Ventricular Assist Device Therapy: What You Need to Know

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Current Treatment- Heart Failure
- Medications: oral
- Medications: intravenous continuous inotropes
- Resynchronization Therapy/ Bi Ventricular AICD
- Surgery:
  - Success: LV aneurysm removal, valvular surgery (correct valve dysfunction), bypass surgery
  - Reshape heart: Battista & ACORN
- Heart transplant- Not enough donors
- Ventricular Assist Devices

Classification of HF

NYHA
- Class I  No limitations with ordinary activity
- Class II  Slight limitation of physical activity
- Class III  Marked limitation of physical activity
- Class IV  Inability to engage in any physical activity without symptoms

ACC/ AHA
- A: Pts. High risk of developing LV dysfunction presence of conditions strongly associated with HF
- B: Developed structural disease strongly associated with dev. HF
- C: Current or prior symptoms of HF associated with underlying structural disease
- D: advanced structural disease & marked symptoms @ rest

What are VADs???
- VADs are Ventricular Assist Devices
- Mechanical pumps to assist the heart when it is not able to pump enough blood through the body.
- It can be used to partially or completely replace the function of a failing heart.
- Multiple methods of insertion: Implantable, Percutaneous, Paracorporeal and Extracorporeal

Medical Indications for VADs
- Cardiogenic shock
- Myocardial Infarction
- Class IV HF and failed medical therapy
- Refractory atrial/ventricular arrhythmias
- Coronary arteries-no other surgical options
- Inability to wean cardiopulmonary bypass

Evaluation
- Surgeon
- HF cardiologist
- VAD coordinator
- Financial coordinator
- Social Work
CONTRAINDICATIONS
- Body surface area (some devices)
- Multi-organ failure esp. renal/liver
- Untreatable metastatic cancer
- Lack of social support
- Lack of ability to follow regimen

Different Goals of VAD therapy
- Bridge to transplant (must be on the transplant list)
- Destination therapy (not a candidate for transplant)
- Bridge to recovery (? reversible disease that could take device out)

Device Selection
- Device availability & physician’s experience
- Expected duration of support
- ? RVAD or BiVAD
- Cost
- Device related risks (bleeding, average device duration)
- Pt. Characteristics

Different Device Options - UWHC
**Single Ventricle:**
- HeartMate II (left only)
- Heartware (left only)
- Thoratec
- Abiomed
- CentriMag
- Tandem Heart Percutaneous VAD
- Impella Percutaneous VAD (left only)

**Biventricular:**
- Thoratec
- Abiomed
- CentriMag

Methods of Implantation
- Implantable
- Paracorporeal
- Extracorporeal
- Percutaneous
HeartMate II

Requires Coumadin
Continuous flow
No valves
Mechanical hum

Heartware (HVAD)

Overall Device Basic Information
- Effect on "normal vital signs"
- No Chest compressions
- 3 major components: blood pump, power and computer console
  - What to touch and what not to
  - Learn to switch patient from room power source to battery pack

Thoratec VAD- RVAD/ LVAD/ BiVAD
- Can be placed internally or paracorporeal
- RVAD/ LVAD/ BiVAD
- Requires Coumadin
- Less portable.

Comparison of Pulsatile & Axial Flow
Flow Waveforms for Pulsatile and Axial Pumps (Both have average flow between 4-5 L/min)

Electrical vs. Mechanical
- Rhythms with Perfusion
  - Atrial fibrillation
  - Atrial flutter
  - Supraventricular tachycardia
- Rhythms ? Perfusion
  - Ventricular tachycardia
  - Ventricular fibrillation
  - Asystole (BiVAD pt)
  - ICD shocking
Major Complications
- Stroke
- Infection
- RV failure
- Device failure
- GI bleeds
- Arrhythmias

Do’s
- Attempt non-invasive BP cuff measurement 1-2x
- Defibrillation using standard approach
- Pt. may have internal defibrillator/pacemaker
- Transport to nearest hospital (in Madison-UW)
- Follow ACLS/BLS procedures EXCEPT chest compressions

Don’ts
- NO chest compressions!!!!
- Do not disconnect any of the VAD equipment
- No thrombolytics