ACUTE AORTIC DISSECTION

Where we stand Today.

George Economopoulos, MD, FACS.
Acute Aortic Dissection Management in 2018
(Reading the playbook of the Enemy)

• Prevention
• Diagnosis
• Treatment
Can Acute Aortic dissection be Prevented?

**YES !**
PREVENTION OF Acute Aortic Dissection

“Prophylactic” resection of ATAA : at certain size and growth criteria

Urgent Surgery : when Alarming events occur :
- rapid growth
- Acute AI
- Acute chest pain

Diligent follow up of “syndromic “ pts and earlier intervention

Modifying Risk factors for aneurysmal growth (High BP, smoking ,etc)
The value of: Normalized aortic dimensions to body size (Yale Aortic Size Index ASI)

Risk of Aortic events (rupture-dissection)/year

ASI < 2.75: Low risk (approx. 4%/year)
ASI 2.75-4.25: moderate risk 8-10%/year
ASI > 4.25%: 20-25%/year

Attention: this is changed to earlier in pats with connective tissue disorders!
A: “Common sense” Guideline

If you have a patient with an Aorta > 4.0 cms

- **Diam > 4.0 cms**: search for connective tissue disorder, start b blockers, BP control, moderate restriction of physical activity, pre-pregnancy counseling, yearly follow up with TEE and CT/MRI
- **Diam > 4.2 cms + AVR**: Simultaneous surgery for AOV and Aorta
- **Diam > 4.5 cms + Conn Tissue Syndrome**: Surgery for desired pregnancy, FH of AAoD, LDS, TGFBR1/TGFBR2 mutation, progressive growth > 0.2 cms/year
- **Diameter > 5.0 cms + conn Tissue disorder**: Operation
- **Diameter > 5.0 cms + BAV**: Simultaneous Surgery of Aorta and valve
- **Diameter > 5.5 cms in all other cases**: Operative treatment
Diagnosis of Acute Aortic Dissection

Highly “suggestive “ Characteristics of CP
Triple Rule-out CTA (AAD, MI ,PE)
TEE ( root dissection, AOV status)
3D CTA ( arch, rest of the aorta, especially if malperfusion suspected)
Surgical Treatment of AAD

or

“From Frozen Bodies to Frozen Elephants”
The history of surgical therapy for Acute Aortic Dissection

A saga of 83 years (1935-2018) with more to come!
Most important developments

Distinction and classification of AAoD to:
- A and B (Stanford)
- Debakey (type I, II, III)

and the most recent one the DISSECT classification
\[ D = \text{Duration}, I = \text{Intimal tear location}, S = \text{Size (maximal diameter)}, SE = \text{segmental extent (ascending, descending, etc)}, C = \text{Complications} \] and \( T = \text{Thrombosis (of pseudolumen)} \)
Most important developments/innovations
- Open distal anastomosis + DHCA
- ACP with moderate hypothermia + arch replacement
- Elephant trunk procedure
- Antegrade or “frozen elephant trunk” procedure for arch replacement
- TEVAR for complicated /initial Tx for Type B AAoD
- Lately a Transapical TEVAR for Type A AAoD in selected pts
TEVAR for Acute type A Dissection
What is the “common practice “ in AAoD today?

Prompt Dx and Transfer to a Surgical Team with a proven tract record
Prompt surgical intervention : Re: “you better have a live cat than a dead lion”
<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>In all patients with AD, medical therapy including pain relief and blood pressure control is recommended</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>In patients with Type A AD, urgent surgery is recommended</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>In patients with acute Type A AD and organ malperfusion, a hybrid approach (i.e., ascending aorta and/or arch replacement associated with any percutaneous aortic or branch artery procedure) should be considered</td>
<td>IIa</td>
<td>B</td>
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<tr>
<td>In uncomplicated Type B AD, medical therapy should always be recommended</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>In uncomplicated Type B AD, TEVAR should be considered</td>
<td>IIa</td>
<td>B</td>
</tr>
<tr>
<td>In complicated Type B AD, TEVAR is recommended</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>In uncomplicated Type B AD, surgery may be considered</td>
<td>IIb</td>
<td>C</td>
</tr>
</tbody>
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Class of recommendation. Level of evidence. AD, aortic dissection; TEVAR, thoracic endovascular aortic repair.
Difficult to solve and/or Unsettled situations

**Patent pseudolumen**: despite recent advances (FET etc) there is no hard evidence that aortic remodeling of the distally dissected aorta reduces significantly the incidence of pseudolumen patency especially of the abdominal Aorta and the need for further interventions.

The new composite devices (*Evita, Thoraflex*) make these operations safer but further trials must be performed.

**Malperfusion:**

<table>
<thead>
<tr>
<th>Anatomic site</th>
<th>Resolution</th>
<th>30-day mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal</td>
<td>80% (8/10)</td>
<td>10% (1/10)</td>
</tr>
<tr>
<td>Intestinal</td>
<td>0% (0/2)</td>
<td>100% (2/2)</td>
</tr>
<tr>
<td>Extremity</td>
<td>43% (6*/14)</td>
<td>7% (1/14)</td>
</tr>
<tr>
<td>Cerebral</td>
<td>80% (4/5)</td>
<td>20% (1/5)</td>
</tr>
</tbody>
</table>

*, seven of these patients required concomitant or subsequent lower extremity revascularization. One additional patient that did not undergo revascularization required a below the knee amputation.
Malperfusion types

**Static**: Needs intervention

**Dynamic**: Can be modified by BP control

**Both**: Needs intervention

Important to distinguish between malperfusion from ongoing ischemia and the **malperfusion syndrome** which is ischemia and end organ dysfunction
University of Michigan strategy for AAoD + malperfusion

Aao D patients with ongoing arterial obstruction no adverse end organ defects

Immediate surgical repair

AAoD with malperfusion syndrome (end organ dysfunction from ischemia)

Correction of ischemia (fenestration with/no stenting followed by aortic repair)
Fenestration + stenting procedures in malperfusion associated with acute Aortic Dissection (AAoD)
Cerebral Malperfusion

Cerebral Malperfusion is manifested as stroke or coma: 5-15% in pts with AAoD

It is not considered as an exclusion criterion (short of brain death) by many surgeons today. Outcomes are mostly affected by two factors:
- time from AAoD
- extent of CNS injury

From IRAD data
Elderly Patients

From the “we don’t do that here” to “we will do everything”

Data from IRAD: OR mortality has declined to 17-25% BUT 17% of survivors were bedridden and 46% demented.

So: seasoned surgical judgment is a must along with a frank discussion with the family about all risks, the options of withholding heroic Tx and understanding the family expectations about the quality of life after a surgical or conservative option.
Importance of Aortic dedicated Teams (Duke experience)

Reduction of mortality from 33.9% to 2.8% by routine use of:
- R axillary Art perfusion for ACP
- Moderate Hypothermia
- Performance of ODA routinely
- early use of FactorVII to reduce bleeding
- avoiding nocturnal operations in stable patients >48hrs
- Standarized protocols of accepting, transferring and admitting AAOd pats
Despite an ever increasing complex procedures and expanding new therapies this life threatening disease remains a stubborn challenge for cardiac surgeons. Development of specialized thoracic aortic teams and regionalization of care for patients with acute aortic dissection offers the most promise to improve overall results.

Thank you!

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