Treatment of acute type B aortic dissection: Current status

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Thoracic Aortic Aneurysm and Dissection

Incidence of thoracic aortic aneurysms and dissection is up

Operations for thoracic aortic aneurysms and dissection up

Olsson C. et al., Circulation 2006;114:2611-2618
Complications:

- Cerebral / spinal Ischemia: CVA, Paraplegia
- Cardiac: ACS, aMI, Aortic insufficiency, pericardial tamponade
- Aortic rupture
- Visceral ischemia/renal failure
- peripheral malperfusion
Ironically Dr. DeBakey at age 95 ...had some chest pain!

- Finally my 1st AMI...?
- No, a DeBakey Type II Dissection!
- Difficult decision to go for surgery!
Endovascular intervention in ascending aorta

Type A local dissection
64 years old female
Complete healing after 3 months

New Challenge: Diagnosis and Intervention at Chest Pain Center

• Incidence 20,000 cases/year in EU
• 30 day mortality from 0 – 30%
• 30 % missed diagnosis on initial work-up

ACS
- STEMI
- NSTEMI / UA
- coronary spasm

Aortic syndrome
- Dissection
- IMH
- PAU

Pericarditis
Pulmonary embolism
Epidemiology of acute type B aortic dissection

**Incidence:** 2.1/100000 person-year

- Peak incidence rate in men: 14.6/100000 py (65-74)
- Peak incidence rate in women: 19.0/100000 py (75-84)

**MV mortality predictors:**

- Shock/Rupture  OR 6.0
- Renal insufficiency  OR 4.7 (CI 1.1 – 19.4)
- Coexistenst aortic disease  OR 4.1 (CI 1.0 – 16.9)
- Myocardial ischemia  OR 2.3 (n.s.)

Survival after acute type B aortic dissection

Initial management pathways in suspected acute aortic dissection

- Suspected acute aortic dissection
  - Unstable patient with systolic BP <100 mm Hg
    - BP monitoring, ventilation, resuscitation, echocardiogram
      - Aortic dissection confirmed
        - Immediate surgery
      - Other diagnosis
        - Management dependent on diagnosis
  - Stable patient with systolic BP ≥100 mm Hg
    - Initial investigations:
      - Blood tests
      - ECG
      - Chest radiography
      - Titrate BP to 100–120 mm Hg with intravenous β blockers, nitroprusside, or calcium-channel blockers
      - Analgesia
    - Aorta dissection confirmed
      - Type A
        - Surgery
      - Type B
        - Continue medical treatment

**Fact:** Distal dissection may offer endovascular options

Proximal tear / A / I,II

Distal (IRAD classification)
NONSURGICAL RECONSTRUCTION OF THORACIC AORTIC DISSECTION BY STENT–GRAFT PLACEMENT

CHRISTOPH A. NIENABER, M.D., ROSSELLA FATTORI, M.D., GUNNAR LUND, M.D., CHRISTOPH DIECKMANN, M.D., WALTER WOLF, M.D., YSKERT VON KOLOLITSCH, M.D., VOLKMAR NICOLAS, M.D., AND ANGELO PIERANGELI, M.D.
Endovascular stenting vs. open surgery for TAD


Metaanalysis:
30/538 events with TEVAR
94/571 events with open surgery
No established recommendations how and in whom to perform endovascular procedures and SG implantation!
Clinical predictors impact on survival in IRAD

Important: Recognizing asymptomatic Complications in Type B Dissection

Dissection extends into branch artery

Distension of the false lumen compresses true lumen

Imminent malperfusion
Emergency Indication in chronic type B dissection complicated by acute late malperfusion

IVUS

Angio

obstructive Malperfusion

dynamic

static

Malperfusion

Dissection related Malperfusion before Stentgraft

Revascularisation after Stentgraft
Sustained malperfusion after thoracic stentgraft

Dynamic true lumen collapse

Dynamic branch vessel occlusion
The PETTICOAT Concept

Provisional Extension To Induce Complete Attachment After Stent Graft Placement in type B aortic dissection

Nienaber CA, Kische S et al., J Endovasc Ther 2006; 13:738-746
Induced aortic remodeling after stent-graft insertion

Completely reconstructed acute dissection

Progressive shrinkage of false lumen thrombus mass

Relief of infrarenal true lumen collapse
**Outcomes:** Survival of acute complicated B dissection in IRAD

- In the IRAD registry TEVAR improves survival in acute (<14 days) complicated type B dissection

- Randomized data are needed for support this notion!

- However, randomization is conceptually difficult in unstable scenarios!

Complicated Acute Type B Dissection: Is Surgery Still the Best Option?

A Report From the International Registry of Acute Aortic Dissection

Rossella Fattori, MD,* Thomas T. Tsai, MD;† Truls Myrremel, MD, PhD;∥
Arturo Evangelista, MD, FESC;¶ Jeanna V. Cooper, MS;† Santi Trimarchi, MD;‡
Jin Li, MS;† Luigi Lovato, MD,* Stephan Kische, MD,§ Kim A. Eagle, MD;†
Eric M. Isselbacher, MD,# Christoph A. Nienaber, MD, FACC, FESC§

Bologna and Milano, Italy; Ann Arbor, Michigan; Rostock, Germany; Tromsø, Norway;
Barcelona, Spain; and Boston, Massachusetts

Survival of different treatment strategies was

Conclusions In the International Registry of Acute Aortic Dissection, the less invasive nature of endovascular treatment seems to provide better in-hospital survival in patients with acute type B dissection; larger randomized trials or comprehensive registries are needed to assess impact on outcomes. (J Am Coll Cardiol Intv 2008;1:395-402) © 2008 by the American College of Cardiology Foundation
Outcomes: TTR registry data in type B dissections

Results of endovascular stent-graft implantation in acute complicated type B dissection

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>n</th>
<th>Technical Success (%)</th>
<th>Paraplegia (%)</th>
<th>Mortality (%)</th>
<th>Follow-up (month)</th>
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<td>Bortone (55)</td>
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<td>43</td>
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<td>Leurs (25)</td>
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<td>97.1</td>
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</table>

Early intervention
High technical success
~ 10% mortality
Long term benefit
Impact of treatment timing on event (MAVE) free survival in patients with type B aortic dissection (own results)

High technical success rate

Earlier intervention (≤ 3m): less MAVE

Late intervention (> 3m): less remodeling

Mortality 0 - 13%

MAVE = major adverse vascular events

**INSTEAD:** Aortic remodeling works in chronic cases (< 14 days)

**Typical INSTEAD-patient**

69 y, male, acute type B 12/98, SG 9/99, uneventful F/U
INSTEAD: Aorta related 1- and 2-year mortality

Primary endpoint analysis after adjudication

INSTEAD 2 year intention-to-treat analysis

Low mortality in both groups (94.2 vs. 97.0%)

No difference between groups (p = 0.417)
INSTEAD: Progression and adverse events

**Secondary endpoint analysis after adjudication**

**INSTEAD 2 year ITT analysis of cluster endpoint**

**Ongoing event rate in both groups.**

Event-free survival: 79.3 vs. 83.3% @ 1y (p = 0.53) and @ 2y with event-free survival of 74.0% and 72.0% (p = 0.91).
Two patients with a small initial false lumen diameter at the upper descending thoracic aorta showed a complete resorption of the false lumen (left) or did not show an aneurysm for approximately 3 years (middle), while another patient with a large initial false lumen diameter developed an aorta aneurysm after approximately 2.5 years (right).

New risk group II: Partial false lumen thrombosis?

The use of TEVAR in type B dissection?

- Endovascular interventions are emerging as a beneficial concept in dissection and TAA suitable to enable aortic remodeling.

- For **complicated type B aortic dissection** endovascular Stentgraft treatment is accepted and can be life-saving.

- For **uncomplicated type B dissection** a primary strategy of tailored antihypertensive medical treatment and serial imaging is justified, with **deferred stent-graft implantation** as an option for patients failing to respond to medical management or developing late complications.