Is medical treatment alone the treatment of choice for all patients with uncomplicated type-B dissection?

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Disclosure

Speaker name:
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I have the following potential conflicts of interest to report:

- Consulting
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Other(s)

X I do not have any potential conflict of interest
Introduction

- Incidence 1-2/100,000/yr
- Male:Female >3:1
- Distal < 40% of all dissections
- 1/200 of patients presenting with chest/back pain
Classification

- Anatomical
  - Stanford A/B
  - DeBakey I-III
Classification

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  - Stanford A/B
  - DeBakey I-III
Classification

- Anatomical
  - DeBakey I-III
  - Stanford A/B
- Symptoms
  - Complicated
  - Uncomplicated
Classification

• Anatomical
  – DeBakey I-III
  – Stanford A/B

• Symptoms
  – Complicated
  – Uncomplicated

• Chronology
  – Acute <14 days
  – Chronic >14 days
Current accepted management

• Acute Complicated
  – Malperfusion
  – Leak
  – Uncontrolled pain
  – Uncontrolled hypertension
Current accepted management

• Acute Complicated
  – Malperfusion
  – Leak
  – Uncontrolled pain
  – Uncontrolled hypertension

• Rx TEVAR
Current accepted management

• Acute Complicated
  – Malperfusion
  – Leak
  – Uncontrolled pain
  – Uncontrolled hypertension

• Rx TEVAR

• Acute Uncomplicated
  – Asymptomatic
  – Stable
Current accepted management

- Acute Complicated
  - Malperfusion
  - Leak
  - Uncontrolled pain
  - Uncontrolled hypertension

- Rx TEVAR

- Acute Uncomplicated
  - Asymptomatic
  - Stable

- Rx BMT
  (and surveillance)
Current unknowns

• Should uncomplicated patients get TEVAR?
• If so – which ones?
• And when?
Hospitals / Response Rate

Population
14,045,575
(13% UK)

A&E Episodes/yr
7,739,010
(13% UK)

52 Respondents

100% Trusts
Q1) How many patients with **acute** Type B dissection have you managed in last 5 years?
Q3) In your hospital which speciality acutely manages patients?
Questions

• Why to treat?
• Who to treat?
• When to treat?
Questions

• Why to treat?
  – To allow remodelling and prevent aneurysmal dilatation

• Who to treat?

• When to treat?
Questions

• Why to treat?
  – To allow remodelling and prevent aneurysmal dilatation

• Who to treat?
  – Those at risk of the above

• When to treat?
Risk groups for late problems

• Patients with connective tissue disorders
• Patent/partial thrombosis false lumen
• Rapid early expansion
• Small aortic diameter at presentation
• Large false lumen diameter (>22mm)
Risk groups for late problems

- Patients with connective tissue disorders
- Patent / partial thrombosis false lumen
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- All patients presenting with type B dissection
Risk groups for late problems

- Patients with connective tissue disorders
- Patent /partial thrombosis false lumen
- Rapid early expansion
- Small aortic diameter at presentation
- Large false lumen diameter (>22mm)
- ? All patients presenting with type B dissection
- ? Is medical treatment alone enough
Questions

• Why to treat?
  – To allow remodelling and prevent aneurysmal dilatation

• Who to treat?
  – Those at risk of the above

• When to treat?
  – While the septum remains pliable
Natural history of uncomplicated type B AD

- IRAD
  - 2003 – 10% inpatient mortality for BMT
  - 2006 – 77% survive 3 years with BMT
  - At 5 years – 25% will exhibit aortic expansion
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Predicting complications

MFLA >922mm²

MFLA <922mm²

Chang et al. JACC 2008
Predicting complications

Akutsu et al. EJCVS 2004
Computational Fluid Dynamics

Analysis of Flow Patterns in a Patient-specific Aortic Dissection Model.
Computational Fluid Dynamics

- Aortic Morphology
- Entry Tear morphology
- Flow Velocity
- Wall Shear Stress
- Turbulence
- OSI
Parameters Examined

• **Geometric Features**
  • Circumferential diameter:
  • Longitudinal diameter:
  • Tear location: distance from arch top

• **Flow rate into false lumen**
  • Percentage of flow rate at tear

• **Disturbed flow and turbulence in flow domain**
  • Turbulence Intensity (\(Tu\))

• **Wall Shear Stress (WSS)**
Entry Tears

Particle Tracking: Flow patterns in dissected aorta
IRAD – Does medical Rx work?

- Main issue longer term is expansion
- Late expansion > difficult to treat
- 191 patients treated by BMT
  - 59% showed aortic expansion
  - 1.7+/− 7mm / year
Investigation of Stent Grafts in Aortic Dissection

- 140 patients (597 assessed) 2003-2005
- 2 to 52 weeks post AD
- IH and PAU excluded
- 1:1 randomisation (BMT vs BMT plus Talent)
- 2 year FU
- End points:
  - Mortality
  - Aortic remodelling/expansion
  - Cross over
  - Intervention
INSTEAD

- 11 cross overs (size >60mm)
- 11 deaths
  - 7 TEVAR
  - 4 BMT
- Conclusion – TEVAR failed to improve on BMT at 2 years
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- Conclusion – TEVAR failed to improve on BMT at 2 years
- Medical therapy alone the treatment of choice
INSTEAD

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  - 7 TEVAR
  - 4 BMT
- Conclusion – TEVAR failed to improve on BMT at 2 years
- ? Medical therapy alone the treatment of choice

But:
- Underpowered (28 deaths expected from historical data)
- 4 TEVAR group deaths protocol violations
- 2 years too early a time point
What happens with intervention?

- INSTEAD
  - Early results irrelevant
  - At 2 years:
    - 91.3% false lumen thrombosis TEVAR
    - 19.4% false lumen thrombosis BMT
  - At 5 years:
INSTEAD XL

- Extended FU to 5 years
  - All cause mortality:
    - BMT 19.3% TEVAR 11.1%
  - Aortic mortality:
    - BMT 19.3% TEVAR 6.9%
  - Disease progression:
    - BMT 46.1% TEVAR 27%
  - TEVAR –induced false lumen thrombosis
    - 90.6%
INSTEAD XL

• Extended FU to 5 years: 2-5 years Landmark analysis
  – All cause mortality:
    • BMT 19.3% TEVAR 11.1%  BMT 16.9% TEVAR 0%
  – Aortic mortality:
    • BMT 19.3% TEVAR 6.9%  BMT 16.9% TEVAR 0%
  – Disease progression:
    • BMT 46.1% TEVAR 27%  BMT 28.1% TEVAR 4.1%
  – TEVAR –induced false lumen thrombosis
    • 90.6%
What happens with intervention early?

• ADSORB (1 year results)
  – 3% false lumen thrombosis BMT
  – 57% false lumen thrombosis TEVAR
  – BMT
    • True lumen diameter + 1.7mm
    • False lumen diameter + 5.1mm
  – BMT and TEVAR
    • True lumen diameter + 7.7mm
    • False lumen diameter – 6.1mm
What happens with intervention early?

- **ADSORB (1 year results)**
  - 3% false lumen thrombosis BMT
  - 57% false lumen thrombosis TEVAR
  - BMT
    - True lumen diameter $+ 1.7\text{mm}$
    - False lumen diameter $+ 5.1\text{mm}$
  - BMT and TEVAR
    - True lumen diameter $+ 7.7\text{mm}$
    - False lumen diameter $- 6.1\text{mm}$
When to intervene?

1 year post presentation

3/12 post TEVAR

1 year post TEVAR
Chronic intervention

- BMT for all from day 1
- Main indication for intervention – size
- TAAA – flap is no longer mobile
- Need to exclude aneurysmal segment:
  - Open surgery – type II
  - Need landing zones for endovascular
  - Difficulties with fenestrations and branches
Summary

• BMT is vital
• BMT alone is not enough
• Despite BMT – aortic expansion continues
• Risk groups for expansion identifiable
• TEVAR (early and late) causes positive aortic remodelling
Conclusion

• Mounting evidence that uncomplicated asymptomatic chronic type AD is not benign
• More difficult to treat once remodelling not possible
• TEVAR (from both INSTEAD and ADSORB) leads to positive aortic remodelling
• Lower threshold needed for early TEVAR in risk groups
Conclusion

- Mounting evidence that uncomplicated asymptomatic chronic type AD is not benign
- More difficult to treat once remodelling not possible
- TEVAR (from both INSTEAD and ADSORB) leads to positive aortic remodelling
- Lower threshold needed for early TEVAR in risk groups as medical treatment alone is not the treatment of choice for all
Is medical treatment alone the treatment of choice for all patients with uncomplicated type-B dissection?

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