

END-STAGE HEART FAILURE MANAGEMENT IN WOMEN: ADVANCED HEART FAILURE STRATEGIES

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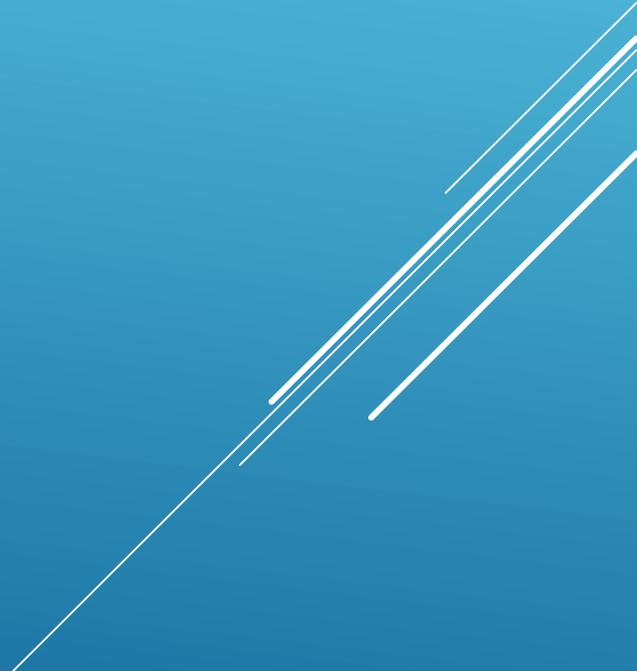
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<u>Presenter</u>	<u>Disclosure</u>
▶ Keving Brady, MD	None

DISCLOSURES

HEART FAILURE

- Stage A No structural heart disease, no symptoms
Positive for risk factors
 - Stage B Structural heart disease present
No symptoms
 - Stage C Structural heart disease present
Heart failure symptoms present
 - Stage D Refractory heart failure requiring advanced treatments
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PREVALENCE OF HEART FAILURE

25 million people worldwide

6 million people in US

Predicted to affect 10 million people in US by 2030

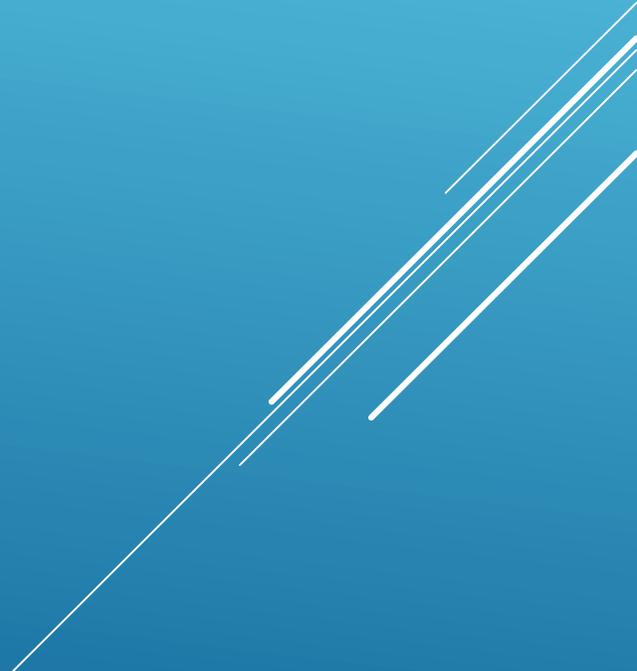
Acute heart failure leading cause of hospitalizations for people older than 65 years in US



PROGNOSIS

- ❖ Incurable
 - ❖ Progressive
 - ❖ Unpredictable

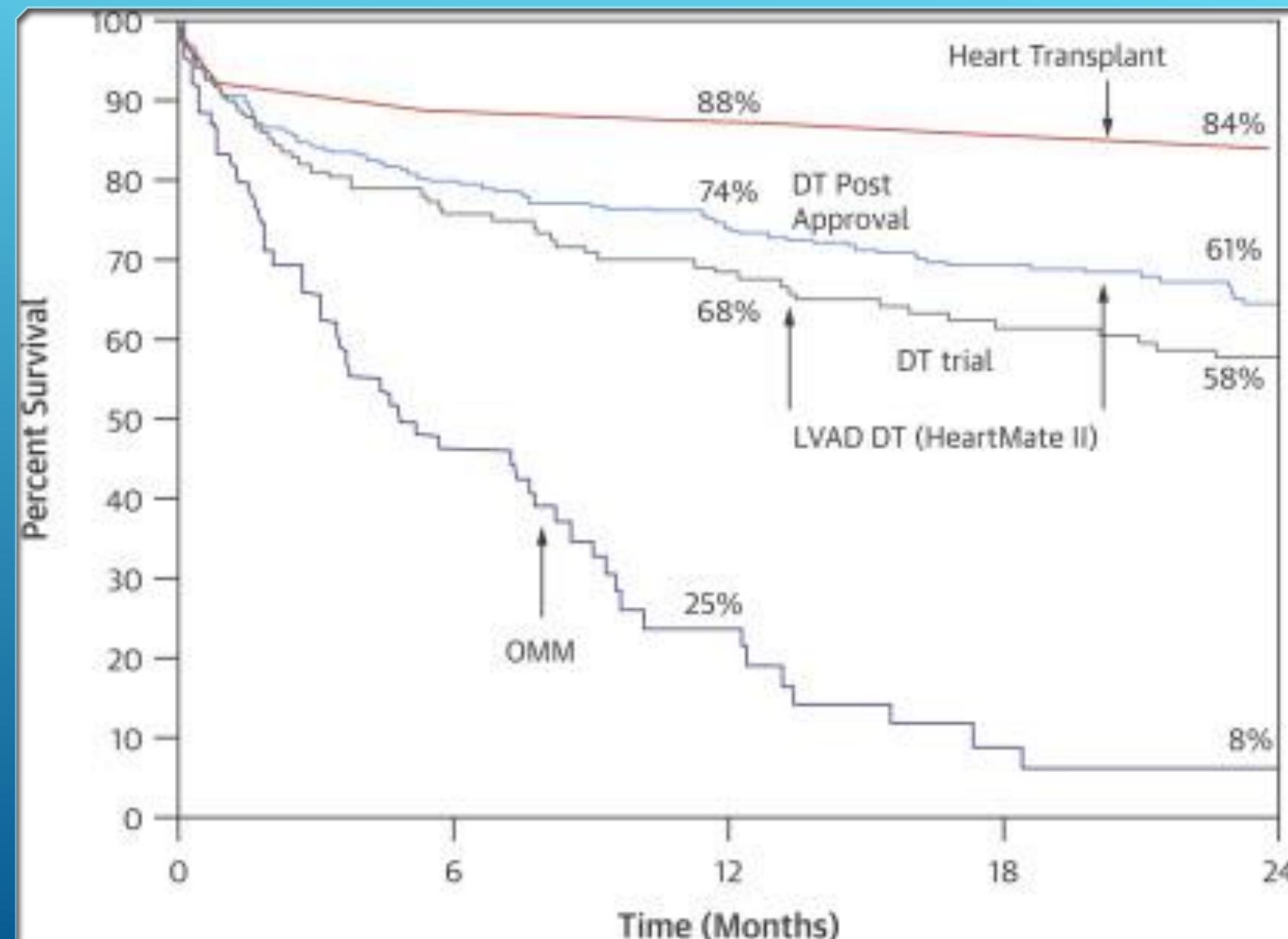
 - ❖ HYHA fc IV one year mortality 75%

 - ❖ Worse prognosis than most cancers without emphasis placed on end of life issues
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MECHANICAL AND SURGICAL MANAGEMENT OF ADVANCED HEART FAILURE

- Inotropic support
- Heart transplant
- Temporary mechanical support
- Durable mechanical support
 - Bridge to transplant (BTT)
 - Destination therapy

Survival with advanced therapies



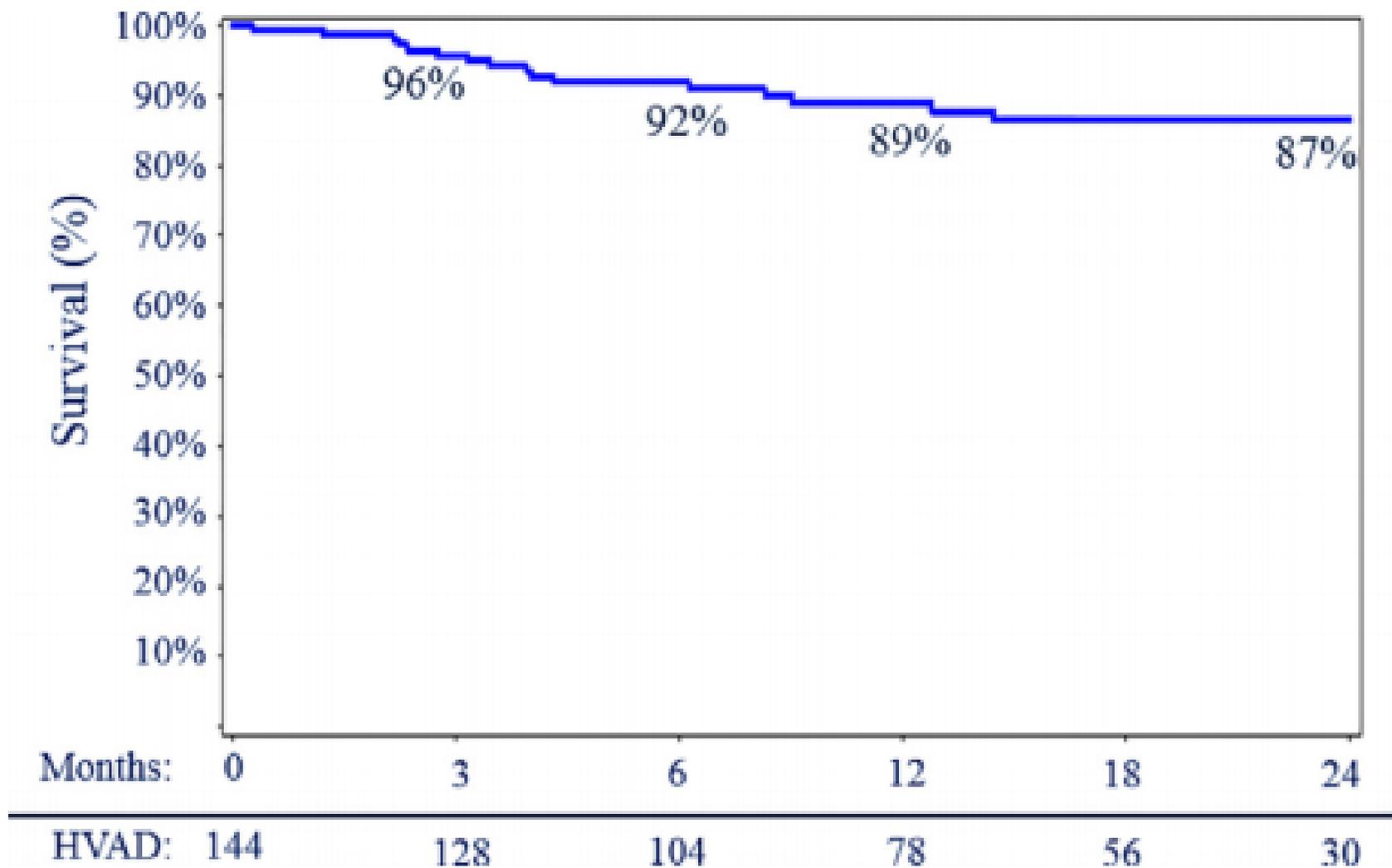


Figure 5 Kaplan–Meier survival of patients on their original HVAD device through 2 years.

HEART TRANSPLANT

Considered a true cure

Approximately 5,000 heart transplants worldwide per year, 50% performed in US

Relatively flat donor pool availability last 25 years

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HEART TRANSPLANTATION

Indications:

- Refractory cardiogenic shock
- Peak $VO_2 < 10\text{ml/kg/min}$
- Ventricular arrhythmias
- Dependency inotropic support
- Frequent acute HF hospitalizations
- Refractory debilitating angina despite revascularization/medical therapy

HEART TRANSPLANTATION

Contraindications:

Age > 70 y/o

BMI > 35 kg/m²

Severe organ dysfunction

Fixed severe PAH

Severe CVA

Uncured malignancy

Active substance abuse

Active infection

Non-compliance

Inadequate social support

Active mental illness

HEART TRANSPLANT SURVIVAL

75% survive at least 5 years, 50% greater than 13 years

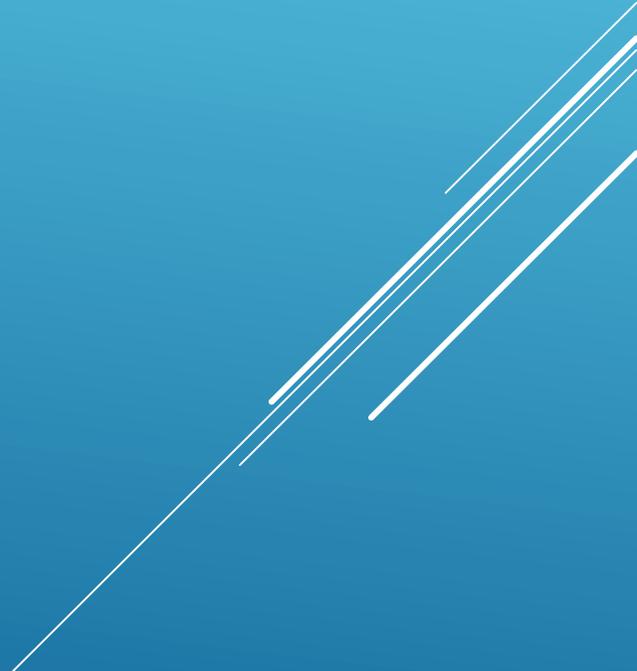
Lower survival in patients with valvular CM, CHD, re-transplant

Early mortality: acute rejection (18%), infection (22%)

Late mortality: allograft vasculopathy, malignancy (39.1%)

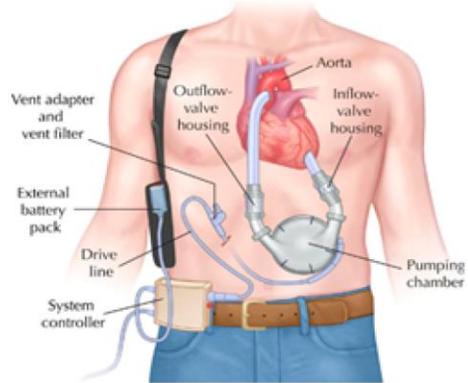
MECHANICAL CIRCULATORY SUPPORT

LVAD:

- 1966 = Pneumatic LVAD
 - 1984 = Novacor BTT
 - 2001 = Heartmate XVE BTT
 - 2003 = Heartmate XVE DT
 - 2010 = Heartmate II DT
 - 2017 = HVAD DT
 - 2018 = Heartmate III DT
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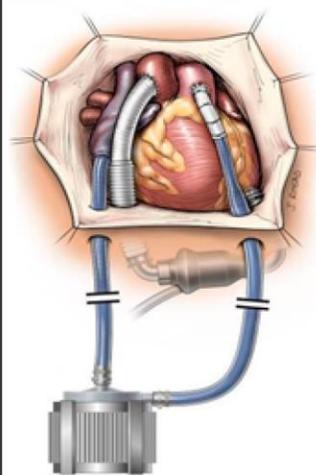
First Generation

LVAD



HeartMate XVE LVAS

RVAD



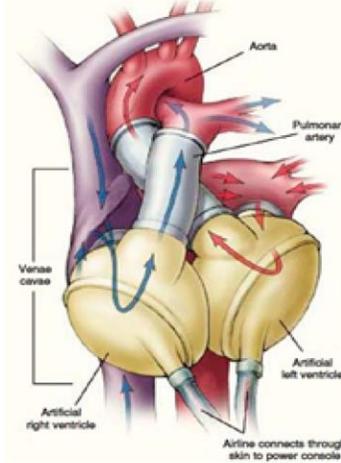
CentriMag RVAD

BiVAD



Berlin Heart EXCOR

TAH



Jarvik 7

Second Generation



HeartMate II

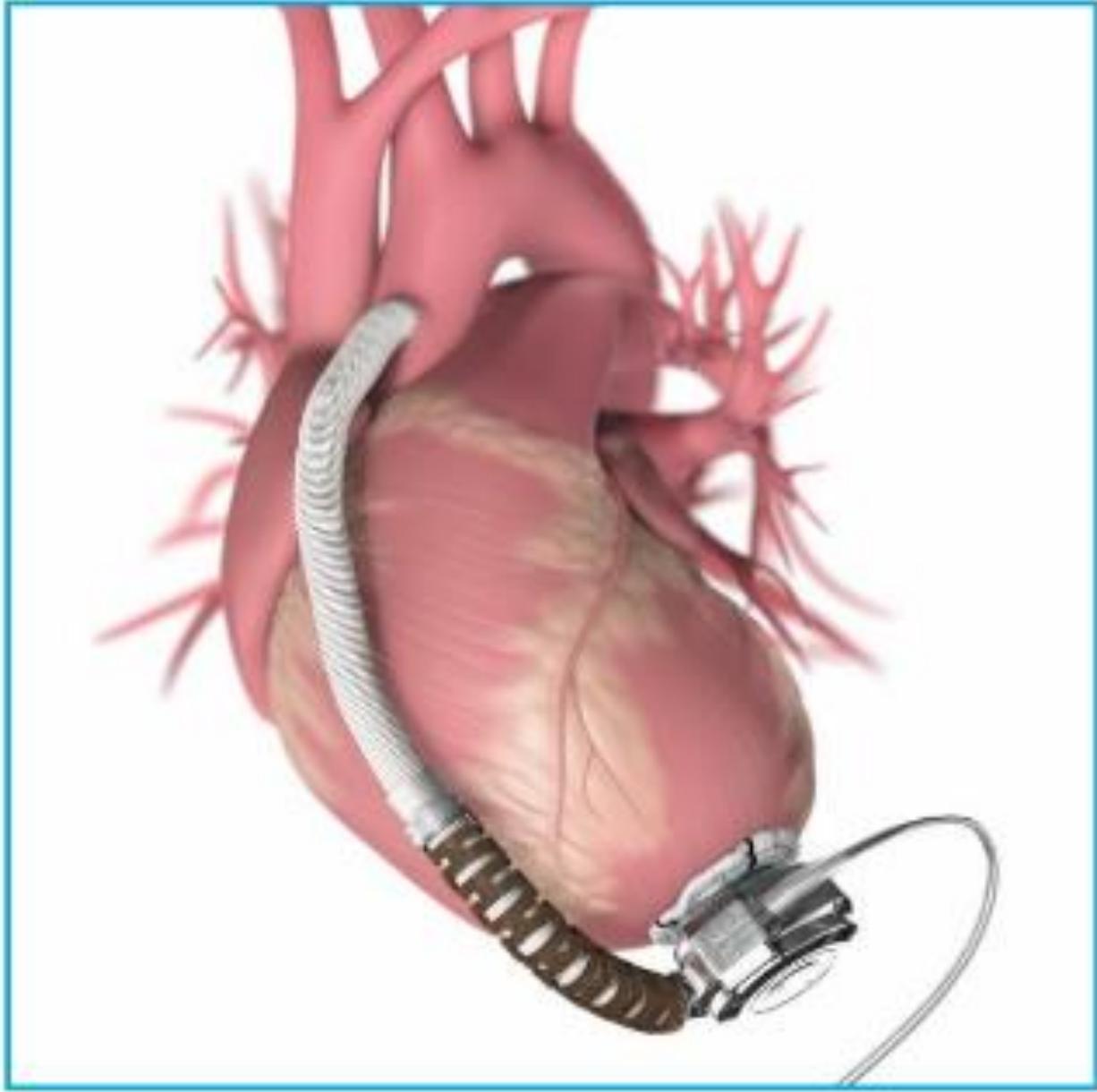
Third Generation



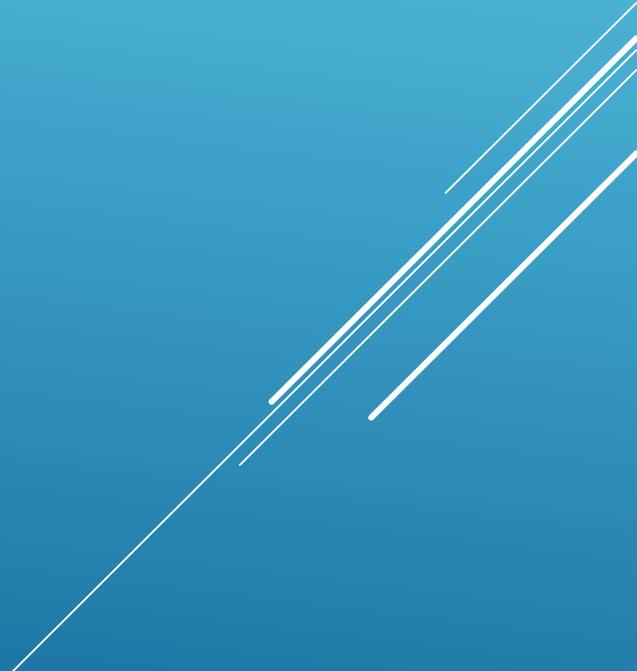
HeartMate III

EVOLUTION OF LVAD AND RVAD





LVAD SURVIVAL

- 2005-2010 Mean Survival 7.1 years
 - Readmission 1.1 events per year
 - By 4 years, 92% NYHA functional class I or II
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WOMEN AND HEART FAILURE

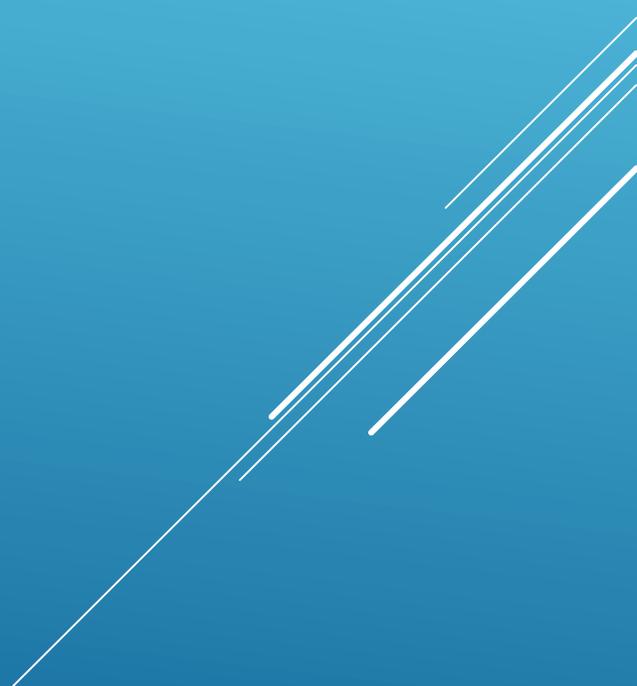
58% all annual heart failure deaths are women despite equal likelihood of developing heart failure between men and women

Heart failure in women may be underappreciated in women due to higher frequency of preserved ejection fraction (HFpEF) compared to men who have reduced ejection fraction heart failure (HFrEF).

Prior studies (including Framingham) have reported higher survival in women due to including both HFpEF and HFrEF. More contemporary studies (SOLVD) looking at HFrEF women had greater 1 year mortality compared to men.

CARDIAC TRANSPLANTATION IN WOMEN

(Circ. Heart failure 2019)

- Women comprised <25% heart transplant recipients
 - From 2004-2014 reviewing 34,198 international transplants, no significant survival differences between men and women
 - Despite lower risk features (DM, HTN, Smoking), women received higher risk donor hearts
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CARDIAC TRANSPLANTATION IN WOMEN

(New Heart Study, 2019)

- Male recipients older (45% vs 24% over 60y/o), higher percentage HTN, HLP, DM, tobacco abuse.
- Females had more:
 - Episodes of acute rejection (3.9 vs 3.0) on 1 year follow up period
 - Greater number of hospitalizations
- No significant differences in mortality between men and women

CARDIAC TRANSPLANTATION IN WOMEN

Gender based differences:

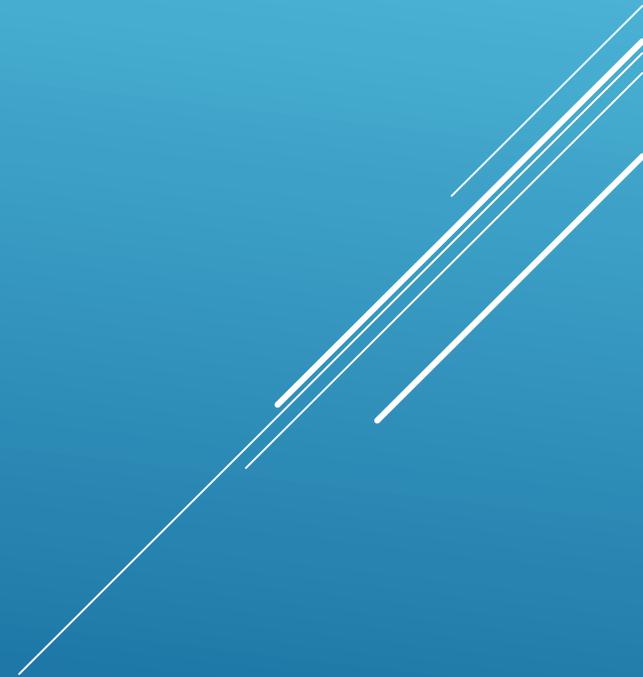
- Age (women later onset of HF)
- Earlier detection of CV disease in men resulting in greater chance of earlier diagnosis and subsequent referral.
- Higher Charleston Comorbidity Index (CCI) in men
- Increased mortality of women on OHT waiting list
- Lower BTT LVAD in women

DURABLE LEFT VENTRICULAR ASSIST DEVICE IN WOMEN

Historically LVAD implantation has been underutilized in women

At time of implantation, women frequently more unstable (INTERMACS 1 or 2)

Survival at 1 year lower (75.5% vs 83.2%)



DURABLE LEFT VENTRICULAR ASSIST DEVICE IN WOMEN

Number of women undergoing LVAD implantation has increased with the development of continuous-flow LVADs (CF-LVAD)

Inpatient mortality after CF-LVADs similar between genders (13.42% vs 12.85% males)

DURABLE LEFT VENTRICULAR ASSIST DEVICE IN WOMEN

(CircHeartFailure 2019)

Increasing use of durable LVADs for advanced heart failure management

Women continue to represent a decreasing fraction of total implants from 25.8% (2004) to 21.9% (2016)

Improving inpatient mortality for women with CF-LVADs

- Pulsatile flow 46.9% vs 31.1% males
- CF-LVADs 13.3% vs 12.1% males (p= 0.27)

CONCLUSIONS

Women comprise a greater proportion of heart failure patients with a higher incidence than men

Majority of women have preserved ejection heart failure. Women represent approximately 1/3 of advanced systolic heart failure population

Women are:

- less likely to receive appropriate pharmacological treatment
- less likely to undergo invasive testing and device therapies
- less likely to receive durable LVADs and heart transplants despite similar outcomes to men