DISCLOSURE:

Medtronic: consultant
Disclosure

Speaker name: FRANK J CRIADO

I have the following potential conflicts of interest to report:

- [x] Consulting - MEDTRONIC
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Acute Aortic Syndrome AAS

- Term AAS coined by Vilacosta et al. in 1998
- Aortic Dissection AD, penetrating aortic ulcer PAU, and intramural hematoma of the thoracic aorta IMH

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• Group of inter-related aortic pathologies sharing a similar clinical presentation and the demand for urgent treatment

• Common denominator is AORTIC PAIN
Aortic Pain

• Acute
• Thoracic (typically interscapular)
• Maximum intensity from onset
• *ripping, migrating, pulsating*…
Penetrating Aortic Ulcer PAU

caused by rupture of atherosclerotic plaque through internal elastic lamina with subsequent hematoma/necrosis between media and adventitia
Atherosclerotic Ulcers on CTA
• Prevalence unknown
  *but surely more frequent than previously believed*
• Older men
• Atherosclerosis (often severe)
• Single or multiple
• Comprise 2-11% of AAS cases
• Evolve into Aortic Dissection in 5% of cases
• Predominantly in the descending thoracic aorta
• 70-75% symptomatic (pain)
PAUs come in 2 flavors…

#1

Most common
PAU Potential Complications

• Rupture (death)
• Dissection and IMH
• Aneurysm formation
• serious nature of PAU recognized over 10 years ago: 30-50% of patients with acute Sx will progress to classic AD or rupture

• PAU patients recognized as good anatomic targets for TEVAR Rx as the lesions often involve non-branched aortic segments
Management

• **Aggressive** approach advocated at present

• **Predictors** of progression and a bad outcome:
severe unrelenting pain, pleural effusion, association with IMH, and SIZE
Definition of Large-Size PAU

>20mm Diameter
>10mm Depth
Thoracic Endovascular Aortic Repair for Penetrating Aortic Ulcer: Literature Review

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Background. The aim of the study was to provide a literature review of thoracic endovascular aortic repair (TEVAR) outcomes for penetrating ulcer of the aorta.

Methods. Relevant articles in the Embase, Medline, and Cochrane databases reporting the results of endovascular repair for penetrating ulcers of the thoracic aorta were systematically searched and reviewed.

Results. Thirty-one articles were integrated after a literature review, and 310 patients treated by TEVAR for penetrating ulcers of the aorta were identified. In this cohort, most patients were male (65.8%), had a history of smoking (60.4%), and systemic hypertension (90%). Only 9% were asymptomatic at initial presentation. Most cases (76.5%) occurred among patients with a single ulcer, located in the descending thoracic aorta (61%), with associated intramural hematoma in 45%. The technical success of TEVAR was 98.3%. Surgical conversion during the postoperative period with stent-graft explantation was required in 1 patient. The overall 30-day mortality was 4.8% (15 of 310). The most frequent complications were endoleaks (8%, 25 of 310) and access problems (16.1%, 20 of 121). After a mean follow-up of 17.7 months (range, 1 to 52), the all-cause mortality was 22.9% (71 of 310), and the aortic-related mortality was 4.1% (13 of 310). During follow-up, new endoleak and ulcer recurrence were observed in 5.4% (n = 15 of 274) and 4.5% (n = 5 of 110), respectively, requiring a new aortic endovascular procedure in 50% (n = 10).

Conclusions. Thoracic endovascular aortic repair of penetrating ulcer has excellent short-term and midterm results. The endovascular approach should be the first line management for aortic ulcer when intervention is indicated.

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Penetrating ulcer of the thoracic aorta represents about 7.6% of cases in acute aortic syndrome, but the exact incidence remains unknown [33]. Most patients included in the study were in their seventies and the majority were men. This cohort tends to have numerous comorbidities such as previous history of smoking (60%), systemic hypertension (90%), and a high ASA score (ASA = 3 or 4 in 85%). Thoracic pain is the most frequent symptom (65%), and pleural effusion was observed in 35% of the cases. The clinical presentation may imitate aortic dissection but since the advent of computed tomography scanning and magnetic resonance imaging, it is possible to distinguish between the pathologies. The typical radiodiagnostic features of PAU are an atherosclerotic aorta with erosion of the intima and associated central ulceration. The media, exposed to pulsatile pressure can locally dissect, creating an IMH. In this study, IMH were coexistent with PAU in 45% of cases. The Stanford study [12] demonstrated that PAU with IMH is associated with more progressive disease and greater complications.
Intramural Hematoma (IMH)

Caused by bleeding into the outer layers of the aortic media from rupture of the vasa-vasorum 

**without an intimal tear**

**Acute Intramural Hematoma of the Aorta**  
A Mystery in Evolution

Arturo Evangelista, MD; Debabrata Mukherjee, MD; Rajendra H. Mehta, MD; Patrick T. O’Gara, MD; Rossella Fattori, MD; Jeanna V. Cooper, MS; Dean E. Smith, PhD; Jae K. Oh, MD; Stuart Hutchison, MD; Udo Sechtem, MD; Eric M. Isselbacher, MD; Christoph A. Nienaber, MD; Linda A. Pape, MD; Kim A. Eagle, MD; for the International Registry of Aortic Dissection (IRAD) Investigators*

- **IMH accounts for 10%+ of AAS**
- Like classic AD, type A IMH can be lethal and demand urgent surgical treatment (graft replacement of asc aorta)
- **Evolution to full-blown aortic dissection occurs in 16% of IMH patients**

*Conclusions—The IRAD data demonstrate a 5.7% prevalence of IMH in patients with acute aortic syndromes. Like classic AD, IMH is a highly lethal condition when it involves the ascending aorta and surgical therapy should be considered, but this condition is less critical when limited to the arch or descending aorta. Fully 16% of patients have evidence of evolution to dissection on serial imaging. (Circulation. 2005;111:1063-1070.)*
IMH vs. AD

- IMH patients tend to be older
- IMH more likely to involve distal thoracic aorta
  
  **60% type B vs. 35% type A** (but more type As in Japan/Korea)

- patients with IMH tend to have more severe initial pain but are less likely to have malperfusion or AV insufficiency
- diagnosis of IMH tends to take longer and require more studies
IMH Natural history

- Regression/resolution
- Progression to classic AD
- Aortic expansion
- Rupture
- Wide variability in published reports...
- Behavior of IMH largely unpredictable
- More benign course and lower overall mortality in Asian series...
IMH progression into PAU and saccular TAA
IMH with persistent severe pain despite OMT
TEVAR Strategies for IMH

- Straightforward
- Only 1 lumen to deal with
- Endograft coverage of full DTA, or full length of IMH
- Land proximally in healthy aorta (same as TBAD)
- Minimal or no oversizing (same as for AD)

Use lumen inner-to-inner measurements for graft sizing
Suggested Indications for IMH Intervention:

- Type A
- Aortic diameter >50mm
- IMH thickness >11mm
- Persistent pain despite BP lowering and OMT
- ‘Image worsening’: progression to AD, aneurysm formation, periaortic/pleural effusion
- Rupture
- IMH associated with PAU
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