



# Do Adjuncts Improve Durability of POSE?

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# Disclosures

- Research grant from Endologix
- Education Honoraria from GORE, Endologix, Medtronic

# Irresponsible Mavericks!



# Predictors of Abdominal aortic aneurysm sac enlargement after endovascular repair.

*Schanzer et al. Circulation 2011*

- Compliance with anatomic guidelines
- 10228 pts 1999-2008
- 42% met conservative IFU
- 5yr sac enlargement 41%
  - Neck >28mm, CIA >20mm, neck angle >60%

*Poor IFU compliance, high rate of sac enlargement*

*Irresponsible insertion of EVAR?*

**Aneurysm sac failure to regress after endovascular aneurysm repair is associated with lower long-term survival.**

*O'Donnell TFX et al. JVS 2019*

- 2003-2017 EVAR in 14,817 pts with 1 yr CTA
- 40% sac regression, 35% stable, 25% expanded
- Expansion associated with new endoleak (OR1.23)
- Increased long term mortality with:
  - Sac expansion (HR 1.6)
  - Failure to regress (HR 1.2)

Patel R et al. The UK EndoVascular Aneurysm Repair (EVAR) randomised controlled trials: long-term follow-up and cost-effectiveness analysis. Health Technol Assess 2018;22(5).

- EVAR 1 trial: 15yrs
- >8yrs: EVAR > open
  - 1.25 HR total death
  - 5.8 HR AAA death
- EVAR:open
  - AAA rupture 7:1
  - Increased cancer
- EVAR cost £3798 more

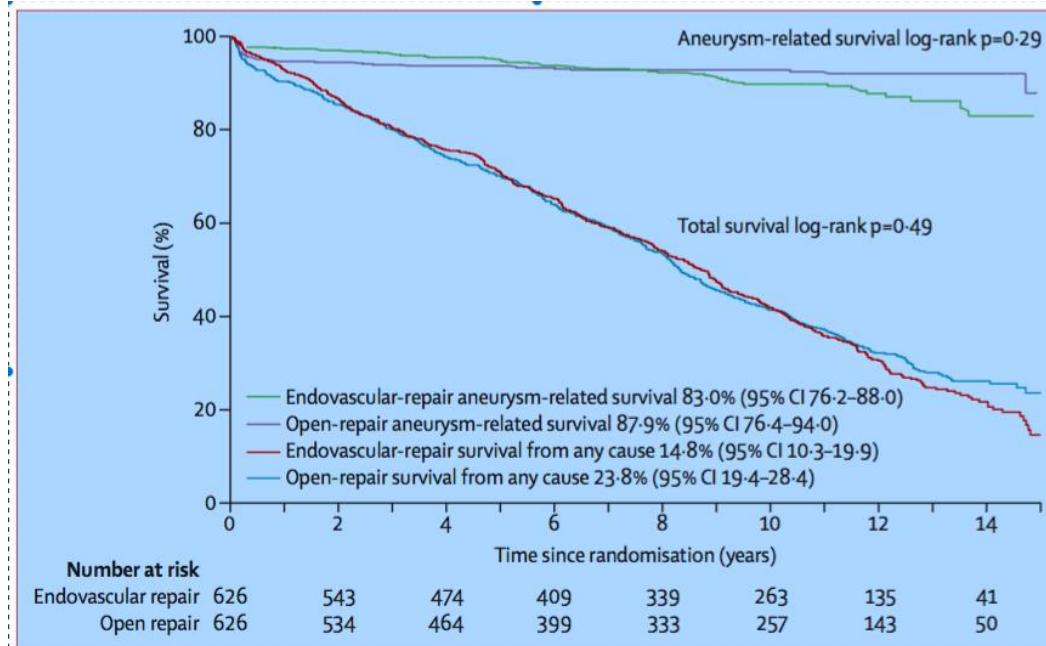


Figure 2: Kaplan-Meier estimates for total survival and aneurysm-related survival up to 15 years of follow-up. The hazard ratio is 1.05 (95% CI 0.92-1.19) for total mortality, and is 1.24 (0.84-1.83) for aneurysm-related mortality.

# Abdominal aortic aneurysm: diagnosis and management

**NICE guideline**

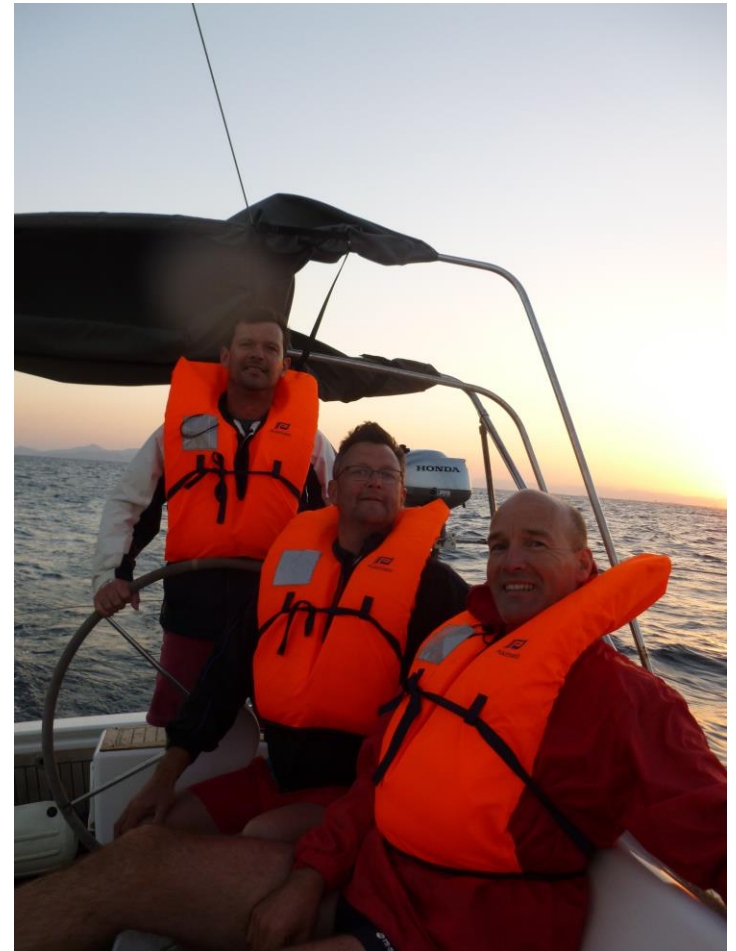
**Draft for consultation, May 2018**

Recommendations:

If fit: Open surgical repair NOT EVAR

If unfit: conservative NOT EVAR

EVAR not cost effective



# Take Home Message?

- EVAR not durable
- EVAR expensive

How to improve:

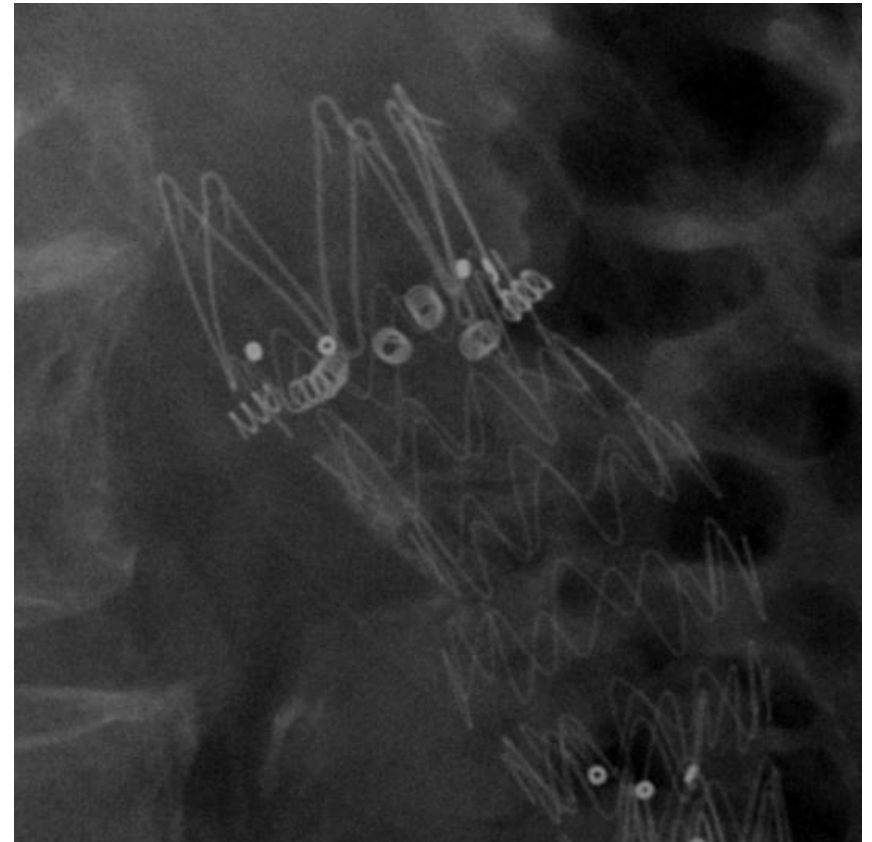
- Get it right first time
- Case selection
- Device selection
- Device delivery
- Effective AAA exclusion
  - Sac regression





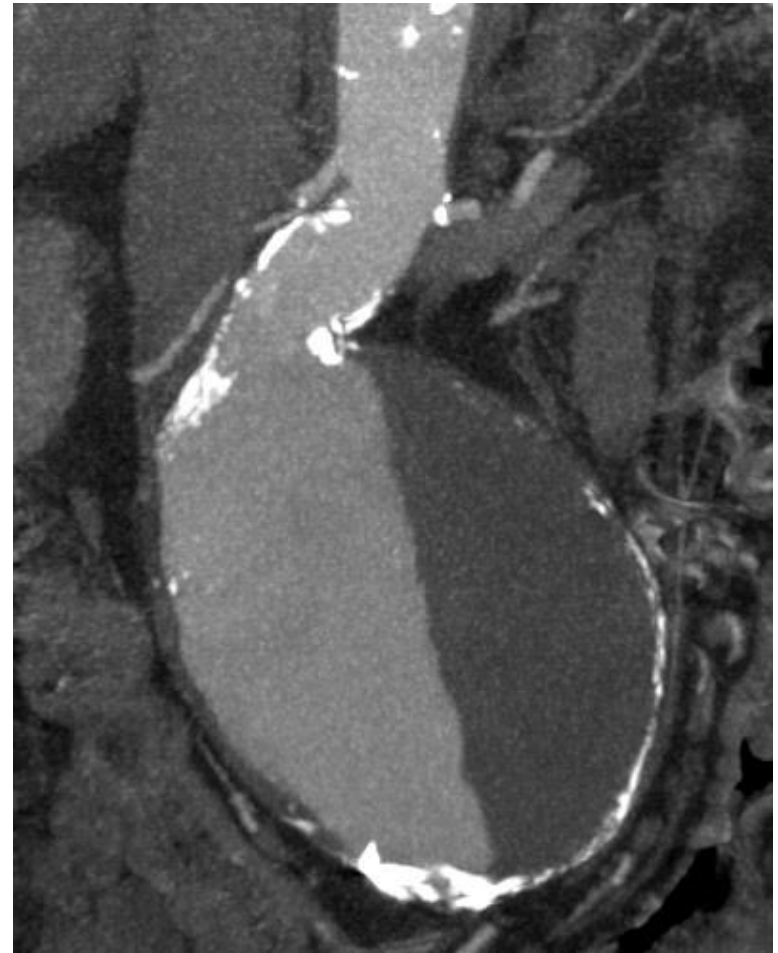
# Do Adjuncts Improve POSE Durability?

- Primary adjuncts
  - Planned
  - Unplanned
- Indications
- Evidence
- Cost



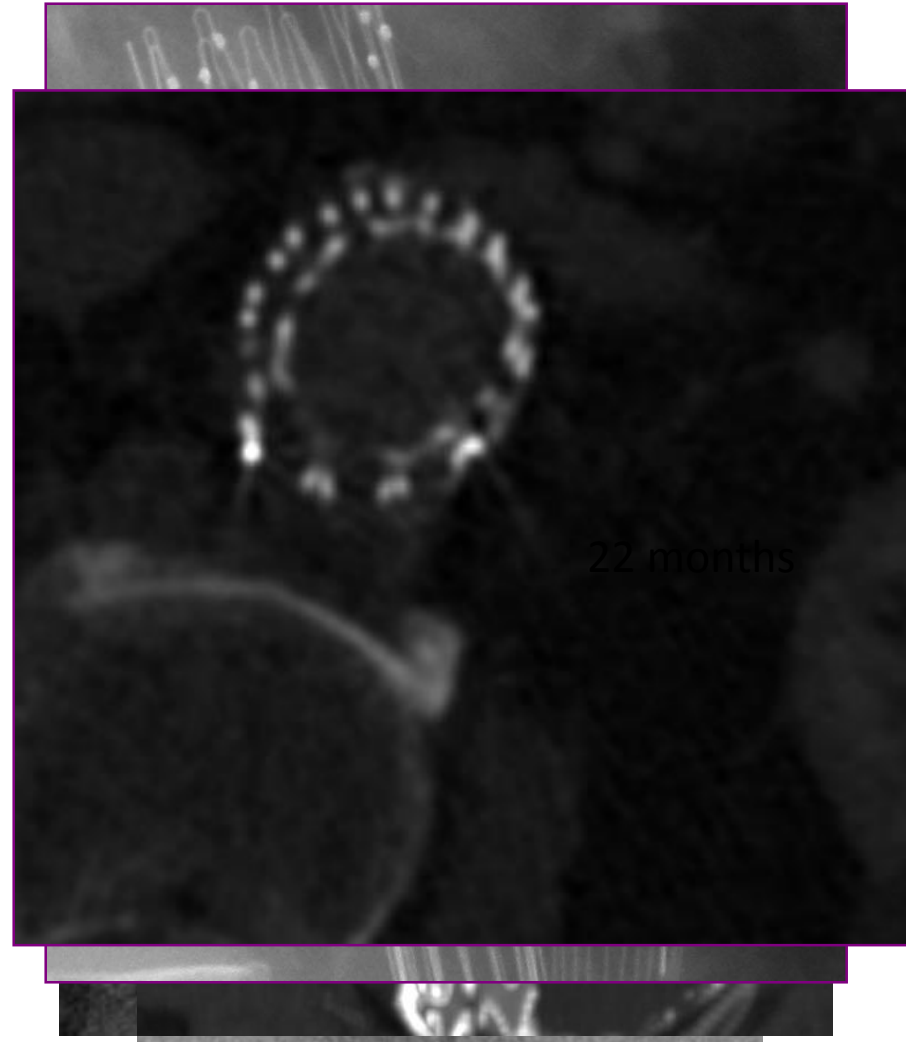
# Aortic Neck

- Compromised seal zone with risk of type Ia endoleak
  - Balloon
  - Giant Palmaz
  - Endoanchors
  - Cuff (+/- chimney or endoanchor)



# Aortic Neck Adjuncts

- Re-ballooning
  - Can eradicate Type Ia
  - Can rupture aorta!
- Giant Palmaz
  - If adequate neck/seal
  - Risk of rupture, emboli, renal compromise
  - Long term neck dilatation



**Long-term outcomes of Palmaz stent placement for intraoperative type Ia endoleak during endovascular aneurysm repair. *Arthurs ZM et al. Ann Vasc Surg 2011.***

- 31 pts between 2000-05; median 53 mths FU
- No type Ia endoleak
- 26% had neck shortening/ 35% loss of seal zone due to aortic degradation
- No stent migration
- 15mm infrarenal: 63% neck diameter >10%
- 55% sac regression; 45% increase

# **The Long-term Durability of Intra-operatively Placed Palmaz Stents for the Treatment of Type Ia Endoleaks After EVAR of Abdominal Aortic Aneurysm.**

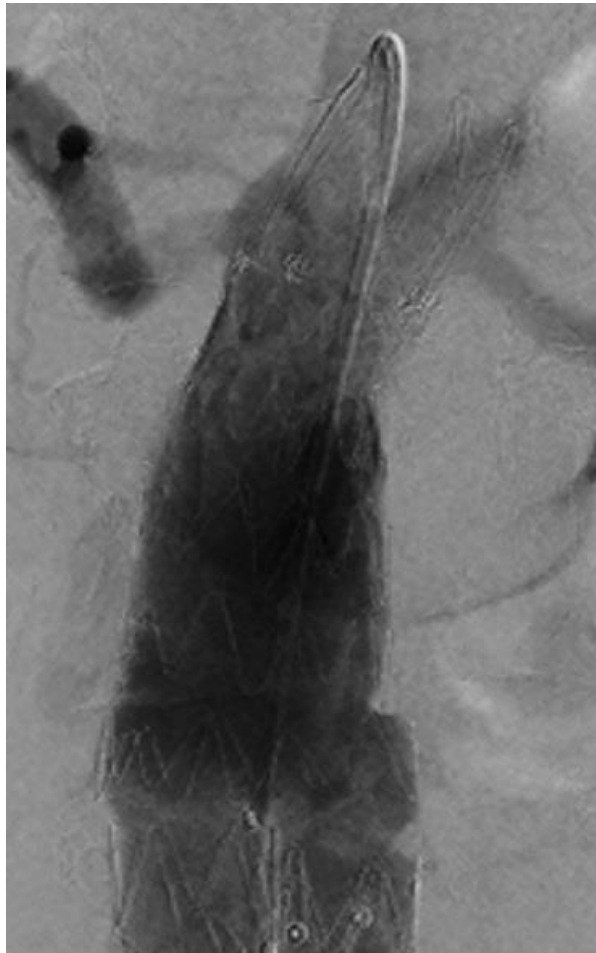
*Abdulrasak M et al. EJVES 2017.*

- Malmo 1998-2012; 125 pts (83 elective, 22 rupture, 20 symp)
- 9 died (2 elective, 7 acute)
- Mean 43month FU; 51 re-interventions (7 for Type Ia)
- 1<sup>o</sup> freedom from endoleak at 5 yrs: 89%
  - Elective >acute
- 9mm infra-renal aortic diameter increased 33% over follow up

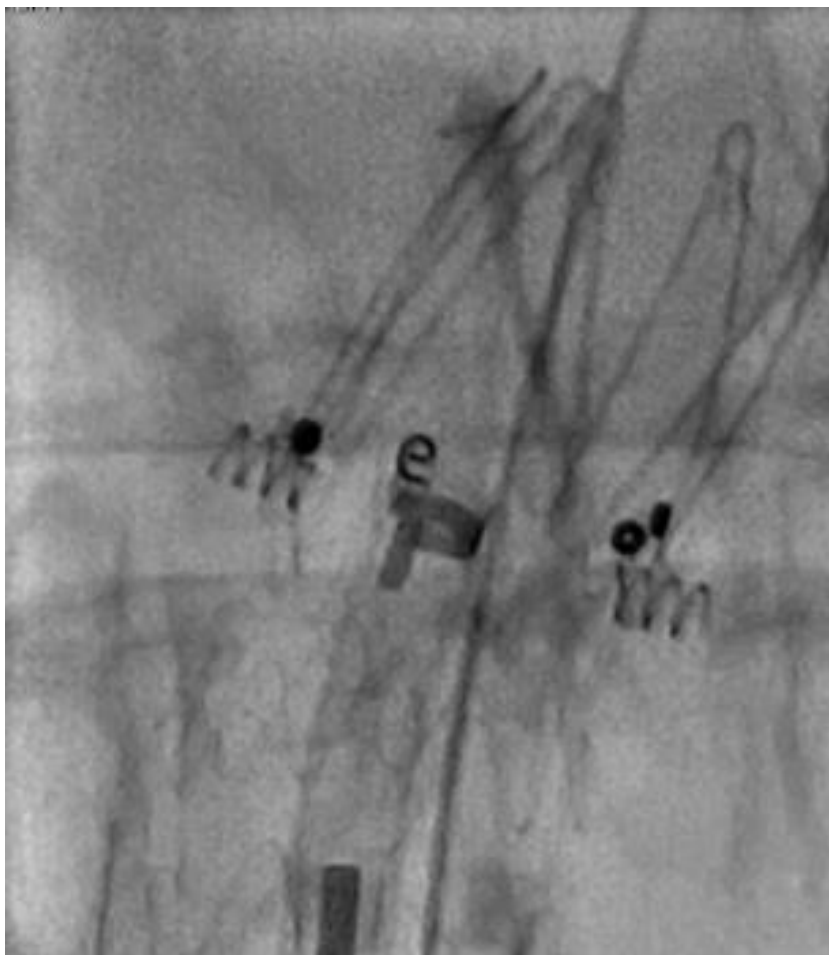
*Palmaz effective eradicating Type Ia endoleaks but continued aortic degradation may influence durability.*

*NOT a permit to go off IFU!*

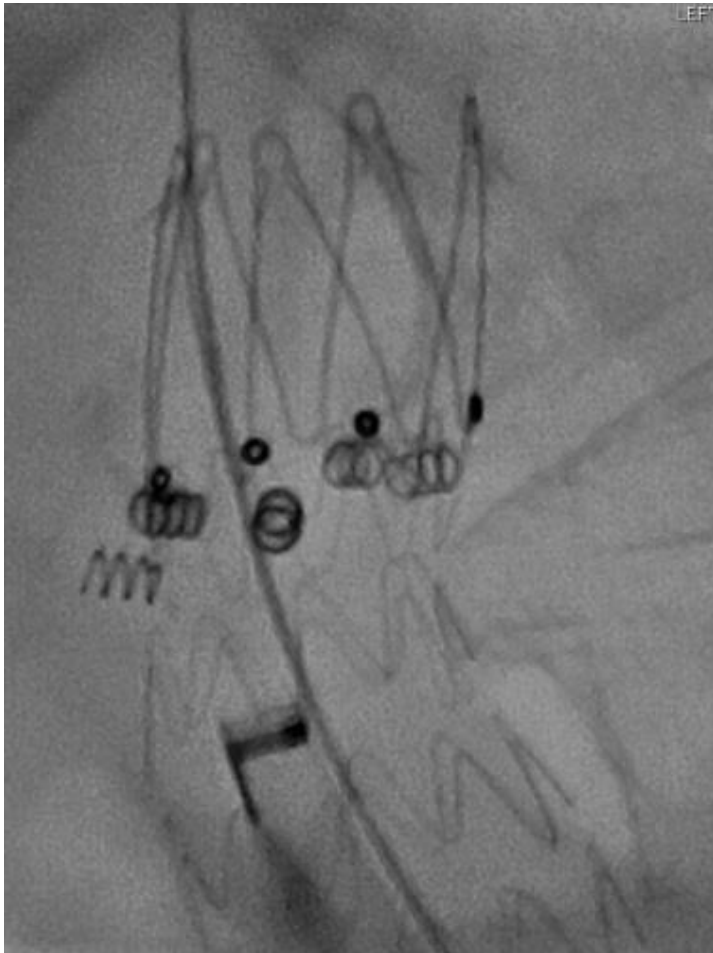
# Aortic Neck Adjuncts: Endoanchors



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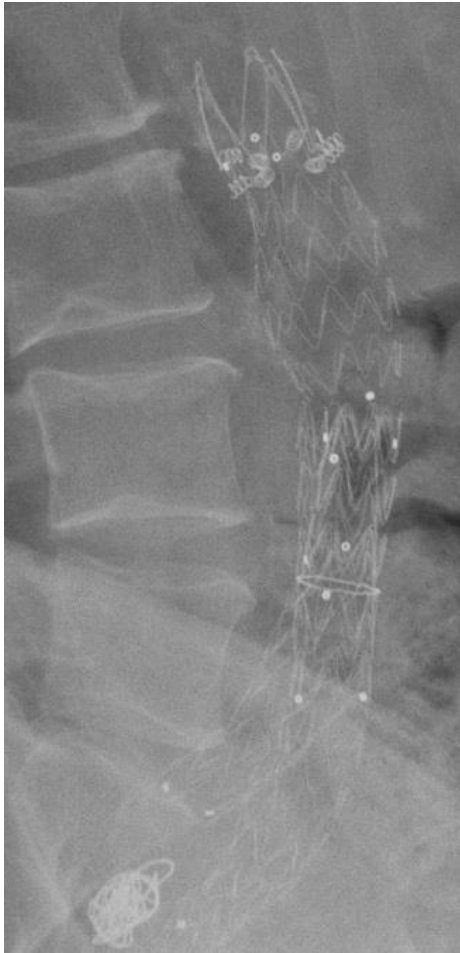


# Aortic Neck Adjuncts: Endoanchors



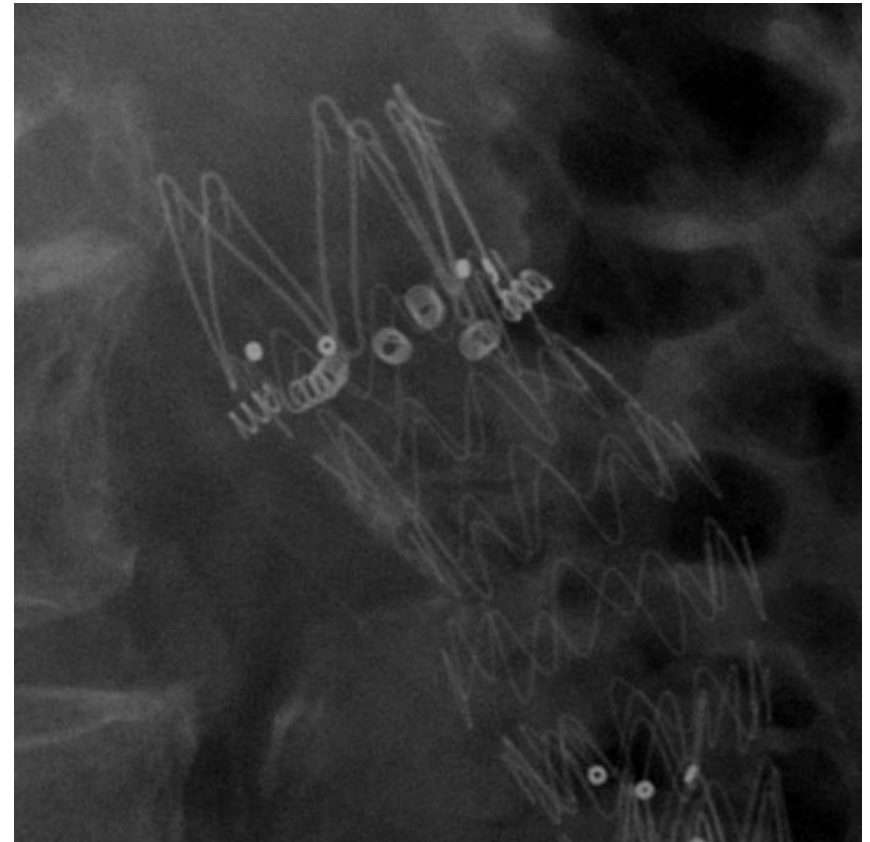


# Aortic Neck Adjuncts: Endoanchors



# Results of the ANCHOR prospective, multicenter registry of EndoAnchors for type Ia endoleaks and endograft migration in patients with challenging anatomy. *Jordan WD et al. J Vasc Surg* 2014

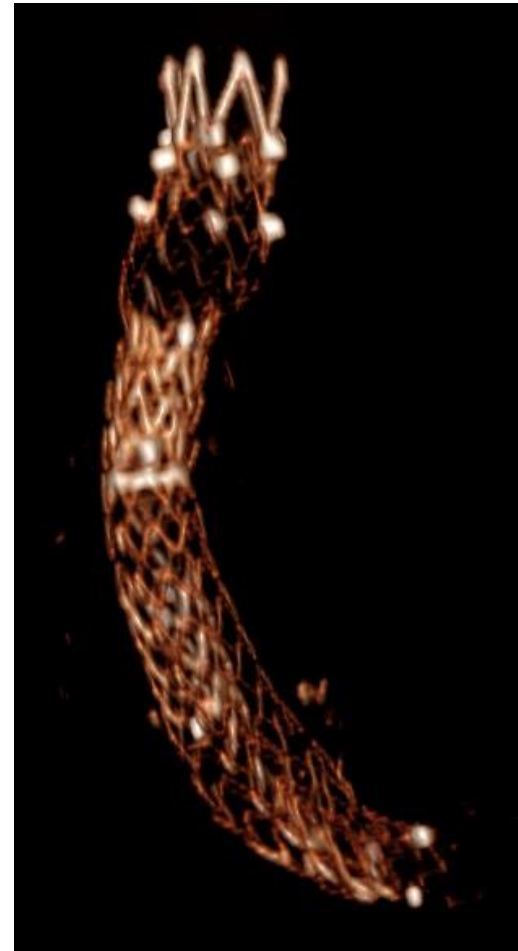
- Multicentre 319 pts
  - 242 primary/77 revision
- Technical success
- Procedural success
- Mean neck length 16mm
  - 43% <10mm/ 43 % conical
- 5.8 endoanchors
- 95% technical success
- Procedural success
  - 90% primary
  - 81% revision



# Influence of aortic neck characteristics on successful aortic wall penetration of EndoAnchors in therapeutic use during endovascular aneurysm repair. Goudekettering SR et al. J Vasc Surg 2018.

- 86 ANCHOR pts
  - 61 primary/ 25 revision
- 62% without Type Ia
  - More endoanchors with good penetration (4vs3)
- Multivariate analysis
  - Good penetration with Endurant graft
- Poor penetration in large, short and calcified necks

*Selection and deployment paramount*



# Aortic Neck Adjuncts

- Aortic Cuffs
- Cuff + APTUS
- The endowedge and kilt techniques to achieve additional juxtarenal seal during deployment of the Gore Excluder endoprosthesis.  
*Minion DJ et al. Ann Vasc Surg 2006.*



**Short-term outcomes of the C3 excluder for patients with abdominal aortic aneurysms and unfavorable proximal aortic seal zones. *Smeds MR et al. Ann Vasc Surg 2013***

- 77 pts with C3 or regular Excluder
- 44 pts (57%) unfavourable neck morphology
- 16/44 (36%) needed cuff
- 13% in C3 group vs 65% in Excluder
- 2month FU- no type Ia endoleaks
- *Repositional grafts may reduce need for cuffs*

# Aneurysm morphology

- Stent stenosis/compression
  - Distal neck
    - Bilateral angioplasty
    - Stent relining
  - Iliac origin morphology
    - Angioplasty
    - Stent relining
  - External Iliac extension
    - Stent relining



# Adjunctive Iliac stents

- **Adjunctive iliac stents reduce the risk of stent-graft limb occlusion following endovascular aneurysm repair with the Zenith stent-graft.** *Oshin et al. JEVT 2010*
- **Self expandable stent application to prevent limb occlusion in external iliac artery during endovascular aneurysm repair .** *Lee JH et al. Ann Surg Treat Res 2016.*
- **Adjunctive stents (Wall stent/SMART stent) reduce incidence of external iliac limb occlusions**



## Cost impact of extension cuff utilization during endovascular aneurysm repair. *Chandra V et al. Ann Vasc Surg 2012.*

- 218 elective EVAR
  - No extensions (98)
  - Prox/distal extension (120)
  - Similar morphology
  - Similar outcomes
  - Median 1 (1-4) pieces
  - 30% uplift in costs
- ?per-case costing*





# Irresponsible Mavericks Getting what they Deserve?

- Poor case selection fuelled by
  - Enthusiasm?
  - Adjuncts?
- Poor durability and cost effectiveness of current EVAR practice
- NICE retribution?
- Appropriate case selection
  - Supported by adjuncts to improve durability

***NOT adjuncts to extend indications for EVAR***

