Management of Antithrombotic Therapy in Complex Valvular Disease

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Overview

- Case presentation
- Discussion of difficult issues
- Discussion of relevant guidelines
- Conclusions
68 year old female
- Marfan’s syndrome
- Mechanical mitral valve replacement for mitral valve prolapse 2012 (target INR 3.5)
- Beta thalassaemia trait

Chest pain
- Sudden onset, sharp, radiating to back
- Started 2 hours previously
- Sweating, nausea, lightheadedness
Examination Findings

- HR 108; $O_2$ sats 93%; resp rate 24; temp 37.1°C

- Blood pressure
  - Left arm 84/40
  - Right arm 72/41
  - Normal femoral pulses

- Heart sounds
  - Diastolic murmur compatible with aortic regurgitation
  - Loudest at right sternal edge

- Chest auscultation
  - Bibasal fine crackles
Investigations

- CXR

- ECG
## Blood Tests

<table>
<thead>
<tr>
<th>FBC</th>
<th>U/E</th>
<th>LFT</th>
<th>Coag</th>
<th>ABG (40% O₂)</th>
<th>CRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb 83</td>
<td>Na 140</td>
<td>ALT 15</td>
<td>INR 4.5</td>
<td>pH 7.31</td>
<td>10</td>
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<tr>
<td>MCV 85</td>
<td>K 4.3</td>
<td>ALP 63</td>
<td>PTTR 1.2</td>
<td>pO₂ 18.9</td>
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<tr>
<td>WBC 20.6</td>
<td>U 7</td>
<td>Bili 7</td>
<td></td>
<td>pCO₂ 4.7</td>
<td></td>
</tr>
<tr>
<td>Neut 19.1</td>
<td>Cr 71</td>
<td>Alb 37</td>
<td></td>
<td>Bicarb 17.3</td>
<td></td>
</tr>
<tr>
<td>Mon 0.9</td>
<td></td>
<td></td>
<td></td>
<td>Lactate 4.6</td>
<td></td>
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<tr>
<td>Plt 251</td>
<td></td>
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Echo
Management

- Immediate Management
  - Haemodynamically stabilised
  - Beriplex and FFP administered (surgical instructions)

- Transferred immediately to surgical centre
  - VF arrest 1 hour after arrival
  - ROSC with 1 shock
  - Hypotensive 84/50
  - Transferred immediately to theatre
Surgery – Day 0

- Median sternotomy
- Cardiopulmonary bypass (heparinized)

Findings
- Circumferential type A dissection
- Severe aortic regurgitation
- Ascending aortic entry tear, dissection into epiaortic cervical branches, through arch and into descending aorta
- Ostial involvement of both coronary arteries
- MVR intact
Surgery – Day 0

- Operation
  - 23mm Carboseal aortic graft
  - Root replacement with composite valve graft
  - Coronary reimplantation
  - Frozen elephant trunk Vascutek Thoraflex hybrid

- Bypass time 259 minutes
- Cross clamp time 207 minutes
- Surgical plan to restart warfarin at 48 hours
Acute Kidney Injury

- **Day 1 Acute Kidney Injury**
- **Anuric, rise in Cr, fall in pH**
- **Continuous veno-venous haemofiltration started**
Hospital Acquired Pneumonia

- Blood cultures
  - E.coli Day 3
  - Sensitive to vancomycin and meropenem

- CXR and CT
  - Showed bibasal consolidation

Vancomycin and meropenem administered

Graph showing changes in Wbc, Neut, and CRP over time:
- Wbc: Increasing trend
- Neut: Fluctuating trend
- CRP: Steady increase
Haemostasis

- Anticoagulant reversed pre-op
- UFH post-op until…
- Marked thrombocytopenia/DIC
- Warfarin (5mg) single dose day 3
- GI bleed day 5
  - Endoscopy
    - Oesophagitis
    - Started on PPI
  - CT
    - ?Small bowel ischaemia

2x RBC  Hb  4x RBC

Platelets

INR

FFP  Beriplex  Warfarin
Haemodynamic Deterioration

- Progressive deterioration day 7-9
- Increasing inotrope demand
  - Adrenaline, noradrenaline, vasopressin, enoximone
  - Progressive lactic acidosis
  - Balloon pump inserted
- TOE
  - Moderate to severe LV dysfunction
  - No tamponade
  - AVR and MVR working well
- Cardiac arrest day 9
Difficult Issues

- Management of anticoagulation pre-operatively
  - Choice of reversal agents
  - Timing of reversal

- Timing of initiation of anticoagulant
  - How soon post-operatively?

- Choice of anticoagulant post-operatively
  - Complicated by thrombocytopenia
EACTS Guideline on antiplatelet and anticoagulant management in cardiac surgery 2008
- Advises similar approach as non-cardiac surgery

ESC Guideline on non-cardiac surgery 2014
- In patients with mechanical prosthetic valves
- If immediate reversal of anticoagulation required:
  - FFP or PCC in addition to low-dose vitamin K (2.5-5mg)
Guidelines - Post-operative

- ESC 2012 valvular heart disease guideline
  - Oral VKA started during the first postoperative days
  - IV UFH for aPTTr 1.5-2 allows rapid anticoagulation before the INR rises

- AHA/ACC 2014 Valve guidelines
  - As soon as bleeding risk acceptable:
    - IV UFH (no bolus) for aPTTr 1.5-2 until INR therapeutic
Anticoagulation in patients with mechanical valves may be reversed only if absolutely required

Timing of initiation of anticoagulation is a critical consideration for post-op patients

Thrombocytopenia complicates decision-making regarding anticoagulant choice
Questions?