A look at the future of AAA repair: **Insights** and **Predictions** from an Aortic Surgeon at the mid-point of his career

**FRANS MOLL**

**Lessons Learned (INSIGHTS)**

- After EVAR patients live longer than expected
- Devices were not (yet) designed for longterm results – late failures
- EVAR might be associated with higher late incidence of cancer compared to open repair due to increased radiation exposure from procedure or stent surveillance with CT-scans
- Prevention is beter than Cure – decline of AAA's due to increased secondary prevention (smoking, hypertension, obesitas)

**In the 80’s something happened..**

**USSR 1986 →NL Volodos: 1st TEVAR**

**Volodos**

- A self-fixing, synthetic remote endoprosthesis
  - Device consists of fixing elements that are loaded into a straight or bifurcated prosthesis
  - Fixing elements are constructed from radial cylindrical springs made of spring wire and coated with silver plating

**Disclosures**

- None
Ancure

Moludar Stent Graft Systems

Vanguard

AneuRx™ Stent Graft
- Modular configuration
- allows treatment for a broader spectrum of disease
- allows customization to individual patients anatomy in vivo

Life Path

How do we study Dynamics
- IVUS
- MR
  } ECG triggering
- CT
Arcus Aortae

Abdominal Aorta

Technology improvements

- STENTS
  - memory metal    - MR compatible
  - wave form          - compatible asymm. exp.
  - oversizing possible
  - amplitude wave < 10 mm
  - match with angulation

Fabric graft

- strong     - thin
- durable     - low profile
- waterproof - type IV prevention

Aneurysm Rupture due to Fabric Perforation

Graft failure described in 36%

New credo
Accept the aneurysm but prevent rupture

Primary differentiation: AAA Sac Anchoring Polymer Fill
- Polyethylene Glycol based Polymer
- Contained within Endobag
- Fills available blood lumen in AAA sac
- “Anchors” device; appears to control remodeling and eliminate migration

Case example: unfavorable anatomy, short, angulated neck

Next credo
Accept the aneurysm but prepare the arterial wall and make it rupture proof
How?

- 4-D printing
- Make a mesh
- Impregnate the arterial wall (media layer)

Adaptive infrastructure

Prepare the Aneurysm Wall

A potential role for glycated cross-links in abdominal aortic aneurysm disease
Koole D, van Herwaarden JA, Schalkwijk CG, Lafeber FP, Vink A, Smeets MB, Pasterkamp G, Moll FL

CONCLUSIONS:
Cross-linking AGE’s have a protective role in AAA progression in Diabetic Patients

- J. Vasc. Surg. May 2017

Future Directions (Predictions)

1) For durable results a shift from only mechanical to more biological solutions is needed

2) Collateral damage, such as overdosage of radiation must be reduced (use of ultrasound, new applications of light-sources)

3) Encourage (secondary) prevention for vascular (aneurysm) disease otherwise we will lose our credibility of being a DOCTOR