TEVAR vs SURGICAL ARCH RECONSTRUCTION

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Disclosure

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Background

- **Surgical arch replacement** is the standard of care
  - Sternotomy, CPB, aortic X-clamp, cardioplegia, circulatory arrest…
  - ± Elephant trunk

- **TEVAR for the descending aorta** is an established technique
  - TF access
  - For aneurysms, rupture and type B dissections

- **TEVAR for the arch** is a promising technique
  - Performed in high-risk (redo) patients
  - New techniques: laser, custom-made endoprosthesis, debranching…
1. Aortic arch surgery

- Gold standard technique
- CPB, aortic X-clamp, cardioplegia, hypothermia (25-28°C), circulatory arrest, cerebral perfusion
- Use of vascular grafts ± side branches and CPB inflow
- Elephant trunk (frozen)
1. Surgical arch and elephant trunk

Case report

- 64 years-old man
- 2014: ascending aorta replacement
- Arch diameter increased of 4mm (54mm) at CT-scan
- Redo surgery: 28°C arrest and standard elephant trunk
2. TEVAR for descending aorta

- New gold standard for descending aorta (rupture, PAU, Type-B, aneurisms)
- 2\textsuperscript{nd} step in elephant trunk
- Surgical femoral access
- Standard endoprosthesis (size on CT)
- Risk of paraplegia (!)
3. Arch surgery + TEVAR

- First hybrid aortic arch procedure
- No need for second surgical step
- Lower surgical risk
- Dissections, aneurisms
4. Debranching + TEVAR for the arch

Challenging for proximal arch TEVAR

- Anatomy / morphology / curved aorta
- Supra-aortic branches
- Specifically designed TEVAR devices with side-branches or laser
- Hybrid skills and multidisciplinary team
4. Laser cut + custom-made endograft

Case report

- 79 years-old man
- CAD, COPD
- Aortic arch aneurysm
- Custom-made fenestrated endograft (Bolton Relay) + laser cut from the left subclavian artery and stenting
4. Debranching + new endografts

Case report

- 84 years-old man
- Aortic arch aneurysm
- Left carotid-subclavian bypass surgery
- 3 endografts (access: carotids and femoral)
- 1st case in Switzerland
4. Debranching + new endografts
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Discussion (TEVAR vs Surgery in Arch)

• TEVAR in the arch has lower risk of paraplegia vs thoracic TEVAR
• Challenging bilateral carotid (or subclavian) surgical access
• Risk of stroke (!)
• CT-scan based endograft sizing and graft-tailoring
• Hybrid room, catheter skills and multidisciplinary team are strongly required
Future steps?

Zone zero (ascending aorta)

• Review of 67 published cases (all high-risk or inoperable patients)
• Early mortality rate 2.9%
• Thoracic endgrafts are not ideal for the ascending aorta

Future steps?

Transcatheter Aortic Root Replacement (TARR)

- Laboratory
- 3D printed root
- Chimney-graft technique
- Presented at ISMICS 2018
Conclusions

• Standard aortic arch surgery is challenging but guarantees good and reliable results in standard patients.

• TEVAR + debranching is a promising and improving technique indicated in high-risk patients or redo cases (selection).

• New endografts and multidisciplinary Vascular-Teams will be the key for the success of TEVAR in the arch (and all aorta).
THANK YOU