ACCESS COMPLICATION DURING TAVI: HOW TO TREAT AND HOW TO PREVENT

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Evolving Devices

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14 - 16 - 18 F = 4.67 - 5.33 - 6 mm

Transfemoral: 90% feasible
TRANSFEMORAL – HOW TO DO IT

PERCUTANEOUS

Site of puncture: third medium of CFA
**Femoral Puncture-Related Risks**

- **High puncture** (ie, above the inguinal ligament) $\rightarrow$ retroperitoneal hemorrhage

- **Low puncture** $\rightarrow$ access site hematoma and pseudoaneurysm
ACCESS SITE-RELATED COMPLICATIONS AFTER TRANSFEMORAL-TAVI


**ILIOFEMORAL COMPLICATIONS**
- Vascular dissection
- Vascular rupture
- Access-site infection
- Bleeding
- Stenosis/Thrombosis/Occlusion
- Artery avulsion
- Pseudoaneurysm
- Failed percutaneous closure

**AORTIC COMPLICATIONS**
- Aortic aneurysm
- Aortic rupture
- Aortic dissection
- Retroperitoneal hemorrhage
Rupture of iliac artery
TRANSFEMORAL: HOW TO PREVENT & PROTECT

Cross-over technique ➔ accurate puncture of CFA (fluoroscopy)
➔ safe removal of the sheath (0.018” safety wire in the SFA)

Minimal artery diameter ≥5.5 mm (for Evolut R and Sapien 3 14-Fr delivery system)

NB: Larger if calcified and tortuous vessels!
Iliofemoral vessel protection

18 F for 0.18” wire and 6F pigtail

7 F
VASCULAR COMPLICATIONS: HOW TO AVOID?

Corrective actions

Puncture of the ‘therapeutic’ vessel and advancement of sheath + controlateral safety wire
**Radial in TAVI: Modified Crossover Technique**

**Transradial approach** to selectivate the preferential ileofemoral axis

**Limitations: SHEATH SIZE**
In case of peripheral complications an 8 Fr sheath is needed to advance adequate materials

- Peripheral covered stent (8 Fr)
- Endovascular balloon occlusion of the aorta 7-8 Fr)

→ Brachial Access
→ Controlateral femoral artery
→ Retrograde omolateral access
SUTURE DEVICE FAILURE

CFA rupture

Peripheral balloon inflation

Contralateral wire & thumb
FEMORAL RUPTURE

Covered Stent

Contralateral wire & thumb: relax and stent (graft) and relax more
Sometimes it’s essential to have a good surgeons as a friend when?
FEMORAL DISSECTION

Evidence of flow-limiting dissection
Balloon inflation attempt
Good final angiographic result
However... 4 hours later the patient developed **acute limb ischemia** confirmed by Doppler US

*What to do next?*

Urgent surgical cut down and successful repair of the occluded artery
ILIAC RUPTURE: IMMEDIATE, LIVE SAVING, INFLATION OF AN AORTIC BALLOON

Failed attempts to close the rupture using coreved stent
Occlusive aortic balloon
Covered stent (or vascular surgery)
FEMORAL THROMBOSIS

What’s next?

→ Fogarty catheter

→ Aspiration catheter

• Guiding, penumbra, angiojet, ....

Massive thrombosis of femoropopliteal axis

Failed balloon inflation
TRANSFEMORAL — LIMITATIONS:

1. Heavy iliofemoral calcification

2. Minimal lumen diameter:
   sheath-to-femoral artery ratio (SFAR) of ≥ 1.05
   predictive of of VARC major vascular complications
   Hayashida K, JACC Cardiovasc Interv 2011;4:851–858

3. Severe tortuosity

4. Vascular pathology
   Aneurysm, dissection, bulky aortic atherosclerosis (mobile atheroma >5mm)
   Previous aortobifemoral bypass

NB: Attempting TF-TAVI with unfavorable anatomy may lead to procedural failure along with increased risk of adverse events (i.e. vascular injury and death)
SUBCLAVIAN/AXILLARY ACCESS – HOW TO DO IT

**Deltopectoral groove:** Surgically vs. Percutaneous

**Left subclavian** artery is favored vs. right subclavian artery: better implantation angle

**Lumen caliber > 6 mm** (7-8 mm in case of patent LIMA graft) and aortoventricular angle <70°

**Vascular preclosure device** due to difficulties in manual compression
Baseline angiography
Essential: safety wire from brachial/radial access

Puncture the mid segment

Pro
Mid
Dis
x

anterior humeral circumflex A.
subscapular A.
COMPLICATIONS AFTER SUBCLAVIAN/AXILLARY-TAVI

- Ipsilateral patent LIMA graft occlusion
- Brachial plexus damage
- Pneumothorax
- Higher risk of dissection and rupture
Baseline angiography via brachial/radial safety wire

Bleeding from axillary artery (failure of proglide)

Successful covered-stent deployment (Viaban 25mm, elective??? $€ ??)
TAKE HOME MESSAGE

• Major vascular complications occur up to 8 or 9% of the cases

• Detailed preoperative imaging (CT scan) evaluation of vascular access is mandatory

• Selection of a specific approach depends on local expertise

• Careful planning and meticulous technique are important to achieve the best possible outcome
THANK YOU FOR YOUR ATTENTION
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