Pumps for the Heart: Improving Survival and Quality of Life for Patients with Heart Failure

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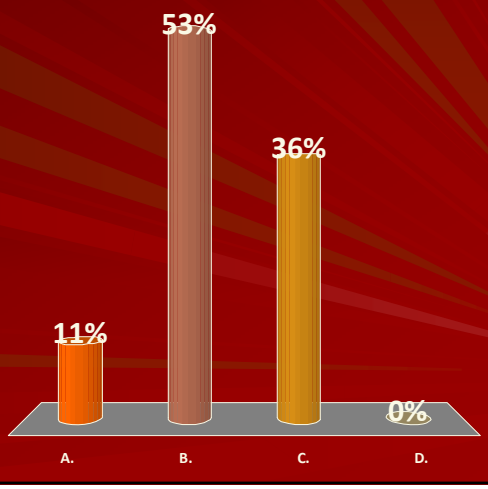
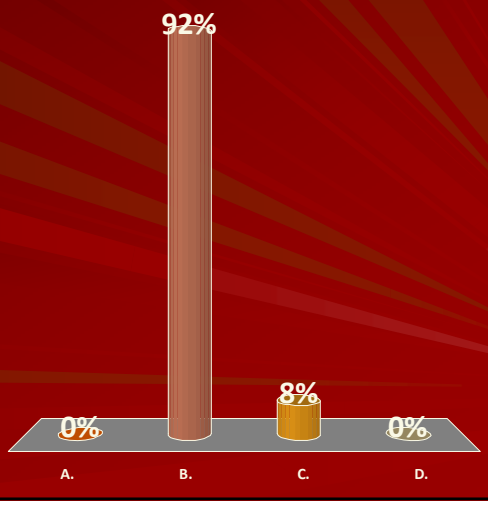
HOW MANY HAVE HEARD THE TERM LVAD?

A. Never heard
B. Have heard, have some understanding, but not sure when indicated
C. I know about LVADs and indications
D. I don't have any patients that could possibly need an LVAD

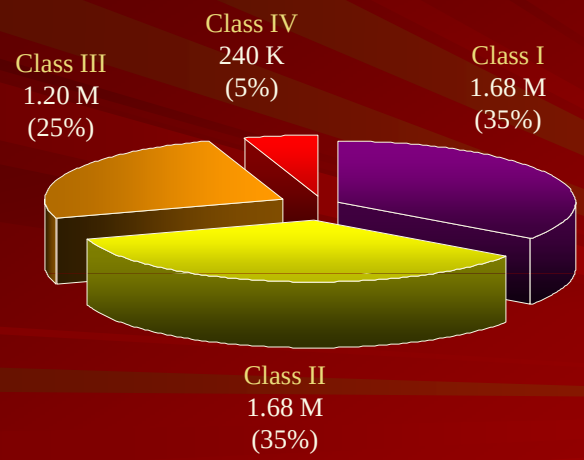


What are LVADs used for?

A. For rescue therapy in patients dying of systolic heart failure
B. For patients with Progressive Heart Failure Refractory to Medical Therapy
C. Only for patients who can't wait for a heart transplant
D. The technology is not advanced enough for routine application at this time



Heart Failure Severity in the United States



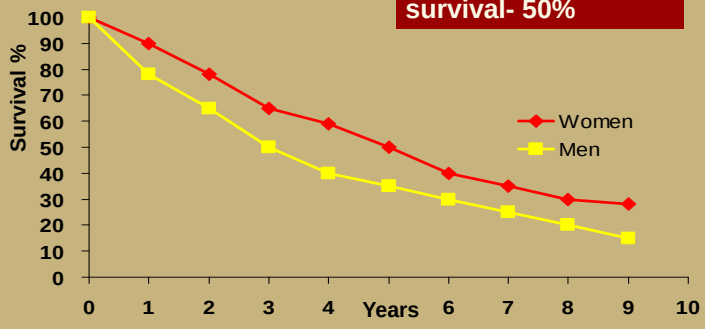
Prognosis After First Symptoms of Heart Failure

ONE YEAR
Mortality of Hospitalized Patients:

Mild to Moderate Symptoms 10-20%

Severe Symptoms 40-60%

Overall 5-year survival- 50%



Ho,K. *Circulation* 1993;88:107-115
AHA, 1998 Heart and Statistical Update. NCHS, National Center for Health Statistics

INDICATIONS For Mechanical Circulatory Support

- Bridge to Recovery (BTR)
- Bridge to Transplant (BTT)
- Destination Therapy (DT)
- Bridge to Candidacy (BTC)

Why VADs?

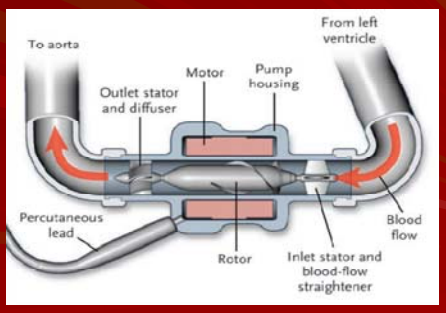
- **Hemodynamic stabilization**
- **Normalization of end organ function**
- **Out patient rehabilitation**
- **For Transplantable Patients:Time for appropriate heart to become available**
- **For non-Transplant candidates improved survival and QUALITY OF LIFE**

Long-term VAD Support

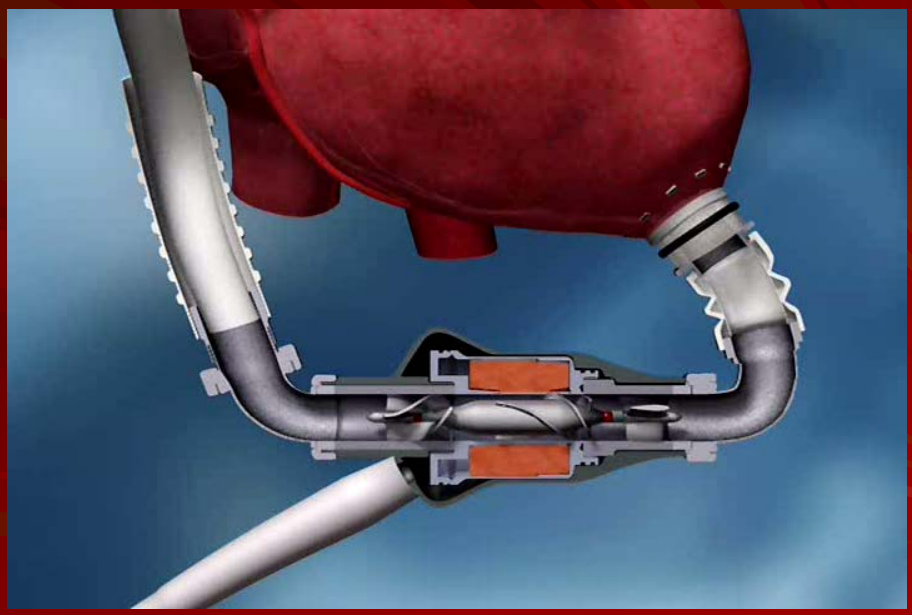
- Biocompatibility
- Durability
  - VAD Internal components
  - VAD External components
- Freedom from major infections complications and Strokes
- Socially acceptable quality of life (pumps that are noiseless, allow ambulation for extended period of time)

2nd- Generation Devices
Axial Flow Pumps

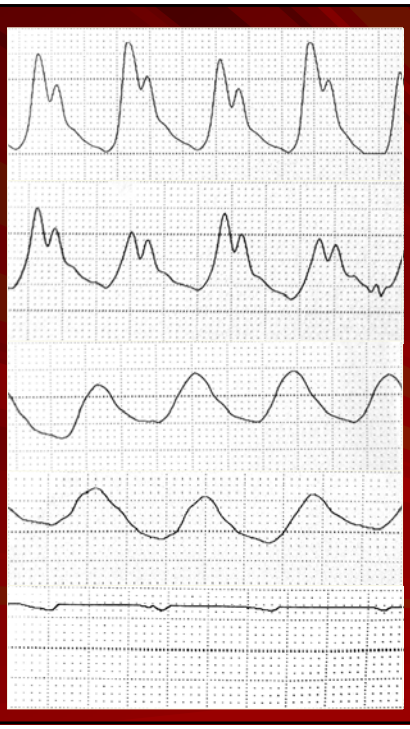
- Continuous flow, rotary pump
  - Axial design
- Small
  - Length 7 cm
  - Diameter 4 cm
  - 280 gm
- Quiet operation
- Single internal moving part
  - Potential for long-term durability



Miller, Pagani, Russell et. al. N Engl J Med 2007;357:885-96.



Increasing Pump Speed



Output = 4.3
Pulse Pressure = 23
Mean BP = 68

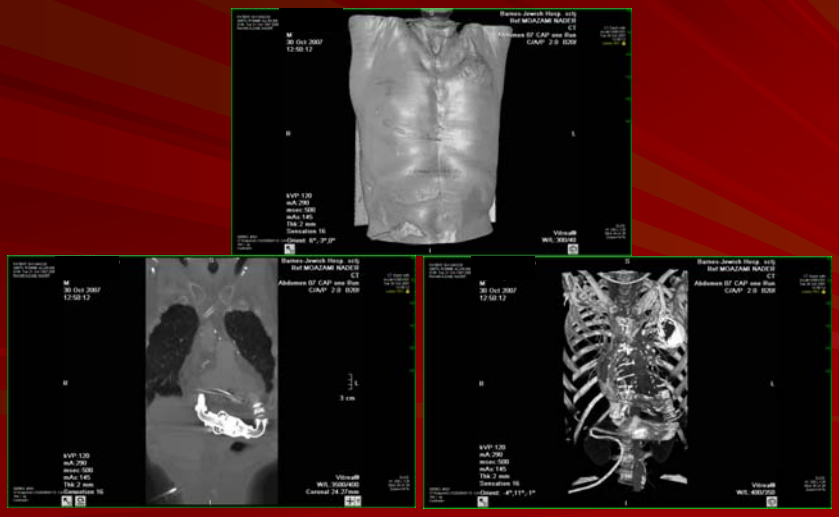
Output = 4.4
Pulse Pressure = 16
Mean BP = 70

Output = 4.5
Pulse Pressure = 12
Mean BP = 74

Output = 4.9
Pulse Pressure = 9
Mean BP = 82

Output = 5.1
Pulse Pressure = 6
Mean BP = 87

MDCT-Imaging
3D Reconstruction

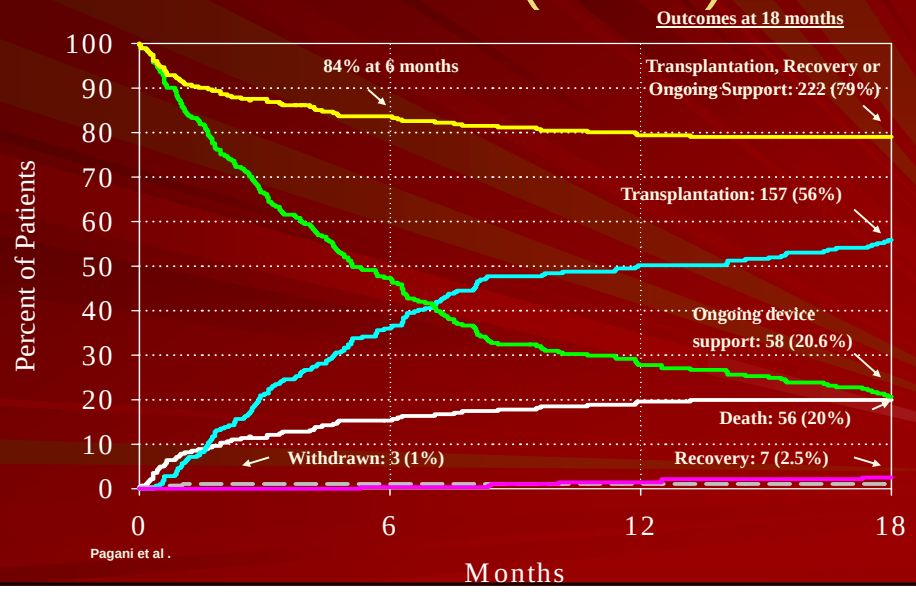


HeartMate II Clinical Trials

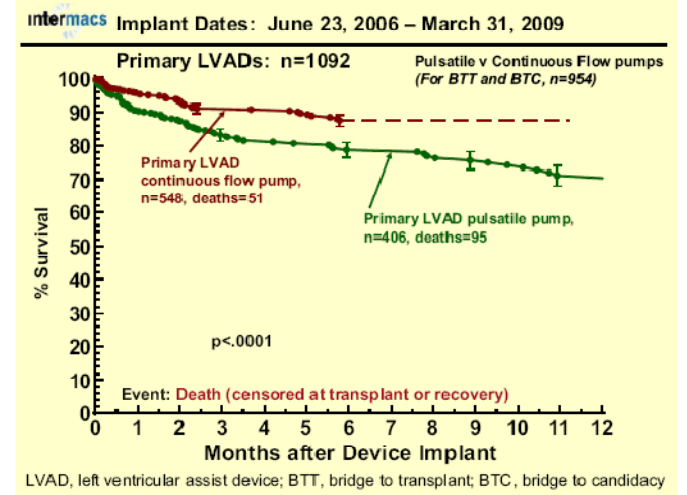
FDA approval:

1. Bridge to Transplant -2008
2. Destination Therapy- 2010

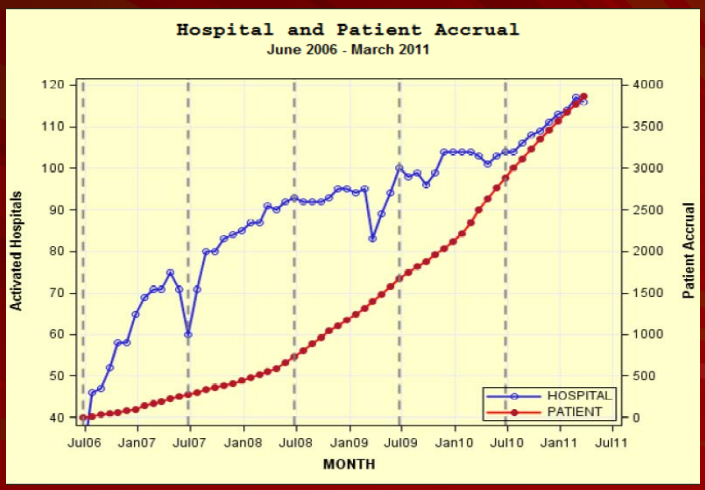
Updated HeartMate II BTT Outcomes (n=281)



90% Survival at 1 year



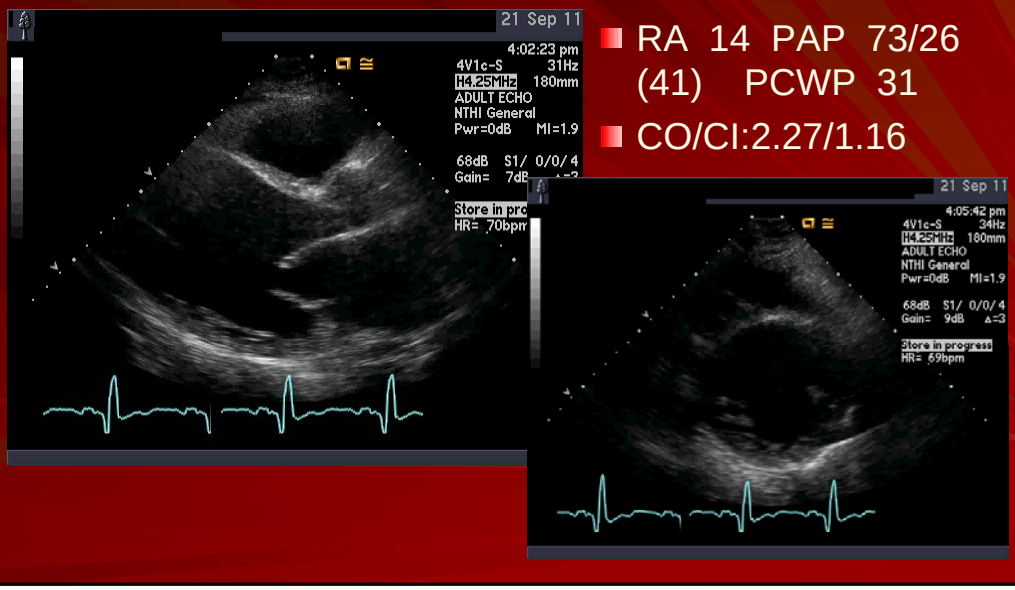
INTERMACS DATA



Case Presentation

- 74 y/o male history of MI (11 yrs ago) ICD
- Reasonably active until 2 months ago
- Presents with increasing SOB, fatigue, dizziness
- ACEI stopped because of low BP by MD
- Poor appetite, recent weight loss
- Baseline Cr 1.6 mg/dL

Hemodynamics



- RA 14 PAP 73/26 (41) PCWP 31
- CO/CI:2.27/1.16

Underwent Implantation of Heartmate 2 as Destination Therapy

Break Down Depending on Severity

	n=	%
Patient Profile Status		
1 Critical Cardio Shock	832	21.5 %
2 Progressive Decline	1656	42.8 %
3 Stable but Inotrope dependent	760	19.6 %
4 Resting Symptoms	424	10.9 %
5 Exertion intolerant	83	2.1 %
6 Exertion limited	57	1.4 %
7 Advanced NYHA Class 3	43	1.1 %
Total	3865	100.0 %

Patient Selection

- Best done electively
  - **Not an alternative to death but rather a bridge to life**
- Don't wait for:
  - Significant RV dysfunction
  - Progressive renal/hepatic dysfunction
  - Cardiac cachexia
  - Multiple inotropes

Who should be considered for LVAD therapy?

A. Multiple recent hospitalizations for fluid overload
B. Reduction in ACEI/Beta blockers due to intolerance
C. Progressive renal dysfunction
D. All of the above