

**APPENDIX A**  
**CONSOLIDATED SAFETY REPORT**

**CorCap® Cardiac Support Device (CSD) (P040049)**  
**Acorn Cardiovascular, Inc.**

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## 1.0 INTRODUCTION

This document contains a summary of the safety data available for Acorn Cardiovascular Inc.'s (Acorn) CorCap CSD. It includes data from human safety studies, the 300-patient United States (US) pivotal trial, and the use of the product outside of the United States (OUS). This document also contains detailed narratives of the 7 peri-operative deaths that occurred during the US clinical trial in an **Attachment**.

In the US clinical trial, there were 120 patients experiencing serious adverse events and 25 deaths in patients treated with the CorCap CSD, and 118 patients experiencing serious adverse events and 25 deaths in the control group as of July 4, 2004. None were determined to be device-related by an independent Clinical Events Review Committee (CERC). The CorCap CSD patients were less likely to have a major cardiac procedure than the control group ( $p < 0.009$ ). There has been no clinical evidence of constrictive physiology due to the device. Overall, the device shows a favorable safety profile when used in the intended population of clinically stable patients with heart failure due to systolic dysfunction.

## 2.0 CLINICAL EXPERIENCE WITH CORCAP CSD

### 2.1 Safety Studies

Enrollment in the Acorn Clinical Safety Study in Germany and Australia began in April 1999, and was completed in July of 2000. This study was initiated in order to evaluate the feasibility and safety of the CorCap CSD. The Austin Repatriation Medical Centre in Melbourne, Australia enrolled 5 patients and Charité Universitätsklinikum in Berlin, Germany enrolled 29 patients.

During the course of the safety study, forty-seven adverse events in twenty-five patients and fifteen deaths were reported. None of the deaths were attributed to the CorCap CSD. In combination with safety data from Pilot and Run-in studies, these results led to two modifications to intended population and procedure. Acorn's Safety Review Committee made the following recommendations:

- Reinforce with implanting physicians the amount of allowable acute reduction in LVEDD at the time of CorCap CSD implant (10% maximum) as currently defined in the protocol, labeling and training.
- Provide guidance on patient selection criteria to ensure late-stage heart failure patients with increased surgical risk are not enrolled. Specifically, exclude patients  $\geq 80$  years and exclude patients with **four or more** of the following:
  - LVEDD  $\geq 80$  mm
  - Peak  $VO_2 \leq 13$  ml/kg/min (cardiopulmonary exercise test)
  - Systolic BP  $\leq 80$  mmHg (cardiopulmonary exercise test)
  - Atrial fibrillation at time of enrollment

- Heart failure duration  $\geq$  8 years
- Exercise-induced increase in systolic BP  $\leq$  10% (cardiopulmonary exercise test)
- 6 minute walk  $\leq$  350 meters
- Previous cardiac surgery
- BUN  $\geq$  100 mg/dl
- Cachexia (clinical impression)

Based on these recommendations, Acorn revised the inclusion and exclusion criteria, the Instructions for Use, and physician protocol training for future trials. These revisions enhanced the safety results of the CorCap CSD and supported progression to the pivotal trial stage.

## 2.2 IDE Pivotal Trial

This study was a prospective, randomized, controlled 300-patient clinical trial of the Acorn CorCap Cardiac Support Device for the treatment of heart failure with systolic dysfunction with or without mitral valve disease. Subjects with heart failure with or without concomitant mitral valve disease requiring mitral valve replacement or repair (MVR) were randomly assigned to treatment with CorCap CSD plus optimal medical therapy vs. medical therapy alone. Treatment subjects requiring MVR underwent MVR prior to placement of the CorCap device. Control subjects requiring MVR but assigned to medical therapy underwent only MVR. Subjects were followed for a minimum of 1 year after the institution of assigned treatment.

One of the secondary objectives of the pivotal trial was to demonstrate the safety of the CorCap CSD. **Table 1** summarizes all of the safety endpoints in the study. There were no differences in mortality, adverse events (AEs) or serious adverse events (SAEs) between treatment and control groups. Additionally, none of the CorCap CSD adverse events were designated as device related or related to constrictive physiology. The treatment group had fewer overall major cardiac procedures and a longer time to incidence (Kaplan-Meier curve) than the control group.

**Table 1**  
**Summary of Safety Endpoints**

Endpoint	p-value
Mortality	0.83
Adverse Events	0.43
Major Cardiac Procedures	0.009*
Death or SAEs	0.27

\*Major cardiac procedures were significantly reduced in the treatment group.

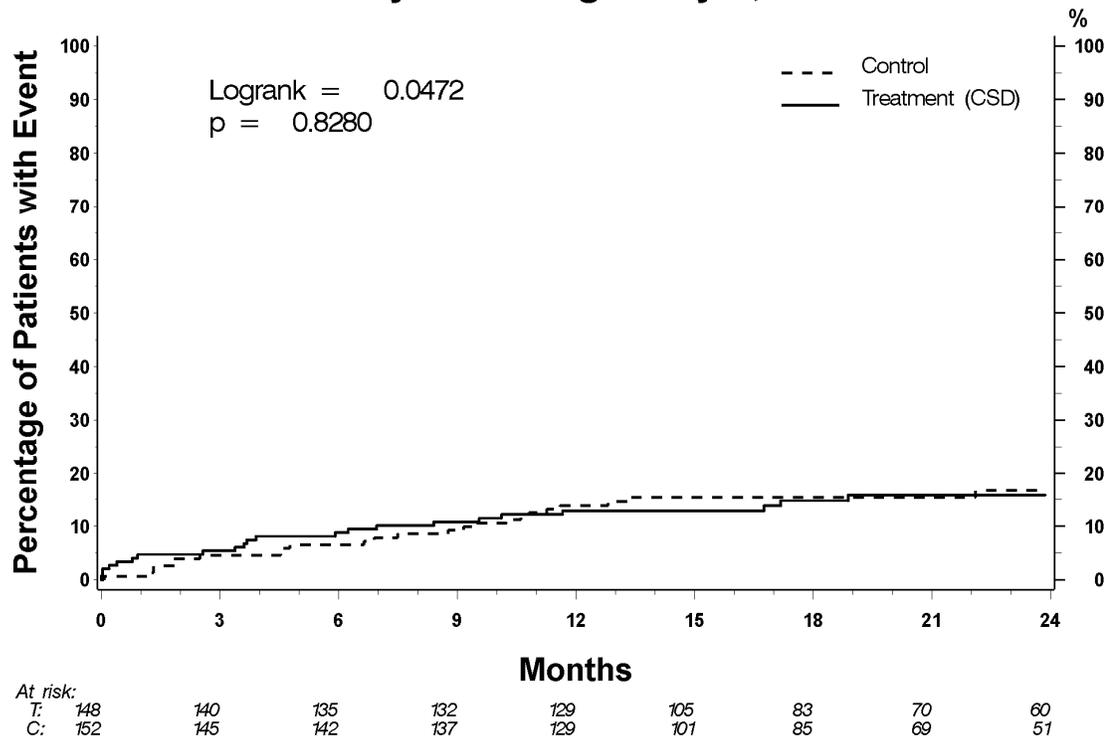
### 2.2.1 Deaths

Overall, there were 25 deaths in each of the control and treatment groups. A Kaplan-Meier analysis shows no differences in overall mortality (p=0.83). These mortality results are displayed in **Figure 1**. Within the perioperative period, 6 subjects died in the CorCap group and 1 subject died in the No CorCap group. The perioperative period was defined as the day of surgery (CorCap placement with or without prior MVR) to 30 days after surgery. Causes of death amongst these 7 subjects (6 of whom received CorCap) are described in an **Attachment**. Note that 1 patient died on the day of enrollment (prior to CorCap placement) and is not included in the Attachment.

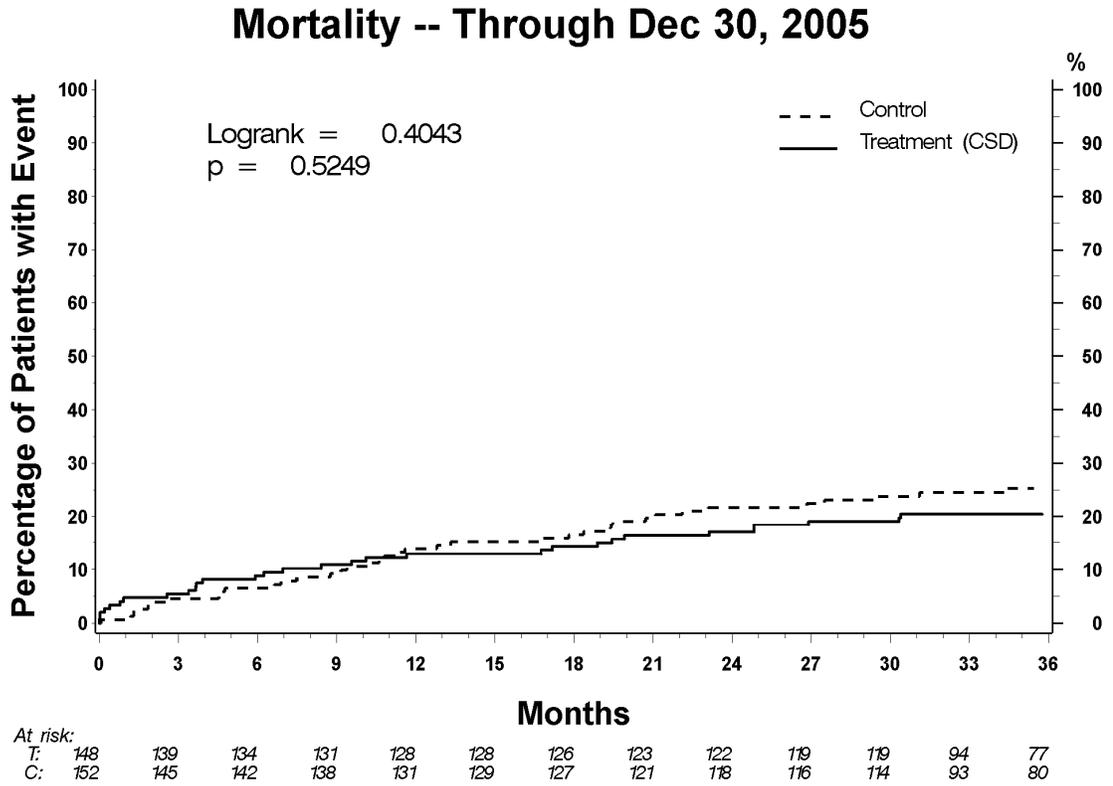
Mortality results updated on December 30, 2005 reported 38 deaths in the control group and 32 deaths in the CorCap group (p=0.52). These updated mortality results are displayed in **Figure 2**.

**Figure 1**  
**Kaplan-Meier Curve – All Cause Mortality**

### Mortality -- Through July 4, 2004



**Figure 2**  
**Kaplan-Meier Curve – All Cause Mortality (Updated 30 December 2005)**



### 2.2.2 Serious Adverse Events

**Table 2** shows the number of subjects with serious adverse event (SAE) by treatment group. Overall, 78% of patients in the control group and 81% of patients in the treatment group experienced at least 1 serious adverse event in follow-up. The proportion of subjects experiencing each type of SAE did not differ across treatment groups.

There has been no clinical evidence of constrictive physiology.

**Table 2**  
**Serious Adverse Events by Type and Treatment**

	Any Serious Adverse Event				
	CorCap (n=148)		No CorCap (n=152)		p-value
	N	%	N	%	
Allergic Response	3	2.0	1	0.7	0.22
Arrhythmia	48	32.4	58	38.2	0.39
Bleeding	9	6.1	14	9.2	0.33
Hemodynamic Compromise	83	56.1	73	48.0	0.18
Hepatic Compromise	2	1.4	0	0.0	0.14
Infection/Pneumonia	46	31.1	35	23.0	0.08
Myocardial Infarction	1	0.7	2	1.3	0.56
Neurological Deficit/Stroke	16	10.8	11	7.2	0.23
Peripheral Thrombus/Embolism	3	2.0	3	2.0	0.96
Pulmonary Compromise	29	19.6	22	14.5	0.17
Pulmonary Embolism	2	1.4	1	0.7	0.57
Renal Compromise	15	10.1	8	5.3	0.12
Other	59	39.9	58	38.2	0.74
Any SAE	120	81.1	118	77.6	0.43

\*P-value based on Cochran-Mantel-Haenzel test  
Each entry represents the number of subjects who experienced an SAE.

The CERC reviewed all serious adverse events. CERC adjudicated a total of 929 adverse events including 472 in the treatment group and 457 in the control group (**Table 3**). There were no device related adverse events. The most common cause of serious adverse events was “heart failure-patient related” (43.3%). Another 27% of serious adverse events were “related to initial surgery.”

**Table 3**  
**Summary of CERC Assessment of SAE Causality by Treatment Group**

	Treatment		Control		Total	
	# SAEs	% of 472	# SAEs	% of 457	# SAEs	% of 929
Related to CorCap CSD	0	0.0	0	0.0	0	0.0
Related to initial surgery	156	33.1	98	21.4	254	27.3
Late effects of initial surgery	7	1.5	11	2.4	18	1.9
Related to another procedure	17	3.6	44	9.6	61	6.6
Heart failure patient related	192	40.7	210	46.0	402	43.3
Other cause	82	17.4	81	17.7	163	17.5
Unknown/unable to determine	18	3.8	13	2.8	31	3.3
Number of SAEs reviewed	472	100.0	457	100.0	929	100.0

The number of SAEs was updated on April 15, 2005. The total number of patients that experienced a serious adverse event was not statistically different between the treatment and control groups. At this time point, 83.1% of the CorCap group experienced any serious adverse event compared to 78.9% of the control group. Of the 13 SAE categories, only one showed a significant difference between treatment and control; specifically, hemodynamic compromise, which favored control (p=0.04). Analysis of hemodynamic compromise by Cox regression showed that only early events (within 30 days after surgery) in the No MVR stratum were significantly different.

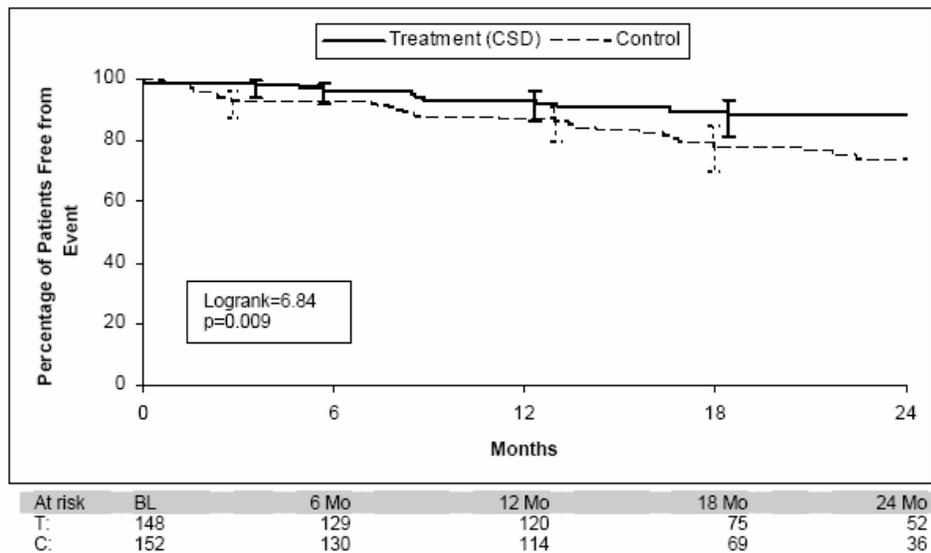
### 2.2.3 Major Cardiac Procedures

Major cardiac procedures included heart transplantation, implantation of cardiac assist or replacement device, coronary artery bypass, implant of biventricular pacing device, subsequent mitral valve or tricuspid valve repair. In total, major cardiac procedures occurred in 19 patients (with a total of 21 procedures) in the CorCap group and in 33 patients (with a total of 48 procedures) in the control group (p=0.01).

A total of 41 subjects experienced a major cardiac procedure during the follow-up period that required review by the CERC. LVADs and heart transplants were not adjudicated, but assumed to be heart failure related. Of these 41, 32 were deemed to be associated with worsening heart failure by CERC. The Kaplan-Meier curve for freedom from major

cardiac procedure shows that the cumulative percent of patients free from a major cardiac procedure indicative of worsening heart failure was significantly worse in the control group through 24 months ( $p=0.009$ , **Figure 3**). An analysis of individual major cardiac procedure types showed a reduction in the rate of heart transplant, LVAD placement and bi-ventricular pacing device placements associated with CorCap treatment.

**Figure 3**  
**Subject Survival Free from Major Cardiac Procedure by Treatment Group**



### 3.0 MARKETING EXPERIENCE (OUS)

Acorn received approval for CE marking of the CorCap CSD in September of 2000. As of 29 September 2006, a total of 277 CorCap CSDs have been implanted in patients from seven European countries including France, Germany, Netherlands, Sweden, Belgium, Italy, and Great Britain. The CorCap CSD has not been removed from the market in any country for any reasons, including the safety and effectiveness of the device. To date, two customer complaints have been filed. One was related to a patient adverse event that was determined to be not device-related, and the other was a product-related comment unrelated to any adverse event. None of these complaints or adverse events met the criteria for Vigilance Reporting; thus no Vigilance Reports have been filed for the CorCap CSD.

**ATTACHMENT**

**NARRATIVES OF PERI-OPERATIVE DEATHS FROM UNITED STATES  
PIVOTAL TRIAL**

Patient ID: 3153 Site: Hershey Medical Center  
Randomization Date: 31 Oct 01  
MVR Stratum: No Randomization Group: Treatment  
Surgery Date: 21 Nov 01  
Discharge Date: Never Discharged  
Death Date: 22 Nov 01 (1 day post-operative)

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This patient was a 47-year-old male with ischemic cardiomyopathy in July 1994 with a prior history of myocardial infarction. Coronary catheterization determined that coronary artery disease was inoperable and that there were no lesions amenable to revascularization. Thallium test revealed no evidence of inducible ischemia. Pre-enrollment NYHA class was III, left ventricular end-diastolic dimension was 75 mm, left ventricular ejection fraction was 35% with 2+ mitral regurgitation. Peak oxygen consumption was 8.0 ml/kg/min. This patient met all of the inclusion/exclusion criteria. He had three of ten late stage heart failure criteria (peak  $VO_2 \leq 13$  ml/kg/min, 6-minute walk  $\leq 350$  meters, exercise induced increase in systolic BP  $\leq 10\%$ ).

Pre-enrollment medications included: hydralazine 150 mg daily dose for greater than 1 year, cozaar 150 mg daily dose for greater than 1 year, isosorbide 90 mg daily dose for greater than 1 year, spironolactone 50 mg daily dose for greater than 1 year, coumadin 6 mg daily dose for greater than 1 year, zocor 20 mg daily dose for 6 months, metoprolol 200 mg daily dose for greater than 1 year, furosemide 200 mg daily dose for greater than 1 year and zaroxyln 5 mg daily dose for 1 month.

During the implant procedure (started at 0825) there were multiple episodes of hypotension while lifting the heart to position the CorCap CSD. Initially, the Guidant Expose device was used in an attempt to avoid hemodynamic instability. Dopamine (10 mcg/kg/min) was given to maintain blood pressure. However, the hemodynamic instability continued so the decision was made to use cardiopulmonary bypass (started at 0950). He was on bypass for a total of 20 minutes. The remainder of the implant procedure was uneventful.

Post-operatively, in the ICU, he had three episodes of bradycardia, hypotension and unresponsiveness. In retrospect, these episodes were thought to be due to ischemia. He was maintained on dobutamine 10 mcg/kg/min for 23 hours, dopamine 3 mcg/kg/min for 23 hours and vasopressin 0.04 units/min for 23 hours. Betablockers were not re-instated. He was placed on positive airway pressure because of concern with the apnea. The next morning (one day post-op), he developed rapid ventricular tachycardia. He was cardioverted to normal sinus rhythm and intubated, but developed recurrent VT. He remained hypotensive after cardioversion. During resuscitation he received epinephrine 29 mg for 15 doses, atropine 1 mg for 1 dose, lidocaine 500 mg for 5 doses, sodium bicarbonate 300 meq for 8 doses and calcium chloride 30 ml for 3 doses. His chest was opened for cardiac massage and internal defibrillation. Inspection of the CorCap CSD revealed good placement and no changes from the implant. He remained hypotensive and an intra-aortic balloon pump was placed. His rhythm and blood pressure seemed to

stabilize. Unfortunately, 18 minutes later, he developed recurrent VT and could not be resuscitated. He was pronounced dead at 10:40 am.

Cause of Death Reported by Site: Ventricular Arrhythmia

CERC status: Final

Attribution: Initial Procedure

Cause of death: Cardiac Procedure-CorCap Implant

Patient ID: 3807 Site: Henry Ford Medical Center  
Randomization Date: 6 Dec 01  
MVR Stratum: No Randomization Group: Treatment  
Surgery Date: 11 Dec 01  
Discharge Date: never discharged  
Death Date: 4 Jan 02 (24 days post-operative)

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This 55 year old female had viral cardiomyopathy diagnosed in July 1996. She had multiple admissions for heart failure requiring inotropic support. Pre-enrollment NYHA class was III, left ventricular end-diastolic dimension was 73 mm, left ventricular end-diastolic dimension index was 36 mm/m<sup>2</sup>, ejection fraction was 10% with 1+ mitral regurgitation. Peak oxygen consumption was 9.9 ml/kg/min. She met all of the inclusion/exclusion criteria.

Baseline medications included: cozaar 25 mg total daily dose for greater than 1 year, hydralazine 30 mg total daily dose for greater than 1 year, lasix 160 mg total daily dose for greater than 1 year, isordil 30 mg total daily dose for greater than 1 year and digoxin 0.125 mg total daily dose for greater than 1 year. This patient was unable to tolerate beta blockers.

On 11 Dec 01, the patient received a CorCap CSD implant. The implant procedure was difficult due to the size of the heart. (The heart was displaced into the left chest cavity.) An intra-aortic balloon pump was attempted via the left femoral artery and the right femoral artery, but it was unable to advance due to vessel tortuosity. Epinephrine and vasopressin were used intra-operatively to maintain blood pressure.

During post-operative recovery there were multiple problems including hypotension and low cardiac output, borderline renal function and poor oxygenation (requiring re-intubation). Multiple pressors (IV milrinone 0.5 mcg/kg/min and IV dopamine 3 mcg/kg/min) were required for hemodynamic support. Echo revealed no change in left ventricular size or function. Pericardial effusion was present, but there were no signs of tamponade.

The patient returned to the operating room on 19 Dec 01 for drainage of a pericardial effusion (800 cc). Cultures were negative. She developed renal compromise and was maintained on low dose IV dopamine (3 mcg/kg/min) in addition to IV lasix (40 mg/hour) to support her kidney function. She developed a skin abscess under a breast that was culture positive for Staph and treated with IV ciprofloxacin (400 mg every day), IV vancomycin (1 gm every day), IV imipenem (500 mg every 12 hours) and IV itraconazole (200 mg every 12 hours).

On 26 Dec 01, she was cardioverted (100 joules) to normal sinus rhythm from atrial flutter. She was also treated with IV amiodarone (150 mg bolus and then 1 mg/min). In addition, an IABP was placed for a prolonged hypotensive episode. She developed acute pulmonary decompensation requiring mechanical ventilation.

The patient remained in the hospital with multi-organ dysfunction and sepsis that progressed into multi-organ failure. The patient died 3 weeks after surgery.

Autopsy results supported the clinical findings. The CorCap CSD was well positioned around the heart. The microscopic examination of the heart suggested minimal fibrotic response.

Cause of Death Reported by Site: Multi-Organ Failure/Sepsis

CERC status: Final

Attribution: Initial Procedure

Cause of death: Cardiac Procedure-CORCAP Implant

Patient ID: 3808 Site: Henry Ford Medical Center  
Randomization Date: 10 Dec 01  
MVR Stratum: Yes Randomization Group: Control  
Surgery Date: 12 Dec 01  
Discharge Date: never discharged  
Death Date: 14 Dec 01 (2 days post-operative)

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This 60 year old male was diagnosed in October 1994 with idiopathic cardiomyopathy. He had a history of ventricular tachycardia (ICD implant), diet controlled diabetes and a family history of heart disease. Pre-enrollment NYHA class was II, left ventricular end-diastolic dimension was 73 mm, left ventricular ejection fraction was 14.7% with 4+ mitral regurgitation. Peak oxygen consumption was 9.1 ml/kg/min. He met all of the inclusion/exclusion criteria.

Baseline medications included: lopressor 50 mg total daily dose for greater than 1 year, demadex 20 mg total daily dose for greater than 1 year, prinivil 20 mg total daily dose for greater than 1 year, lanoxin 0.125 mg total daily dose for greater than 1 year, hydralazine 75 mg total daily dose for greater than 1 year and coumadin (2 mg/day) for 1 year.

On December 12, 2001, he had mitral valve and tricuspid valve repair. This patient was successfully weaned from cardiopulmonary bypass with maximal inotropic support (milrinone 0.375 mcg/kg/min), levophed, epinephrine (4 mcg/kg/min), vasopressin (20 units) and dopamine (5 mcg/kg/min) therapy. IV amiodarone (1 mg/min) and IV lasix (40 mg/hr) were also given. The patient was severely vasodilated and received minimal augmentation from the IABP that was inserted prior to surgery. Post-operatively, the patient developed severe coagulopathy and required 3 units of packed red blood cells, 3 units of pooled platelets and 8 units of FFP to achieve hemostasis. The patient was unable to be weaned from the ventilator and remained on maximal inotropic support and IABP due to continued hemodynamic instability.

On December 13, 2001, he had a run of ventricular tachycardia despite being on IV amiodarone since surgery. IV lidocaine (100 mg bolus followed by an infusion of 2 mg/min) was initiated. He converted from ventricular tachycardia to atrial fibrillation. On December 14, 2001, he had another episode of ventricular tachycardia treated with IV lidocaine. Again, he converted to atrial fibrillation.

On December 14, 2001, the patient experienced an acute neurologic event and became unresponsive. Due to continued hemodynamic instability, a CT scan could not be performed (patient not stable enough to transport to CT scanner). After discussing this patient's prognosis with his family, life support was terminated. He died after life support was terminated on December 14, 2001.

The investigator classified this death as procedure related.

Cause of Death Reported by Site: Cardiogenic Shock

CERC Status: Final

Attribution: Initial Procedure

Cause of Death: Cardiac Procedure-MVR Surgery

Patient ID: 3904 Site: Jewish Hospital/University of Louisville  
Randomization Date: 10 Jan 02  
MVR Stratum: No Randomization Group: Treatment  
Surgery Date: 14 Jan 02  
Discharge Date: never discharged  
Death Date: 26 Jan 02 (12 days post-operative)

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This 68 year old male had idiopathic cardiomyopathy diagnosed in 1997. The patient had a history of cardiac arrest and had an ICD implanted. Pre-enrollment NYHA class was III, left ventricular end-diastolic dimension was 89 mm, left ventricular ejection fraction was 10% with 1+ mitral regurgitation. Peak oxygen consumption was 21.2 ml/kg/min. He met all of the inclusion/exclusion criteria.

Baseline medications include: lasix 80 mg total daily dose for greater than 1 year, zaroxolyn 2.5 mg total daily dose for greater than 1 year, digoxin 0.125 mg total daily dose for greater than 1 year, coreg 6.25 mg total daily dose for greater than 1 year, coumadin 1 mg total daily dose for greater than 1 year and nitroglycerin 1/150 mg prn total daily dose for greater than 1 year.

On 14 Jan 02, he received a CorCap CSD implant. The implant procedure was difficult due to the size of the heart. The patient did experience episodes of low blood pressure during surgery and was treated with boluses of IV epinephrine (0.01 mg – 0.03 mg).

Nine-days post-operatively the patient had recovered, was ambulatory and awaiting discharge. On telemetry monitoring, however, the patient was noted to have multiple runs of asymptomatic non-sustained ventricular tachycardia (NSVT) post operatively. The patient was reluctant to take amiodarone due to previous side effects. The patient had bilateral pleural effusions and low potassium. Extra IV lasix were given and amiodarone was started on 23 Jan 02 to treat the NSVT. A decision was made to keep the patient hospitalized for an additional night of observation. The patient was being monitored on a telemetry unit awaiting discharge when he had a cardiac arrest on 24 Jan 02. There were multiple attempts by the ICD to terminate the VF, but all failed. (The ICD had been interrogated and was functioning well on 23 Jan 02). CPR was performed and the patient was resuscitated. During the arrest, the patient was intubated, IV primacor (0.5 mcg/kg/min), IV dobutrex (10 mcg/kg/min) and IV dopamine (5 mcg/kg/min) were started and an IABP was placed for continued low blood pressure. The patient developed a fever and elevated white count, acute renal failure and decreased level of consciousness. The source of the fever was never identified, but he was treated with IV vancomycin (1000 u/hr every 24 hours), IV zosyn (2.25 g every 8 hours), IV levoquin (250 mg every day). On 24 Jan 02, an echocardiogram was done and a left ventricular mural thrombus was found. The patient was already on IV heparin and no further treatment was indicated.

Due to the patient's poor prognosis and inability to tolerate hemofiltration, the spouse decided to stop life support measures. Twelve days after surgery, the patient died. (26 Jan 02)

The investigator classified this death as related to ventricular arrhythmia.

<p>Cause of Death Reported by Site: Multisystem Organ Failure/Ventricular Arrhythmia CERC Status: Final Attribution: Initial Procedure</p>
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Patient ID: 4405 Site: St. Louis University  
Randomization Date: 3 Apr 02  
MVR Stratum: yes Randomization Group: Treatment  
Surgery Date: 8 Apr 02  
Discharge Date: Never Discharged  
Death Date: 6 May 02 (28 days post-operative)

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This patient was a 61 year old female diagnosed with idiopathic heart disease in Oct. 1994. She had a family history of heart disease. Pre-enrollment NYHA class was III, left ventricular end-diastolic dimension was 64 mm, left ventricular ejection fraction was 28% with 4+ mitral regurgitation. Peak V02 was 10.8 ml/kg/min. She met all of the inclusion/exclusion criteria.

Her pre-enrollment medications included: demadex 100 mg total daily dose for greater than 1 year, accupril 80 mg total daily dose for 1 year, digoxin 0.125 mg total daily dose for 1 year, ASA 325 mg total daily dose for 7 months, Klor-Con 20 meq total daily dose for greater than 1 year, spironolactone 25 mg total daily dose for 1 year, zaroxolyn 2.5 mg every other day for 7 months and imdur 30 mg total daily dose for 7 months.

On 8 Apr 02, she had a mitral valve repair and CorCap CSD implant. The anesthesia was started at 07:53 and ended at 17:34. The patient was discharged from the operating room on epinephrine (0.03 mcg/kg/min) and milrinone (0.25 mcg/kg/min) to maintain blood pressure.

Two days post-op, the patient developed atrial fibrillation with a rapid ventricular response. IV amiodarone (42 mg/hr) and cardioversion were attempted without success. Three days post-op the patient's creatinine began to rise. Hemofiltration was performed intermittently between 11 Apr 02 and 30 Apr 02.

On 14 Apr 02, the patient developed a fever of unknown origin. Cultures were obtained and IV ciprofloxacin (400 mg every 12 hours), vancomycin (1 gm every 12 hours) and gentamycin (60 mg and 120 mg) were continued. Blood cultures from 13 Apr 02 were positive for gram positive cocci. The patient also had positive cultures of sputum, IV catheter tip, bronchial tissue and urine.

On 19 Apr 02, a tracheostomy was placed because the patient could not be weaned from mechanical ventilation.

On 29 Apr 02, the patient became disconnected from the ventilator for an unknown period of time while the patient was being repositioned. When the patient was returned to the supine position, the patient was asystolic and without a blood pressure. CPR was initiated. Temporary pacing and respirations via the tracheotomy tube were initiated. The patient was resuscitated.

On 1 May 02, the patient had a abdominal CT scan showing fluid and possible peritonitis. She was taken to the OR and a 4 cm tear in the gastric fundus from a previous endoscopic gastrostomy was repaired. There was approximately 500 cc of cloudy material in the abdomen. Peritoneal cultures were positive for C. glabrata and P. aeruginosa.

On 5 May 02, the patient had a systolic blood pressure in the 70's on Levophed. Because of problems with ongoing hypotension, acidosis and sternal dehiscence a discussion was had with the family who agreed to withdraw support and provide comfort measures. The patient expired on 6 May 02.

Autopsy results confirmed sepsis as the cause of death.

Cause of Death Reported by Site: Sepsis

CERC Status: Final

Attribution: Initial Procedure

Cause of Death: Non Cardiovascular Disease-Septicemia

Patient ID: 3453

Site: Ochsner Clinic

Randomization Date: 3 Jul 02

MVR Stratum: Yes

Randomization Group: Treatment

Surgery Date: 17 Dec 02

Discharge Date: Never Discharged

Death Date: 23 Dec 02 (6 days post-operative)

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This 25 year old female was diagnosed with idiopathic cardiomyopathy in April of 2000. The patient has no previous cardiac history other than a family history of heart disease. Pre-enrollment NYHA class was III, left ventricular end-diastolic dimension was 68 mm and left ventricular ejection fraction was 13% with 2+ mitral regurgitation. Peak oxygen consumption was 12.0 ml/kg/min. She met all of the inclusion/exclusion criteria.

Pre-enrollment medications included: lasix 40 mg total daily dose for greater than 1 year, digoxin 0.25 mg total daily dose for greater than 1 year, coreg 50 mg total daily dose for 6 months, altace 10 mg total daily dose for 5 months, spironolactone 25 mg total daily dose for 2 months, potassium chloride 20 meq total daily dose for greater than 1 year and magnesium oxide 800 mg total daily dose for 2 months.

On 6 Jul 02, she was admitted to the hospital for pleuritic type chest pain. Cardiac enzymes were negative. An echocardiogram was done and failed to reveal any significant abnormalities. She was prescribed celebrex (200 mg every day for one week).

On 15 Jul 02, she was admitted to the hospital for a "tune up" prior to surgery an intra-aortic balloon pump placement was attempted but aborted when the patient suffered an embolic neurological event. IV heparin was initiated. She was prescribed warfarin (5 mg bid) and discharged home on 21 Jul 02.

Another scheduled surgery was postponed because of a hurricane in the New Orleans area.

She was admitted to the hospital on 16 Dec 02 for pre-operative management to eventually undergo mitral valve repair and CorCap CSD placement. She had right heart catheterization on 16 Dec 02 and was deemed to have acceptable hemodynamics. Mitral valve repair and CorCap CSD placement occurred on 17 Dec 02. Cardiopulmonary bypass time was 122 minutes and transesophageal echocardiography after mitral valve repair revealed no mitral regurgitation. The intraoperative course was complicated by the need to place the patient back on cardiopulmonary bypass for a brief duration and postoperative hypotension required placement of an intra-aortic balloon pump prior to the patient's transfer to the critical care unit. The patient was successfully extubated the next morning and the medical team discontinued the intra-aortic balloon pump based on their assessment of hemodynamic stability. On 18 Dec 02, she had a run of supraventricular tachycardia. IV amiodarone (1 mg/min) was administered and the arrhythmia resolved. However, the patient's hemodynamics deteriorated subsequently leading to repeat intubation, mechanical ventilation, re-institution of intra-aortic counterpulsation and

initiation of the following medications: IV dobutamine (10 mcg/kg/min), IV primacor (0.5 mcg/kg/min) and IV demadex (20 mcg/kg/min). On 20 Dec 02, staphylococcus epidermis was isolated from cultures taken and she was started in IV antibiotics. On 22 Dec 02, atrial fibrillation was noted on the rhythm strip. An amiodarone bolus (1 mg/min) was given and failed to convert the rhythm. The patient was cardioverted to sinus tachycardia. Later that afternoon, the atrial fibrillation returned. An amiodarone bolus (2mg/min) was given and the rhythm converted to sinus tachycardia. The patient also suffered cardiac arrest due to ventricular arrhythmias on 23 Dec 02, but was successfully resuscitated. Echocardiography performed at this time revealed no pericardial effusion. There was also no evidence of mitral valve abnormality. Intravenous amiodarone was instituted, but later that evening the patient suffered recurrent cardiac arrest from which she could not be resuscitated.

Cause of Death Reported by Site: Cardiogenic Shock

CERC Status: Final

Attribution: Procedure Initial

Cause of Death: Cardiac Procedure-MVR + CORCAP Implant

Patient ID: 4407 Site: St. Louis University Hospital  
Randomization Date: 14 Aug 02  
MVR Stratum: No Randomization Group: Treatment  
Surgery Date: 5 Sep 02  
Discharge Date: Never Discharged  
Death Date: 6 Sep 02 (1 day post-operative)

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This patient was a 53 year old male with idiopathic heart disease diagnosed Feb. 1987. He had a history of hypertension, atrial fibrillation, diabetes and sleep apnea. Pre-enrollment NYHA class was III, left ventricular end-diastolic dimension was 95 mm, left ventricular ejection fraction was 15-20% with 1+ mitral regurgitation. Peak oxygen consumption was 16.0 ml/kg/min. Angiography revealed normal coronary arteries. He met all of the inclusion/exclusion criteria.

Pre-enrollment medications included: lisinopril 80 mg qd for greater than 1 year, digoxin 0.25 mg qd for greater than 1 year, toprol XL 50 mg qd for greater than 1 year, pacerone 100 mg qd for greater than 1 year, lasix 120 mg qd for greater than 1 year, imdur 30 mg qd for 4 months, spironolactone 25 mg qd for greater than 1 year, coumadin 7.5 mg qd for 1 year, tricor 160 mg qd for 1 year and aspirin 325 mg qd for greater than 1 year.

During the preparation for the CorCap CSD implant (5 Sep 02), the anesthesiologist was unable to pass the Swan-Ganz catheter into the pulmonary artery. Therefore, only the central venous pressure could be monitored.

The implant procedure was difficult because of the large heart and very poor RV function that may have contributed to hemodynamic instability and arrhythmias. The patient required multiple pressors to maintain blood pressure. The patient developed ventricular fibrillation and was defibrillated. After a second episode of ventricular tachycardia and hypotension, the patient was rapidly placed on cardiopulmonary bypass which allowed the implant procedure to be completed. An intra-aortic balloon pump was also placed to improve hemodynamics.

The patient was transferred from the OR to the ICU on epinephrine (0.25 mcg/kg/min), milrinone (0.37 mcg/kg/min) and levophed (0.25 mcg/kg/min) for pharmacological support. Shortly after arrival to the ICU, the patient went into cardiac arrest and was successfully resuscitated after 40 minutes.

At approximately 2130, the patient returned to the OR for an open thoracotomy and re-exploration secondary to postoperative bleeding. Every cardiac and chest wall bleeding vessel was ligated. The patient returned to the ICU and had another cardiac arrest. An open thoracotomy, open cardiac massage and cardioversion were performed. The patient was resuscitated again. On the morning of 6 Sep 02, all pressors (vasopressin 36 u/hr, milrinone 0.37 mcg/kg/min and dopamine 20 mcg/kg/min) were at their upper limits. The patient remained hypotensive. The chest was opened once again and ventricular

pacing commenced. The family decided to withdraw life support. The patient died before withdrawal of care occurred.

Cause of Death Reported by Site: Post-Operative Bleeding

CERC Status: Final review

Attribution: Initial procedure

Cause of Death: Cardiac procedure – CORCAP implant