BSH Annual Autumn Meeting 2017

Presentation title: What to do when a sick LVAD recipient turns up at your A&E

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Conflicts of interest: None declared

Presentation slide distribution: These presentation slides will be added to www.bsh.org.uk after the meeting
Objectives

Approach to history, examination and basic investigations

Common complications affecting LVAD patients

Echocardiography of LVAD patients

Who to call for help
Case Study

38 year old lady

July 2014 – Diagnosed DCM

September 2014 – Cardiac arrest, cardiogenic shock, BiVAD

October 2014 – Heartmate 2 implantation

Weight gain, smoking

Erratic INR → LMWH → Dabigatran

October 2016 - Fevers, ‘low flow’
History taking

- Standard focused history
- VAD type
- History of complications
- Transplant list status
Examination – No pulse

- No pulse, conscious
  - Look at chest
    - Sternotomy, driveline
      - LVAD
    - Radiation burns
      - Enthusiastic coronary intervention
    - Blue rosette
      - Conservative MP
Examination

- Absent heart sounds

- Blood pressure
  - Doppler probe
  - High sensitivity BP monitor
  - Arterial line

- Abdominal examination
Investigations

- CXR
- ECG
  - Interference
  - Fragmentation
  - Lateral wall ST-T wave changes
- Blood tests
  - Clotting
  - LDH
System controller

Pump speed (rpm)

Power (watts)

Flow (l/min)

Pulsatility Index
Case progress

Recent travel to Dubai
System controller fell in swimming pool
Unwell, reduced appetite, fever
MAP 68mmHg, pulse 90
Erythema around driveline
Reduced LVAD flows, normal power, low PI
Echo – Small LV cavity, septum bowed towards LV, IVC small, collapsing
Elevated WCC, CRP

Blood cultures, driveline swab
IV fluids, antibiotics

Blood cultures – yeasts
IV micafungin

CT thorax/abdomen
Plan for TOE
Infection

VAD related – involving VAD components

VAD associated e.g. mediastinitis, endocarditis

VAD unrelated e.g. UTI pneumonia
Progress

Dark stools, nausea
MAP 70mmHg, heart rate 100
Drop in LVAD flow
Hb 98 → 65

Blood transfusion
Intravenous PPI
Withold aspirin, dabigatran
OGD – gastric erosions
IV heparin
GI Bleeding

- 20-30% LVAD patients
- Acquired Von-Willebrand deficiency
- AV malformations in small bowel
- Identify bleeding source
- Hold/ reverse anticoagulation
- Lower anticoagulation target
- Reduce pump speed
Friday...

Breathless ‘like I was before the LVAD’

MAP 75mmHg, pulmonary crepitations

Dark urine

Power > 10, flows 8-9 l/min

Hb 90 → 72
Echocardiography in patients with an LVAD

Reduced flow
- Hypovolaemia
- Right heart failure
- Tamponade
- Suction events

Normal/increased flow
- Aortic regurgitation
- Pump thrombosis
RV failure
Cardiac Tamponade

Suction events
Assessment of aortic regurgitation

Duration of AR

Jet width vena contracta

Jet width:LVOT ratio

Change in LV dimension

Pump Thrombosis
Pump thrombosis
Echo signs of pump thrombosis

- Increased LV dimensions
- Septal bowing to right
- New AV opening
- Mitral regurgitation
- Raised pulmonary pressures
Pump Thrombosis

- Breathless, signs of heart failure
- Issues with anticoagulation
- Increased pump power
- Signs of haemolysis – Hb, LDH, haptoglobins, bilirubin

- IV heparin, GIIbIIIa infusion
- Direct thrombolysis
- Pump exchange
Progress

IV heparin
Pump exchange

Pus within the pump pocket
Thrombus within pump, outflow graft
Moderate LVSD
Pump removed

Long term antifungal therapy
HF pharmacology
CRT implant
Support

- LVAD nurses
  - 24 hour on call
  - Paramedic notification

- Cardiologists

- VAD/transplant surgeons
Summary

Don’t panic

Systematic assessment

Echocardiography challenging but often useful

Call for help