A New Classification System for Aortic Dissection: DISSECT

The VEITH Symposium
Session 4
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What Is the New Classification of Aortic Dissection?

The AIM Symposium
Session 15
Wednesday, November 18, 2015

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Pathophysiology of Aortic Dissection:
Intimal Tear + Disease of the Aortic Media

Michael Dake, MD

Within the past 12 months, the presenter or their spouse/partner have had a financial interest/arrangement or affiliation with the organization listed below.

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- Officer, Director, Board Member or other Fiduciary Role
  - VIVA Physicians Group
- Speaker’s Bureau
  - None

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The process of aortic dissection begins with an intimal tear, followed by medial degeneration.
Why do we need a new classification system for aortic dissection?

**Rationale for DISSECT**

In current clinical practice, endovascular therapy is increasingly considered as an alternative to medical management or open surgical repair for aortic dissection. The traditional classification systems in current use are relics of a time before endovascular techniques were developed and are based on features of the disease that only help direct selection between the two traditional treatment options. The expanded range of interventional procedures now practiced around the world requires a more detailed evaluation.
What is DISSECT?
A mnemonic-based approach that...
- Acknowledges the importance of classification systems to guide management
- Recognizes the limitations of traditional schemes (DeBakey and Stanford) devised over 40 years ago prior to the introduction of endovascular techniques
- Addresses 6 specific anatomic and clinical manifestations of the dissection process that are most relevant to contemporary decision-making
- Facilitates optimal communication among medical providers of the most salient details to inform a critical analysis of the therapeutic options

DISSECT
- Duration
- Intimal entry tear location
- Size of aorta (max diameter)
- Segemental Extent of dissection
- Clinical condition
- Thrombosis of aortic false lumen

DISSECT
Duration
- Acute (< 2 weeks p symptom onset)
- Sub-acute (> 2 weeks & < 6 weeks)
- Chronic (> 6 weeks after diagnosis)

In the future, we will precisely detail the specific time interval between the onset of symptoms and current evaluation, i.e., exact number of hours, days, months, etc.
**DISSECT**

Size of aorta (max diameter)
- Maximum transaortic diameter (mm) of dissected aorta

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**Ann Thor Surg 2004; 78:1268-1273**

Long-Term Outcome and Prognostic Predictors of Medically Treated Acute Type B Aortic Dissections

- 76 patients. Late events of chronic phase surgery or acute event
  - Statistically significant difference between patients with and without events with regard to atherosclerotic factors, status of false lumen, max aortic diameter upon admission, mean aortic enlargement rate and blood pressure control during follow-up.
  - Of these factors, patent false lumen and a maximum aortic diameter > 40 mm were the most strongly associated with the development of events.

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**Ann Thorac Cardiovasc Surg 2008;14:303-10**

- 43 patients
  - Maximal diameter > 40 mm most predictive of later Aortic Dissection related events
  - False lumen patency predictive but not significant

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**J Thorac Cardiovasc Surg 2011;142:e25-31**

- 160 patients. Cox proportional Hazards
  - Diameter of 40.5 mm predicts late events with:
    - Sensitivity 61%
    - Specificity 73.4%
    - Maximal diameter HR 1.151 P < .0001 for each mm > 40 mm
This image cannot currently Department of Cardiothoracic Surgery, Stanford University School of Medicine

Predictors of late aortic events after Stanford type B acute aortic dissection

- 117 patients. Cox Regression
- Maximal diameter > 40 mm Most Predictive of later Aortic Dissection Related Events. P = .003

DISSECT

**Segemental Extent of dissection**
- Ascending (As) + → Arch, Descending, Abdominal, Iliac
- Arch (Ar) + → Descending, Abdominal, Iliac
- Descending (D) + → Abdominal, Iliac
- Abdominal (Ab) + → Iliac (I)

**Clinical condition**
- Complicated
- Uncomplicated
Clinical condition
• Complicated
  - rupture
  - symptomatic branch vessel involvement/compromise: static
    (re-entry or no re-entry), dynamic, or both
  - extension of dissection – prox or distal
  - early aortic dilation, >10mm in first 30d
DISSECT
Thrombosis of aortic false lumen
• Patent
• Complete thrombosis
• Partial thrombosis

Predictors of late aortic events after Stanford type B acute aortic dissection
Yusuke Koda, MD, Akhiru Mine, MD, PC, Hiroshi Kamori, MD, PhD, Ryo Suzuki, MD, PhD, Hideyuki Ono, MD, PhD, and Kousuke Harasawa, MD, PhD

117 patients. Cox Regression

<table>
<thead>
<tr>
<th>False Lumen</th>
<th>5 year Event Free rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partially Thrombosed</td>
<td>59%</td>
</tr>
<tr>
<td>Fully Open</td>
<td>65%</td>
</tr>
<tr>
<td>Fully Thrombosed</td>
<td>96%</td>
</tr>
</tbody>
</table>
DISSECT

- Duration
- Intimal entry tear location
- Size of aorta (max diameter)
- Segemental Extent of dissection
- Clinical condition
- Thrombosis of aortic false lumen

Finally, 6 off-the-grid scenarios plus a comment for special consideration

- Acute aortic intramural hematoma (IMH)
- DeBakey type IID – PIT in descending with retrograde involvement of ascending aorta
- Re-dissection or multi-barreled dissection (multiple FL rather than single FL)
- Repaired type A, now with residual chronic B with aneurysm
- Connective tissue disease patients (Marfans, EDS)
- Stent-graft induced retrograde type A dissection
- The perils of chronic anticoagulation

DISSECT -- Summary

DISSECT is a mnemonic-based classification system that uses 6 anatomic and clinical features to describe aortic dissection and facilitate decisions regarding its management in the current endovascular era.

Conclusion

Although much insight has been achieved into the diagnosis and management of aortic dissection over the last 20 years, much work remains. The challenge for the new era will fall to the emerging fields of genomics, bioinformatics, and molecular imaging to determine if the onset of this vexing and frequently lethal condition can be predicted and eventually prevented in individuals at high risk of developing dissection. Until this is a reality, we will continue to evaluate safer and more effective alternative treatments for patients with aortic dissection.

Conclusion

- In this regard, over the last two decades we have developed a refined appreciation of the variety and complexity posed by thoracic aortic dissection.
- In part, this is due to insight afforded by accumulating experience with TEVAR for management of a wide range of dissection types – each with particular anatomical and physiological features that pose special challenges.
- From this experience, we are defining an increasing variety of such features that are associated with a complicated course. Identifying patients at risk for progression of disease and evaluating the potential benefits of early intervention is a critical next step.
Thank You