



BERLIN HEART INC.
HDE# H100004

Pediatric Advisory Committee Meeting
September 20, 2013

Robert Kroslowitz
President and CEO

EXCOR® Pediatric



Berlin Heart Company Overview

Development, production and worldwide distribution of ventricular assist devices (VADs) for adult and pediatric populations

- **Only company worldwide with VAD applications for patients with heart failure of every age and size**
- **Over 1200 EXCOR® Pediatric implants worldwide**
- **Outside North America: Implantable INCOR® and EXCOR® adult and pediatric paracorporeal VAD**
- **United States: EXCOR® Pediatric paracorporeal VAD**





Regulatory Overview

1990 First Pediatric application

2000 First US EXCOR® Pediatric Implant
Compassionate Use Regulations

2005 FDA and Berlin Heart Inc. recognized the unmet clinical need
Approval process begins

2007 IDE Approval, IDE Study enrollment begins

2011 HDE Approval

2012 Post Approval Study Approval

2013 Post Approval Study Approval enrollment begins



- **Transplant wait list mortality for children is high***
- **Median wait time for heart transplant in children is 119 days****
- **Less than 300 pediatric heart transplants performed each year*****

References:

* Almond CS, *Circulation* 2009; 199; 717-727

** Larsen RL, 2011 *JHLT* 2011: 755-760

*** OPTN



Heart Failure in Children – Options

ADULT OPTIONS

FDA Approved Devices

- AbioCor TAH
- Novacor PC
- HeartMate IP
- Novacor PCq
- HeartMate VE
- Syncardia TAH
- HeartMate XVE
- Thoratec IVAD
- Thoratec PVAD
- HeartMate II

Investigational Devices

- Jarvik 2000
- MicroMed DeBakey
- Evaheart
- Terumo Duraheart
- Heartware
- Levacor

CHILD OPTIONS

Temporary Support

ECMO or centrifugal VAD*

Long Term support

EXCOR® Pediatric Adult VADs*

* Off label use



EXCOR® Pediatric Device Description

Paracorporeal ventricular assist device (VAD)



IKUS® driving unit



EXCOR® Pediatric Indication

EXCOR® Pediatric is intended to provide mechanical circulatory support as a bridge to cardiac transplantation for pediatric candidates. Pediatric candidates with severe isolated left ventricular or biventricular dysfunction who are candidates for cardiac transplant and require circulatory support may be treated using the EXCOR® Pediatric.



EXCOR[®] Pediatric North American Experience



Group	# Implants
U.S. Pre IDE Approval (2000-2007)	97
IDE Study Primary Study Cohorts (including Continued Access)	94
IDE Compassionate Use	187
Post approval study implants	20
Post approval non-study implants	120
Canadian implants	60
Total	578



Study Purpose

Evaluate whether safety and outcomes of the device use in the commercial setting are comparable to the safety and outcomes of the device use in the IDE study

Because the device had extensive use during the IDE study (available to all North American sites who requested the device under compassionate use regulations), it is expected that the pre-approval and post-approval experience will be similar.



PAS Progress

- Study approved by FDA July 26, 2012
- 24 sites with IRB approval, 11 pending
- First PAS enrollment January 13, 2013
- 20 patients enrolled as of September 13, 2013
- Expected date of enrollment completion June 2014



Current PAS Conclusions

- With only 20 implants in post approval study it is too early to perform any statistical comparisons to the IDE study results and to draw any conclusions
- However, success rate of all implants post approval is **78%** compared to **70%** in the pre-approval experience



EXCOR® Pediatric

Overall Support time and outcomes

ERA		N	Median Days of support	Success Rate*
2000-2007	Pre IDE study	73	49	70% (51/73)
2007-2011	IDE Study	281	37	70% (198/281)
2011- 2013	Post Approval	140	47	78%** (89/114)

*Success rate calculated as those transplanted or weaned out of patients who met an endpoint

*114 of 140 patients have met endpoint in this group



EXCOR® Pediatric VAD

Serious Adverse Events

Patients with SAE	IDE Study N=109	Post-Approval Study N=15*
Major Bleeding	50 (45.9%)	4 (26.7%)
Major Infection	54 (49.5%)	4 (26.7%)
Neurological Dysfunction	33 (30.3%)	4 (26.7%)

**as reported in July 2013 annual report*



EXCOR® Pediatric VAD

Medical Device Reporting (MDRs)

Component	OUS	US	Comment
Ikus	1	0	No patient involvement
Cannula	2	0	1 adverse event
Driveline	9	3	0 adverse events
Blood Pump	8	6	1 adverse event 3 no patient involvement



MDRs related to Drivelines

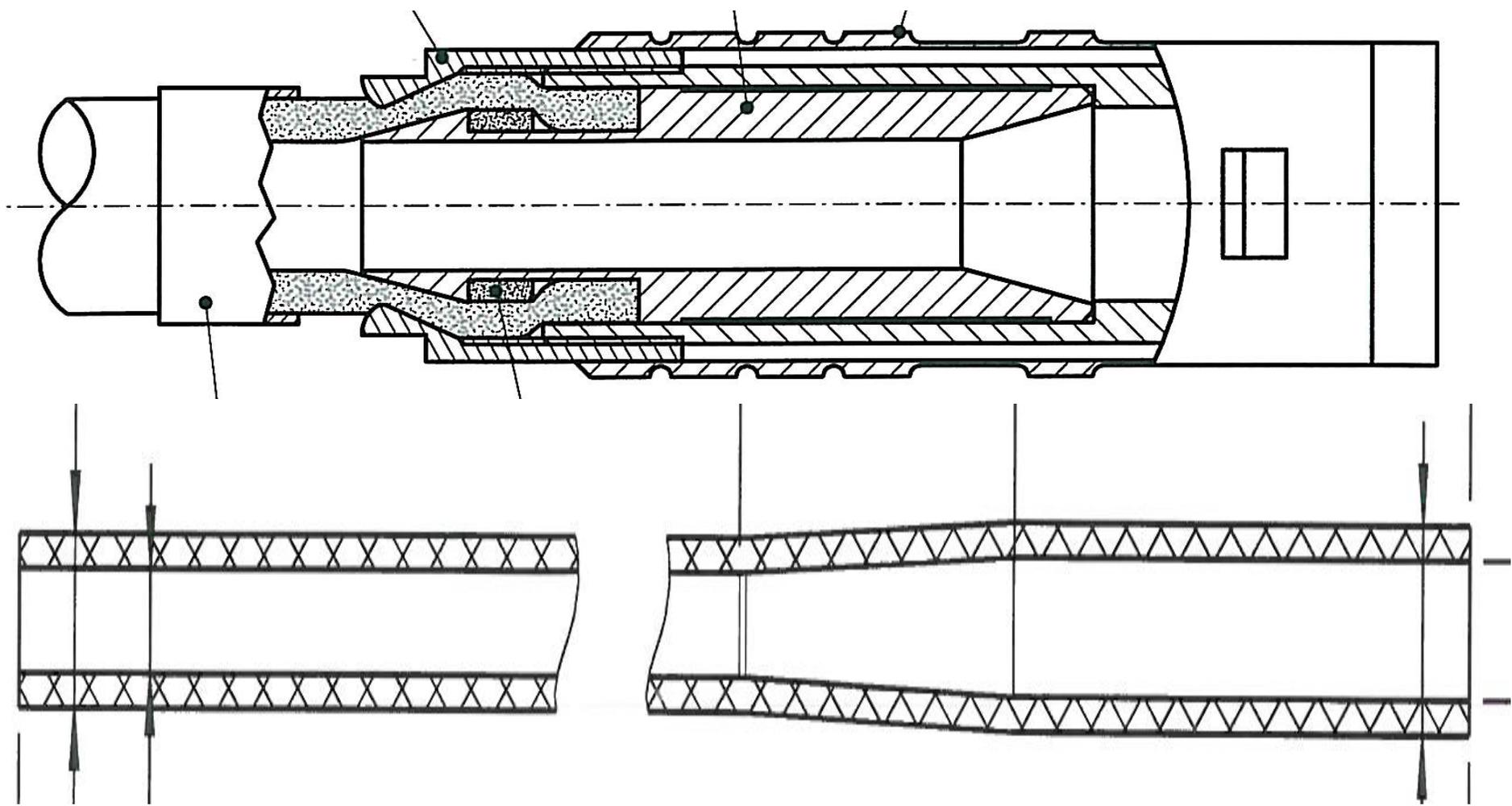
12 driveline leaks reported: 9 OUS / 3 US

- **In all cases driveline exchanged without incident and no adverse events reported**
- **New driveline design to mitigate this problem; samples currently in reliability testing**
- **Supplement will be submitted to FDA once testing completed**



EXCOR® Pediatric VAD

MDRs related to Drivelines





MDRs related to Blood Pumps

14 events reported: 8 OUS / 6 US

- **3 events during priming (no patient involvement), 2 of these events were attributed to user error**
- **In all other cases the safety feature of the triple layer membrane design functioned as intended and maintained the integrity of the air and blood chambers**
- **1 patient death (OUS), due to extenuating circumstances**
- **In all other cases, blood pump exchanged without incident and no adverse events reported**



MDRs related to Blood Pumps





Conclusion

- **PAS is ongoing, we continue to actively recruit and enroll subjects**
- **Although the number of patients currently enrolled is small and the study is not yet complete, the adverse event rate and the outcomes are consistent with the IDE Study results and in some areas are trending more favorably**
- **Safety profile of device in the post-approval experience remains unchanged**

Thank you for your attention!



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