The optimum management pathways for acute thoracic aortic pathology

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Acute Thoracic Aortic Syndrome

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- Evolved as a concept as a result of advances in modern high-resolution imaging.

- Acute Aortic Syndrome Categorisation linked by:
  - Presentation
    - sudden chest/back pain
  - Common pathology
    - disruption of the medial layer of the aortic wall

AAS categorisation - Pathological

- **PAU**: Focal atherosclerotic lesion that disrupts internal elastic lamina
- **IMH**: Progression of PAU to IMH
  - "Dissection without a tear"
  - Haematoma within the media but may be subadventitial

- **Aortic dissection**: Separation of the aortic media of variable longitudinal and circumferential extension

Diagnose, Stabilise and Transfer the “aortic attack”

- Immediate detailed high resolution cross-sectional imaging

- Diagnosis is still a challenge for some centres
  - Education
  - High index of suspicion
  - Serum Biomarkers in the future?
    - D Dimers

- Increasing importance on management in vascular unit high dependency care

- Immediate transfer for rupture
- In TBAD/IMH - Arterial line and strict BP modulation aiming for 100-120mmHg systolic

- Many unknowns but transfer appears to be safe in many cases
  - 52/56 survived transfer, range 4–211 miles, 30D mortality 16%

Early outcomes of patients transferred with ruptured suprarenal aneurysm or dissection
N Rudarakanchana, M Hamady, S Harris, E Afify, RGJ Gibbs, CD Bicknell, MP Jenkins
Guidelines for Best Medical Therapy

• High dependency, close observation

• Aggressive anti-impulse therapy is the cornerstone of management in the majority of patients with TBAD

• Guidelines recommend goal-directed therapy to achieve a heart rate of less than 60bpm and systolic pressure of 100-120mmHg; goals which may require a number of pharmacological agents to achieve

• Beta blockers generally recommended alongside further regimes to control BP
  - Labetalol
  - GTN
  - SNP

Hiratzka L, Bakris G, Beckman J, ... Williams D. 2010

Management Strategy - overview

Acute Thoracic Aortic Pathology

Imaging and resuscitation with strict BP control

Type A dissection or IMH
- Surgery

Type B dissection or IMH
- Complicated
  - Medical management and Surgery/Stenting
- Uncomplicated
  - Medical management – and consideration of stenting early

PAU
- Ruptured / symptomatic
  - Surgery/stenting
- Asymptomatic
  - Selective surgery/stenting
Type B Acute Dissection – “complicated”

Indications for stenting:
- Rupture
- Malperfusion syndromes
- Acute dilatation
- Persistent pain or uncontrolled BP at three days
  (and those who go into ARF)
Stenting for type B dissection

- A clear advantage to stenting in the acute phase compared to open surgical management

- Meta-analysis of contemporary series reported a pooled 30-day
  - Surgery mortality of 19% (19% CI, 16.8-21.1%)
  - neurological complication rate of 9.8% (95% CI, 8.2-11.5%).
  - TEVAR Mortality 7.3% (95% CI, 5.3-9.6%)
  - neurological complication rate 7.3% (95% CI, 5.2-9.7%).


- Open surgery is effective
  - mortality from bleeding and LHB/Circ arrest significant mortality with ischaemic syndromes

- Fenestration, now rare practice.
Stenting for type B dissection

- From femoral...choose wisely
- Utilise LSCA wire and snare if necessary
- Ensure in true lumen with angiograms serially...do make sure you look at the imaging
- CO2 flushing
- Use a stent with no proximal bare stent
- Land 2cm proximal to the flap, cover subclavian, you don’t have to revascularise the subclavian (MOTHER)
- Cover entry tear
- Stent to diaphragm
- Reassess on imaging and using central BP comparisons
Stenting for type B dissection – continued malperfusion
Static Visceral Artery Obstruction

Right renal artery occlusion
Surgical adjuncts

Hybrid grafts

Fem-fem X over

Frozen elephant trunk
Medical Management of dissection/IMH

- Closely observe
- BP control convert to oral, introduce one at a time
- Re CT scan at 48-72 hours
- Keep in for ten days

IMH specifically
- Do not stent early unless complicated
- Re CT again at 4 weeks
- Large proportion will remodel
- If they convert to dissection then consider as dissection

Patients receiving “best” medical therapy in chronic TBAD fare badly compared to those undergoing TEVAR.

ADSORB - Demonstrates low mortality in stable group at early stage with significant remodelling.

Leading to suggestions that TEVAR for uncomplicated dissection should be considered in all patients.

But, no evidence there is a difference in all cause mortality.

Poor evidence for “best” medical therapy.

Compliance in dissection patients is low.
Penetrating aortic ulcer

- Rare as an isolated finding
- Indications for repair
  - Rupture
  - Symptomatic
  - Wide base or significant aneurysmal change
- Imperial five yr experience:
  - 25 PAU without IMH
  - 11 undergoing endovascular repair
  - No aortic related deaths in the surveillance group

Locci R, Martin G, Salim S
Endovascular if possible

It has ulcerated and ruptured because the tissue is weak and damaged and not good quality for sewing.
PAU in the aortic arch

SINGLE CHIMNEY FOR LANDING IN ZONE ZERO

Consider in:
• Emergency
• Hostile chest
• Turned down for open

Useful but....
Make sure it seals!
Open surgical management

- Selected cases - infected or unsuitable for endovascular approach
- Planning and set up important
- Left Heart Bypass or Axillo-femoral shunt
- Thoracoabdominal incision
- Clamp proximal, and serially if possible
- Once visceral segment open selective perfusion of viscera
- Carrell patch/branched stag graft if necessary
The Ascending aorta - Type A Dissection

- Traditionally an open surgical approach

- Replacement of ascending aorta +/- arch
  - Type A dissection and DeBakey I and II
  - IMH extending over the arch into ascending aorta

- For IMH into but limited in the arch there is a case for conservative management (in a cardiac unit)
Stenting acute type A dissection
Stenting acute PAU in ascending aorta
Conclusions

• Evolving understanding of the conditions that make up this set of syndromes
• Diagnostics important and clinical care pathways similar to MI need to exist
• Best medical therapy for all
• Understanding of risk/benefit of stenting (uncomplicated dissection) is needed
• Technology improvement leading to extension of minimally invasive strategies, open surgery is important but is not first line