Vitals
12:01 AM	Treatment
12:01 AM	Vitals
12:03 AM	Treatment
12:07 AM	Treatment
12:07 AM	Vitals
12:42 AM	Treatment
12:42 AM	Vitals
12:42 AM	Vitals
01:04 AM	Treatment
01:16 AM	Treatment
01:16 AM	Vitals
01:41 AM	Treatment
01:41 AM	Vitals
01:41 AM	Vitals
01:41 AM	Treatment
02:13 AM	Purchase
02:41 AM	Vitals
03:24 AM	Treatment
03:24 AM	Vitals
03:24 AM	Treatment
03:27 AM	Treatment
03:30 AM	Treatment
03:30 AM	Vitals
03:30 AM	Vitals
03:31 AM	Vitals
03:53 AM	Treatment
03:53 AM	Vitals

B6

Client: B6
Patient:

Patient History

B6

03:53 AM	Treatment
03:53 AM	Vitals
03:53 AM	Vitals
04:41 AM	Treatment
04:45 AM	Treatment
04:45 AM	Vitals
04:45 AM	Treatment
04:45 AM	Vitals
04:45 AM	Vitals
05:23 AM	Treatment
05:55 AM	Treatment
05:55 AM	Vitals
05:55 AM	Vitals
06:02 AM	Treatment
06:02 AM	Treatment
06:02 AM	Treatment
06:02 AM	Treatment
06:02 AM	Vitals
06:05 AM	Vitals
06:08 AM	Vitals
06:35 AM	Treatment
06:35 AM	Vitals
06:35 AM	Vitals
07:54 AM	Treatment
07:54 AM	Vitals
07:54 AM	Treatment
07:54 AM	Treatment
07:54 AM	Vitals
07:54 AM	Vitals
07:57 AM	Treatment
07:57 AM	Treatment
07:57 AM	Vitals
08:07 AM	Vitals
08:07 AM	Vitals
08:13 AM	Prescription
08:38 AM	Vitals
08:39 AM	Treatment
08:39 AM	Vitals
08:39 AM	Vitals
08:51 AM	Vitals

B6

Client: B6
Patient:

Patient History

B6

08:57 AM	Treatment
09:13 AM	Treatment
09:17 AM	Purchase
09:18 AM	Purchase
10:17 AM	Treatment
10:17 AM	Vitals
10:17 AM	Vitals
11:11 AM	Vitals
11:36 AM	Appointment
12:21 PM	Appointment
12:22 PM	Treatment
12:22 PM	Treatment
12:22 PM	Vitals
12:29 PM	Appointment
12:34 PM	Treatment
12:43 PM	Treatment
01:15 PM	Treatment
01:33 PM	Treatment
01:33 PM	Vitals
01:33 PM	Vitals
01:59 PM	Prescription
02:04 PM	Purchase
02:06 PM	Prescription
02:08 PM	Prescription
02:10 PM	Prescription
02:15 PM	Purchase
02:15 PM	Purchase
02:26 PM	UserForm
03:05 PM	Deleted Reason

B6

02/26/2018 08:56 AM	Appointment
04/10/2018 12:26 PM	Appointment
04/20/2018 01:18 PM	Appointment
07/27/2018 09:17 AM	Task
08/28/2018 02:37 PM	Appointment

B6

Client: B6
Patient:

Patient History

08/28/2018 02:39 PM	Appointment
08/28/2018 02:52 PM	Appointment
08/28/2018 04:49 PM	Appointment
08/31/2018 04:02 PM	UserForm
08/31/2018 04:10 PM	Treatment
08/31/2018 04:11 PM	Purchase
08/31/2018 04:12 PM	Purchase
08/31/2018 04:12 PM	Purchase
08/31/2018 05:08 PM	Purchase
08/31/2018 05:10 PM	Prescription
08/31/2018 05:14 PM	Vitals
08/31/2018 05:15 PM	UserForm
10/23/2018 01:43 PM	UserForm

B6

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax (508) 839-7951
http://vetmed.tufts.edu/
Referring Vet Direct Line: 508-887-4989

Notice of Patient Admit

Date: B6 12:56:36 PM
Case No: B6
Referring Doctor: B6
Client Name:
Patient Name: B6

Dear Colleague,

B6

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax: (508) 839-7951
http://vetmed.tufts.edu/

B6 Male (Neutered)
Canine Pit Bull Brindle/White
B6

B6

Dear B6

Thank you for referring B6 with their pet B6

B6 presented to the Emergency and Critical Care Service yesterday. He was diagnosed with CHF, DCM, and malignant ventricular tachycardia. He was continued on B6, had a B6 hospital, and B6 He has a recheck with our Cardiology service this week.

If you have any questions, or concerns, please contact us at 508-887-4888.

Thank you,

B6 DVM (Emergency & Critical Care Resident)

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

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55 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax: (508) 839-7951
http://vetmed.tufts.edu/

B6

B6 Male (Neutered)
Canine Pit Bull Brindle/White
B6

B6

Dear B6

Thank you for referring B6 with their pet B6

If you have any questions, or concerns, please contact us at 508-887-4981.

Thank you,

B6 DVM (Cardiology)

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
35 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax: (508) 839-7951
http://vetmed.tufts.edu/

B6 Male (Neutered)
Canine Pit Bull Brindle/White
B6

B6

Dear B6

Thank you for referring B6 with their pet B6

If you have any questions, or concerns, please contact us at 508-887-4981.

Thank you,

B6 DVM (Cardiology)

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
(508) 839-5395

All Medical Records

Client: B6
Address:

Patient: B6
Breed: Pit Bull
DOB: B6

Species: Canine
Sex: Male (Neutered)

Home Phone: B6
Work Phone: (___) _-____
Cell Phone: (___) _-____

Referring Information

B6

Client:
Patient: B6

Initial Complaint:
Emergency

SOAP Text B6 1:04PM - B6

Subjective
NEW VISIT (ER)

Presenting complaint: tachyarrhythmia
Referral visit?: yes
Diagnostics completed prior to visit: CBC/chem, CXR,

HISTORY:
- choking sounds at home ~1 months ago, ~2/10 had some coughing
- went to rDVM 2/12, xrays performed reportedly showed cardiomegaly; had BW with no abnormalities noted per owner
- Seen at B6 on 2/13 for echocardiogram; a heart murmur, was detected unclear what disease; started B6
- 2/22 recheck BW rDVM , some concern with kidneys per owner, unsure of details; did EKG, 200+ BPM
- doing well at home, good energy/appetite, no weakness/collapse, PU/PD since lasix started
- HWT x2 recently negative
- Purina One lamb and rice dry food, +/- hamburger or cold cuts

Signalment: ~7yo MN Pitbull mix
Prior medical history:

- owned for past 2 years, no prior medical history known
Current medications:
- B6

Vaccination status/flea & tick preventative use: no F/T/HWP in past
Travel history: NE only

EXAM:

B6

C/V: normal rate/rhythm on auscultation but faster rate when excited; Grade II/VI heart murmur PMI left apex ausculted; no arrhytmias appreciated during exam; s/s femoral pulses bilaterally.

B6

DIAGNOSTIC TESTING:

B6

- Samples pulled for CBC/chem/BNP - on hold

PROBLEM LIST:
- Grade II/VI heart murmur
- History of suspected structural cardiac disease
- Tachyarrhythmia noted at rDVM 2/22
- Hyperlactatemia - suspect exertional/sampling

ASSESSMENT:
B6 is suspected of having DCM, and has had reported tachyarrhythmias. After admission to Tufts, EKG noted runs of v-tach - suspect due to underlying structural cardiac disease. Plan for cardiology consult and continuous EKG monitoring in hospital for at least one night.

PLAN:
Diagnostics: cardiology consultation with echo; +/- CBC/chem, +/- BNP

Client: B6
Patient:

Pending: none
Treatments:
- B6
-
-
-
Monitoring: telemetry, RR/RE, vitals, comfort, appetite

CLIENT COMMUNICATION:
Discussed concerns with owner of underlying cardiac disease, for which he was started on B6 but newer concern for arrhythmia, particularly tachyarrhythmia. No arrhythmias noted on ER cursory EKG, but can be intermittent, and top considerations for SVT vs. ventricular arrhythmias vs. other. Can be due to underlying structural cardiac disease vs. other such as adrenal or splenic disease B6

B6

Resuscitation code (if admitting to ICU): YELLOW

B6, DVM

ADDENDUM:
Cardiology consult confirmed suspected DCM, frqeuent v-tach noted during exam. Plan to start B6 BID, in the meantime gave B6 Plan to start taurine supplementation @ 1000 mg PO BID with blood sample pulled prior. Called owner to discuss, and different antiarrhythmic options, that we would likely start amiodarone for now. We will otherwise update tomorrow morning if no other major changes overnight.
B6

Overnight Update:
- B6
-
-
-

B6

SOAP Text B6 **5:49PM** - B6

HISTORY:
- B6
- went to rDVM 2/12, xrays performed reportedly showed cardiomegaly; had BW with no abnormalities noted per owner
- Seen at B6 for echocardiogram; a heart murmur, was detected unclear what disease; started medication 75 mg PO BID furosemide, 7.5 mg PO BID vetmedin
- 2/22 recheck BW rDVM , some concern with kidneys per owner, unsure of details; did EKG, 200+ BPM
- doing well at home, good energy/appetite, no weakness/collapse, PU/PD since lasix started
- HWT x2 recently negative
- Purina One lamb and rice dry food, +/- hamburger or cold cuts

Client:
Patient: B6

Current medications:

- B6

DIAGNOSTIC TESTING:

B6

Cardiology Consult

EXAM:

B6

C/V: normal rate/rhythm on auscultation but faster rate when excited; Grade I-II/VI heart murmur PMI left apex ausculted; no arrhytmias appreciated during exam; SSFP.

B6

PLAN:

B6

Resuscitation code (if admitting to ICU): YELLOW

B6, DVM (ECC Resident)

Initial Complaint:

Recheck - B6 - DCM protocol

SOAP Text Aug 31 2018 5:08PM - B6

Disposition/Recommendations

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
(508) 839-5395

Client:	B6
Veterinarian:	
Patient ID:	B6
Visit ID:	

Patient:	B6
Species:	Canine
Breed:	Pit Bull
Sex:	Male (Neutered)
Age:	B6 Years Old

Lab Results Report

Nova Full Panel-ICU B6 **15:25 PM** **Accession ID:** B6

Test	Results	Reference Range	Units
SO2%	B6	94 - 100	%
HCT (POC)		38 - 48	%
HB (POC)		12.6 - 16	g/dL
NA (POC)		140 - 154	mmol/L
K (POC)		3.6 - 4.8	mmol/L
CL(POC)		109 - 120	mmol/L
CA (ionized)		1.17 - 1.38	mmol/L
MG (POC)		0.1 - 0.4	mmol/L
GLUCOSE (POC)		80 - 120	mg/dL
LACTATE		0 - 2	mmol/L
BUN (POC)		12 - 28	mg/dL
CREAT (POC)		0.2 - 2.1	mg/dL
TCO2 (POC)		0 - 0	mmol/L
nCA		0 - 0	mmol/L
nMG		0 - 0	mmol/L
GAP		0 - 0	mmol/L
CA/MG		0 - 0	mol/mol
BEecf		0 - 0	mmol/L
BEb		0 - 0	mmol/L
A		0 - 0	mmHg
NOVA SAMPLE		0 - 0	

Client: B6
Patient:

FiO2	B6	0 - 0	%
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
PH		7.337 - 7.467	
PCO2		36 - 44	mmHg
PO2		80 - 100	mmHg
HCO3		18 - 24	mmol/L

Nova Full Panel-ICU B6 **2:20:26 PM** **Accession ID:** B6

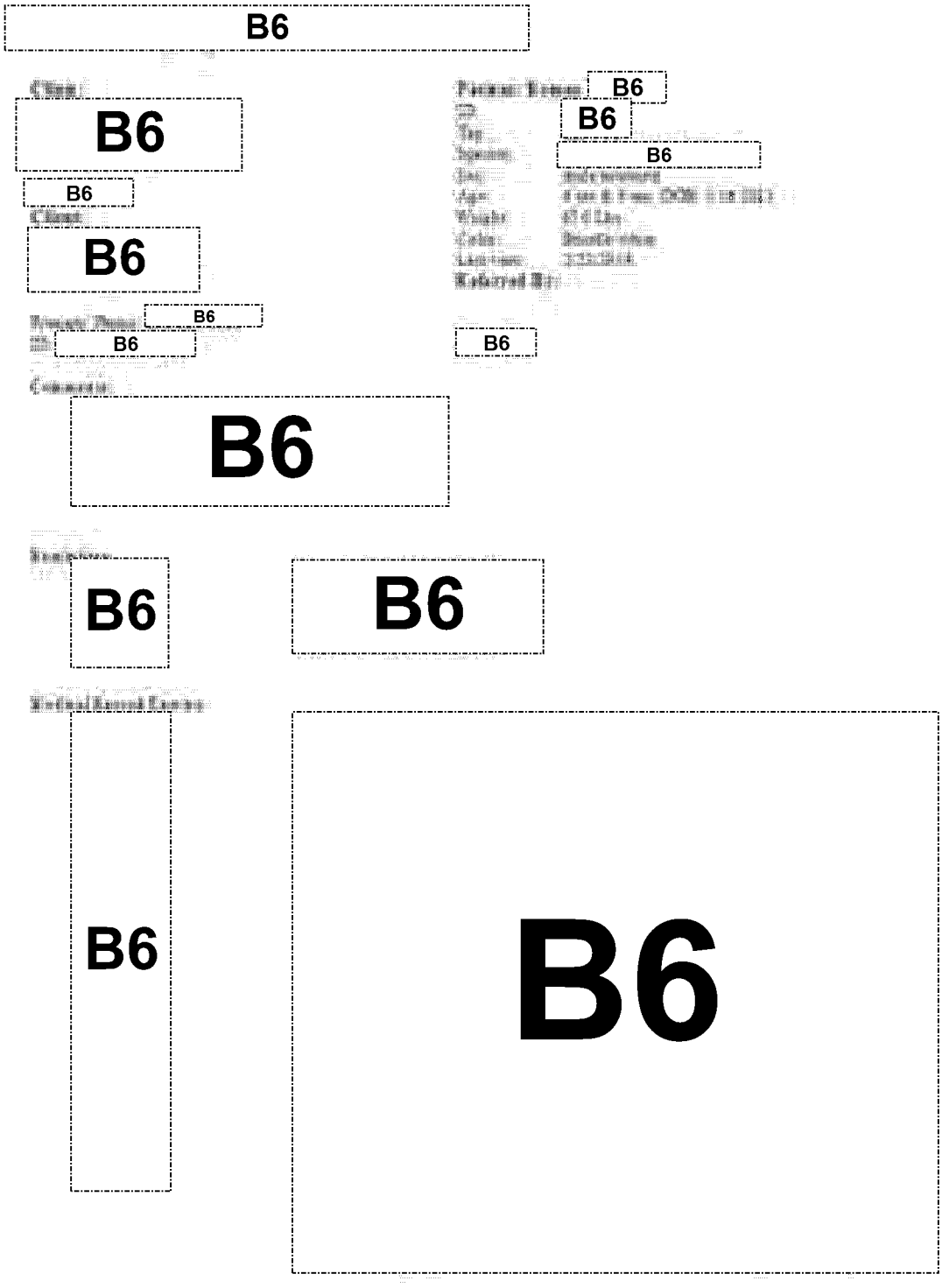
Test	Results	Reference Range	Units
TS (FHSA)	B6	0 - 0	g/dl
PCV **		0 - 0	%
TS (FHSA)		0 - 0	g/dl

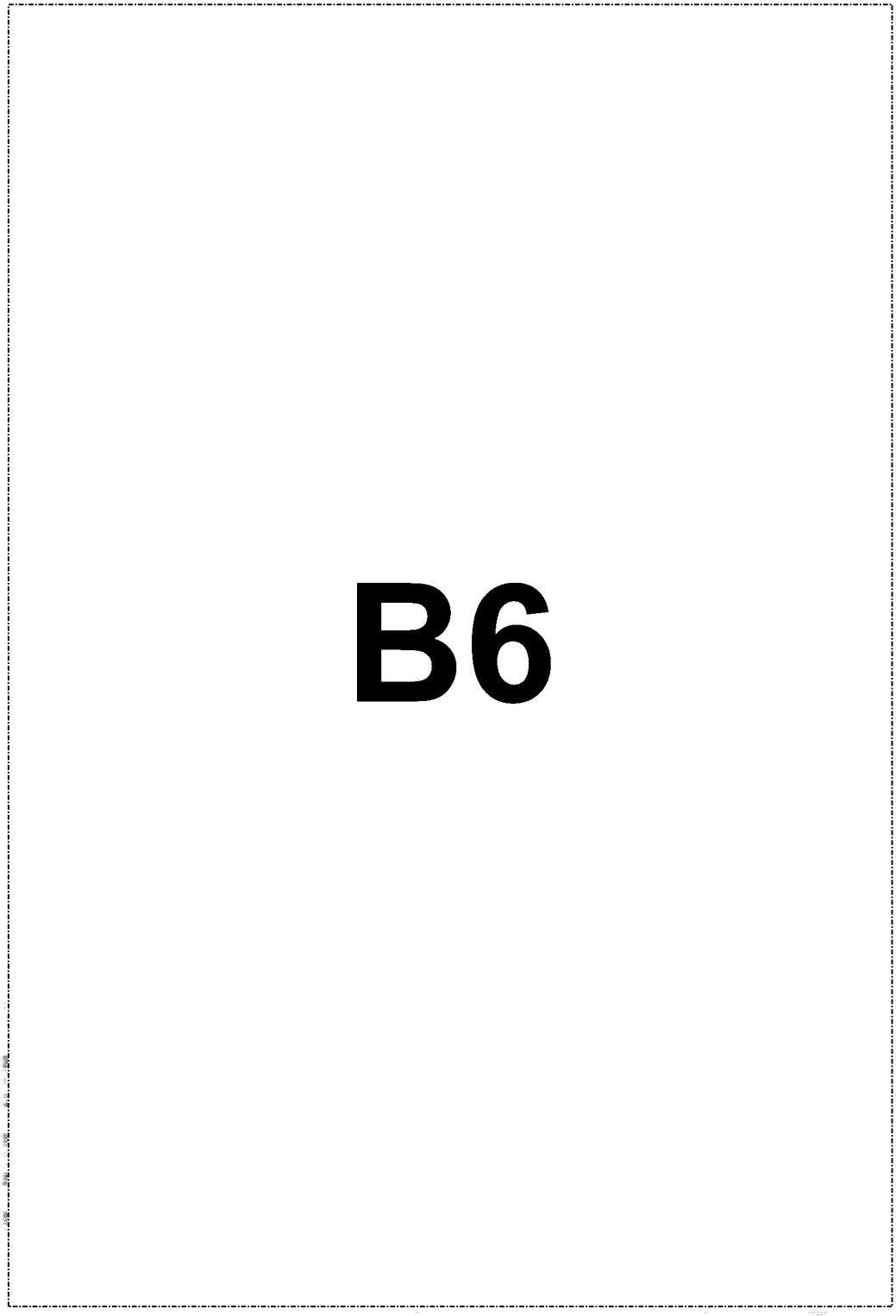
Nova Full Panel-ICU B6 **2:43:32 PM** **Accession ID:** B6

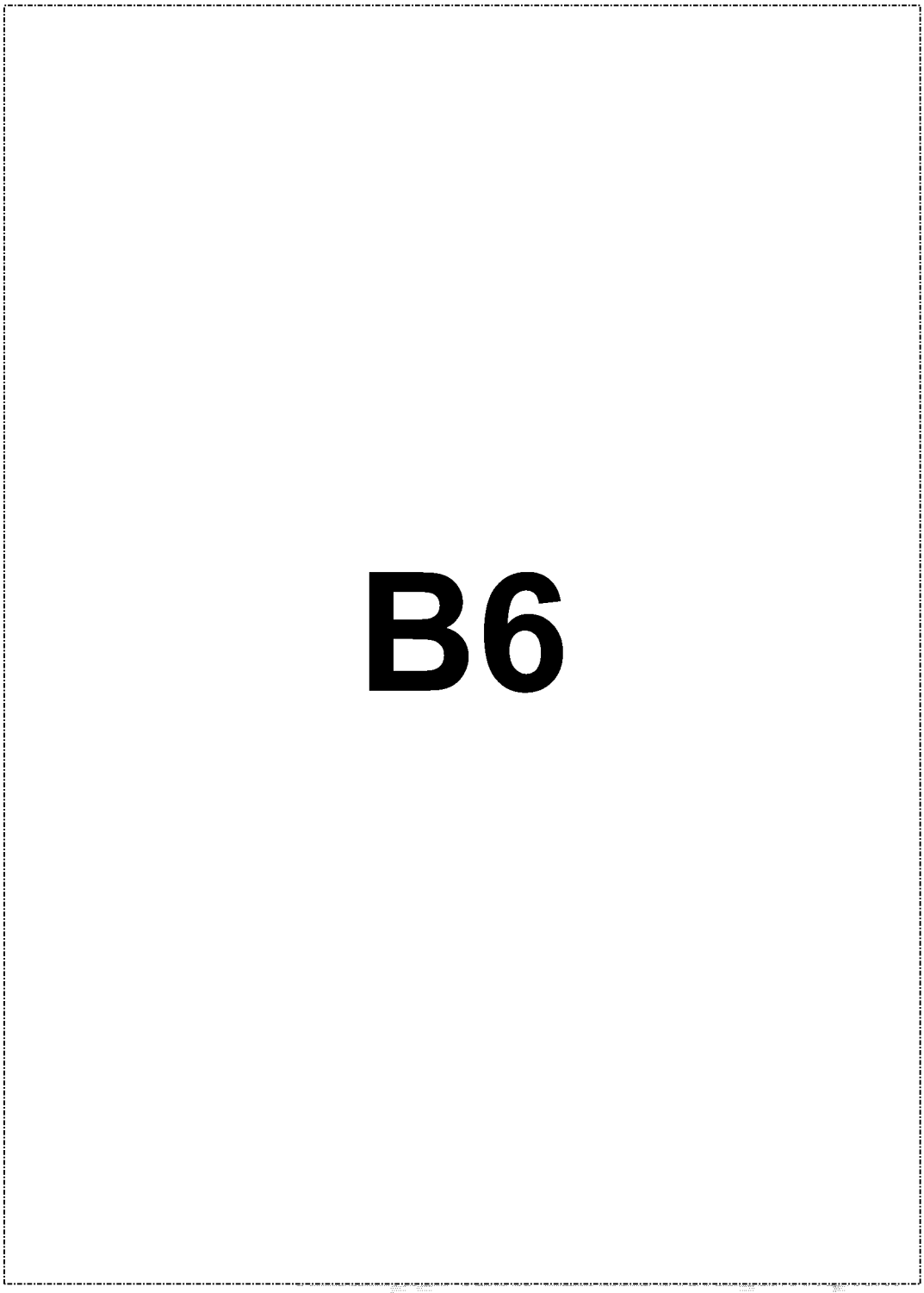
Test	Results	Reference Range	Units
4DX (omnicell)- FHSA	B6	0 - 0	

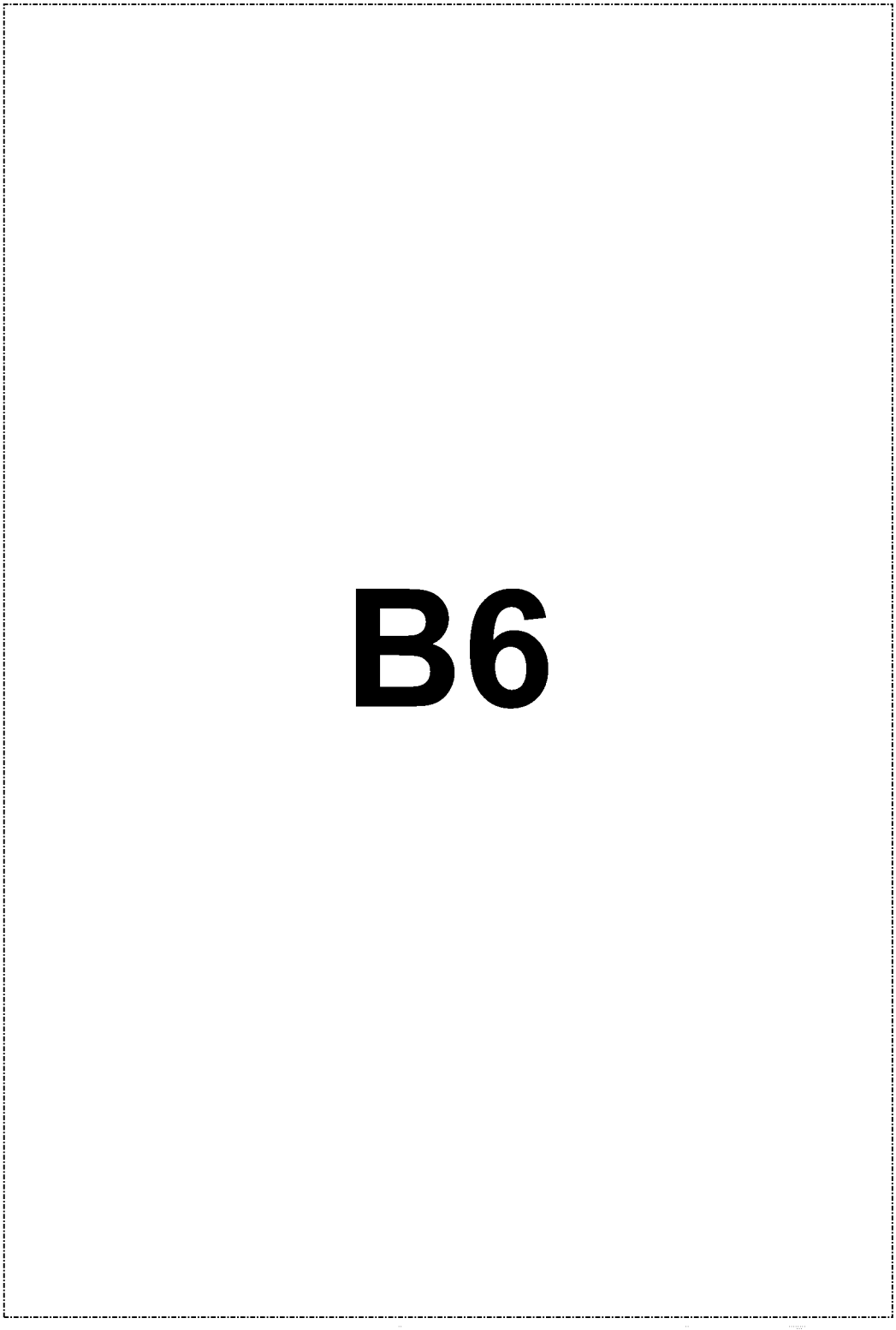
Nova Full Panel-ICU **8/31/2018 5:09:20 PM** **Accession ID:** B6

Test	Results	Reference Range	Units
GLUCOSE	B6	67 - 135	mg/dL
UREA		8 - 30	mg/dL
CREATININE		0.6 - 2	mg/dL
PHOSPHORUS		2.6 - 7.2	mg/dL
CALCIUM2		9.4 - 11.3	mg/dL
T. PROTEIN		5.5 - 7.8	g/dL
ALBUMIN		2.8 - 4	g/dL
GLOBULINS		2.3 - 4.2	g/dL
A/G RATIO		0.7 - 1.6	
SODIUM		140 - 150	mEq/L
CHLORIDE		106 - 116	mEq/L
POTASSIUM		3.7 - 5.4	mEq/L
NA/K		29 - 40	
T BILIRUBIN		0.1 - 0.3	mg/dL
D.BILIRUBIN		0 - 0.1	mg/dL
I BILIRUBIN		0 - 0.2	mg/dL
ALK PHOS		12 - 127	U/L
ALT		14 - 86	U/L
AST		9 - 54	U/L
CHOLESTEROL		82 - 355	mg/dL
OSMOLALITY (CALCULATED)		291 - 315	mmol/L

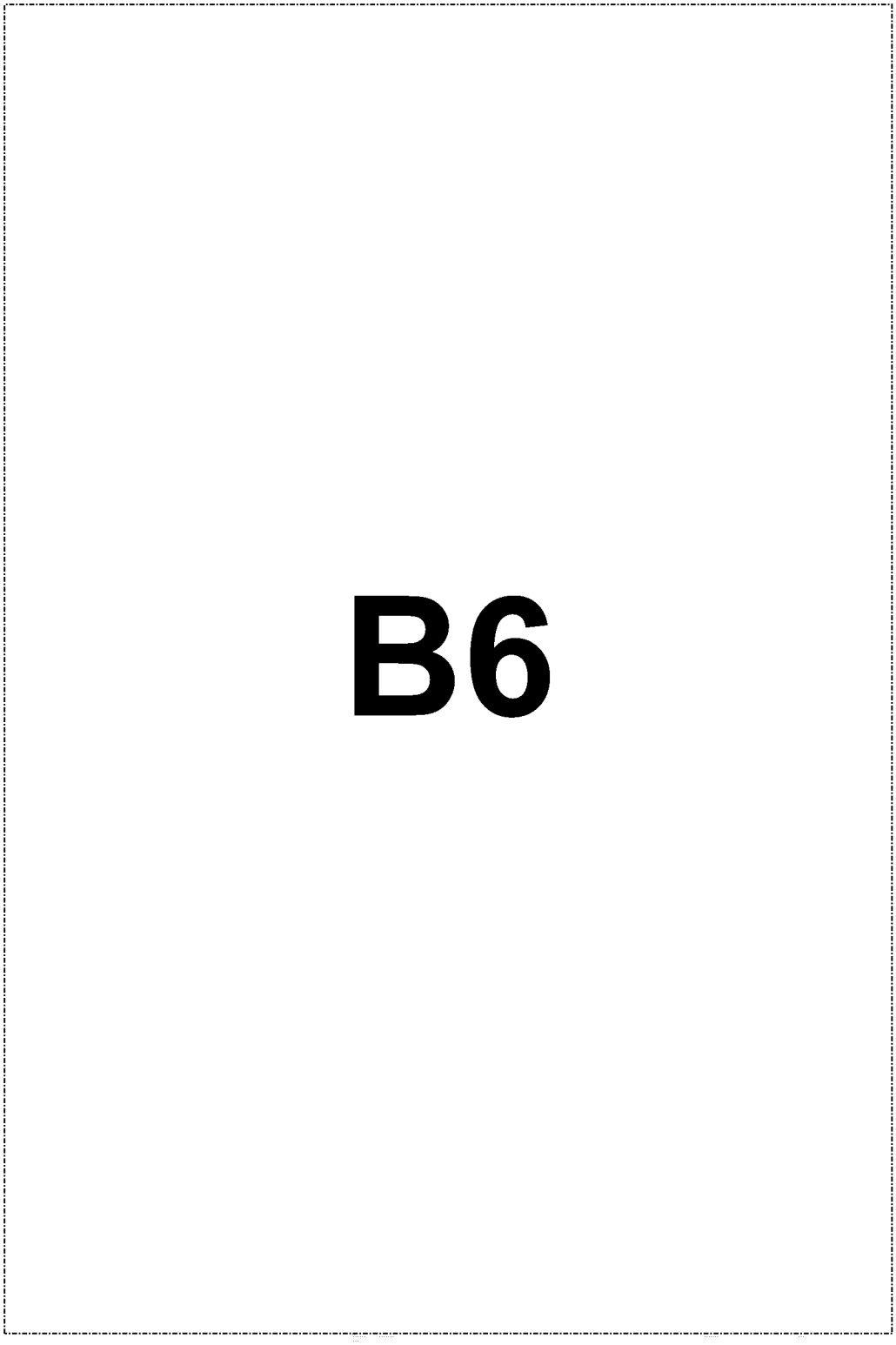




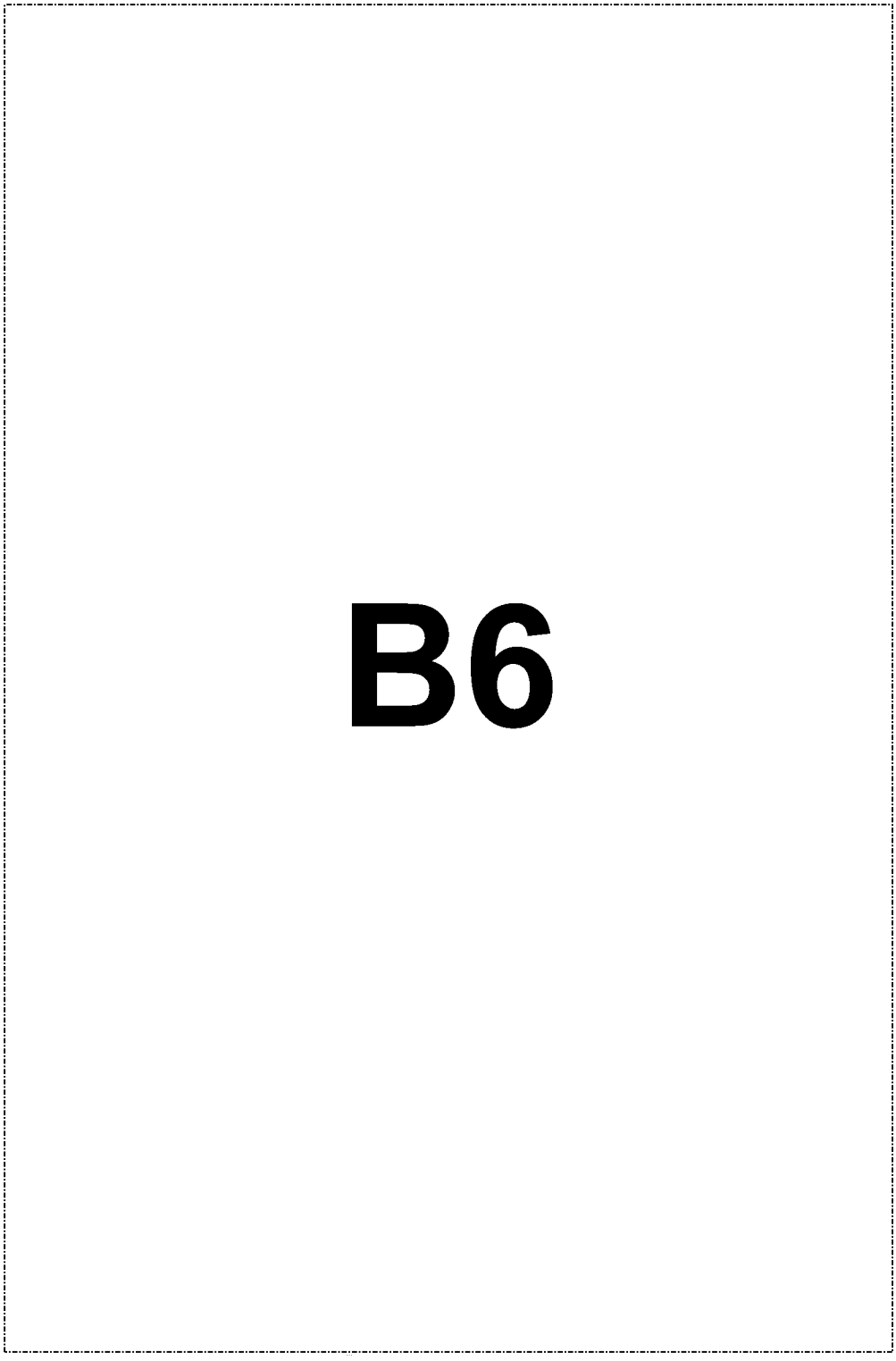




B6



B6



B6

B6

Lab Results:

B6

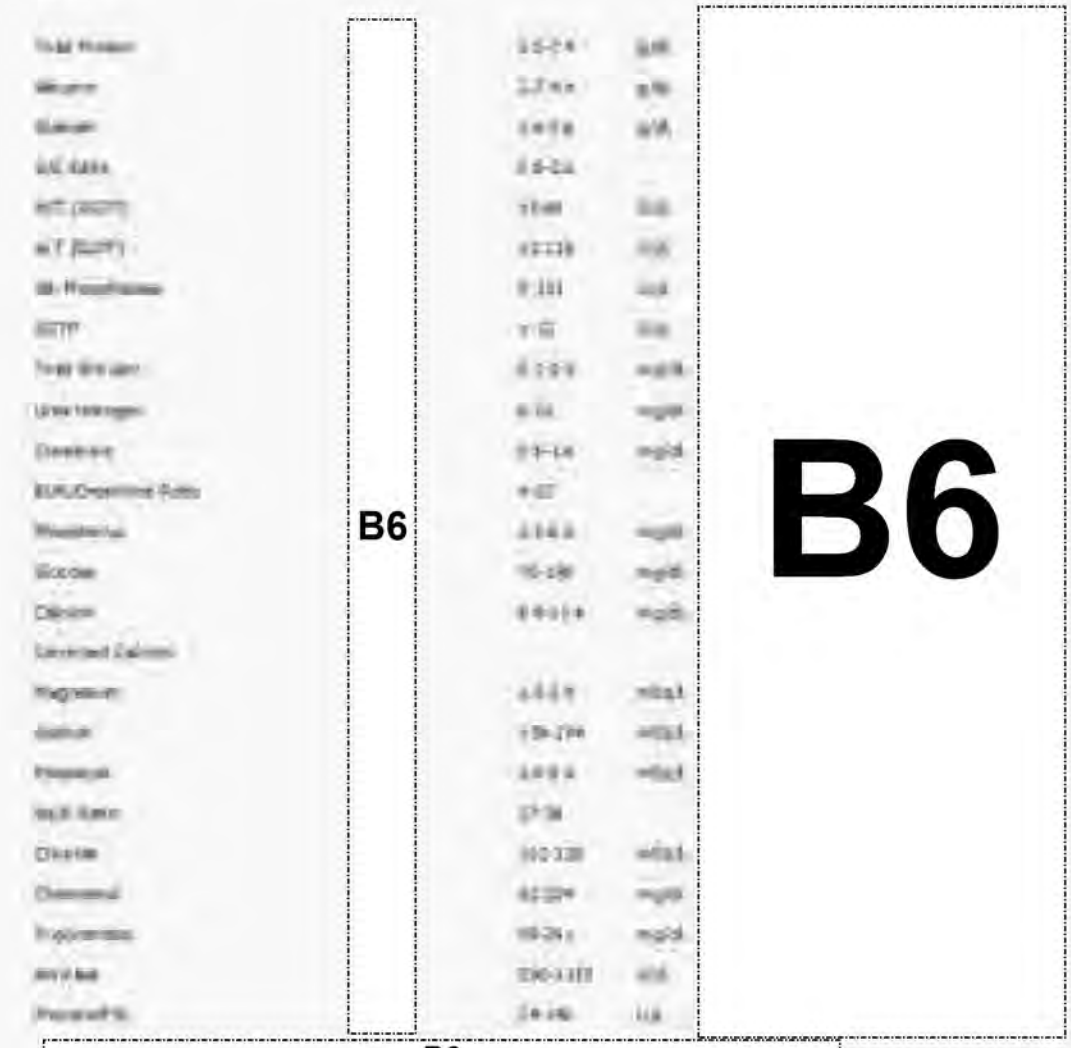
Assay Name	Value	Ref. Range	Units
[illegible]	B6	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]
[illegible]		[illegible]	[illegible]

B6

B6

B6

B6



B6

B6

B6

B6

B6

B6 **Echo/ER Report -** B6

Patient History Report

B6

B6

B6

B6

Echocardiogram Report

B6

Patient History Report

Client: B6
Phone:
Address:

Patient: B6
Species: Canine
Age: [illegible]
B6
Birthdate:

Breed: [illegible]
Sex: [illegible]
Color: [illegible]
Weight: [illegible]

PHYSICAL EXAM FINDINGS
Wt - [illegible]
BCS - [illegible]
T - [illegible]
P - [illegible]
R - [illegible]
RE - [illegible]
MM - pink, moist, **CRT** - <2 sec
Hydration - [illegible]
Pain - [illegible]

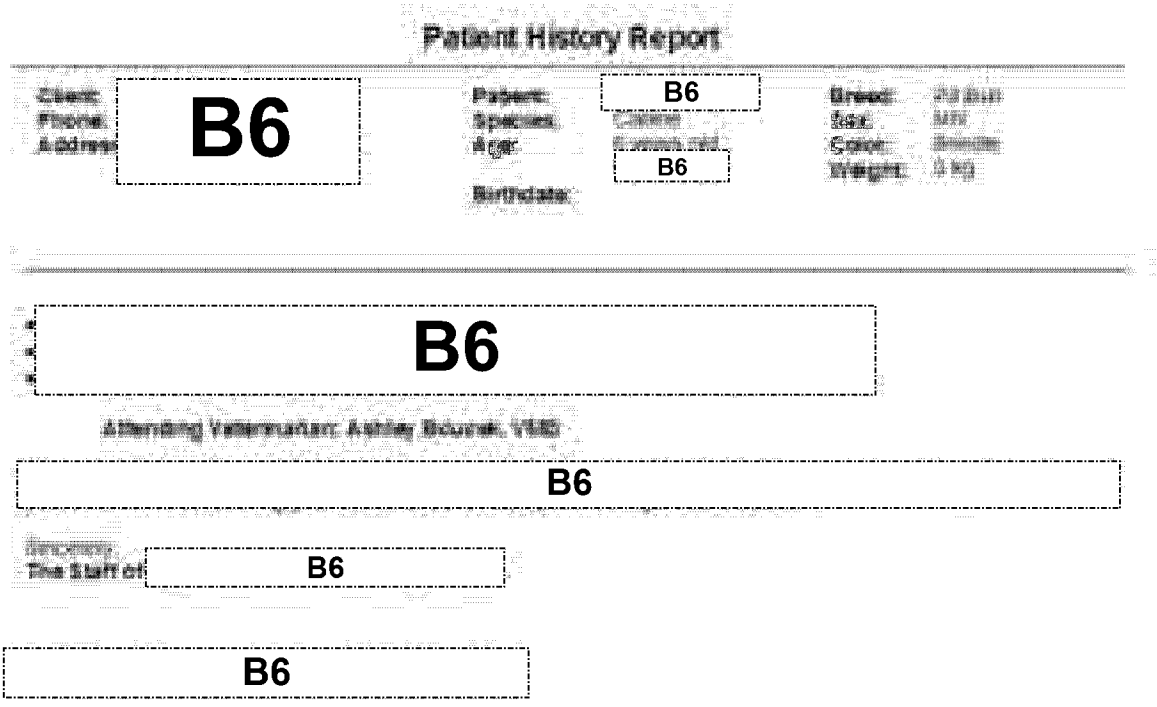
EENT - clear corneas, no discharge OU, clear AU, moderate dental disease
H/L - Grade [illegible] murmur, PG strong and synchronous, lung sounds clear bilaterally, no nasal discharge, intermittent barking cough
Abd - soft on palpation, no fluid wave or masses palpable
MS - Ambulatory x 4, no [illegible]
Integ - good general condition, no masses, lesions, or ectoparasites visualized or palpated
Neuro - BAR, normal CNS, normal gait
PLN - wnl
Rectal - wnl

ASSESSMENT
Problem List:
B6

Summary assessment and client communication
B6

PLAN
B6

B6



Client: B6
Patient:

NOVA B6 2:15pm

Sample Profile

B6

B6

Patient ID: B6
Patient Name:
Analyzed: 02/23/2018 02:17:28 PM
Analyzer ID: B6
Sample Type: Venous
Panel: Critical Care
Operator: B6
Reviewer:

Required Fields

Optional Fields 54% / B6 gell

Measured

Test	Value	Units	Reference Range	Flags
pH				
pCO2		mmHg		
pO2		mmHg		
sO2%				
Hct		%		
Hb		g/dL		
Na+		mmol/L		
K+		mmol/L		
Cl-		mmol/L		
Ca++		mmol/L		
Mg++		mmol/L		
Glc		mg/dL		
Lac		mmol/L		
BUN		mg/dL		
Crea		mg/dL		
TCO2		mmol/L		

B6

Calculated

Test	Value	Units	Reference Range	Flags
Ca+		mmol/L		
AMg		mmol/L		
Gap		mmol/L		
Ca++Mg++		mmol		
BUN/Crea		mg/mg		
BE-ecf		mmol/L		
BEb		mmol/L		
SBC		mmol/L		
HCO3-		mmol/L		
PH2		mmHg		
cCCap		mL/dL		
cCCT		mL/dL		
A		mmHg		
Osm		mOsm/kg		

B6

Patient History Report

Client: B6
Phone:
Address:

Patient: B6
Species:
Age:
Birthdate:

Breed:
Sex:
Colour:
Weight:

B6

Echocardiogram Report

This report describes evaluation of echocardiography.

B6

SUMMARY:
1. Dilated cardiomyopathy
2. Intermittent arrhythmia

CONCLUSION: These findings are most consistent with dilated cardiomyopathy. The recent referral radiographs are positive for left-sided congestive heart failure.

B6 DVM

B6

HISTORY:

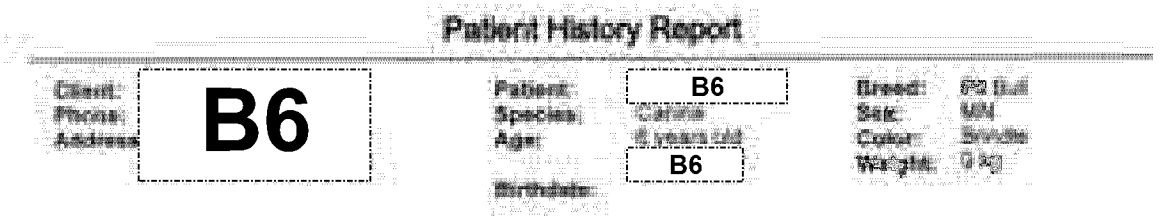
B6

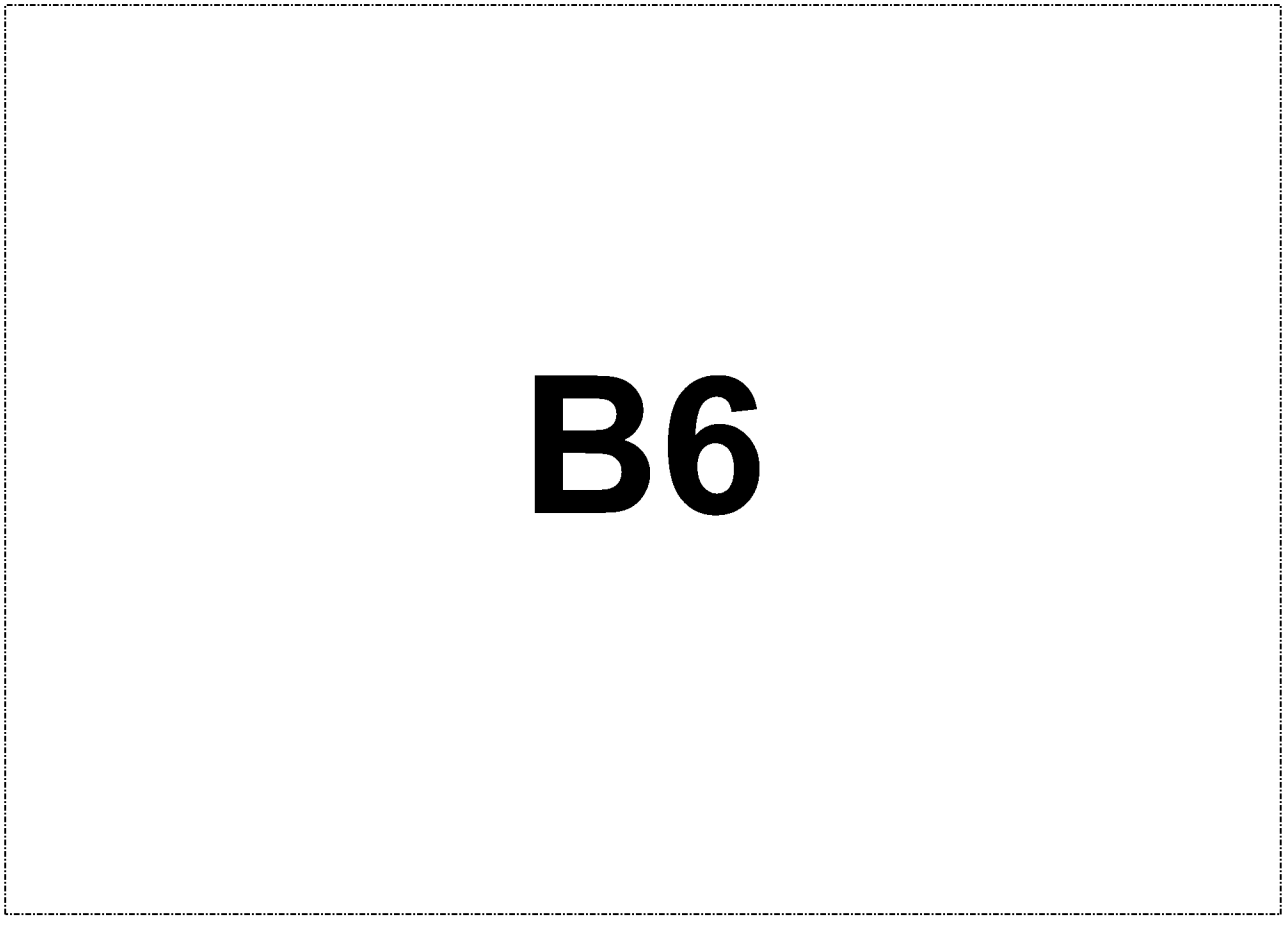
recommended echocardiogram.

rDVM B6

Client: B6
Patient:

RDVM B6 VC med hx B6





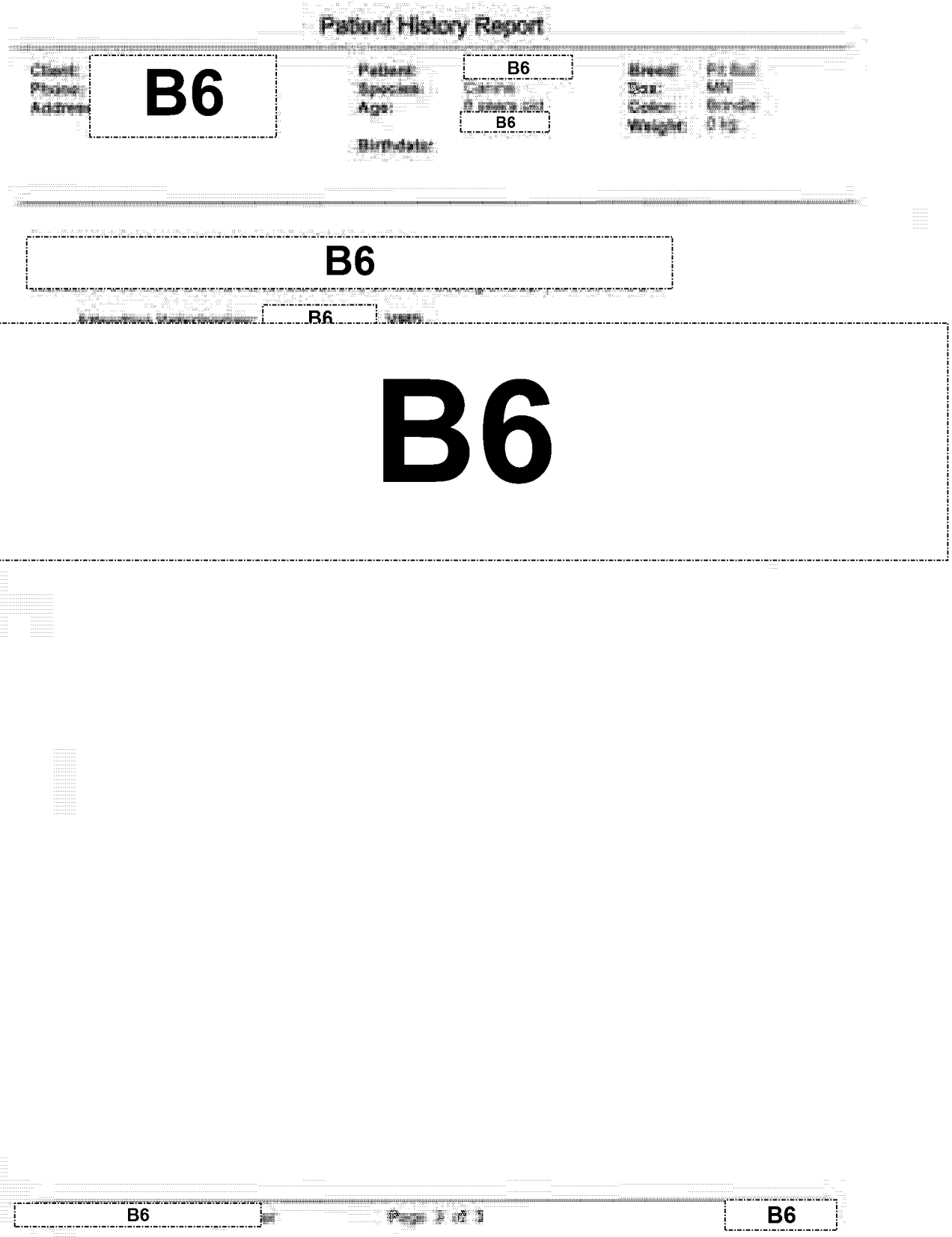
PLAN

B6

B6

B6

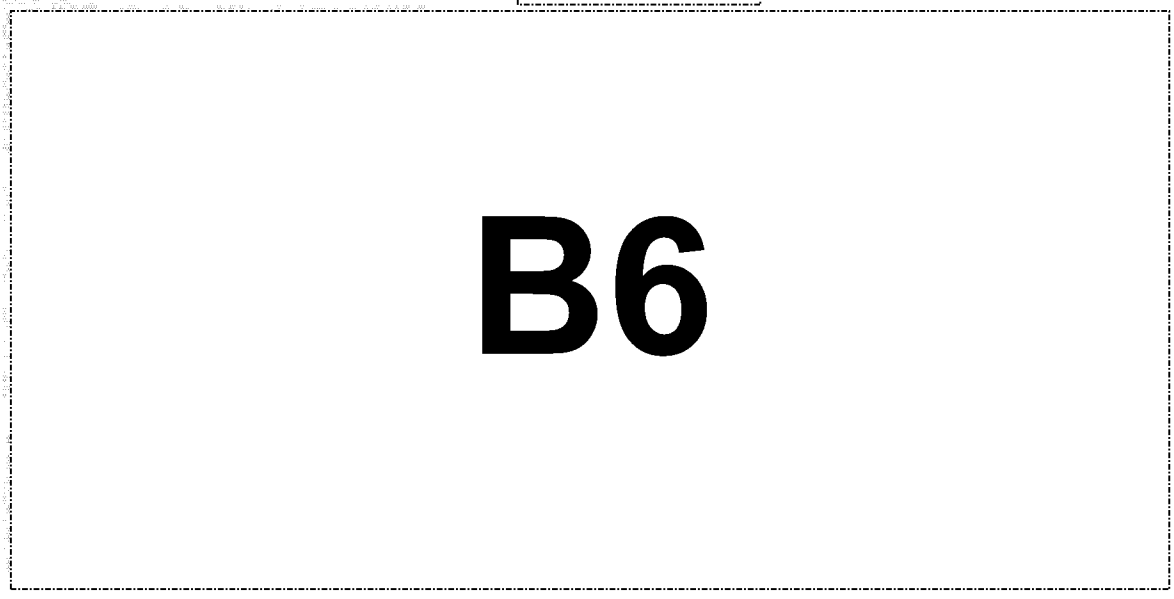
B6



Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6

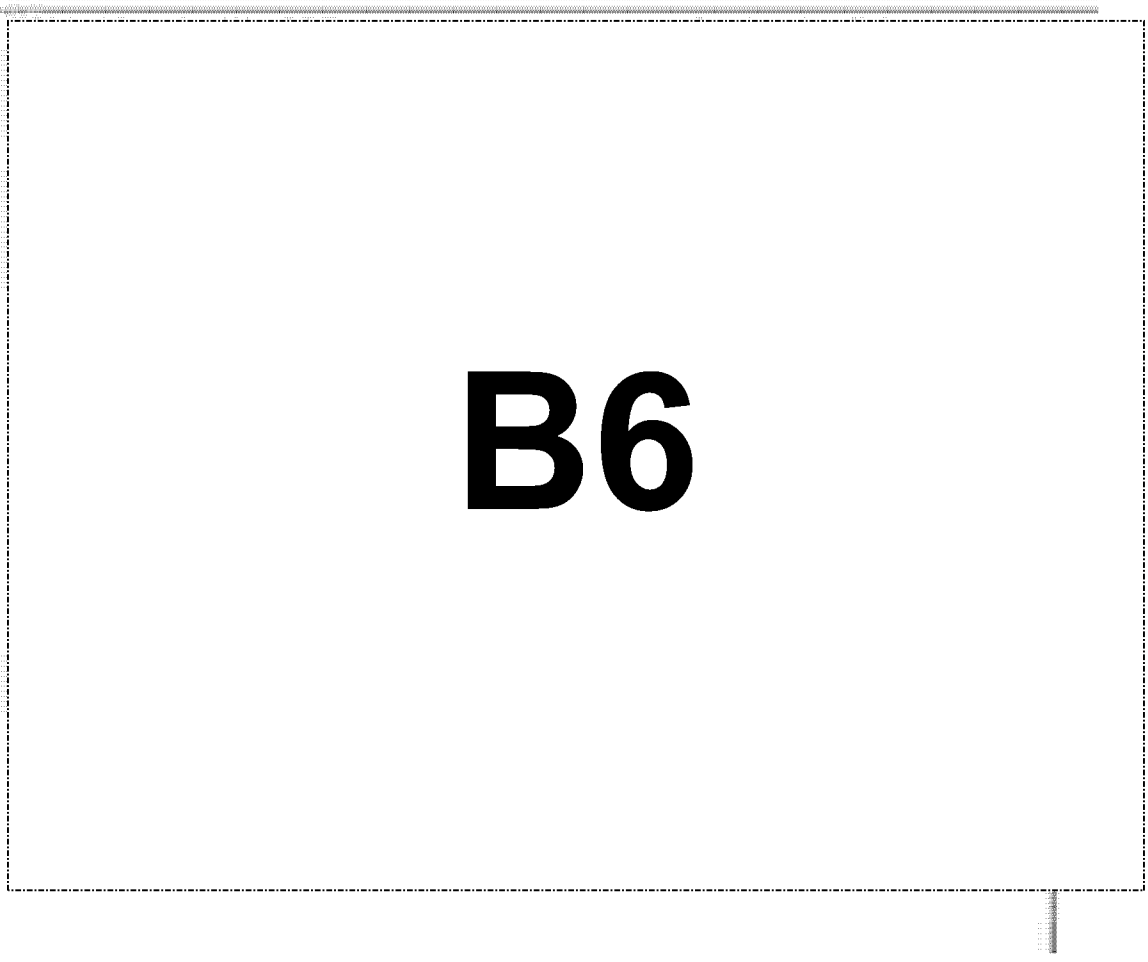
B6



B6

Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6



Client: B6
Patient:

Insurance B6 **request Invoice DOS 2/23/2018**

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
B6

Invoice
B6

B6

B6

Client: B6
Patient:

Insurance B6 **request Invoice DOS** B6

B6

B6

B6

B6

B6

Client: B6
Patient: B6

RDVM B6 **AH records.**

B6 18:53 B6 B6 PAGE [illegible]
B6

Date: 3-9-18
Number of pages including cover sheet: 10

FAX

To: B6

Phone Number:

Fax: B6

From: B6

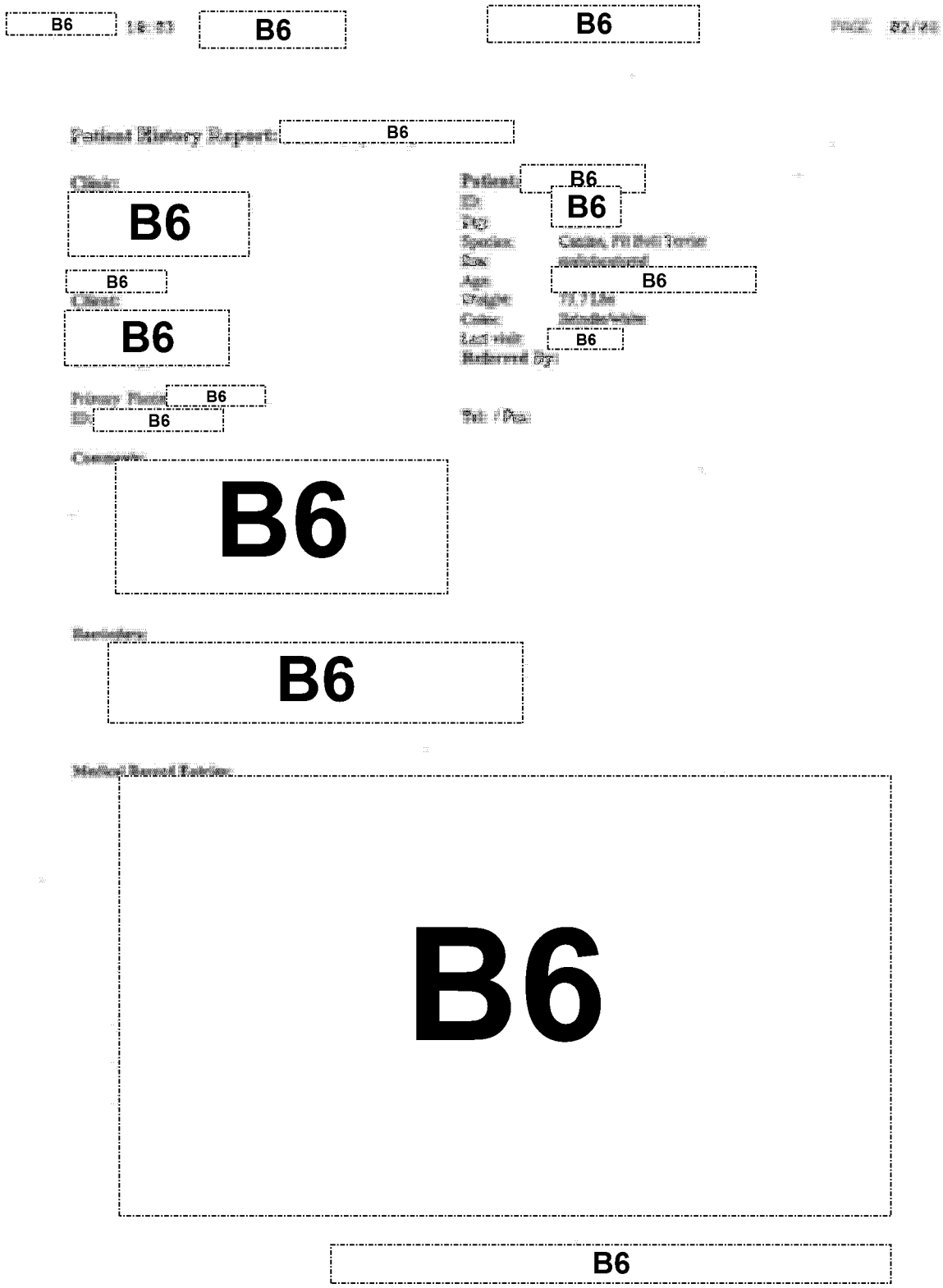
Remarks: X Urgent X For your review __ Reply ASAP __ Please comment

B6

B6 had B6
Cardiac U/s Done here
at this hospital.

Thank
you,
B6

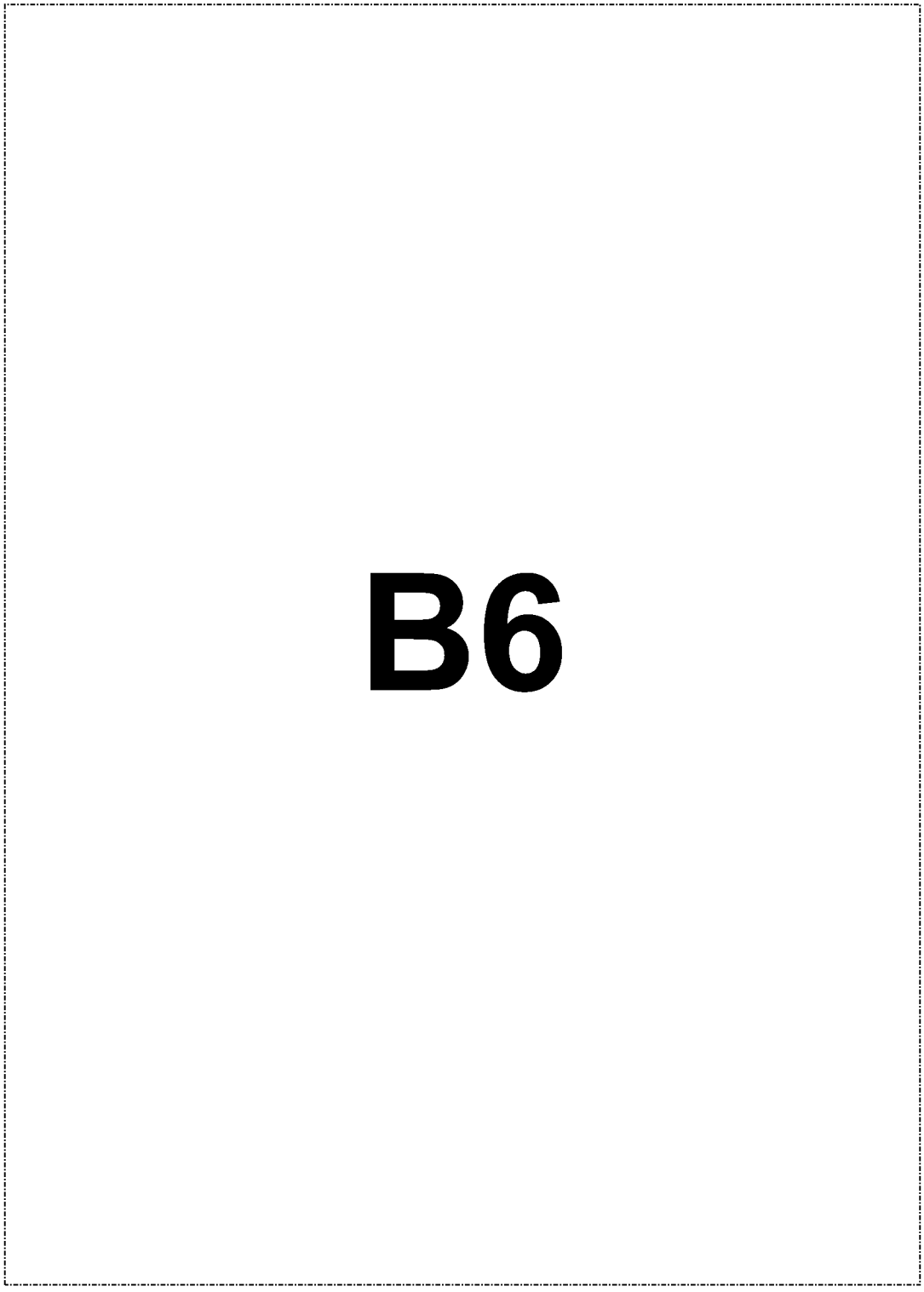
RDVM B6 H records.



Client: B6
Patient:

RDVM B6 **AH records.**

B6 B6



Client: B6
Patient:

RDVM B6 **AH records.**

B6 B6 B6

B6

B6

Client: B6
Patient:

RDVM B6 **AH records.**

B6 B6 B6

B6

B6

Client: B6
Patient:

RDVM B6 **AH records.**

B6 [illegible] B6 B6 [illegible]

B6

Auscultation: Arrythmia mitral - pulse deficits + [illegible]

Radiographs:

ECG:

Echocardiography:

LVIDD: 76 mm LVIDS: 8.5 mm ASD: 4.5 mm LA: 44.6 [illegible]

LVPWD: 6 LVPWS: 11.6 RSS: 16.5 FS: [illegible] [illegible] HR: 168

[illegible] Severe LV dilation. Moderate LA ↑ mild ↑ RV. Function is reduced. Arrythmia noted.

Doppler: Mild mitral regurg [illegible]

Assessment: Arrythmia - mild improvement
Dilated Cardiomyopathy
- continue current tx.
Guarded Prognosis

Client: B6
Patient:

Vitals Results

B6

2:09:53 PM	Notes
3:30:10 PM	Nursing note
3:41:34 PM	Weight (kg)
3:41:47 PM	Respiratory Rate
3:43:28 PM	Catheter Assessment
3:43:36 PM	Temperature (F)
3:43:47 PM	Cardiac rhythm
3:43:48 PM	Heart Rate (/min)
4:02:49 PM	Blood Pressure (mmHg)
4:44:44 PM	Cardiac rhythm
4:44:45 PM	Heart Rate (/min)
5:25:10 PM	Eliminations
5:25:15 PM	Respiratory Rate
5:45:37 PM	Cardiac rhythm
5:55:08 PM	Quantify IV Fluids (CRI) in mls
5:55:09 PM	Catheter Assessment
5:57:11 PM	Cardiac rhythm
5:57:12 PM	Heart Rate (/min)
6:54:35 PM	Cardiac rhythm
6:54:36 PM	Heart Rate (/min)
7:30:01 PM	Cardiac rhythm
7:58:28 PM	Quantify IV Fluids (CRI) in mls
7:58:29 PM	Catheter Assessment
7:58:53 PM	Cardiac rhythm
7:58:54 PM	Heart Rate (/min)
7:59:07 PM	Respiratory Rate
8:45:43 PM	Cardiac rhythm
8:45:44 PM	Heart Rate (/min)
9:10:01 PM	Cardiac rhythm
9:46:06 PM	Cardiac rhythm
9:46:07 PM	Heart Rate (/min)
9:46:14 PM	Respiratory Rate
10:40:51 PM	Cardiac rhythm
10:40:52 PM	Heart Rate (/min)
11:18:19 PM	Respiratory Rate
11:19:53 PM	Catheter Assessment
11:20:08 PM	Quantify IV Fluids (CRI) in mls
11:20:09 PM	Catheter Assessment
11:22:17 PM	Nursing note

B6

Client: B6
Patient:

Vitals Results

B6

11:56:15 PM	Cardiac rhythm	
11:56:16 PM	Heart Rate (/min)	
12:01:14 AM	Eliminations	
12:07:09 AM	Nursing note	
12:42:35 AM	Cardiac rhythm	
12:42:36 AM	Heart Rate (/min)	
1:16:25 AM	Respiratory Rate	
1:41:21 AM	Cardiac rhythm	
1:41:22 AM	Heart Rate (/min)	
2:41:29 AM	EKG: Note rate and rythm.	
3:24:05 AM	Catheter Assessment	
3:30:30 AM	Quantify IV Fluids (CRI) in mls	
3:30:31 AM	Catheter Assessment	
3:31:02 AM	Nursing note	
3:53:47 AM	Respiratory Rate	
3:53:56 AM	Cardiac rhythm	
3:53:57 AM	Heart Rate (/min)	
4:45:07 AM	Eliminations	
4:45:17 AM	Cardiac rhythm	
4:45:18 AM	Heart Rate (/min)	
5:55:10 AM	Cardiac rhythm	
5:55:11 AM	Heart Rate (/min)	
6:02:24 AM	Respiratory Rate	
6:05:44 AM	Nursing note	
6:08:49 AM	Nursing note	
6:35:37 AM	Cardiac rhythm	
6:35:38 AM	Heart Rate (/min)	
7:54:13 AM	Respiratory Rate	
7:54:37 AM	Cardiac rhythm	
7:54:38 AM	Heart Rate (/min)	
7:57:26 AM	Catheter Assessment	
8:07:31 AM	Eliminations	
8:07:58 AM	Weight (kg)	
8:38:09 AM	Nursing note	
8:39:08 AM	Cardiac rhythm	
8:39:09 AM	Heart Rate (/min)	
8:51:20 AM	Notes	
10:17:19 AM	Quantify IV Fluids (CRI) in mls	
10:17:20 AM	Catheter Assessment	

B6

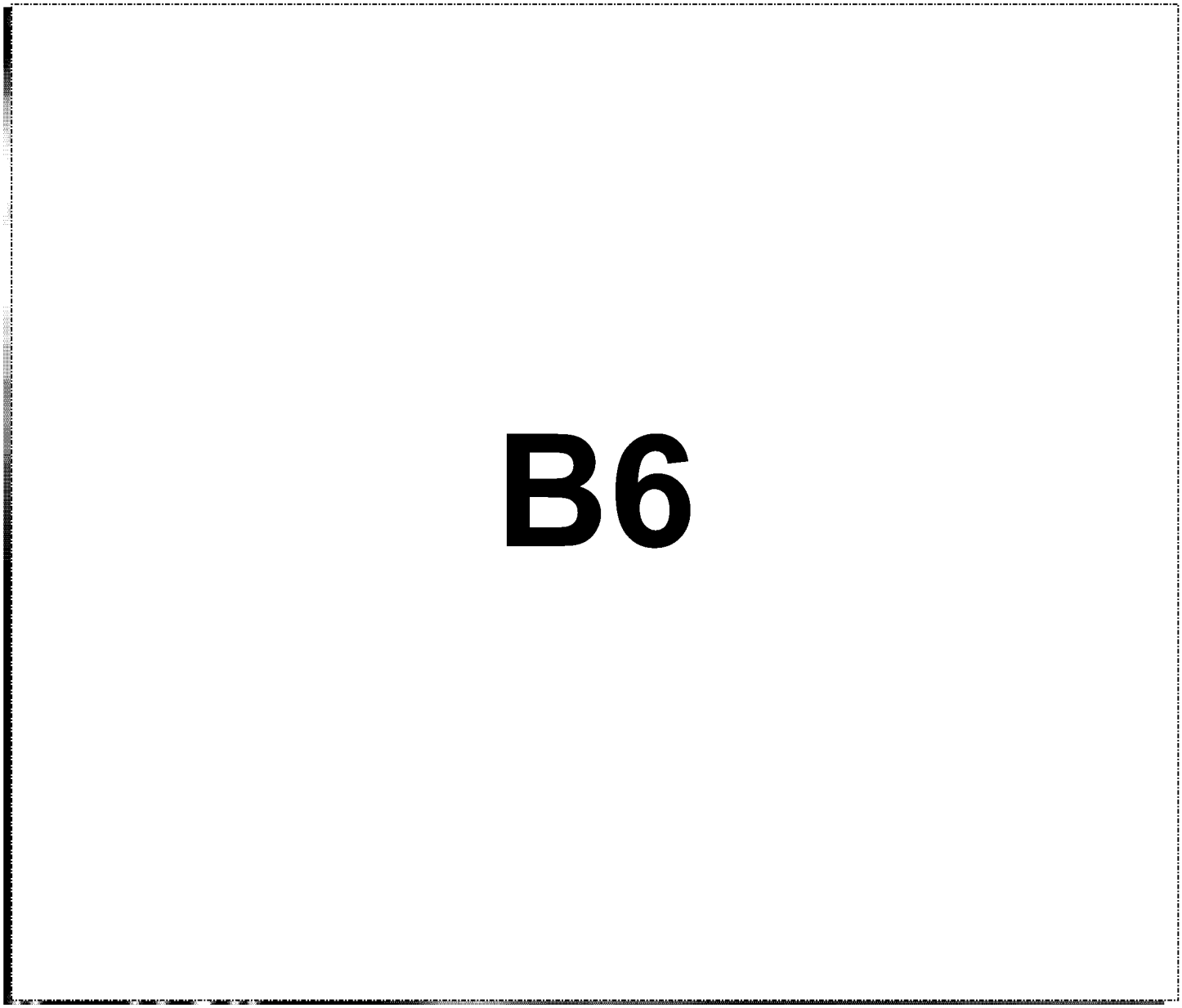
Client: B6
Patient:

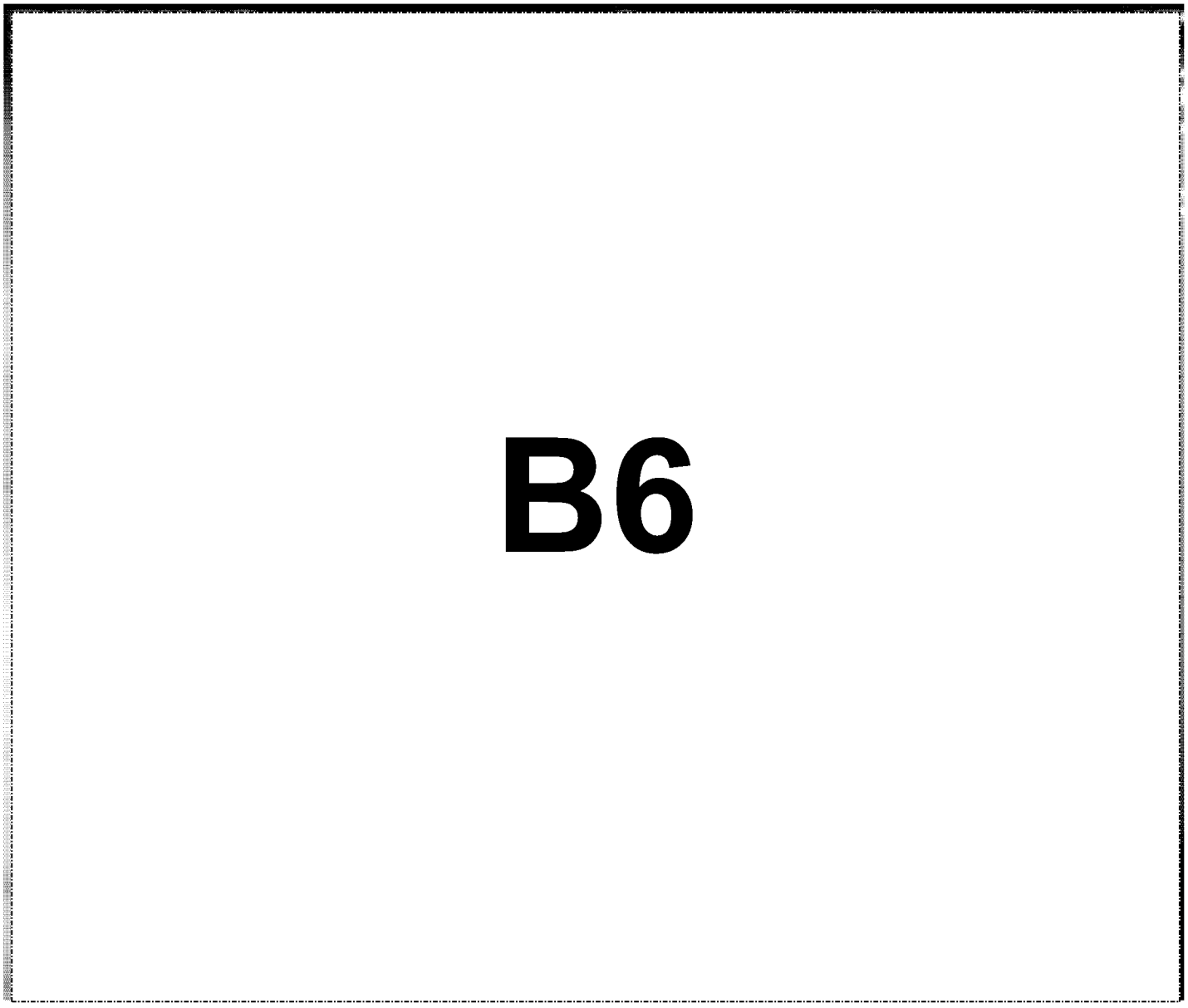
Vitals Results

B6	11:11:00 AM	Eliminations
	12:22:54 PM	Amount eaten
	1:33:46 PM	Quantify IV Fluids (CRI) in mls
	1:33:47 PM	Catheter Assessment
8/31/2018 5:14:22 PM		Weight (kg)

B6

B6 CXR and Neck Rads - B6





B6

B6

Telemetry

B6

Telemetry

B6

Telemetry

B6

Client: B6
Patient:

Alivecor ECG

B6

B6

B6

B6

B6

B6

Client: B6
Patient:

ECG from Cardio

B6

B6

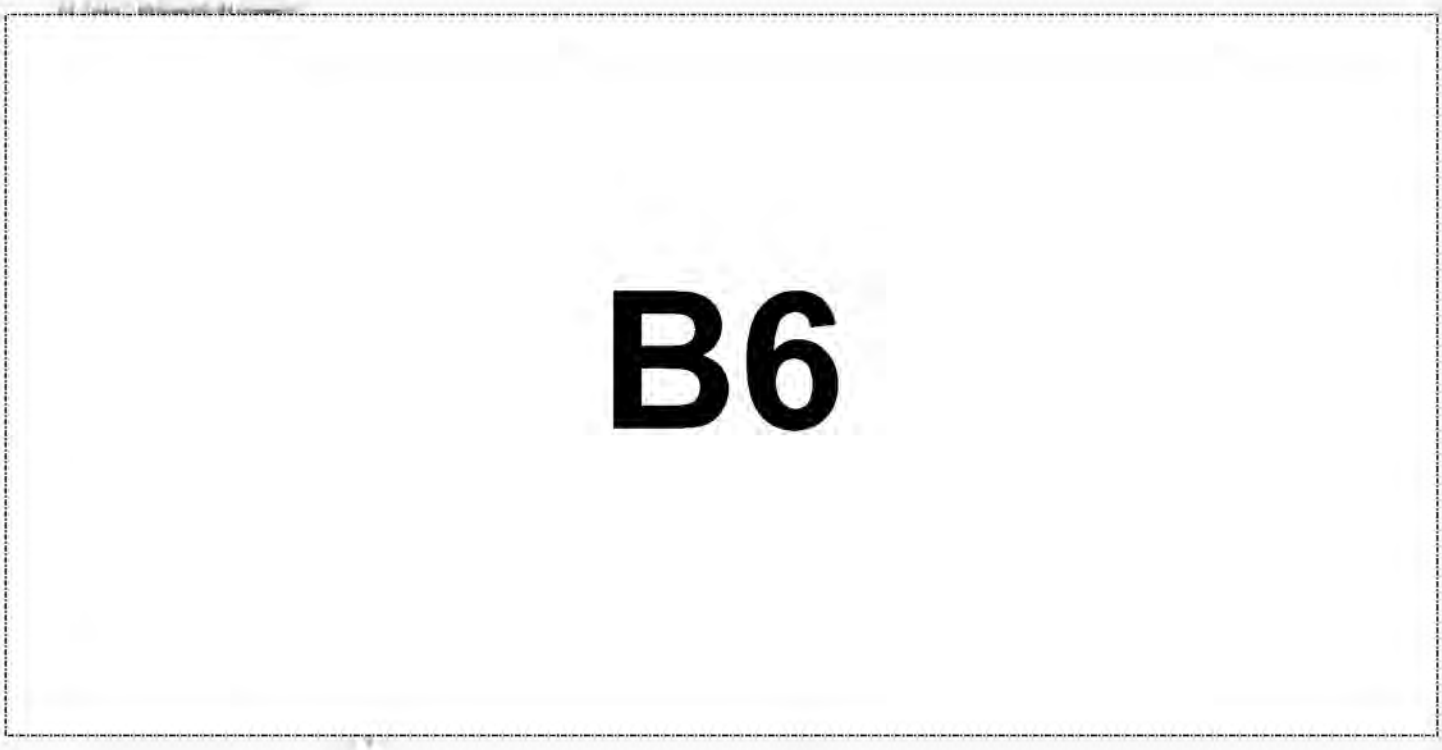
B6

Client: B6
Patient:

ECG from Cardio

B6

B6



Client: B6
Patient:

ECG from Cardio

B6

B6

B6

Patient History

B6

12:58 PM	UserForm
01:34 PM	UserForm
01:41 PM	UserForm
02:08 PM	Purchase
02:08 PM	Purchase
02:09 PM	Purchase
02:09 PM	Purchase
02:09 PM	Purchase
02:09 PM	Purchase
02:09 PM	Vitals
02:15 PM	Purchase
02:20 PM	Labwork
03:07 PM	Treatment
03:30 PM	Vitals
03:30 PM	Purchase
03:30 PM	Purchase
03:30 PM	Treatment
03:41 PM	Treatment
03:41 PM	Vitals
03:41 PM	Treatment
03:41 PM	Vitals
03:43 PM	Treatment
03:43 PM	Vitals
03:43 PM	Treatment
03:43 PM	Vitals
03:43 PM	Treatment
03:43 PM	Vitals
03:43 PM	Vitals
03:43 PM	Vitals
04:02 PM	Vitals
04:03 PM	Purchase
04:05 PM	Treatment
04:44 PM	Treatment
04:44 PM	Vitals
04:44 PM	Vitals
04:47 PM	UserForm
05:01 PM	Purchase
05:01 PM	Treatment
05:12 PM	Treatment
05:23 PM	Treatment

B6

Patient History

B6

05:23 PM	Treatment
05:25 PM	Treatment
05:25 PM	Vitals
05:25 PM	Treatment
05:25 PM	Vitals
05:45 PM	Vitals
05:55 PM	Treatment
05:55 PM	Vitals
05:55 PM	Vitals
05:55 PM	Treatment
05:55 PM	Prescription
05:57 PM	Treatment
05:57 PM	Vitals
05:57 PM	Vitals
06:54 PM	Treatment
06:54 PM	Vitals
06:54 PM	Vitals
07:27 PM	Prescription
07:30 PM	Vitals
07:58 PM	Treatment
07:58 PM	Vitals
07:58 PM	Vitals
07:58 PM	Treatment
07:58 PM	Vitals
07:58 PM	Vitals
07:59 PM	Treatment
07:59 PM	Vitals
08:00 PM	Treatment
08:45 PM	Treatment
08:45 PM	Vitals
08:45 PM	Vitals
09:10 PM	Vitals
09:19 PM	Vitals
09:32 PM	Treatment
09:46 PM	Treatment
09:46 PM	Vitals
09:46 PM	Vitals
09:46 PM	Treatment
09:46 PM	Vitals
10:40 PM	Treatment

B6

Patient History

B6

10:40 PM	Vitals
10:40 PM	Vitals
11:18 PM	Treatment
11:18 PM	Treatment
11:18 PM	Vitals
11:19 PM	Treatment
11:19 PM	Vitals
11:20 PM	Treatment
11:20 PM	Vitals
11:20 PM	Vitals
11:22 PM	Vitals
11:56 PM	Treatment
11:56 PM	Vitals
11:56 PM	Vitals
12:01 AM	Treatment
12:01 AM	Vitals
12:03 AM	Treatment
12:07 AM	Treatment
12:07 AM	Vitals
12:42 AM	Treatment
12:42 AM	Vitals
12:42 AM	Vitals
01:04 AM	Treatment
01:16 AM	Treatment
01:16 AM	Vitals
01:41 AM	Treatment
01:41 AM	Vitals
01:41 AM	Vitals
01:41 AM	Treatment
02:13 AM	Purchase
02:41 AM	Vitals
03:24 AM	Treatment
03:24 AM	Vitals
03:24 AM	Treatment
03:27 AM	Treatment
03:30 AM	Treatment
03:30 AM	Vitals
03:30 AM	Vitals
03:31 AM	Vitals
03:53 AM	Treatment
03:53 AM	Vitals

B6

Client: B6
Patient:

Patient History

B6

03:53 AM	Treatment
03:53 AM	Vitals
03:53 AM	Vitals
04:41 AM	Treatment
04:45 AM	Treatment
04:45 AM	Vitals
04:45 AM	Treatment
04:45 AM	Vitals
04:45 AM	Vitals
05:23 AM	Treatment
05:55 AM	Treatment
05:55 AM	Vitals
05:55 AM	Vitals
06:02 AM	Treatment
06:02 AM	Treatment
06:02 AM	Treatment
06:02 AM	Treatment
06:02 AM	Vitals
06:05 AM	Vitals
06:08 AM	Vitals
06:35 AM	Treatment
06:35 AM	Vitals
06:35 AM	Vitals
07:54 AM	Treatment
07:54 AM	Vitals
07:54 AM	Treatment
07:54 AM	Treatment
07:54 AM	Vitals
07:54 AM	Vitals
07:57 AM	Treatment
07:57 AM	Treatment
07:57 AM	Vitals
08:07 AM	Vitals
08:07 AM	Vitals
08:13 AM	Prescription
08:38 AM	Vitals
08:39 AM	Treatment
08:39 AM	Vitals
08:39 AM	Vitals
08:51 AM	Vitals

B6

Client: B6
Patient:

Patient History

B6

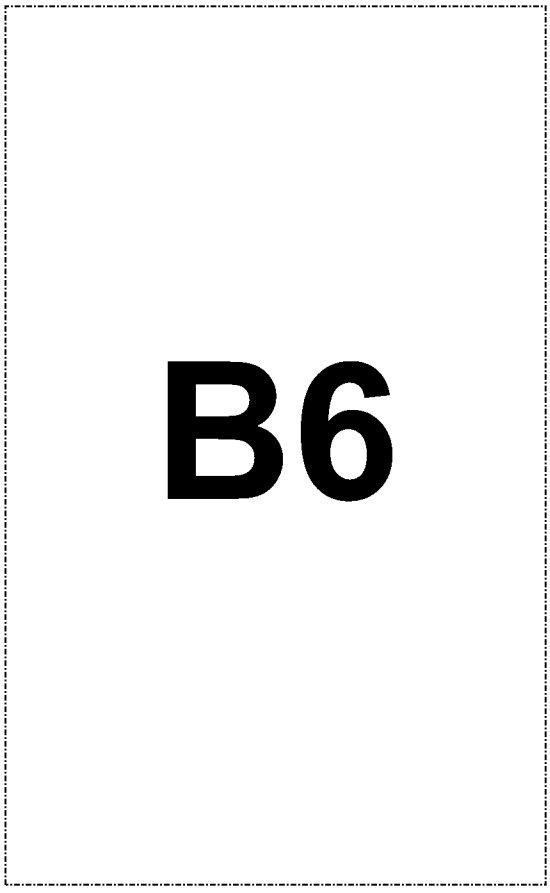
08:57 AM	Treatment
09:13 AM	Treatment
09:17 AM	Purchase
09:18 AM	Purchase
10:17 AM	Treatment
10:17 AM	Vitals
10:17 AM	Vitals
11:11 AM	Vitals
11:36 AM	Appointment
12:21 PM	Appointment
12:22 PM	Treatment
12:22 PM	Treatment
12:22 PM	Vitals
12:29 PM	Appointment
12:34 PM	Treatment
12:43 PM	Treatment
01:15 PM	Treatment
01:33 PM	Treatment
01:33 PM	Vitals
01:33 PM	Vitals
01:59 PM	Prescription
02:04 PM	Purchase
02:06 PM	Prescription
02:08 PM	Prescription
02:10 PM	Prescription
02:15 PM	Purchase
02:15 PM	Purchase
02:26 PM	UserForm
03:05 PM	Deleted Reason
08:56 AM	Appointment
12:26 PM	Appointment
01:18 PM	Appointment
09:17 AM	Task
02:37 PM	Appointment

B6

Client: B6
Patient:

Patient History

08/28/2018 02:39 PM	Appointment
08/28/2018 02:52 PM	Appointment
08/28/2018 04:49 PM	Appointment
08/31/2018 04:02 PM	UserForm
08/31/2018 04:10 PM	Treatment
08/31/2018 04:11 PM	Purchase
08/31/2018 04:12 PM	Purchase
08/31/2018 04:12 PM	Purchase
08/31/2018 05:08 PM	Purchase
08/31/2018 05:10 PM	Prescription
08/31/2018 05:14 PM	Vitals
08/31/2018 05:15 PM	UserForm
10/23/2018 01:43 PM	UserForm



Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax (508) 839-7951
http://vetmed.tufts.edu/
Referring Vet Direct Line: B6

Notice of Patient Admit

Date: B6 12:56:36 PM
Case #: B6
Referring Doctor: B6
Client Name: B6
Patient Name: B6

Dear Colleague,

Your patient presented to our Emergency service. Please make note of the following information to facilitate communication with our team.

The attending doctor is: B6
The reason for admission to the FHSA is: B6 DOM, OHF

If you have any questions regarding this particular case, please call 508-887-4900 to reach the ICC Service. Information is updated daily, by noon.

Thank you for your referral to our Emergency Service.

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax: (508) 839-7951
http://vetmed.tufts.edu/

B6 Male (Neutered)
Canine: Pit Bull Brindle/White
B6

B6

Dear B6

Thank you for referring B6 with their pet B6

B6 presented to the Emergency and Critical Care Service yesterday. He was diagnosed with CHF, DCM, and malignant ventricular tachycardia. He was continued on pimobendan and furosemide, had a lidocaine CRI in hospital, and administered amiodarone, doxycycline, and taurine. He has a recheck with our Cardiology service this week.

If you have any questions, or concerns, please contact us at 508-887-4888.

Thank you,

B6 DVM (Emergency & Critical Care Resident)

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-7951
http://vetmed.tufts.edu/

B6 Male (Neutered)
Canine Pit Bull Brindle/White
B6

B6

Dear B6

Thank you for referring B6 with their pet B6

If you have any questions, or concerns, please contact us at 508-887-4988.

Thank you,

B6 DVM (Cardiology)

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone: (508) 839-5395
Fax (508) 839-7951
http://vetmed.tufts.edu/

B6
Male (Neutered)
Canine Pit Bull Brindle/White
B6

B6

Dear B6

Thank you for referring B6 with their pet B6

If you have any questions, or concerns, please contact us at 508-887-4988.

Thank you,

B6 DVM (Cardiology)

B6

Case Number: B6
Patient: B6
CANINE, GERMAN SHEPHERD Born B6 *MALE, Castrated*
Owner: B6
Primary Vet: B6
Primary Clinician: B6
Supervising Clinician: B6
Service: CARDIOLOGY
Admission Date: November 8, 2017
Discharge Date: November 8, 2017
Weight: 38.000 kg(s)

B6

Thank you for using B6 **as your referral center. As a referral report for your information and records, here are the instructions given to your client at the time the patient was discharged from** B6 B6

Diagnoses:	Diagnosis 1 *(Confirmed)*: Dilated Cardiomyopathy (DCM) Diagnosis 2 *(Confirmed)*: Congestive heart failure - clinically controlled Diagnosis 3 *(Confirmed)*: Grade II-III/VI Left Apical Systolic Murmur
Chief Complaint and History:	B6 is a 2 year old male intact German Shepherd who presented to the B6 Cardiology service on 11/9/17 for recheck. B6 initially presented to the Emergency Service on B6 for lethargy and was diagnosed with DCM and congestive heart failure. Since being discharged from the hospital, his owner reports he has been doing very well at home. He is very energetic and is eating well. He is breathing normally at home, and his resting respiratory rates vary between 28-36. His blood work was checked by his primary care veterinarian on 11/6, and his kidney values were normal B6 He also had a normal CBC performed at the time. Urinalysis was unremarkable. Current medications: B6
Clinical Examination:	On physical exam, B6 was bright, alert, and responsive. He had a normal heart rate (B6 bpm) and was panting with a normal respiratory effort. Thoracic auscultation revealed normal bronchovesicular sounds bilaterally. He had a grade II-III/VI left apical systolic heart murmur. No gallop was auscultated today. Femoral pulses were moderate but synchronous with his heartbeat. His abdomen was soft and non-painful. He weighed 38 kgs with a body condition score of 3/9 (ideal 4-5/9) and mild muscle atrophy. The rest of the physical exam was unremarkable.
Diagnostics, Treatments and Progress:	None performed today

Assessment:	We are glad that B6 is doing so well at home! His kidney values are normal indicating he is tolerating his diuretic therapy. His lungs are clear and suspicion of ongoing active pulmonary edema is low, indicating well controlled congestive heart failure. We will continue his current medications and would like to recheck him in 3 months.
Recommendations:	MONITOR Please continue to monitor B6 respiratory rate and effort at home as well as his general attitude. Please contact B6 or your local veterinarian if you notice any lethargy, decreased appetite, collapse, coughing, exercise intolerance or anything else abnormal. MEDICATIONS Please continue to administer as previously prescribed. FOLLOW UP Please schedule a recheck appointment with B6 in 3 months. At this time, we would like to repeat blood work, blood pressure +/- thoracic radiographs.
Drugs:	**In compliance with state and risk management guidelines, all Pharmacy items, including drugs, fluid therapy, nutritional products and food are non-returnable. This policy is to protect your pet from receiving items that may have been tampered with or improperly used. The exception to this policy is pet foods that display a manufacturer's warranty.** **For drug related questions please call the pharmacy at B6** **Drug** / **Quantity Dispensed** / **Dosage** / **Instructions** B6
Comments for B6	Thank you for entrusting us with B6 care! He is such a sweet dog and a wonderful patient!
Discharge Instructions:	B6
Clinician and Finalize Date:	B6

Case Number: B6

Please help us help dogs. Please complete our survey at: B6
All dogs, whether diabetic or not, are encouraged to participate.

B6

Case Number: B6
Patient: B6
CANINE, GERMAN SHEPHERD Born B6 *MALE, Castrated*
Owner: B6
Primary Vet: B6
Primary Clinician: B6
Supervising Clinician: B6
Service: CARDIOLOGY
Admission Date: February 13, 2018
Discharge Date: February 13, 2018
Weight: 40.200 kg(s)

B6

Thank you for using The B6 **as your referral center. As a referral report for your information and records, here are the instructions given to your client at the time the patient was discharged from** B6.

Diagnoses:	Diagnosis 1 *(Confirmed)*: Dilated Cardiomyopathy (DCM) Diagnosis 2 *(Confirmed)*: Congestive heart failure - significant ascites today Diagnosis 3 *(Confirmed)*: Grade III/VI left apical systolic murmur
Chief Complaint and History:	B6 a 2 year old male intact German Shepherd, was presented to the B6 on 2/13/18 for recheck evaluation of his dilated cardiomyopathy and congestive heart failure. B6 initially presented to the Emergency Service on B6 for lethargy and was diagnosed with DCM and congestive heart failure. For the past few weeks, B6 has had a decreased appetite. He is eating approximately 2/3 of his normal amount and often needs to be coaxed to eat or hand fed. He has been limping on his left hindlimb for the past few weeks as well. He has been mildly activity restricted but has appeared lethargic and less interested in playing during this time period as well. Today he appeared more lethargic than usual, and his abdomen appeared distended. He is breathing normally at home, and his resting respiratory rates vary between 28-36 breaths per minute. Recently he has a mild increase in respiratory effort. He has had no recent episodes of coughing, sneezing, vomiting or diarrhea. He had blood work performed at his primary care veterinarian on 2/7 to evaluate his kidney function. His creatinine was normal B6 and his BUN was mildly elevated (BUN B6). His potassium was also mildly elevated B6. His complete blood count was unremarkable. Current medications: B6

Clinical Examination:	On physical exam, B6 was somewhat anxious but alert and responsive. He had a mildly elevated heart rate (110-130 bpm) and was panting with a mildly increased respiratory effort. Thoracic auscultation revealed normal bronchovesicular sounds bilaterally. No crackles or wheezes were noted. He had a grade III/VI left apical systolic heart murmur. A focal musical systolic murmur was heard cranioventrally on the left. No gallop was auscultated today. Femoral pulses were fair and synchronous with his heartbeat. His abdomen was slightly tense but non-painful on palpation. He had a palpable fluid wave. His caudal abdomen was distended. He weighed 40.2 kg with a body condition score of 3/9 (ideal 4-5/9) and mild epaxial muscle atrophy. The remainder of the physical exam was unremarkable.
Procedures:	Procedure 1: AFAST Procedure 2: TFAST
Diagnostics, Treatments and Progress:	AFAST & TFAST: An abbreviated ultrasound of B6 abdomen and chest were performed to look for effusion (free fluid). A large amount of fluid was noted in B6 caudal abdomen surrounding his bladder and a smaller amount of fluid was appreciated cranially between his liver lobes and intestinal loops. No effusion was noted in his chest cavity or in his pericardium.
Assessment:	Based on B6 physical examination and the presence of effusion in his abdomen, B6 right-sided heart failure is not adequately controlled. The fluid in his abdomen should be removed to make him more comfortable at home. You have elected to take B6 to his primary care veterinarian to have this performed. We will also be increasing the doses of his B6 to better control his clinical signs of right-sided heart failure. At this time, there is no evidence of left-sided heart failure. His lung sounds were clear and no obvious fluid or evidence of consolidation was noted on his TFAST. Please continue to monitor B6 respiratory rate and effort at home. If either increase, please have B6 evaluated by a veterinarian and repeat thoracic radiographs may be indicated at that time.
Recommendations:	MONITORING: Please continue to monitor B6 respiratory rate and effort at home as well as his general attitude. Please contact B6 or your local veterinarian if you notice any lethargy, decreased appetite, collapse, coughing, exercise intolerance, a distended abdomen or anything else abnormal. MEDICATIONS: We would like to adjust B6 medications to better control his right-sided heart failure. Please see the medication section below for these changes. BLOODWORK: Please recheck B6 bloodwork (renal values) 5-7 days after increasing his medications. The results can be faxed or emailed to the Cardiology service. We have sent home our Cardiology group contact information. FOLLOW-UP: Please bring B6 to your primary care veterinarian to have the fluid in his abdomen removed via abdominocentesis as soon as possible. Please contact B6 to let her know how much fluid was removed and the character of the fluid (color, thickness, etc), and how B6 is doing afterward. At this time, we will discuss a more specific follow up plan for B6
	In compliance with state and risk management guidelines, all Pharmacy items, including drugs, fluid therapy, nutritional products and food are non-returnable. This policy is to protect your pet from receiving items that may have been tampered with or improperly used. The exception to this policy is pet foods that display a manufacturer's warranty. **For drug related questions please call the pharmacy at B6**

Case Number B6

Drugs:

Drug	Quantity Dispensed	Dosage	Instructions
B6		mg	*DOSE INCREASE* Give 1 & 1/2 tablet by mouth three times per day.
		mg	*DOSE INCREASE* Give 1 tablet by mouth three times per day.
		mg	Give 1/2 tablet by mouth once daily.
		mg	*DOSE INCREASE* Give 1 & 1/2 tablet by mouth twice daily.

B6

Comments for B6

Thank you for entrusting us with B6 care. He is a very sweet boy and a wonderful patient! Please do not hesitate to contact us with any questions or concerns.

Discharge Instructions: Clinician and Finalize Date:

B6

Please help us help dogs. Please complete our survey at: B6
All dogs, whether diabetic or not, are encouraged to participate.

B6

Case Number: B6
Patient: B6
CANINE, GERMAN SHEPHERD Born B6 *MALE, Castrated*
Owner: B6
Primary Vet: B6
Primary Clinician: B6
Supervising Clinician: B6
Service: CARDIOLOGY
Admission Date: B6
Weight: 39.200 kg(s)

B6

Thank you for using B6 **as your referral center. As a referral report for your information and records, here are the instructions given to your client at the time the patient was discharged from The** B6 B6

Diagnoses:	Diagnosis 1 *(Confirmed)*: Dilated Cardiomyopathy (DCM) Diagnosis 2 *(Confirmed)*: Congestive heart failure - pulmonary edema and peritoneal effusion Diagnosis 3 *(Confirmed)*: Grade II-III/VI Left Apical Systolic Murmur and gallop
Chief Complaint and History:	B6 a B6 year old male castrated German Shepherd, was presented to the B6 Emergency Service on B6 for a Cardiology consultation. On 10/26/17, it was noted that B6 was experiencing exercise intolerance and increased panting when playing. He is usually a very high energy and active dog. B6 was taken to his primary veterinarian, where thoracic radiographs revealed cardiomegaly and lung infiltrate. Blood work (complete blood count, serum chemistry, SNAP Dx) at this time was within normal limits. B6 was started on B6 twice daily. B6 had an decreased appetite this past week and is eating only about 25% of normal food intake. Intermittent coughing has been noted this past week. A cursory ultrasound on B6 by the referring veterinarian was suspicious for peritoneal effusion, and it was recommended to bring B6 here this morning. B6 was a previously healthy dog with no significant medical history. He was adopted as a puppy from a hoarder/breeder situation. He receives monthly heartworm and flea/tick preventative and a history of Anaplasma exposure (currently negative). He eats Zignature kangaroo dry food. He had been fed a Zignature diet consisting of mostly fish protein, however this was switched because of vomiting that resolved after his diet was switched.
Clinical Examination:	On presentation, B6 was bright, alert, and responsive. He had an elevated heart rate (140-160 bpm) and was panting with a mildly increased respiratory effort. Thoracic auscultation revealed muffled heart sounds and mildly increased bronchovesicular sounds bilaterally. He had a persistent gallop heard on the left along with a grade II-III/VI left apical systolic heart murmur. A focal musical systolic murmur was heard cranioventrally on the left. Femoral pulses were weak but synchronous with his heartbeat. Abdominal palpation revealed mild abdominal distention, however no fluid wave was appreciated. His abdomen overall was soft and non-painful. He weighed 39.2 kgs with a body condition score of 3/9 (ideal is 4-5/9) and mild muscle atrophy. The rest of the physical exam was unremarkable.

Procedures:	Procedure 1: Echocardiogram Procedure 2: Thoracic Radiographs Procedure 3: Blood Taurine Levels Procedure 4: Cardiac Troponin I Levels Procedure 5: Complete blood count and chemistry panel Procedure 6: Electrocardiogram (ECG)
Diagnostics, Treatments and Progress:	NON-INVASIVE BLOOD PRESSURE Within normal limits at 140mmHg. TFAST EMERGENCY THORACIC ULTRASOUND All cardiac chambers showed dilation. The ratio of the left atrium to the aorta, a way to assess atrial enlargement, was increased at 2.5:1. No pericardial effusion was seen. AFAST ABDOMINAL ULTRASOUND Peritoneal effusion was seen on brief abdominal ultrasound. CARDIOLOGY PHYSICAL EXAMINATION On examination, B6 continued to be bright, alert, and responsive. A left-sided grade II-III/VI apical musical murmur with left-sided gallop was auscultated. Femoral pulse were weak and synchronous. ECHOCARDIOGRAM An ultrasound of B6 heart revealed significant enlargement of all cardiac chambers, with significantly impaired systolic function (contractility) of the left ventricle. Both atrioventricular valves (mitral and tricuspid) showed regurgitation of blood. THORACIC RADIOGRAPHS B6 was given an intramuscular injection of B6 to decrease his stress level and facilitate obtaining chest x-rays. Significant cardiac enlargement was seen with a mild bronchointerstitial pattern in the caudodorsal lung field, which typically signifies pulmonary edema, or fluid in the lungs, secondary to heart disease (congestive heart failure). B6 tolerated sedation pretty well but became mildly dysphoric. He was given an injection of B6 to reverse the sedation. ELECTROCARDIOGRAM (ECG) B6 ECG showed sinus rhythm with an average heart rate of 140 bpm. His QRS complexes were wide consistent with aberrant ventricular conduction. PENDING BLOODWORK: Blood was drawn and submitted for Taurine, blood chemistry and complete blood count, and Troponin (an acute marker of heart damage) levels. These results are pending and we will contact you as soon as the results are available. PROGRESS B6 was given an intramuscular injection o B6 medication), and was discharged from the hospital to be maintained on medical therapy and monitoring at home.
	B6 echo showed poor cardiac contractility and significant dilation of all four heart chambers. Possible causes of the decreased heart muscle contractility (systolic function) include dietary taurine deficiency (an amino acid required for the development and function of the heart muscle), myocarditis (heart inflammation), hypothyroidism (an endocrine disease of the thyroid gland), and idiopathic (primary heart muscle disease) dilated cardiomyopathy (DCM). There is also significant mitral and tricuspid regurgitation, which we suspect is occurring secondary to his cardiac chamber dilation. We have a troponin and taurine level pending to determine if there is another underlying cause of B6 poor cardiac function aside from primary dilated cardiomyopathy (primary heart muscle disease).

Assessment:	Unfortunately, no drugs have proven effective in either preventing or slowing progression of DCM. When the disease progresses to congestive heart failure, the prognosis of idiopathic DCM typically is poor with an average survival time of 6-8 months. Due to B6 diagnostic findings today, we are concerned for his long-term health at this time. Possible sequelae to DCM include worsening of congestive heart failure and arrhythmias due to the stretching and remodeling of heart tissue, syncope or fainting, or even sudden death. We are starting B6 on medications to control his congestive heart failure. At this time, we suspect that he is in both left and right sided congestive heart failure. The left sided congestive heart failure results in fluid accumulation within the lung tissue, and right sided congestive heart failure can cause ascites or possibly fluid around the lung tissue. Our goal for B6 is to control this fluid accumulation and make him as comfortable as possible. Please see the handouts on Dilated Cardiomyopathy, Congestive Heart Failure, and Monitoring Respiratory Rate that have been provided today.
Recommendations:	MONITORING: 1. Respiratory Rate: It is important to become familiar with your dog's normal resting respiratory rate and effort. An increase in either of these is one of the first signs of fluid in the lungs and should be monitored regularly. When your dog is at rest, watch their sides rise and fall as they breathe normally. One rise and fall cycle is equal to one breath. Count the number of breaths they take in 15 seconds, then multiply this number by 4 to get total breaths per minute. For example, if you count 8 breaths in 15 seconds, that is equal to 32 (8 x 4) breaths per minute. A normal dog at rest should have a respiratory rate less than 40. If you notice this number increasing consistently, or notice an increase in the effort it takes to breathe, please contact B6 or your local veterinarian. If B6 is in respiratory distress, please have him evaluated immediately at the closest emergency hospital. 2. General: Monitor for any lethargy, collapse, exercise intolerance, coughing, or decreased appetite. Contact B6 or your local veterinarian if you notice any of these signs. MEDICATIONS Treatment of DCM centers on eliminating signs of congestive heart failure and improving contractility with the following drugs: B6

FOLLOW-UP

Please schedule a follow-up appointment in 5-7 days. You can do this by calling the appointment desk or e-mailing B6

We have provided you with a lot of information today. Please feel free to contact us by phone or e-mail if you have any questions or concerns.

Drugs:

In compliance with state and risk management guidelines, all Pharmacy items, including drugs, fluid therapy, nutritional products and food are non-returnable. This policy is to protect your pet from receiving items that may have been tampered with or improperly used. The exception to this policy is pet foods that display a manufacturer's warranty.

For drug related questions please call the pharmacy at B6.

Drug	Quantity Dispensed	Dosage	Instructions
B6	50 tablets	mg let	Give one tablet by mouth twice daily.
	30 tablets	ng ets	Give 1/2 tablet by mouth once daily.
		B6 ng ets	Please give 1 and 1/2 tablet by mouth three times daily for three days, then give 1 and 1/2 tablet by mouth twice daily thereafter.
	90 tablets	ng ets	Please give 1 and 1/2 tablets by mouth once daily.
			Please give 1.5 grams by mouth twice daily with food.

Comments for B6

B6 is a very sweet and well-behaved boy. Thank you for entrusting us with his care.

Discharge Instructions: Clinician and Finalize Date:

B6

Please help us help dogs. Please complete our survey at: B6
All dogs, whether diabetic or not, are encouraged to participate.

B6

08/24/2018

B6

Acct Number:
Address.....:

B6

Phone.....:
Cell Phone....:

- ext:

B6

Medical Alert:

Sex.....: M
DOB.....: B6
Species..: Canine

Weight.: 88lbs
Age.....: B6
Breed...: German Shepherd Dog

Chronic Meds.....:
Chronic Cond.....:
Flea Prev Meds....:
Heartworm Meds.:

Date Due:
Date Due:

Problem History:	Status:	Date Opened:	Date Closed:	Number:

06/08/2018	**Note**	Sent B6 n Report 6/8/18 Sent all B6 reports on 6/8/18 @ 8:26am.//ca		**Provider:** (Dr.)
05/04/2018	**Service**	B6	QTY: 100	**Provider:** (Dr.)
05/04/2018	**RX#: 27940** **Expires On:** 05/04/2019		**QTY:** 100	**Provider:** (Dr.)
	Give 2 pill(s) orally 3 time(s) a day (every 8 hours). Chronic medication.			
05/04/2018	**Service**	B6	QTY: 90	**Provider:** (Dr.)
05/04/2018	**RX#: 27939** **Expires On:** 05/04/2019		**QTY:** 90	**Provider:** (Dr.)
	Give 2tablet(s) orally 3 time(s) a day (every 8 hours) until gone. Start now			
05/01/2018	**Service**	B6	QTY: 1	**Provider:** (Dr.)
04/18/2018	**Service**		QTY: 90	**Provider:** (Dr.)
04/18/2018	**RX#: 27520** **Expires On:** 04/18/2019		**QTY:** 90	**Provider:** (Dr.)
	Give 2 tablet(s) orally 3 time(s) a day (every 8 hours) until gone. Start now			
04/16/2018	**Service**	B6	QTY: 100	**Provider:** (Dr.)
04/16/2018	**RX#: 27435** **Expires On:** 04/16/2019		**QTY:** 100	**Provider:** (Dr.)
	Give 4 pill(s) orally 3 time(s) a day (every 8 hours). Chronic medication.			
04/06/2018	**Service**	B6	QTY: 1	**Provider:** (Dr.)

B6

B6 - **Renal Profile**

04/05/2018 11:47 PM

Accession Result ID	B6		B6
Renal Profile			
Total Protein		5.0-7.4 g/dL	
Albumin		2.7-4.4 g/dL	
Globulin		1.6-3.6 g/dL	

Information fo B6

B6

08/24/2018

A/G Ratio	0.8-2.0	
Urea Nitrogen	6-31	mg/dL
Creatinine	0.5-1.6	mg/dL
Phosphorus	2.5-6.0	mg/dL
Glucose	70-138	mg/dL
Calcium	8.9-11.4	mg/dL
Corrected Calcium		
Sodium	139-154	mEq/L
Potassium	3.6-5.5	mEq/L
Na/K Ratio	27-38	
Chloride	102-120	mEq/L

B6

B6

04/05/2018	**Service**	E Renal Profile (mini)	QTY: 1	**Provider:** Dr.
04/02/2018	**Service**	B6	QTY: 90	**Provider:** (Dr
04/02/2018	**RX#: 27095**		**QTY:** 90	**Provider:** (Dr
	Expires On: 04/02/2019			
	Give 2 tablet(s) orally 3 time(s) a day (every 8 hours) until gone. Start now			
03/30/2018	**Service**	B6	QTY: 1	**Provider:** (Dr
03/30/2018	**RX#: 27041**		**QTY:** 1	**Provider:** (Dr
	Expires On: 03			
	Give 1 pill(s) orally 3 time(s) a day (every 8 hours). Chronic medication.			
03/29/2018	**Service**	B6	QTY: 1	**Provider:** Dr.

B6

Zoasis - Complete Blood Count, Renal Profile,Complete Blood Count, Renal Profile

03/29/2018 12:08 PM

Accession Result ID		
Complete Blood Count		
WBC	4.0-15.5	$10^3/\mu L$
RBC	4.8-9.3	$10^6/\mu L$
Hemoglobin	12.1-20.3	g/dL
Hematocrit	36-60	%
MCV	58-79	fL
MCH	19-28	pg
MCHC	30-38	g/dL
Platelet Count	170-400	$10^3/\mu L$
Platelet EST		
Neutrophils	60-77	%
Bands	0-3	%
Lymphocytes	12-30	%
Monocytes	3-10	%
Eosinophils	2-10	%
Basophils	0-1	%

B6

B6

Information fo B6

B6

08/24/2018

Absolute Neutrophils	2060-10600	/µL
Absolute Lymphocytes	690-4500	/µL
Absolute Monocytes	0-840	/µL
Absolute Eosinophils	0-1200	/µL
Absolute Basophils	0-150	/µL
Renal Profile		
Total Protein	5.0-7.4	g/dL
Albumin	2.7-4.4	g/dL
Globulin	1.6-3.6	g/dL
A/G Ratio	0.8-2.0	
Urea Nitrogen	6-31	mg/dL
Creatinine	0.5-1.6	mg/dL
Phosphorus	2.5-6.0	mg/dL
Glucose	70-138	mg/dL
Calcium	8.9-11.4	mg/dL
Corrected Calcium		
Sodium	139-154	mEq/L
Potassium	3.6-5.5	mEq/L
Na/K Ratio	27-38	
Chloride	102-120	mEq/L
Comment		
Hemolysis 1+ No sig		
Accession Result ID		
Complete Blood Count		
WBC	4.0-15.5	$10^3/\mu L$
RBC	4.8-9.3	$10^6/\mu L$
Hemoglobin	12.1-20.3	g/dL
Hematocrit	36-60	%
MCV	58-79	fL
MCH	19-28	pg
MCHC	30-38	g/dL
Platelet Count	170-400	$10^3/\mu L$
Platelet EST		
Neutrophils	60-77	%
Bands	0-3	%
Lymphocytes	12-30	%
Monocytes	3-10	%
Eosinophils	2-10	%
Basophils	0-1	%

B6

B6

B6

08/24/2018

Absolute Neutrophils		2060-10600	/µL
Absolute Lymphocytes		690-4500	/µL
Absolute Monocytes		0-840	/µL
Absolute Eosinophils		0-1200	/µL
Absolute Basophils		0-150	/µL
Renal Profile			
Total Protein		5.0-7.4	g/dL
Albumin		2.7-4.4	g/dL
Globulin		1.6-3.6	g/dL
A/G Ratio		0.8-2.0	
Urea Nitrogen		6-31	mg/dL
Creatinine		0.5-1.6	mg/dL
Phosphorus		2.5-6.0	mg/dL
Glucose		70-138	mg/dL
Calcium		8.9-11.4	mg/dL
Corrected Calcium			
Sodium		139-154	mEq/L
Potassium		3.6-5.5	mEq/L
Na/K Ratio		27-38	
Chloride		102-120	mEq/L
Comment			

B6

B6

Hemolysis 1+ No significant interference.

03/28/2018	**Service**	E Renal Profile (mini)	QTY: 1	**Provider:** (Dr.
03/16/2018	**Service**		QTY: 90	**Provider:** (Dr.
03/16/2018	**Service**		QTY: 1	**Provider:** (Dr.
03/16/2018	**RX#: 26796**		**QTY:** 1	**Provider:** (Dr.

Expires On: 03/

Give 1 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.

02/28/2018	**Service**		QTY: 90	**Provider:** (Dr.
02/28/2018	**RX#: 26460**		**QTY:** 90	**Provider:** (Dr.

Expires On: 02/28/2019

Give 1.5 tablet(s) orally 3 time(s) a day (every 8 hours) until gone. Start now

02/22/2018	**Service**		QTY: 1	**Provider:** Dr.
02/22/2018	**Service**		QTY: 1	**Provider:** Dr.
02/22/2018	**RX#: 26377**		**QTY:** 1	**Provider:** Dr.

Expires On: 02/22

Give 1 pill(s) orally 3 time(s) a day (every 8 hours). Chronic medication.

B6

B6

B6

Zoasis - Renal Profile, HOLD TEST

02/21/2018 10:38 PM

Information for B6

B6

08/24/2018

Accession Result ID	B6		B6
Renal Profile			
Total Protein		5.0-7.4	g/dL
Albumin		2.7-4.4	g/dL
Globulin		1.6-3.6	g/dL
A/G Ratio		0.8-2.0	
Urea Nitrogen		6-31	mg/dL
Creatinine		0.5-1.6	mg/dL
Phosphorus		2.5-6.0	mg/dL
Glucose		70-138	mg/dL
Calcium		8.9-11.4	mg/dL
Corrected Calcium			
Sodium		139-154	mEq/L
Potassium		3.6-5.5	mEq/L
Na/K Ratio		27-38	
Chloride		102-120	mEq/L
Comment			

Hemolysis 1+ No significant interference.

HOLD TEST

REQUESTED BY: B6

Hold

****

WE RECEIVED YOUR REQUEST TO PLACE THIS SAMPLE ON HOLD. WE WILL HOLD ALL SPECIMENS SUBMITTED FOR A PERIOD OF 6 DAYS. IF YOU WOULD LIKE THE SAMPLE(S) HELD FOR A LONGER PERIOD, PLEASE CONTACT CUSTOMER SERVICE.

****

02/21/2018 **Service** E Renal Profile (mini) QTY: 1 **Provider:** (Dr. B6

02/14/2018 **Provider:** (Dr. B6

B6

02/13/2018 **LINK** Penn Report 2/13/18

Zoasis - Superchem, Complete Blood Count, Total T4, Urinalysis-Complete, Heartworm Antigen-

02/07/2018 10:35 PM

Accession Result ID B6

Superchem

Information IS B6

B6

08/24/2018

Total Protein	5.0-7.4	g/dL	
Albumin	2.7-4.4	g/dL	
Globulin	1.6-3.6	g/dL	
A/G Ratio	0.8-2.0		
AST (SGOT)	15-66	IU/L	
ALT (SGPT)	12-118	IU/L	
Alk Phosphatase	5-131	IU/L	
GGTP	1-12	IU/L	
Total Bilirubin	0.1-0.3	mg/dL	
Urea Nitrogen	6-31	mg/dL	
Creatinine	0.5-1.6	mg/dL	
BUN/Creatinine Ratio	4-27		
Phosphorus	2.5-6.0	mg/dL	
Glucose	70-138	mg/dL	
Calcium	8.9-11.4	mg/dL	
Corrected Calcium			
Magnesium	1.5-2.5	mEq/L	
Sodium	139-154	mEq/L	
Potassium	3.6-5.5	mEq/L	
Na/K Ratio	27-38		
Chloride	102-120	mEq/L	
Cholesterol	92-324	mg/dL	
Triglycerides	29-291	mg/dL	
Amylase	290-1125	IU/L	
PrecisionPSL	24-140	U/L	

B6

B6

B6

CPK

Comment

Hemolysis 1+ No significant interference.

Complete Blood Count			
WBC	4.0-15.5	$10^3/\mu L$	
RBC	4.8-9.3	$10^6/\mu L$	
Hemoglobin	12.1-20.3	g/dL	
Hematocrit	36-60	%	
MCV	58-79	fL	
MCH	19-28	pg	
MCHC	30-38	g/dL	
Platelet Count	170-400	$10^3/\mu L$	
Platelet EST			

B6

B6

B6

08/24/2018

Neutrophils		60-77 %	
Bands		0-3 %	
Lymphocytes		12-30 %	
Monocytes		3-10 %	
Eosinophils		2-10 %	
Basophils		0-1 %	
Absolute Neutrophils		2060-10600 /µL	
Absolute Lymphocytes		690-4500 /µL	
Absolute Monocytes		0-840 /µL	
Absolute Eosinophils		0-1200 /µL	
Absolute Basophils		0-150 /µL	
Total T4			
T4		0.8-3.5 µg/dL	
Urinalysis-Complete			
Collection Method			
Not Stated			
Color			
Appearance			
Specific Gravity		1.015-1.050	
pH		5.5-7.0	
Protein		Negative	
Glucose			
Ketone			
Bilirubin			
Blood			
WBC			
RBC			
Casts			
Crystals			
Bacteria			
Squamous Epithelia			
Heartworm Antigen-Canine			
Collection Method			
Occult Heartworm Antigen			

B6

B6

B6

B6

B6

02/07/2018	**Service**	E Senior wellness Canine	QTY: 1	**Provider:** (Dr.)
02/05/2018	**Service**		QTY: 1	**Provider:** (Dr.)
02/05/2018	**RX#: 25996**		**QTY:** 1	**Provider:** (Dr.)

Expires On: 02/0

Give 1 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.

B6

B6

08/24/2018

01/25/2018	**Service**	B6	QTY: 90	**Provider:** Dr.
01/25/2018	**RX#: 25820**		**QTY:** 90	**Provider:** Dr.
	Expires On: 01/25/2019			
	Give 1.5 tablet(s) orally 2 time(s) a day (every 12 hours) until gone. Start now			
01/08/2018	**Service**	B6	QTY: 1	**Provider:** (Dr
01/08/2018	**RX#: 25457**		**QTY:** 1	**Provider:** (Dr
	Expires On: 01/0			
	Give 1 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.			
01/05/2018	**Service**	B6	QTY: 90	**Provider:** (Dr
01/05/2018	**RX#: 24348**		**QTY:** 90	**Provider:** (Dr
	Expires On: 11/11/2018			
	Give 1.5 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.			
12/15/2017	**Service**	B6	QTY: 1	**Provider:** (Dr
12/15/2017	**RX#: 25094**		**QTY:** 1	**Provider:** (Dr
	Expires On: 12/1			
	Give 1 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.			
12/13/2017	**Service**	B6	QTY: 1	**Provider:** (Dr
12/13/2017	**Service**		QTY: 1	**Provider:** (Dr
12/08/2017	**Service**		QTY: 1	**Provider:** (Dr
12/08/2017	**RX#: 24980**		**QTY:** 1	**Provider:** (Dr
	Expires On: 12/08/2018			
	Give 1.5 tablet(s) orally 2 time(s) a day (every12 hours) until gone. Start now			
11/17/2017	**Service**	B6	QTY: 50	**Provider:** (Dr
11/17/2017	**RX#: 24493**		**QTY:** 50	**Provider:** (Dr
	Expires On: 11/1			
	Give 1 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.			
11/11/2017	**Service**	B6	QTY: 90	**Provider:** (Dr
11/11/2017	**RX#: 24348**		**QTY:** 90	**Provider:** (Dr
	Expires On: 11/11/2018			
	Give 1.5 pill(s) orally 2 time(s) a day (every 12 hours). Chronic medication.			
11/09/2017	**LINK**	B6	Vet Report 11/8/17	

B6

Zoasis - Renal Chemistry, Complete Blood Count, Urinalysis-Complete

11/06/2017 04:14 PM

Accession Result ID	B6		B6
Renal Chemistry			
Total Protein		5.0-7.4 g/dL	
Albumin		2.7-4.4 g/dL	
Globulin		1.6-3.6 g/dL	
A/G Ratio		0.8-2.0	
Urea Nitrogen		6-31 mg/dL	

B6

08/24/2018

Creatinine	0.5-1.6	mg/dL
BUN/Creatinine Ratio	4-27	
Phosphorus	2.5-6.0	mg/dL
Calcium	8.9-11.4	mg/dL
Corrected Calcium		
Sodium	139-154	mEq/L
Potassium	3.6-5.5	mEq/L
Na/K Ratio	27-38	
Comment		
Hemolysis 1+ Nc		
Complete Blood Count		
WBC	4.0-15.5	$10^3/\mu L$
RBC	4.8-9.3	$10^6/\mu L$
Hemoglobin	12.1-20.3	g/dL
Hematocrit	36-60	%
MCV	58-79	fL
MCH	19-28	pg
MCHC	30-38	g/dL
Platelet Count	170-400	$10^3/\mu L$
Platelet EST		
Neutrophils	60-77	%
Bands	0-3	%
Lymphocytes	12-30	%
Monocytes	3-10	%
Eosinophils	2-10	%
Basophils	0-1	%
Absolute Neutrophils	2060-10600	/µL
Absolute Lymphocytes	690-4500	/µL
Absolute Monocytes	0-840	/µL
Absolute Eosinophils	0-1200	/µL
Absolute Basophils	0-150	/µL
Urinalysis-Complete		
Collection Method		
Not Stated		
Color		
Appearance		
Specific Gravity	1.015-1.050	
pH	5.5-7.0	
Protein	Negative	

B6

08/24/2018

Glucose
Ketone
Bilirubin
Blood
WBC
RBC
Casts
Amorphous Crystals
Bacteria
Squamous Epithelia
Fat Droplets

B6

11/06/2017	**Service**	E Renal Profile	QTY: 1	**Provider:** (Dr.
11/04/2017	**LINK**	B6 Report		
10/31/2017	**LINK**	B6 Cardio report 10-31-17		
10/27/2017	**Service**	Radiograph(s) - 1 View	QTY: 1	**Provider:** (Dr.
10/27/2017	**Service**	Discount	QTY: 1	**Provider:** (Dr.
10/27/2017	**Service**	B6	QTY: 50	**Provider:** (Dr.
10/27/2017	**RX#: 23972**		**QTY:** 50	**Provider:** (Dr.

B6

Expires On: 10/27/2018
Give 1.5 tablet(s) orally 2 time(s) a day (every 12 hours)

Zoasis - Superchem, Complete Blood Count, Total T4, Urinalysis-Complete, Accuplex 4
10/26/2017 10:52 PM

Accession Result ID		
Superchem		
Total Protein	5.0-7.4	g/dL
Albumin	2.7-4.4	g/dL
Globulin	1.6-3.6	g/dL
A/G Ratio	0.8-2.0	
AST (SGOT)	15-66	IU/L
ALT (SGPT)	12-118	IU/L
Alk Phosphatase	5-131	IU/L
GGTP	1-12	IU/L
Total Bilirubin	0.1-0.3	mg/dL
Urea Nitrogen	6-31	mg/dL
Creatinine	0.5-1.6	mg/dL
BUN/Creatinine Ratio	4-27	

B6

B6

B6

08/24/2018

Phosphorus		2.5-6.0	mg/dL
Glucose	V	70-138	mg/dL
Calcium		8.9-11.4	mg/dL
Corrected Calcium			
Magnesium		1.5-2.5	mEq/L
Sodium		139-154	mEq/L
Potassium		3.6-5.5	mEq/L
Na/K Ratio		27-38	
Chloride		102-120	mEq/L
Cholesterol		92-324	mg/dL
Triglycerides		29-291	mg/dL
Amylase		290-1125	IU/L
PrecisionPSL		24-140	U/L
CPK		59-895	IU/L

B6

B6

B6

Comment

Hemolysis 2+ No significant interference.

Complete Blood Count			
WBC		4.0-15.5	$10^3/\mu L$
RBC		4.8-9.3	$10^6/\mu L$
Hemoglobin		12.1-20.3	g/dL
Hematocrit		36-60	%
MCV		58-79	fL
MCH		19-28	pg
MCHC		30-38	g/dL
Platelet Count		170-400	$10^3/\mu L$
Platelet EST			
Neutrophils		60-77	%
Bands		0-3	%
Lymphocytes		12-30	%
Monocytes		3-10	%
Eosinophils		2-10	%
Basophils		0-1	%
Absolute Neutrophils		2060-10600	/µL
Absolute Lymphocytes		690-4500	/µL
Absolute Monocytes		0-840	/µL
Absolute Eosinophils		0-1200	/µL
Absolute Basophils		0-150	/µL
Total T4			

B6

B6

B6

08/24/2018

T4	B6	0.8-3.5 µg/dL	B6
Urinalysis-Complete			
Collection Method			
Natural Voiding			
Color			
Appearance			
Specific Gravity		1.015-1.050	
pH		5.5-7.0	
Protein		Negative	

B6

Glucose	B6
Ketone	
Bilirubin	
Blood	
WBC	
RBC	
Casts	
Struvite Crystals	
Bacteria	
Squamous Epithelia	
Accuplex 4	
Collection Method	
Heartworm (Antigen)	

B6

10

Information is B6

B6

08/24/2018

10/26/2017 **SOAP** **Exam** **Provider:** B6

S:

Sick Canine Examination

Tech B6

Reason for visit?
exercise intolerance
How long have you had pet(new patient)?
since 8 weeks old
E/D? Diet? V/D/C/S?
eating is a bit off; eats Zignature kangaroo
House pet/Outdoor pet?
house
Other pets in the home?
2 dogs
Any recent traveling? Contact with other dogs?
no
Medications/FT/HW (missed doses?)?
no missed doses
Discuss vaccine status with owner/ask about previous records (if still needed):
UTD
Any vaccination/drug reactions?
none
Any seizure Hx?
no
Would you like to perform diagnostics if the doctor recommends it?
yes

Flea Comb: ~~
Fecal sample/Deworm: ~~

Heart Rate: ~~ BPM (normal dog=60-160, normal cat=120-240)
Respiration: ~~ BPM (normal dog=10-40, normal cat=16-40)
Temperature: ~~ (normal=100-102.5)

Weight (put in database): 92.5

Blood Pressure:Systolic ~~ mmHg (100-160)
Diastolic ~~ mmHg (80-120)
Mean ~~ mmHg (90-120)
HR ~~ mmHg (60-160)
Cuff Location: ~~
Pet's Behavior: ~~

B6 Examination

B6

B6

B6

08/24/2018

B6

B6

Irregular heart rhythm

Concerned for primary cardiac disease with failure

P: Thoracic radiograhs x 3 - cardiomegaly, perihilar infiltration and interstial pattern caudal lung fields, pleural fissue line right middl lung lobe
Abdominal radiorgaphs - hepatomegaly, decreased abdominal detail - suspicious for ascites, difficult to visualize spleen weel, mineral density in stomach and SI - no obstructive patten noted
PCV/TS - 44/7.0

B6

08/24/2018

Senior wellness with accuplex t B6

Plan to start B6 mg/kg BID pending echocardiogram and cardiology consultation

B6

10/26/2017	**Service**	B6	QTY: 50	**Provider:** Dr	B6
10/26/2017	**RX#: 23949**		**QTY:** 50	**Provider:** Dr	
	Expires On: 10/2				
	Give 6.5 tablet(s) orally 2 time(s) a day (every12hours) until gone. Start now.				
10/26/2017	**Service**	E Senior Wellness w/ Accuplex	QTY: 1	**Provider:** Dr	
10/26/2017	**THI**	A-Referral Directory Cardiology			

For any questions on B6 **ealth, please ca** B6

From: Freeman, Lisa <Lisa.Freeman@tufts.edu>
To: Peloquin, Sarah
Sent: 11/1/2018 6:30:21 PM
Subject: FW: Taurine result - B6
Attachments: T_23316.jpg

Hi Sarah,
This is for a previously submitted dog. Initially had a borderline low level B6 and mildly reduced contractile function. Clearly high enough taurine now! We will recheck an echo soon.
Thanks
Lisa

Lisa M. Freeman, DVM, PhD, DACVN
Board Certified Veterinary Nutritionist™
Professor
Cummings School of Veterinary Medicine
Friedman School of Nutrition Science and Policy
Tufts Clinical and Translational Science Institute
Tufts University
www.petfoodology.org

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AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-8739
http://vetmed.tufts.edu/

Discharge Instructions

Patient
Name: B6
Species: Canine
White/Brown Male (Neutered) Beagle Cross
Birthdate: B6

Owner
Name: B6
Address: B6

Patient ID: B6

Attending Cardiologist:
☐ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC
B6

Cardiology Resident:
B6

Student: B6 V18
Cardiology Technician:
B6

Date: 6/22/2017

Diagnoses: Dilated cardiomyopathy (DCM) with history of congestive heart failure

Clinical Findings: Thank you for bringing B6 in today for his recheck with Tufts Cardiology. B6 was looking great on examination today. No murmur was heard today. The chambers of B6 heart are smaller than in the past, and his heart's contractile function is stable to improved. We also drew blood to see how B6 is tolerating his medications. We will call you later today or tomorrow with the results of this test.

Monitoring at Home:

- We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest. The doses of drugs will be adjusted based on the breathing rate and effort.
- In general, most dogs with heart failure that is well controlled have a breathing rate at rest of less than 35 to 40 breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal if heart failure is controlled.
- An increase in breathing rate or effort will usually mean that you should give an extra dose B6 If difficulty breathing is not improved by within 30-60 minutes after giving ex B6 then we recommend that a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.
- We also want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.
- If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Diet Suggestions: B6 should continue to eat his current diet.

Recommended Medications: ****No changes at this time****

B6

Recheck Visits: We recommend a recheck in about 6 months. However, if you have any concerns in the meantime, please let us know as he may need to be seen sooner.

Thank you for allowing us to participate in B6 care. He is such a sweet boy and we are so glad he is doing so well!

Please visit our HeartSmart website for more information
http://vet.tufts.edu/heartsmart/

Prescription Refill Disclaimer:
For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:
Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:
Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvmc/clinical-studies

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Discharge Instructions

Patient
Name: B6
Species: Canine
White/Brown Male (Neutered) Beagle Cross
Birthdate: B6

Owner
Name: B6
Address: B6

Patient ID: B6

Attending Cardiologist:
☐ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC
B6

Cardiology Resident:
B6

Student: B6 V17
Cardiology Technician: B6, CVT, VTS(Cardiology)

Date: B6

Diagnoses: Dilated cardiomyopathy (DCM) with history of congestive heart failure

Clinical Findings:
B6 has been diagnosed with a primary heart muscle disease called dilated cardiomyopathy (DCM). This disease is more common in large and giant breed dogs and is characterized by thinning of the walls of the heart, reduced cardiac pump function, and enlargement of the upper chambers of the heart. However, B6 breed, age, and clinical signs are somewhat atypical for this disease. Significant arrhythmias, which can be life-threatening, can be associated with DCM, but at this stage Jackson has not been having arrhythmia.

Today we rechecked B6 blood work to determine if he is tolerating his medications. We will call you with these results. Because B6 is not the typical breed or age of dog to develop DCM, we also took another quick look at B6 heart via echocardiogram today. The echocardiogram findings were very similar to his previous examination, with visible enlargement of all heart chambers. Low taurine levels have been associated with DVM, but B6 taurine levels came back yesterday, and are within normal limits.

Monitoring at home:

- We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest. The doses of drugs will be adjusted based on the breathing rate and effort.
- In general, most dogs with heart failure that is well controlled have a breathing rate at rest of less than 35 to 40 breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal if heart failure is controlled.
- An increase in breathing rate or effort will usually mean that you should give an extra dos B6 If difficulty breathing is not improved by within 30-60 minutes after giving ext B6 en we recommend that a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.

- There are instructions for monitoring breathing, and a form to help keep track of breathing rate and drug doses, on the Tufts HeartSmart web site (http://vet.tufts.edu/heartsmart/).
- We also want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.
- If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Recommended Medications:

B6

****New Medication****

B6

****Formulation Change****

B6

Diet suggestions:
Dogs with heart failure accumulate more fluid in their body if they eat large amounts of sodium (salt). Sodium can be found in all foods, but some foods are lower in sodium than others. Many pet treats, people foods, and supplements used to give pills often have more sodium than is desirable – a sheet that has suggestions for low sodium treats can be found on the HeartSmart web site (http://vet.tufts.edu/heartsmart/)

Your dog's usual diet may also have more sodium than recommended – we want him to continue to eat his normal diet until we are sure he is tolerating medications well, but after that time we would recommend slowly introducing one of the lower sodium diets on the HeartSmart list (25% of the new diet and 75% old diet for 2-3 days, then 50:50, etc.). Hopefully you can find a diet on the list that your dog likes to eat. Alternatively, if you are attached to the current diet you can research the amount of sodium in the diet to ensure that the sodium content is similar to those on the list.

The HeartSmart web site also has some information on supplements such as fish oil, taurine, and other supplements that you might have questions about.

Exercise Recommendations:
Now that B6 heart failure is better controlled, slightly longer walks are acceptable. However, if you find that B6 is lagging behind or needs to stop on a walk then this was too long a walk and shorter walks are advised in the future. Repetitive or strenuous high energy activities (repetitive ball chasing, running fast off-leash, etc.) are generally not advised at this stage of heart failure.

Recheck Visits:
A recheck visit with your primary care veterinarian is recommended in 1-2 weeks to recheck kidney values. If his blood work

is normal at that time we recommend increasing the B6 to twice daily.
A recheck echocardiogram is recommended in 3-4 months. We have scheduled a recheck for Thursday December 8th at 10AM. Please call or email if you need to change this appointment or if you have any concerns.

Please visit our HeartSmart website for more information
http://vet.tufts.edu/heartsmart/

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Telephone (508) 839-5395
Fax (508) 839-8739
http://vetmed.tufts.edu/

Discharge Instructions

Patient
Name: B6
Species: Canine
White/Brown Male (Neutered) Beagle Cross
Birthdate: B6

Owner
Name: B6
Address: B6

Patient ID: B6

Attending Cardiologist:
☐ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC
B6

Cardiology Resident:
B6

Student: B6 V17
Cardiology Technician: B6 CVT, VTS(Cardiology)

Date: 12/8/2016

Diagnoses: Dilated cardiomyopathy (DCM) with history of congestive heart failure

Clinical Findings: Thank you for bringing B6 in today for his recheck with Tufts Cardiology. You report that B6 had been doing well until two weeks ago when he started experiencing an increase in respiratory effort and a cough. His B6 was increased to B6 by his primary veterinarian and you report this has resolved B6 respiratory difficulty. His activity level has decreased and he is sleeping more than usual, but he has maintained a good appetite. You report that B6 had a single episode of B6 that may have been a B6 B6 he remained standing during this event and was normal both before and after this episode.

On examination today, B6 heart sounds the same as his last exam. His heart appears stable on echocardiogram; the chambers of his heart are very mildly more dilated than they were previously, but his heart's contractile function remains stable. We did not identify any pleural effusion (fluid in the chest) or ascites (free fluid in the abdomen). We also drew blood to assess B6 renal values since his furosemide dose has been increased; we will call you later today or tomorrow with the results of this test.

We also submitted his blood for a test called a 4DX test to see if B6 may be experiencing a B6 as he seemed potentially painful during his echocardiogram. You report that B6 has also been sensitive to touch on his abdomen when he is sleeping for about a month and that in July he tested strongly positive for an B6 s infection. We may recommend antibiotic treatment depending on the results of the 4DX test.

Monitoring at Home:

- We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest. The doses of drugs will be adjusted based on the breathing rate and effort.
- In general, most dogs with heart failure that is well controlled have a breathing rate at rest of less than 35 to 40

breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal if heart failure is controlled.

- An increase in breathing rate or effort will usually mean that you should give an extra dose B6 If difficulty breathing is not improved by within 30-60 minutes after giving extr B6 then we recommend that a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.
- There are instructions for monitoring breathing, and a form to help keep track of breathing rate and drug doses, on the Tufts HeartSmart web site (http://vet.tufts.edu/heartsmart/).
- We also want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.
- If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.
- Please continue to monitor B6 for any repeated episodes of facial twitching or seizures. If this occurs again B6 should be evaluated by a veterinarian.

Diet Suggestions: Please continue to feed B6 his current diet. You can also continue to feed B6 frozen peas as a treat.

Exercise Recommendations: Try to limit B6 activity to short leashed walks until he is feeling better. If you find that B6 is lagging behind or needs to stop on a walk then this was too long a walk and shorter walks are advised in the future. Repetitive or strenuous high energy activities (repetitive ball chasing, running fast off-leash, etc.) are generally not advised at this stage of heart failure, but we do want B6 to enjoy life and have fun.

Recommended Medications:

B6

Recheck Visits: A recheck appointment and echocardiogram is recommended in 3-4 months as long as B6 is doing well. You can reach the cardiology liaison B6 at 508-887-4696 to schedule this appointment.

Thank you for entrusting us with the care of B6 he is a great dog and it was nice to see you both today.

Prescription Refill Disclaimer:
For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:
To ensure your pet food is in stock, please call 7-10 days in advance at 508-887-4629. Alternatively, foods can be ordered through www.chewy.com or www.petfooddirect.com

Clinical Trials:
Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvmc/clinical-studies

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Fax (508) 839-7951
http://vetmed.tufts.edu/

Discharge Instructions

Patient
Name: B6
Species: Canine
White/Brown Male (Neutered) Beagle Cross
Birthdate: B6

Owner
Name: B6
Address: B6

Patient ID: B6

Attending Cardiologist:
☑ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC
B6

Cardiology Resident:
B6

Student: B6 V'18

Cardiology Technician:
B6

Date: 12/8/2017

Diagnoses: Dilated cardiomyopathy (DCM) with history of congestive heart failure

Clinical Findings: Thank you for bringing B6 in today for his recheck with Tufts Cardiology. B6 looked great on examination today, and his echocardiogram continues to be improved. The chambers of B6 heart are smaler than in the past, and his heart's contractile function is improved. We also drew blood to see how B6 is tolerating his medications, and his bloodwork is normal today. This means that he is tolerating his current medications and no changes are required. His heart looks good enough that it seems like you could remove his mid day dose of B6, but since his blood work looks great and he is feeling great no changes are clearly necessary at this time.

Monitoring at Home:

- We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest. The doses of drugs will be adjusted based on the breathing rate and effort.
- In general, most dogs with heart failure that is well controlled have a breathing rate at rest of less than 35 to 40 breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal if heart failure is controlled.
- An increase in breathing rate or effort will usually mean that you should give an extra B6 If difficulty breathing is not improved by within 30-60 minutes after giving ext B6 hen we recommend that a recheck exam be scheduled and/or that your dog be evaluated by an emergency clinic.
- We also want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.
- If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24

hours/day.

Diet Suggestions: B6 should continue to eat his current diet.

Recommended Medications:

B6

Recheck Visits: We recommend a recheck in about 6 months. However, if you have any concerns in the meantime, please let us know as he may need to be seen sooner. Please call or email (508 887 4696 or cardiovet@tufts.edu) to schedule this appointment.

Thank you for allowing us to participate in B6 's care. He is such a good boy and we are so glad he is doing so well!

Please visit our HeartSmart website for more information
http://vet.tufts.edu/heartsmart/

Prescription Refill Disclaimer:
For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:
Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:
Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvmc/clinical-studies

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12/08/2016 10:28 #7335 P.002/007

30263

CANINE PATIENT MEDICAL SUMMARY

Owners: B6

Mailing Address: B6 City: B6 Zip: B6

Home Phone: B6 Work Phone: Cell phone B6

E-mail address:

Pet's Name: B6 Birthdate: B6

Breed: beagle/mix Foxhound Color: wht/blk/brn Sex: MC

Precautions: thinkingstrings.com

Vaccinations	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date	Date
	B6										
DHL4PP											
LEPTO											
Rabies											
Nasal Bordetella											
Lyme											
4 DX											
Lyme Test											
Fecal Exam											

Date	Dental Procedures

Date	Surgical Procedures
	Drug Tufts

Date Active	MASTER PROBLEM LIST	~~Date Resolved~~
	B6	B6
7/13	B6	
7/14		
	Cardiology / [redacted]	

12/09/2016 10:28 #7335 P.003/007

PROGRESS NOTES PAGE

B6 | beagle/[illegible] | tri | M/C | B6

BREED COLOR SEX BIRTH DATE

DATE MO	DAY	YR	PROBLEM NUMBER	SOAP FORMAT	PROGRESS NOTES
11	6	16			
12	2	16		H&C	
			59		
				P1	

B6

B6

12/08/2016 10:29 #7335 P.004/007

DATE MO	DAY	YR	PROBLEM NUMBER	SOAP FORMAT	PROGRESS NOTES
8	2	16			bloodwork from Tufts Taurine levels WNL
8	12	16			Blood work - Kidney panel { BUN & K+
W=41lbs 9oz					Faxed BPs and Renal values to Tufts -SP
8	13	16			Take to ō per CBC everything is fine
8	19	16			report from Tufts
8	30	16			B6 ō said BID per Tufts -SP
9	1	16			B6 10/4/16 B6
10	28	16			ō called worried about B6 breathing they are 8-10 - 30sec. H/C said that was fine only worry if they are quiet.
10	31	16			Please sign taken B6 B6 -
11	1	16			Rx our online service B6

12/08/2016 10:28 #7335 P.005/007

PROGRESS NOTES PAGE 5

B6 B6 hound Tri M/C B6

OWNER'S NAME BREED COLOR SEX BIRTH DATE

DATE MO	DAY	YR	PROBLEM NUMBER	SOAP FORMAT	PROGRESS NOTES

B6

12/09/2016 10:30 #7335 P.006/007

Client: B6
Patient Name: B6
Species: Canine
Breed: Mixed

Gender: Male/Castrated
Weight:
Age: 3 Years
Doctor:

B6

Test	Results	Reference Interval	LOW	NORMAL	HIGH
Catalyst Dx (B6	10:58 AM)				B6 10:15 AM
GLU	B6	74 - 143		B6	B6
BUN		7 - 27			
CREA		0.5 - 1.8			
BUN/CREA					
PHOS		2.5 - 6.8			
TP		5.2 - 8.2			
ALB		2.3 - 4.0			
GLOB		2.5 - 4.5			
ALB/GLOB					
Na		144 - 160			
K		3.5 - 5.8	LOW		
Na/K					
Cl		109 - 122			
Osm Calc					

B6

B6

B6

Printed: August 12, 2016 10:58 AM

Page 1 of1

IDEXX LABORATORIES

12/08/2016 10:30 #7335 P.007/007

Client: B6
Patient Name: B6
Species: Canine
Breed: Mixed

Gender: Male/Castrated
Weight:
Age: 3 Years
Doctor:

B6

ProCyte Dx (B6 10:51 AM)

B6 10:05 AM

Test	Results	Reference Interval	LOW / NORMAL / HIGH
RBC		5.65 - 8.87	
HCT		37.3 - 61.7	
HGB		13.1 - 20.5	
MCV		61.6 - 73.5	
MCH		21.2 - 25.9	
MCHC		32.0 - 37.9	
RDW		13.6 - 21.7	
%RETIC			
RETIC		10.0 - 110.0	
WBC		5.05 - 16.76	HIGH
%NEU			
%LYM			
%MONO			
%EOS			
%BASO			
NEU		2.95 - 11.64	HIGH
LYM		1.05 - 5.10	
MONO		0.16 - 1.12	HIGH
EOS		0.06 - 1.23	
BASO		0.00 - 0.10	
PLT		148 - 484	
MPV		8.7 - 13.2	
PDW		9.1 - 19.4	
PCT		0.14 - 0.46	

B6 B6 B6

WBC Abnormal Distribution

RBC Run WBC Run

Size

B6

Fluorescence Granularity

■ RBC ■ RETICS ■ PLT ■ RBC Frags ■ WBC ■ NEU ■ LYM ■ MONO ■ EOS ■ BASO ■ URBC

Printed: July 26, 2016 10:51 AM

IDEXX LABORATORIES

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY
Cardiology Liaison: 508-887-4696

B6

Patient ID: B6
B6 Canine
B6 Years Old Male (Neutered) Beagle Cross
White/Brown

Cardiology Appointment Report

Date: 12/8/2017

Attending Cardiologist:
☑ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC

B6

Cardiology Resident:
B6

Cardiology Technician:
B6

Student: B6 V'18

Presenting Complaint: Recheck of historical DCM (diagnosed 7/22/16)

Concurrent Diseases: None

General Medical History:
Dx with DCM-like changes, secondary CHF, mild PHT 7/22/16. Taurine levels sent out due to concern for taurine deficiency as the cause, but levels were elevated.

B6 has been doing well since his last visit, however, he started coughing at night a few weeks ago. Lasted for around 10 days. Coincided with when owner went out of town and her husband was giving B6 his meds- concerned that he may have been giving the wrong amounts. Additiona B6 were not given when he was coughing. Since owner has returned and B6 is definitely on his regular schedule, coughing has subsided and he is doing well. No exercise intolerance. Good appetite.

Diet and Supplements:
Hill's Chicken and Rice ideal balance kibble (on Heartsmart website) - 1.5cups BID
Gets frozen carrots and other veggies as treats is

Cardiovascular History:

Prior CHF diagnosis? yes
Prior ATE? no
Prior arrhythmia? no
Cough? occasional when possibly not getting all of his meds
Shortness of breath or difficulty breathing? no
Syncope or collapse? no
Sudden onset lameness? no
Exercise intolerance? no
Prior heart murmur? yes, intermittent I/VI holosystolic left basilar on last PE

Current Medications Pertinent to CV System:

B6

B6

B6

Cardiac Physical Examination:

B6

Muscle condition:

- ☑ Normal
- ☐ Mild muscle loss
- ☐ Moderate cachexia
- ☐ Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

- ☐ None
- ☐ I/VI
- ☑ II/VI
- ☐ III/VI
- ☐ IV/VI
- ☐ V/VI
- ☐ VI/VI

Murmur location/description: L systolic basilar

Jugular vein:

- ☑ Bottom 1/3 of neck
- ☐ Middle 1/3 of neck
- ☐ Top 2/3rd of neck

Arterial pulses:

- ☐ Weak
- ☐ Fair
- ☐ Good
- ☑ Strong
- ☐ Bounding
- ☐ Pulse deficits
- ☐ Pulsus paradoxus
- ☐ Other:

Arrhythmia:

- ☑ None
- ☐ Sinus arrhythmia
- ☐ Premature beats
- ☐ Bradycardia
- ☐ Tachycardia

Gallop:

- ☐ Yes
- ☑ No
- ☐ Intermittent
- ☐ Pronounced
- ☐ Other:

Pulmonary assessments:

- ☑ Eupneic
- ☐ Mild dyspnea
- ☐ Marked dyspnea
- ☑ Normal BV sounds
- ☐ Pulmonary crackles
- ☐ Wheezes
- ☐ Upper airway stridor

Abdominal exam:

- ☑ Normal /tense
- ☐ Hepatomegaly
- ☐ Abdominal distension
- ☐ Mild ascites
- ☐ Marked ascites

Problems:

(1) Hx DCM (primary vs secondary to myocarditis) with secondary CHF
(2) Hx mild PHT

Diagnostic plan:

- ☑ Echocardiogram
- ☑ Chemistry profile
- ☐ ECG
- ☐ Renal profile
- ☐ Blood pressure
- ☐ Dialysis profile
- ☐ Thoracic radiographs
- ☐ NT-proBNP
- ☐ Troponin I
- ☐ Other tests:

Echocardiogram Findings:

General/2-D findings:

"Echocardiogram performed standing. Do not put on table. Does not like abdomen touched"

LV cavity is mildly dilated with mildly reduced contractile function (better side to side motion); improved from previous exam. The LA is normal to at most mildly dilated. MV is mildly thickened. The RH is mildly dilated. No pericardial or pleural effusion.

Doppler findings:

Elevated aortic velocity.

Assessment and recommendations:

Echocardiogram reveals continued improvement in contractile function and reduced LV and LA chamber dimensions. Patient is doing well at home, so recommend

continuing current medications unless blood work indicates need for reduction, in which case the mid day dose o[B6]ould be removed. The size of the LA does not suggest that extra[B6]should be required, so if owner has frequent concerns regarding need for extra[B6]then recommend rechecking radiographs and echo. Otherwise recheck echo in 6 months, or sooner if clinical signs occur such as increased RR/RE, cough, collapse, or exercise intolerance.

Final Diagnosis:
DCM (primary vs. secondary to myocarditis) with history of secondary CHF - improved echocardiographic measurements today.

Heart Failure Classification Score:
ISACHC Classification:

- ☐ Ia
- ☐ Ib
- ☐ IIIa
- ☐ IIIb

ACVIM Classification:

- ☐ A
- ☐ B1
- ☐ B2
- ☑ C
- ☐ D

M-Mode		
IVSd	B6	cm
LVIDd		cm
LVPWd		cm
IVSs		cm
LVIDs		cm
LVPWs		cm
%FS		%
Max LA		cm
M-Mode Normalized		
IVSdN	B6	(0.29 - 0.52) !
LVIDdN		(1.35 - 1.73) !
LVPWdN		(0.33 - 0.53)
IVSsN		(0.43 - 0.71) !
LVIDsN		(0.79 - 1.14)
LVPWsN		(0.53 - 0.78)
2D		
SA LA	B6	cm
Ao Diam		cm
SA LA / Ao Diam		
IVSd		cm
LVIDd		cm
LVPWd		cm
EDV(Teich)		ml
IVSs		cm
LVIDs		cm
LVPWs		cm
ESV(Teich)		ml
EF(Teich)		%
%FS		%
SV(Teich)		ml

Doppler

AV Vmax
AV maxPG

B6

m/s
mmHg

From: PFR Event <pfreventcreation@fda.hhs.gov>

To: Cleary, Michael *; HQ Pet Food Report Notification; B6

Sent: 10/8/2018 5:44:37 PM

Subject: Acana Heritage formula dog food (mostly freshwater fish: Lisa Freeman - EON-367839

Attachments: 2055788-report.pdf; 2055788-attachments.zip

A PFR Report has been received and PFR Event [EON-367839] has been created in the EON System.

A "PDF" report by name "2055788-report.pdf" is attached to this email notification for your reference. Please note that all documents received in the report are compressed into a zip file by name "2055788-attachments.zip" and is attached to this email notification.

Below is the summary of the report:

EON Key: EON-367839
ICSR #: 2055788
EON Title: PFR Event created for Acana Heritage formula dog food (mostly freshwater fish free run poultry and meats (beef pork and lamb) formulas. Also Meadowlands; 2055788

AE Date	10/04/2018	**Number Fed/Exposed**	1
Best By Date		**Number Reacted**	1
Animal Species	Dog	**Outcome to Date**	Stable
Breed	Great Dane		
Age	B6 Years		
District Involved	PFR-New England DO		

Product information
Individual Case Safety Report Number: 2055788
Product Group: Pet Food
Product Name: Acana Heritage formula dog food (mostly freshwater fish, free run poultry, and meats (beef, pork, and lamb) formulas. Also, Meadowlands
Description: Murmur identified by RDVM 7/17/18. Asymptomatic. DCM diagnosed 10/4/18. Has been eating Acana diet. Owner is happy to talk to FDA and to provide more info. Taurine levels pending. Details on diet and treats below: I can tell you, for starters, that B6 was put on a Fromm diet from July of 2015 thru about March

of 2016. Since that period, she has been eating only Acana Heritage formula dog food. This contains "0% grain, potato, gluten, meat by-products, and plant protein concentrates" as listed on their label. She has had a variety of flavors from this brand. Primarily, it has been "freshwater fish", "free run poultry", and "meats formula" (beef, pork, and lamb). B6 has also had multiple bags of Acana "meadowland" which is advertised as poultry, fish, and eggs. I have also discovered that all of her treats have been produced by Acana. One is labeled as macarel and greens, another is poultry and monkfish, and the last is lamb, liver, and tripe. I should be able to get some records from our local pet store as they have a rewards program we are part of and all of our purchases from the last three years are on our account.

Submission Type: Initial
Report Type: Adverse Event (a symptom, reaction or disease associated with the product)
Outcome of reaction/event at the time of last observation: Stable
Number of Animals Treated With Product: 1
Number of Animals Reacted With Product: 1

Product Name	Lot Number or ID	Best By Date
Acana Heritage formula dog food (mostly freshwater fish, free run poultry, and meats (beef, pork, and lamb) formulas. Also, Meadowlands		

Sender information

Lisa Freeman
200 Westboro Rd
North Grafton, MA 01536
USA

Owner information

B6
USA

To view this PFR Event, please click the link below:
https://eon.fda.gov/eon//browse/EON-367839

To view the PFR Event Report, please click the link below:
https://eon.fda.gov/eon//EventCustomDetailsAction!viewReport.jspa?decorator=none&e=0&issueType=12&issueId=384761

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Failure to adhere to the above provisions could result in removal from the approved distribution list. If you think you received this email in error, please send an email to FDAReportableFoods@fda.hhs.gov immediately.

Report Details - EON-367839

ICSR:	2055788	
Type Of Submission:	Initial	
Report Version:	FPSR.FDA.PETF.V.V1	
Type Of Report:	Adverse Event (a symptom, reaction or disease associated with the product)	
Reporting Type:	Voluntary	
Report Submission Date:	2018-10-08 13:38:04 EDT	
Reported Problem:	**Problem Description:**	Murmur identified by RDVM 7/17/18. Asymptomatic. DCM diagnosed 10/4/18. Has been eating Acana diet. Owner is happy to talk to FDA and to provide more info. Taurine levels pending. Details on diet and treats below: I can tell you, for starters, that B6 was put on a Fromm diet from July of 2015 thru about March of 2016. Since that period, she has been eating only Acana Heritage formula dog food. This contains "0% grain, potato, gluten, meat by-products, and plant protein concentrates" as listed on their label. She has had a variety of flavors from this brand. Primarily, it has been "freshwater fish", "free run poultry", and "meats formula" (beef, pork, and lamb). B6 has also had multiple bags of Acana "meadowland" which is advertised as poultry, fish, and eggs. I have also discovered that all of her treats have been produced by Acana. One is labeled as macarel and greens, another is poultry and monkfish, and the last is lamb, liver, and tripe. I should be able to get some records from our local pet store as they have a rewards program we are part of and all of our purchases from the last three years are on our account.
	Date Problem Started:	10/04/2018
	Concurrent Medical Problem:	No
	Outcome to Date:	Stable
Product Information:	**Product Name:**	Acana Heritage formula dog food (mostly freshwater fish, free run poultry, and meats (beef, pork, and lamb) formulas. Also, Meadowlands
	Product Type:	Pet Food
	Lot Number:	
	Package Type:	BAG
	Product Use Information:	**Description:** Owner can provide more details.
	Manufacturer /Distributor Information:	
	Purchase Location Information:	
Animal Information:	**Name:**	B6
	Type Of Species:	Dog
	Type Of Breed:	Great Dane
	Gender:	Female
	Reproductive Status:	Neutered
	Weight:	42.2 Kilogram
	Age:	B6 Years
	Assessment of Prior Health:	Excellent
	Number of Animals Given the Product:	1
	Number of Animals Reacted:	1
	Owner Information:	**Owner Information provided:** Yes
		Contact: **Name:** B6 **Phone:** **Email:**

		Address:	B6 United States
	Healthcare Professional Information:	Practice Name:	Tufts Cummings School of Veterinary Medicine
		Contact:	Name: Lisa Freeman
			Phone: (508) 887-4523
			Email: lisa.freeman@tufts.edu
		Address:	200 Westboro Rd North Grafton Massachusetts 01536 United States
Sender Information:	Name:		Lisa Freeman
	Address:		200 Westboro Rd North Grafton Massachusetts 01536 United States
	Contact:	Phone:	5088874523
		Email:	lisa.freeman@tufts.edu
	Permission To Contact Sender:		Yes
	Preferred Method Of Contact:		Email
Additional Documents:			
	Attachment:		B6 compiled records.pdf
	Description:		B6 compiled medical records
	Type:		Medical Records

Cummings Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
(508) 839-5395

All Medical Records

Client:
Address: **B6**

Patient: **B6**
Breed: Great Dane
DOB: **B6**

Species: Canine
Sex: Female (Spayed)

Home Phone: **B6**
Work Phone: ( ) -
Cell Phone: **B6**

Referring Information

B6

Client:
Patient: **B6**

Initial Complaint:
Scanned Record

Initial Complaint:
New - Rush - murmur

SOAP Text Oct 4 2018 2:50PM - Rush, John

Disposition/Recommendations

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
(508) 839-5395

Client:	B6
Veterinarian:	
Patient ID:	B6
Visit ID:	

Patient:	B6
Species:	Canine
Breed:	Great Dane
Sex:	Female (Spayed)
Age:	B6 Years Old

Lab Results Report

Accession ID:

Test	Results	Reference Range	Units

stringsoft

Printed Monday, October 08, 2018

07/17/2018 05:44 B6 B6 ANIMAL HOSPIT PAGE 02/05

B6

07/17/2018 05:44 B6 B6 ANIMAL HOSPIT PAGE 03/06

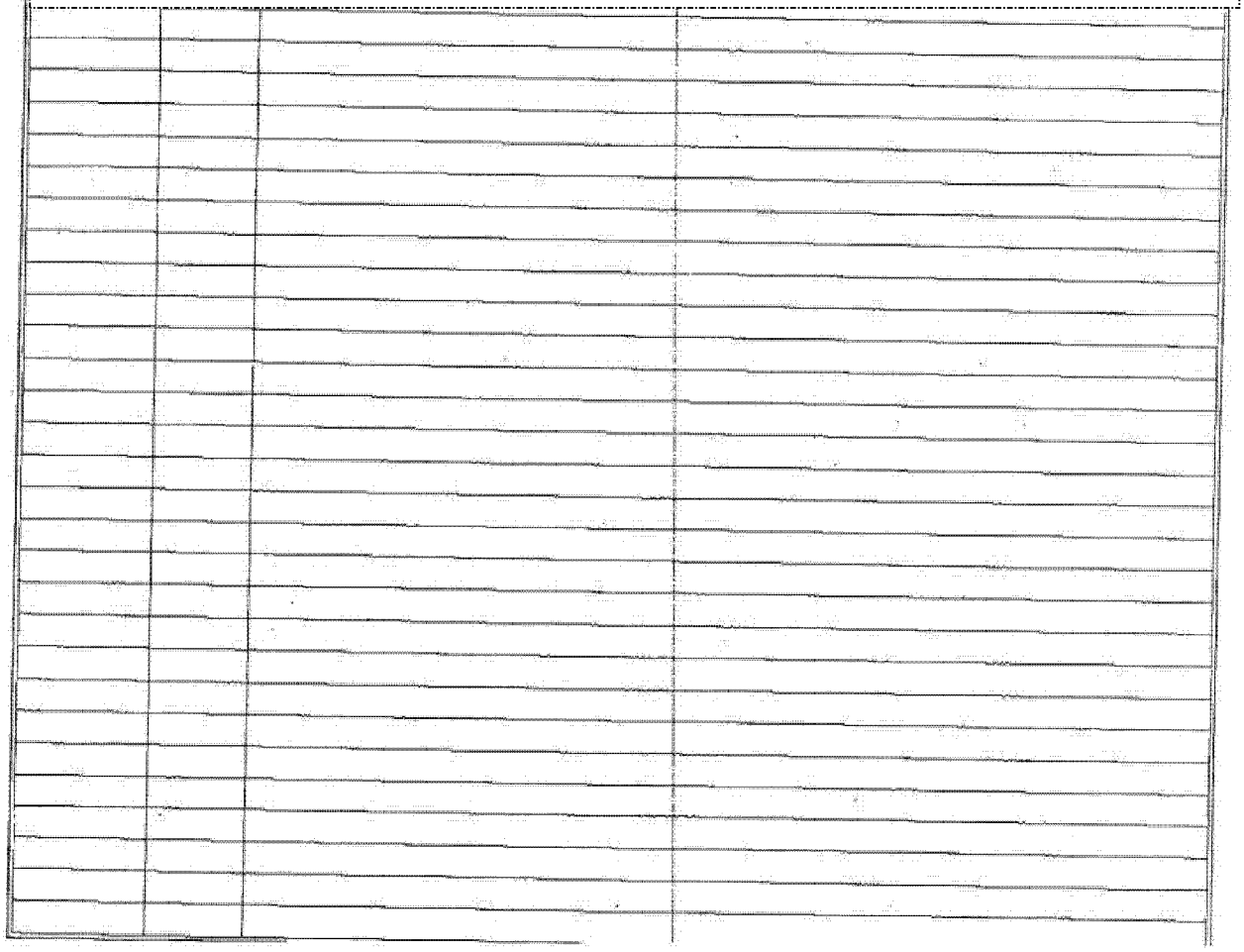
B6

Client: B6
Patient:

rDVM B6 **AH hx 5/21/15-7/17/18**

07/17/2018 05:44 B6 B6 ANIMAL HOSPIT PAGE 04/06

B6



07/17/2018 05:44 B6 B6 ANIMAL HOSPIT PAGE 05/06

B6

Printed: July 17, 2018 3:02 PM

Page 1 of 1

IDEXX LABORATORIES

Client: B6
Patient:

rDVM B6 **AH hx 5/21/15-7/17/18**

07/17/2018 05:44 B6 B6 ANIMAL HOSPIT PAGE 05/06

B6

Printed: June 21, 2017 3:31 PM

Page 1 of1

IDEXX LABORATORIES

Client: B6
Patient:

IDEXX CARDIOPET proBNP 10/4/18

IDEXX Reference Laboratories

Client: B6 Patient: B6

IDEXX VetConnect 1-888-433-9987

Client: B6
Patient:
Species: CANINE
Breed: GREAT_DANE
Gender: FEMALE S PAYED
Age: 3Y

Date: 10/04/2018
Requisition #: 434689
Accession # B6
Ordered by: RUSH, JOHN

TUFTS UNIVERSITY
200 WESTBORO RD
NORTH GRAFTON, Massachusetts 01536-1828
508-839-5395

Account #80735

CARDIOPET proBNP - CANINE

Test	Result	Reference Range	Low	Normal	High
CARDIOPET proBNP - CANINE	B6	0 - 900 pmol/L	HIGH	B6	

Comments:

1 B6

Please note: Complete interpretive comments for all concentrations of Cardiopet proBNP are available in the online directory of services. Serum specimens received at room temperature may have decreased NT-proBNP concentrations.

Page 1 of 1

Client: B6
Patient:

Vitals Results

10/4/2018 2:50:15 PM	Weight (kg)
10/4/2018 3:33:56 PM	Sedation

B6

Patient History

07/17/2018 03:46 PM	Appointment
09/07/2018 04:46 PM	Appointment
10/04/2018 02:28 PM	UserForm
10/04/2018 02:33 PM	UserForm
10/04/2018 02:49 PM	Purchase
10/04/2018 02:49 PM	Purchase
10/04/2018 02:50 PM	Vitals
10/04/2018 02:50 PM	Treatment
10/04/2018 02:59 PM	UserForm
10/04/2018 03:33 PM	Vitals
10/04/2018 03:34 PM	Purchase
10/04/2018 04:08 PM	Purchase
10/04/2018 04:08 PM	Purchase
10/04/2018 04:10 PM	Prescription
10/04/2018 04:10 PM	Purchase
10/04/2018 04:11 PM	Purchase
10/04/2018 04:13 PM	Purchase

B6

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

B6

B6 Female (Spayed)
Canine Great Dane Black
Patient ID: B6

STANDARD CONSENT FORM

I am the owner, or agent for the owner, of the above described animal and have the authority to execute consent. I hereby authorize the Cummings School of Veterinary Medicine at Tufts University (herein after Cummings School) to prescribe for treatment of said animal according to the following terms and conditions.

Cummings School and its officers, agents and employees will provide such veterinary medical care as they deem reasonable and appropriate under the circumstances.

Cummings School and its officers, agents, and employees will use all reasonable care in the treatment of the above mentioned animal, but will not be liable for any loss or accident that may occur or any disease that may develop as a result of the care and treatment provided.

I understand that the above identified animal may be treated by Cummings School students under the supervision and assistance of Cummings School staff members.

In executing this form, I hereby expressly acknowledge that risks, benefits and alternative forms of treatment have been explained to me. I understand said explanation, and I consent to treatment. Should any additional treatments or diagnostics be required during the continued care of my animal, I understand that I will be given the opportunity to discuss and consent to these additional procedures. I understand that further or additional treatment may be required without an opportunity for discussion and consideration by me, in the case of the development of any life-threatening emergency during the continued care of my animal and I expressly consent to all such reasonable treatment as required. I realize and understand that results cannot be guaranteed.

If any equipment is left with the animal, it will be accepted with the understanding that Cummings School assumes no responsibility for any loss of equipment that may occur.

I agree to pick up the animal when notified that it is ready for release.

In the event the animal is not picked up, and if ten (10) days have expired since a registered letter was sent to the address given above, notifying me to call for the animal, the animal may be sold or otherwise disposed of in a humane manner and the proceeds applied to the charges incurred in caring and treating the animal. Failure to remove said animal will not and does not relieve me from obligation for the costs of services rendered.

I hereby grant to the Cummings School of Veterinary Medicine at Tufts University, its officers and employees (collectively referred to herein as Cummings School), and its agents and assigns (the Grantees) the irrevocable rights to photograph / videotape the operation or procedure to be performed, including appropriate and otherwise use such photographs and images for, and in connection with, a Grantee's medical, scientific, educational, and publicity purposes, by any means, methods and media (print and electronic) now known or, in the future, developed that the Grantee deems appropriate (provided that such photographs and images may not be used in for-profit commercials, unless such commercials are publicizing educational programs at Cummings School). As medical and surgical treatment necessitates the removal of tissue, cells, fluids or body parts of my animal, I authorize the Grantees to dispose of or use these tissues, cells, fluids or body parts for scientific and educational purposes.

I understand that a FINANCE CHARGE will be applied to all accounts unpaid after 30 days. The FINANCE CHARGE is computed on a monthly rate of 1.33% per month, which is an annual percentage rate of 16% applied to the average daily balance outstanding, with a minimum fee of $.50.

I do further agree that should any payment, or the full amount of the sum stated above, become overdue more than 20 days from the above-agreed upon time of payment or payments, the entire balance shall be considered in default and become due and payable. I further agree to be responsible for any or all collection agency and/or attorney fees necessary to collect the full amount.

I do further agree to comply with hours of visitation in conjunction with our Hospital's policy.

I have read, understand, and agree to accept the terms and conditions herein.

Owner's name: B6 Date: 10/4/2018

Owner's address: B6

B6

10/4/18
Date

If the individual admitting the animal is someone other than the legal owner, please complete the portion below:

The owner of the animal B6 has granted me authority to obtain medical treatment and to bind this owner to pay the veterinary medical services provided at Cummings School pursuant to the terms and conditions described above

Authorized Agent - Please Print

Agent's Signature

Street Address

Date

Town/City State Zip

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-7951
http://vetmed.tufts.edu/

Discharge Instructions

Patient
Name: B6
Species: Canine
Black Female (Spayed) Great Dane
Birthdate: B6

Owner
Name: B6
Address: B6

Patient ID: B6

Attending Cardiologist:
☑ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC
B6

Cardiology Resident:
B6

Cardiology Technician:
B6

Student: B6 VM9

Admit Date: 10/4/2018 2:27:50 PM
Discharge Date: 10/4/2018

Diagnoses: Dilated cardiomyopathy (DCM) with mitral regurgitation

Clinical Findings:
Thank you for bringing B6 to Tufts today. On presentation B6 was bright, alert, and very nervous. We had to give some sedation to B6 for her exam today, she may be a sleepy when she gets home today. She has normal lung sounds and was panting. Her heart rate was increased (likely excitement), an extra heart sound and grade II/VI heart murmur on the left side and a grade III/VI murmur on the right was heard. On echocardiogram (ultrasound of the heart), the left ventricle is dilated with thickened walls, there is decreased ability of the heart to contract, the left atrium is moderately to markedly enlarged, and there is a moderate amount of mitral and tricuspid regurgitation. No arrhythmias were seen on ECG today.

B6 has been diagnosed with a primary heart muscle disease called dilated cardiomyopathy (DCM). This disease is more common in large and giant breed dogs and is characterized by thinning of the walls of the heart, reduced cardiac pump function, and enlargement of the upper chambers of the heart. Many dogs with DCM will also have significant arrhythmias which can be life-threatening and also require medical management. The heart enlargement can progress to the point of congestive heart failure, meaning that fluid is backing up into the lungs or belly. Unfortunately this is a progressive disease and we usually cannot reverse the changes to the heart muscle, however we can use cardiac medications and some changes to the diet to help delay the onset of heart failure

Today we performed an NT-proBNP test, BNP is produced when the heart muscles are stretched. We have also checked her taurine levels today, because of the association with the diets that she is on. These results are pending and we will give you a call when they are in. The BNP should be back in 1-2 days; the taurine often takes 10-12 days - so if you have not heard from us in about 12 days then please call.

Monitoring at Home:
We would like you to monitor your dog's breathing rate and effort at home, ideally during sleep or at a time of rest.

In general, most dogs have a breathing rate at rest of less than 35 breaths per minute. In addition, the breathing effort, noted by the amount of belly wall motion used for each breath, is fairly minimal. If you notice fast or labored breathing then a chest x-ray should be performed.

We want you to watch for weakness or collapse, a reduction in appetite, worsening cough, or distention of the belly as these findings indicate that we should do a recheck examination.

If you have any concerns, please call or have your dog evaluated by a veterinarian. Our emergency clinic is open 24 hours/day.

Diet Suggestions:
Today we discussed the fact that there seem to be a relationship between grain free diet, diets with exotic protein sources, and DCM. We recommend switching from a grain free diet. At this moment we are unsure of the cause of the connection, some studies have indicated low taurine levels in the food. If taurine is the cause, there is potential for some reversal of her heart disease. We have checked her taurine levels today, and results are pending. If results are low, supplementation long term may be required.

Some Diet Change Recommendations
Canned Options
- Hills Science Diet Adult Beef & Barely Entree
- Hills Science Diet Adult 1-6 Healthy Cuisine Roasted Chicken, Carrots & Spinach Stew

Dry Options
- Royal Canin Early Cardiac
- Purina Pro Plan Adult Weight Management

A sheet that has suggestions for low sodium, heart healthy, treats and diets can also be found on the HeartSmart web site (http://vet.tufts.edu/heartsmart/diet/)

Here is a link to a blog by our nutrionalist with more information about the association between diet and DCM on Petfoodology.
"A broken heart risk of heart disease in boutique or grain free diets and exotic ingredients"
http://vetnutrition.tufts.edu/2018/06/a-broken-heart-risk-of-heart-disease-in-boutique-or-grain-free-diets-and-exotic-ingredients/

If it is possible for you to bring a sample of her food to us for analyzing and reporting to the FDA.

Exercise Recommendations:
B6 can continue with her normal activity level, we recommend that she not exercise to the point of exhaustion.

Recommended Medications:
B6 **blet - Give 1 tablet by mouth every 12 hours.**
that increases the vigor of contraction of the heart. Side effects are uncommon but can include excitability or intestinal upset.
NEXT DOSE DUE: Tonight

Taurine 1000mg by mouth every 12 hours. ***You can purchase this at your local pharmacy or GNC. We recommend using Twinlabs, Swanson, NOW or GNC brands of taurine for quality control reasons***

Recheck Visits: A recheck echocardiogram is recommended in 3-4 months. At this time we will reasses her heart disease and changes in medication or additional medications may be required. We gave you a prescription for B6 to give before the visit - this may calm her down just a bit and we might be able to get away without sedation. Give the B6 at home on a trial at home to see the response; if good (quieter, not more excitable) then give a dose the night before and a dose (2 capsules) the morning of the next visit.

Thank you for entrusting us with B6 care. Please contact our Cardiology liaison at (508)-887-4696 or email us at cardionet@tufts.edu for scheduling and non-emergent questions or concerns.

Please visit our HeartSmart website for more information
http://vet.tufts.edu/heartsmart/

Prescription Refill Disclaimer:
For the safety and well-being of our patients, your pet must have had an examination by one of our veterinarians within the past year in order to obtain prescription medications.

Ordering Food:
Please check with your primary veterinarian to purchase the recommended diet(s). If you wish to purchase your food from us, please call 7-10 days in advance (508-887-4629) to ensure the food is in stock. Alternatively, veterinary diets can be ordered from online retailers with a prescription/veterinary approval.

Clinical Trials:
Clinical trials are studies in which our veterinary doctors work with you and your pet to investigate a specific disease process or a promising new test or treatment. Please see our website: vet.tufts.edu/cvmc/clinical-studies

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Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY
Cardiology Liaison: 508-887-4696

B6

Patient ID: B6
B6 Canine
Years Old Female (Spayed) Great Dane
Black

Cardiology Appointment Report

Date: 10/4/2018

Attending Cardiologist:
☑ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC (primary)

B6

Cardiology Resident:
B6

Cardiology Technician:
B6

Student: B6 V19

Presenting Complaint: Murmur II/VI
First heard 7/17/18, zero change in behavior, has always been happy and healthy. No other concerns.

Concurrent Diseases: No other diseases

General Medical History:
Other wise normal, UTD on HWP (heartgard) and vaccines.

Diet and Supplements:
Acana, Fromm, dry food, Kongs with peanut butter, carrots
no supplements

Cardiovascular History:
Prior CHF diagnosis? N
Prior heart murmur? Y
Prior ATE? N
Prior arrhythmia? N
Monitoring respiratory rate and effort at home? N
Cough? N
Shortness of breath or difficulty breathing? N
Syncope or collapse? N
Sudden onset lameness? N
Exercise intolerance? N

Current Medications Pertinent to CV System:

No medications

Cardiac Physical Examination:

B6

Muscle condition:

- [x] Normal
- [ ] Mild muscle loss
- [ ] Moderate cachexia
- [ ] Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

- [ ] None
- [ ] I/VI
- [x] II/VI
- [x] III/VI
- [ ] IV/VI
- [ ] V/VI
- [ ] VI/VI

Murmur location/description: Left apical II/VI has a musical component - also heard III/VI on right side low frequency rumbling murmur

Jugular vein:

- [x] Bottom 1/3 of the neck
- [ ] Middle 1/3 of the neck
- [ ] 1/2 way up the neck
- [ ] Top 2/3 of the neck

Arterial pulses:

- [ ] Weak
- [ ] Fair
- [x] Good
- [ ] Strong
- [ ] Bounding
- [ ] Pulse deficits
- [ ] Pulsus paradoxus
- [ ] Other:

Arrhythmia:

- [x] None
- [ ] Sinus arrhythmia
- [ ] Premature beats
- [ ] Bradycardia
- [ ] Tachycardia

Gallop:

- [x] Yes
- [ ] No
- [x] Intermittent
- [ ] Pronounced
- [ ] Other:

Pulmonary assessments:

- [ ] Eupneic
- [ ] Mild dyspnea
- [ ] Marked dyspnea
- [x] Normal BV sounds
- [ ] Pulmonary crackles
- [ ] Wheezes
- [ ] Upper airway stridor

Abdominal exam:

- [x] Normal
- [ ] Hepatomegaly
- [ ] Mild ascites
- [ ] Marked ascites

☐ Abdominal distension

Problems:
Hx: Murmur II/VI (rDVM)

Differential Diagnoses:
Valvular disease (dysplasia vs degenerative) vs pulmonic stenosis vs aortic stenosis vs DCM

Diagnostic plan:

- ☑ Echocardiogram
- ☑ Chemistry profile
- ☐ EOG
- ☐ Renal profile
- ☐ Blood pressure
- ☐ Dialysis profile
- ☐ Thoracic radiographs
- ☐ NT-proBNP
- ☐ Troponin I
- ☐ Other tests:

Echocardiogram Findings:

B6

Assessment and recommendations:
Echocardiogram findings are consistent with dilated cardiomyopathy. The patient was very tachycardiac during the echocardiogram. Because today's findings are consistent with DCM and the patient is on a grain-free diet, the DCM protocol is recommended. Blood was pulled and submitted for a taurine level today.

B6

B6

Final Diagnosis:
- Occult DCM r/o genetic vs. diet related.
- Murmur due to secondary mitral regurgitation

Heart Failure Classification Score:
ISACHC Classification:

- ☐ Ia
- ☑ Ib
- ☐ IIIa
- ☐ IIIb

☐ II

ACVIM Classification:

☐ A
☐ B1
☑ B2
☐ C
☐ D

M-Mode

IVSd	B6	cm
LVIDd		cm
LVPWd		cm
IVSs		cm
LVIDs		cm
LVPWs		cm
%FS		%
Ao Diam		cm
LA Diam		cm
LA/Ao		
Max LA		cm
EPSS		cm

M-Mode Normalized

IVSdN	B6	(0.29 - 0.52) !
LVIDdN		(1.35 - 1.73) !
LVPWdN		(0.33 - 0.53)
IVSsN		(0.43 - 0.71)
LVIDsN		(0.79 - 1.14) !
LVPWsN		(0.53 - 0.78)
Ao Diam N		(0.68 - 0.89)
LA Diam N		(0.64 - 0.90) !

2D

IVSd	B6	cm
LVIDd		cm
LVPWd		cm
EDV(Teich)		ml
IVSs		cm
LVIDs		cm
LVPWs		cm
ESV(Teich)		ml
EF(Teich)		%
%FS		%
SV(Teich)		ml
LVId LAX		cm
LVAd LAX		cm
LVEDV A-L LAX		ml
LVEDV MOD LAX		ml

LVLs LAX	B6	cm
LVAs LAX		cm
LVESV A-L LAX		ml
LVESV MOD LAX		ml
HR		BPM
EF A-L LAX		%
LVEF MOD LAX		%
SV A-L LAX		ml
SV MOD LAX		ml
CO A-L LAX		l/min
CO MOD LAX		l/min
LV Diameter		cm
LV Length		cm

<u>Doppler</u>

MR Vmax	B6	m/s
MR maxPG		mmHg
AV Vmax		m/s
AV maxPG		mmHg

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Foster Hospital for Small Animals
55 Willard Street
North Grafton, MA 01536
Telephone (508) 839-5395
Fax (508) 839-7951
http://vetmed.tufts.edu/

B6

B6 Female (Spayed)
Canine Great Dane Black
B6

10/5/2018

Dear B6

Thank you for referring B6 with their pet B6.

If you have any questions, or concerns, please contact us at 508-887-4988.

Thank you,

John Rush DVM, DACVIM (Cardiology), DACVECC

Cummings
Veterinary Medical Center
AT TUFTS UNIVERSITY

Cardiology Liaison: 508-887-4696

B6

Patient ID: B6

B6 Canine

Years Old Female (Spayed) Great Dane

Black

Cardiology Appointment Report
ENROLLED IN DCM STUDY

Date: 1/15/2019

Attending Cardiologist:

☑ John E. Rush DVM, MS, DACVIM (Cardiology), DACVECC (primary)

B6

Cardiology Resident:

B6

Cardiology Technician:

B6

Student: B6 V19

Presenting Complaint: Recheck DCM

Concurrent Diseases: None

General Medical History:

B6 is here today for a recheck of her DCM which was diagnosed 10/4/18 on echo after being referred to Tufts Cardiology for a murmur. Since then owner reports she is doing well at home but maybe has some increased exercise intolerance. No coughing, collapse, or increased respiratory rate/ effort.

Diet and Supplements:

Early Cardiac RC Diet - 3c 2x/d

Cardiovascular History:

Prior CHF diagnosis? No
Prior heart murmur? Yes
Prior ATE? No
Prior arrhythmia? No
Monitoring respiratory rate and effort at home? Yes - Around 20bpm when resting.
Cough? No
Shortness of breath or difficulty breathing? No
Syncope or collapse? No

Sudden onset lameness? No
Exercise intolerance? Yes - Only wants to play for a few minutes, stops sooner than before.

Current Medications Pertinent to CV System:

B6

Cardiac Physical Examination:

B6

Muscle condition:

- ☐ Normal
- ☑ Mild muscle loss
- ☐ Moderate cachexia
- ☐ Marked cachexia

Cardiovascular Physical Exam:

Murmur Grade:

- ☐ None
- ☐ I/VI
- ☑ II/VI
- ☐ III/VI
- ☐ IV/VI
- ☐ V/VI
- ☐ VI/VI

Murmur location/description: Can be heard on left and right side; has a musical component

Jugular vein:

- ☑ Bottom 1/3 of the neck
- ☐ Middle 1/3 of the neck
- ☐ 1/2 way up the neck
- ☐ Top 2/3 of the neck

Arterial pulses:

- ☐ Weak
- ☑ Fair
- ☐ Good
- ☐ Strong
- ☐ Bounding
- ☐ Pulse deficits
- ☐ Pulsus paradoxus
- ☐ Other:

Arrhythmia: Suspect sinus tachycardia on exam and during echo - ECG not done today

- ☐ None
- ☐ Sinus arrhythmia
- ☐ Premature beats
- ☐ Bradycardia
- ☑ Tachycardia

Gallop:

- ☑ Yes
- ☐ No
- ☐ Intermittent
- ☑ Pronounced
- ☐ Other:

Pulmonary assessments: Panting/excited but less excited than without B6

- ☑ Eupneic
- ☐ Mild dyspnea
- ☐ Marked dyspnea
- ☐ Normal BV sounds
- ☐ Pulmonary crackles
- ☐ Wheezes
- ☐ Upper airway stridor

Abdominal exam:

- [x] Normal
- [ ] Hepatomegaly
- [ ] Abdominal distension
- [ ] Mild ascites
- [ ] Marked ascites

Problems:

DCM with secondary mitral regurgitation

Diagnostic plan:

- [x] Echocardiogram
- [ ] Chemistry profile
- [ ] ECG
- [x] Renal profile +/-
- [ ] Blood pressure
- [ ] Dialysis profile
- [ ] Thoracic radiographs
- [ ] NT-proBNP
- [ ] Troponin I
- [ ] Other tests:

Echocardiogram Findings:

B6

ECG findings:

Not done today

Assessment and recommendations:

DCM with soem mitral regurgtiation and exercise limitation. No major change from before - the findings today could indicate mild progression of disease or may be a combination of sedated echo and on table for first exam and standing unsedated echo today. Recommend continue B6

B6

Heart Failure Classification Score:

ISACHC Classification:

- [ ] Ia
- [x] Ib
- [ ] II
- [ ] IIIa
- [ ] IIIb

ACVIM Classification: Exercise limitation suggests low output

- [ ] A
- [ ] B1
- [x] B2
- [ ] C
- [ ] D