Temporal and Morphological Patterns Predict Outcome of Endovascular Repair in Acute Complicated Type B Aortic Dissection

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Disclosure of Interest

Speaker name: Rebecka Hultgren

I have the following potential conflicts of interest to report:

• Consulting
• Employment in industry
• Shareholder in a healthcare company
• Owner of a healthcare company
• Other(s)

• I do not have any potential conflict of interest
Dissection anatomy

Classification according to Stanford and DeBakey

Morphological predictors

- Primary entry tear (PET) $\geq 10$ mm
- Inner curve PET
- Maximal diameter aorta desc $\geq 40$ mm
- False lumen diameter $\geq 22$ mm
- Maximal false lumen area

Circulation 2012;125:3133e41
Ann Thorac Surg 2012;93:1215e22
J Thorac Cardiovasc Surg 2014;148:98e104
J Am Coll Cardiol 2007;50:799e804
J Am Coll Cardiol 2008;52(14):1170-6
Timing of repair

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WHAT THIS PAPER ADDS
The data showed that the outcome was far worse in patients with complications requiring invasive treatment within 48 h of the first symptoms, supporting the notion of a hyperacute or urgent phase. Moreover, a false lumen area exceeding 50% of the total aortic cross sectional area at the level of the tracheal bifurcation was found in all the early deaths and associated with impaired survival.

Objectives: The aim was to analyse early and late outcomes in patients undergoing thoracic endovascular aortic repair (TEVAR) for acute or subacute non-traumatic type B aortic dissection (TBAD), with the particular aims of identifying prognostic morphological predictors, and to assess the magnitude of the impact of the timing of TEVAR.

Methods: This was a retrospective, two centre, population based consecutive case series. The study group consisted of all the 53 patients undergoing TEVAR for complicated TBAD in Stockholm during the 12 year period 2004—2015. Demographic data, risk factors, operative, and outcome variables were registered and analysed. The
Objectives

• Prognostic implications of morphological factors

• Impact of the timing of TEVAR
Materials and methods (I)

• 53 patients

• All TEVAR procedures for acute/subacute complicated type B aortic dissection in Stockholm 2004-15

• Timing:  
  Urgent = 0-48 h  
  Acute = >48 h-14 d  
  Subacute = 15-90 d

• Reexamination of the 53 preoperative CTs by 2 independent examiners (1 vascular surgeon, 1 radiologist)
Materials and methods (II)

- Median age 63 years (range, 32-88)
- Hypertension: n = 38 (72%)
- COPD: n = 6 (11%)
- Diabetes: n = 1 (2%)
- Marfan syndrome: n = 2 (4%)
Presentation and indication for repair

Onset symptom
• Chest pain: n = 28 (53%)
• Back pain: n = 17 (32%)
• Abdominal pain: n = 5 (9%)

Blood pressure on admission
• Hypertension: n = 31 (58%)
• Sys BP >200 mmHg: n = 14 (26%)
• Shock: n = 3 (6%)

Main indication for TEVAR (n = 53)
Malperfusion: n = 24 (45%)
• Isolated renal malperfusion: n = 11
• Isolated visceral malperfusion: n = 4
• Isolated lower limb malperfusion: n = 3
• Multiple organ systems: n = 6

(Pre-)Rupture: n = 9 (17%)

Rapid expansion (n = 5)
Intractable hypertension (n = 5)
Intractable pain (n = 4)
Progression of dissection (n = 3)
Aneurysm (n = 3)
Time from onset to repair

- Urgent (0-48 h) \( n = 24 \text{ (45\%)} \)
- Acute (>48 h-14 d) \( n = 20 \text{ (38\%)} \)
- Subacute (15-90 d) \( n = 9 \text{ (17\%)} \)
Survival – Impact of timing

Survival

- 30 d mortality 17% (9 patients)
- 4 deaths aortic-related
- Other causes: cardiac (n=2), stroke (n=2), multiple organ failure (n=1)

Worse survival in urgent TEVAR than in acute/subacute (crude OR 14.0; 95% CI 1.6-122, p=0.007)

30 d mortality in urgent group 33% (8/24), in acute/subacute group 3% (1/29)

8 of 9 early (30 d) deaths occurred in the urgent group

log rank; p=0.002
Survival – Impact of morphology

All 9 early deaths (30 d) had a **false lumen area (FLA)** >50% of the aortic cross-sectional area at the level of the tracheal bifurcation (p=0.04)

25% 30 d mortality in case of FLA >50% (n=36) at that segment

0% 30 d mortality if FLA <50%

Of 24 patients with malperfusion 19 (79%) had FLA >50%
Conclusions

- Worse prognosis in patients undergoing urgent (<48 h) repair
  - could medical therapy be refined?
  - Disease or treatment?

- All the early deaths had a false lumen area exceeding 50% of the aortic cross-sectional area at the level of the tracheal bifurcation

- Need of individualized, patient-specific risk stratification
  - Is the false lumen area the marker we have been looking for?
Thank you

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DISSECT Algorithmic Strategy

Figure 1. Full Algorithm Overview

Initial Assessment: DISSECT
- Duration
- Intimal entry tear location
- Size of aorta (max. diameter)
- Segmental Extent of dissection
- Clinical condition
- Thrombosis of aortic false lumen

Management Considerations
- Complicated?

Disease Progression?
- (aneurysm degeneration, dissection extension)^

High Risk*:
- Primary entry tear diameter ≥ 10 mm
- Primary entry tear location
- Total aortic diameter ≥ 4 cm
- False lumen diameter ≥ 2 cm
- Partial false lumen thrombosis
- Fusiform index ≥ 0.64

*Most commonly discussed high-risk indicators.
Discussion

- All patients undergoing TEVAR <48 h had life-threatening complications. Still a chance to medically stabilize the aorta?

- Complications of the disease vs the procedure

- Several morphological predictors identified. Which one is the most important?

- Improved reproducibility by measuring FLA at the level of the tracheal bifurcation

- The impact of the FLA finding needs further validation