The Role of the Arch Tear in Acute Aortic Dissection

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Current guidelines suggest surgical repair for acute aortic arch dissection (AAAD). However, treatment strategies remain a subject of debate because current classifications do not stratify for AAAD, neither for patients with proximal tear in the arch.

**Background**

To analyze patients with acute aortic arch dissection based on the location of entry tear and extent of the dissection.

**Aim of the study**

- To analyze patients with acute aortic arch dissection based on the location of entry tear and extent of the dissection.
- To evaluate treatments and outcomes in the different arch groups, in particular for those with proximal intimal tear in the arch.
Methods

• Inclusion criteria
  – Patients with acute aortic dissection enrolled in the International Registry of Acute Aortic Dissection (IRAD)
  – Available data regarding entry tear (ET) location and extension of dissection

• All patients were classified into 6 groups based on ET location and extension.

• Management and outcome were compared between groups, focusing in particular on those with proximal ET in the arch, and retrograde or antegrade extension

• Group 1 (De Bakey type II) and 6 (De Bakey III or B without retrograde extension) were considered as control groups.
Arch groups

- Group 1: isolated ascending aortic dissection
- Group 2: ET in ascending aorta + antegrade extension into arch
- Group 3: ET in aortic arch + retrograde ascending extension
- Group 4: ET in aortic arch + antegrade descending extension
- Group 5: ET in descending aorta + retrograde extension into aortic arch
- Group 6: dissection confined to descending aorta
Results

Total patients included in the IRAD
\[ n = 4430 \]

 Patients with entry tear data
\[ n = 1873 \]

 Excluded because entry tear location:
  Not identified \( (n = 1123) \)
  Missing \( (n = 1343) \)
  Multiple tears \( (n = 91) \)

 Excluded for not meeting criteria for proximal or distal extent:
\[ n \equiv 446 \]

Patients included in final analysis
\[ n = 1427 \]
• 1427 patients
  • 954 male
  • mean age 61.7 years
Management

- Open surgery decreased as the ET localization and dissection were located more distally.
- Medical and endovascular treatment was more often adopted when the ascending aorta was not involved.
Management

- In patients with proximal ET located in the arch:
  - surgery and medical: 75.2% and 18.2% in Group 3
  - 20.4 and 52.0% in Group 4
  - p<0.001 for all
Overall in-hospital mortality

- The overall in-hospital mortality rate of the cohort was 18.7%.
- Range 22.4% in Group 2 & 4 to 8.6% in Group 5
Arch Tear: Antegrade vs retrograde extension

- Surgery for ET in the arch and retrograde ascending extension resulted in lower mortality compared to surgery for antegrade descending extension
  - 18.2% in Group 3 vs 40.0% in Group 4; $p = .027$
• Medical therapy was associated with no significant different in-hospital mortality, comparing patients presenting with ET in the arch and retrograde ascending or antegrade descending extension
  
  20.0% in Group 3 vs 15.7% in Group 4;  \( p = .620 \)

• As well comparing all pts with only arch-descending involvement
  
  15.7% in Group 4 vs 6.9% in Group 5 vs 8.8% in Group 6;  \( p = .307 \)
Conclusions

- Outcome of acute aortic arch dissection (AAAD) is related to the entry tear location and the extent of dissection.

- Although current guidelines suggest surgical repair for AAAD, patients with ET in the arch without retrograde ascending involvement are more frequently managed medically, using a patient-specific approach, similarly to classic acute type B dissections.

- Based on these morphologic characteristics, for AAAD patients with ET in the arch a new classification, as arch-A and arch-B, is proposed.