Outcomes in EVAR, FEVAR, & BEVAR Are there Differences between Men & Women?

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    - *Consultant*

Presentation Layout

- Literature Data
- Nuremberg Experience

Sex-related Outcome Inequalities in Endovascular Aneurysm Repair

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Eur J Vasc Endovasc Surg (2016) 52, 518–525

- 20780 EVAR procedures in the UK
  - 11.2% Women
- Women
  - Older than men (78 vs 76 yrs, P<.001)
  - ↑ Length of Hosp. Stay (OR 1.86)
  - ↑ 30d Mortality (OR 1.54)
  - ↑30d Readmission (OR 1.23)
  - ↑ 1 year Mortality (OR 1.24)

→ Women:↑ M&M vs Men

Sex Differences in Mortality and Morbidity following Repair of Intact Abdominal Aortic Aneurysms

Sarah E. Deery[1,2], Peter A. Soden[1], Sara L. Zettervall[1], Katie E. Shean[1], Thomas C.F. Bodewes[1], Alexander B. Pothof[1], Ruby C. Lo[1], and Marc L. Schermerhorn[1]

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J Vasc Surg. 2017 April ; 65(4): 1006–1013

- 5795 Elective EVAR Procedures
  - 19% Women
- Women
  - Older than men (76 vs 73 yrs, P<.001)
  - ↑ Operative times (138 min vs 131min, P<.01)
  - ↑ Renal & lower limb revascularisation (6.6% vs 3.8%, P<.01)
  - ↑ 30d Mortality (3.2% vs 1.2%, P<.001)

→ Women: ↑ M&M vs Men

Sex as an independent risk factor for long-term survival after endovascular aneurysm repair

William P. Shutze Sr, MD,[a,b] Ryan Shutze,[b] Paul Dhot, BS,[b] Moses Forge, BS,[b] Alejandro Salazar, BS,[b] *and* Gerald O. Ogola, PhD,[c] *Plano and Dallas, Tex*

(J Vasc Surg 2018;■:1-10.)

- 336 EVAR Procedures
  - 17% Women
- Women
  - ↓ 5 year Survival (49% vs 73%, P=.0013)
  - More often Hostile Anatomy
    - More often outside IFU (78% vs 54%, P=.0005)

→ Women: ↓Long-term Survival vs Men

Morphological suitability for endovascular repair, non-intervention rates, and operative mortality in women and men assessed for intact abdominal aortic aneurysm repair: systematic reviews with meta-analysis

*Pinar Ulug, Michael J Sweeting, Regula S von Allmen, Simon G Thompson, Janet T Powell, on behalf of the SWAN collaborators**

Lancet 2017; 389: 2482–91

- Systematic Review
  - 9 Studies, 52018 men vs 11076 Women
- Women
  - ↑30d Mortality (2.3% vs 1.4%, OR 1.67)
  - Less often eligible for EVAR

→ AAA Management in Women needs Improvement…

Gender and perioperative outcomes after fenestrated endovascular repair using custom-made and off-the-shelf devices

David E. Timaran, MD,[a] Martyn Knowles, MD,[b] Marilisa Soto-Gonzalez, MD,[a] J. Gregory Modrall, MD,[a] Shirling Tsai, MD,[a] Melissa Kirkwood, MD,[a] John Rectenwald, MD,[a] and Carlos H. Timaran, MD,[a]
Dallas, Tex; and Chapel Hill, NC

(J Vasc Surg 2016;64:267-72.)

- 79 FEVAR procedures
  - 20% Women
- Women
  - ↑ Need of Endoconduit for access (19 % vs 2%, P=.02)
  - ↑ ICU Stay (3 days vs 2 days, P=.05)
  - ↑ Renal function deterioration (OR 8.1)
  - ↑ 30d Reintervention rate (OR 7.4)

→ Women: ↑ Morbidity & Reintervention vs Men

Inferior Outcomes in Women
Potential Reasons

- Women
  - Older at presentation
  - More hostile anatomy
  - More adjunct procedures
    - Smaller access?
  - Additional unknown factors?

Conclusion: These population-based data show that, following EVAR, women have a longer LoS and higher readmission and mortality than men. This reflects the same disparity in outcomes that is found in open AAA repair. Further work to clarify the cause of this is needed.

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Inferior Outcomes in Women

- Female Gender seems to be an independent risk factor…

Sex as an independent risk factor for long-term survival after endovascular aneurysm repair (J Vasc Surg 2018;■:1-10.)

William P. Shutze Sr, MD,[a,b] Ryan Shutze,[b] Paul Dhot, BS,[b] Moses Forge, BS,[b] Alejandro Salazar, BS,[b] *and* Gerald O. Ogola, PhD,[c] *Plano and Dallas, Tex*

Conclusions: Women presented at an older age and with a more hostile anatomy. They had reduced survival compared with men after EVAR. After controlling for comorbidities and aortic neck and iliac artery anatomy, sex remained an independent predictor for survival. (J Vasc Surg 2018;■:1-10.)

Sex-related Outcome Inequalities in Endovascular Aneurysm Repair

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rate and mortality rate at both 30 days and 1 year. Following multivariate logistic regression, being female remained significantly related to poor outcome on all outcomes: LoS (odds ratio [OR] 1.86, 95% confidence

Nuremberg Experience
2010-2018

- EVAR (Infrarenal AAA)
- FEVAR (Pararenal AAA)
- BEVAR (TAAA)

EVAR
(2010-03/2018)

- 442 Elective pts
  - Men: 399 (90.3%)
  - Women: 43 (9.7%)

EVAR
Anatomical & Risk Factors

- Mean ASA Score
  - Men: 2.35, Women: 2.38, NS
- Mean Age
  - Men: 72.6 yrs, Women: 76.7 yrs, P< 0.001
- Mean AAA Max Diameter
  - Men: 57.7mm, Women: 56.5mm, NS
- Mean Neck Length
  - Men: 29.4mm, Women: 25.6mm, NS

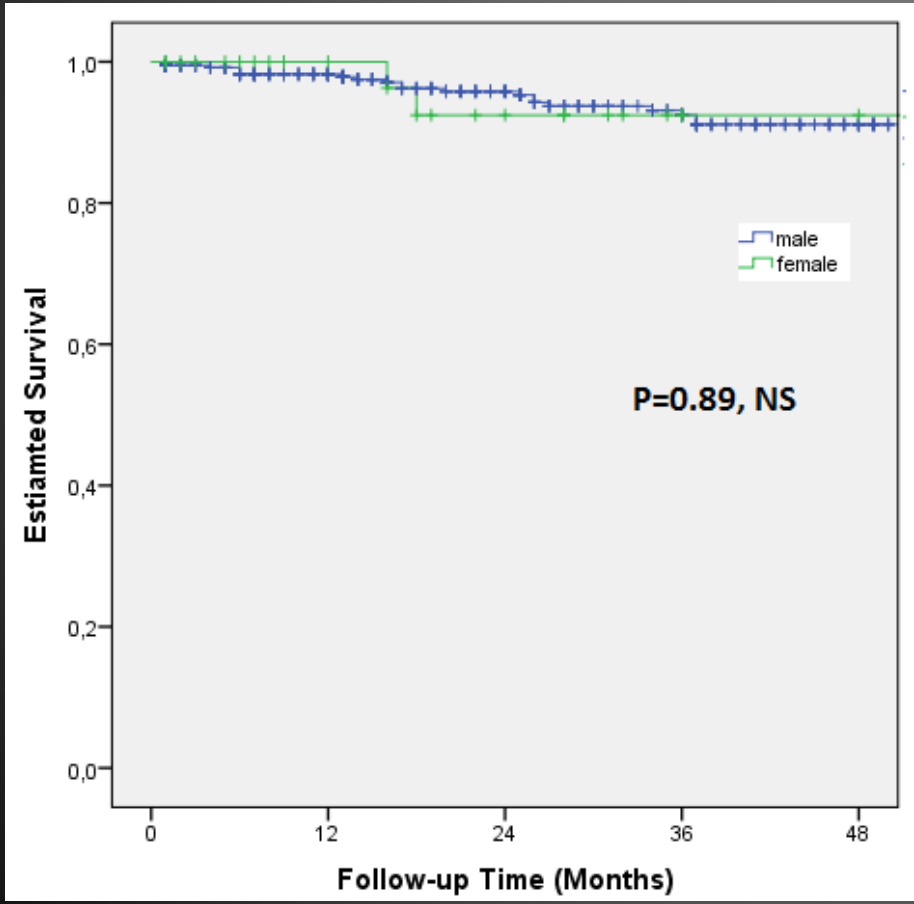
EVAR
Early Results

- 30d Mortality
  - Men: 1/399 (0.3%)
  - Women: 0/43 (0.0%)

P= 0.8, NS

EVAR
Follow-up (30 ± 24 months)

Survival



- Men
  - 99.2 ± 0.7% at 1 year
  - 93.1 ± 3.7% at 3 years
- Women
  - 100 ± 0.0% at 1 year
  - 92.4 ± 5.1% at 3 years

FEVAR
(2010-05/2018)

- 454 pts
  - Men: 412 (90.7%)
  - Women: 42 (9.3%)

FEVAR
Anatomical & Risk Factors

- Mean ASA Score
  - Men: 2.48, Women: 2.43, NS
- Mean Age
  - Men: 72.4 yrs, Women: 72.6 yrs, NS
- Mean AAA Max Diameter
  - Men: 59.9mm, Women: 60.1mm, NS
- Mean N of Fenestrations
  - Men: 3.35, Women: 3.14, P= 0.05

FEVAR
Early Results

- 30d Mortality
  - Men: 2/412 (0.5%)
  - Women: 1/42 (2.4%)

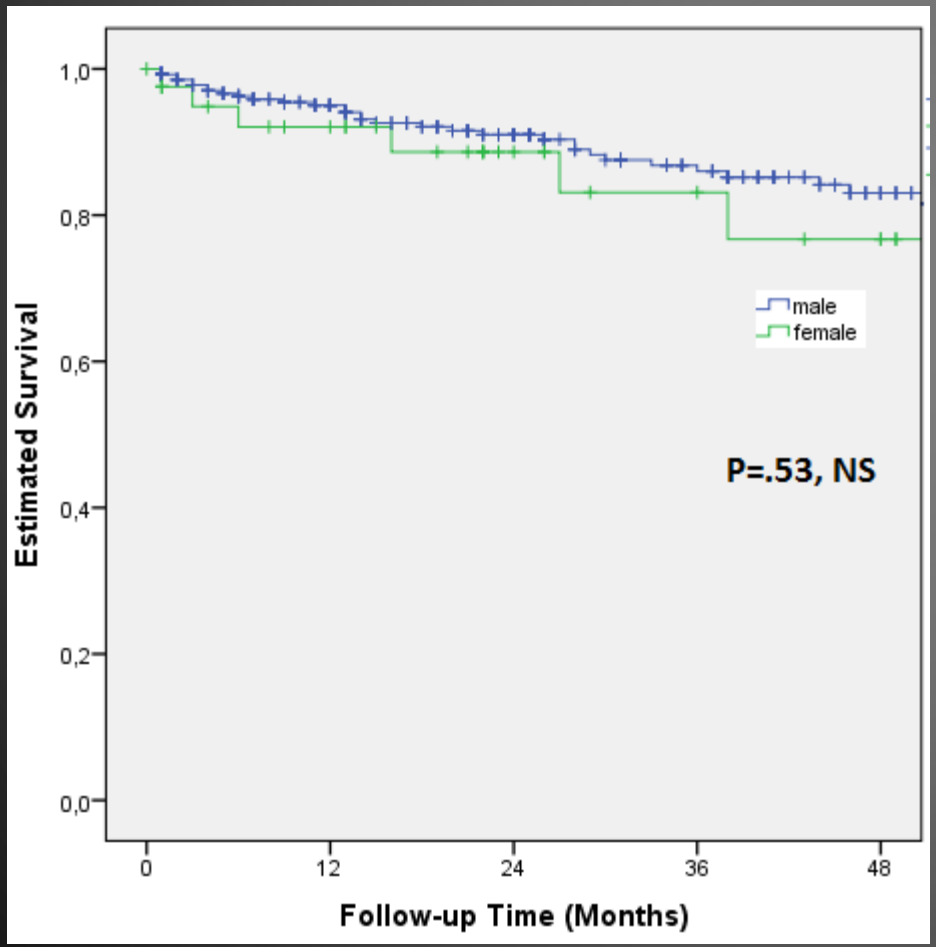
P= 0.25, NS

- 30d Major Complications
  - Men: 46/412 (11.2%)
  - Women: 3/42 (7.1%)

P= 0.6, NS

FEVAR
Follow-up (26 ± 20 months)

Survival



- Men
  - 95.0 ± 1.3% at 1 year
  - 86.0 ± 2.6% at 3 years
- Women
  - 92.1 ± 4.4% at 1 year
  - 83.1 ± 7.4% at 3 years

BEVAR
2010-11/2018

- 377 pts
  - Men: 295 (78.2%)
  - Women: 82 (21.8%)*

* Higher Percentage of Women compared to EVAR & FEVAR

BEVAR
Anatomical & Risk Factors

- Mean ASA Score
  - Men: 2.81, Women: 2.88, NS
- Mean Age
  - Men: 69.5 yrs, Women: 70.1 yrs, NS
- Mean AAA Max Diameter
  - Men: 66.9mm, Women: 67.4mm, NS
- Mean N of Fenestrations/Branches
  - Men: 3.73, Women: 3.68, NS

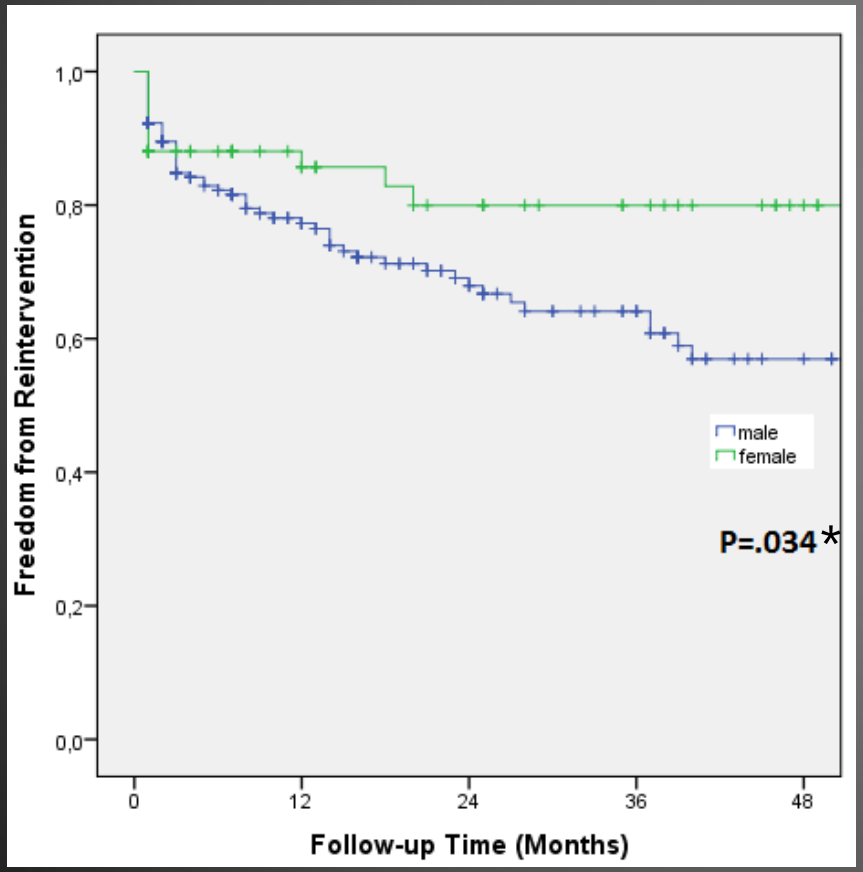
BEVAR
Early Results

- 30d Mortality
  - Men: 17/295 (5.8%)
  - Women: 10/82 (12.2%), P= 0.045
    - (Technical Success: 95% for both groups)

- 30d Major Complications
  - Men: 70/295 (23.7%)
  - Women: 24/82 (29.3%), P= 0.3, NS

BEVAR
Follow-up (22 ± 18 months)

Freedom from Reinterventions

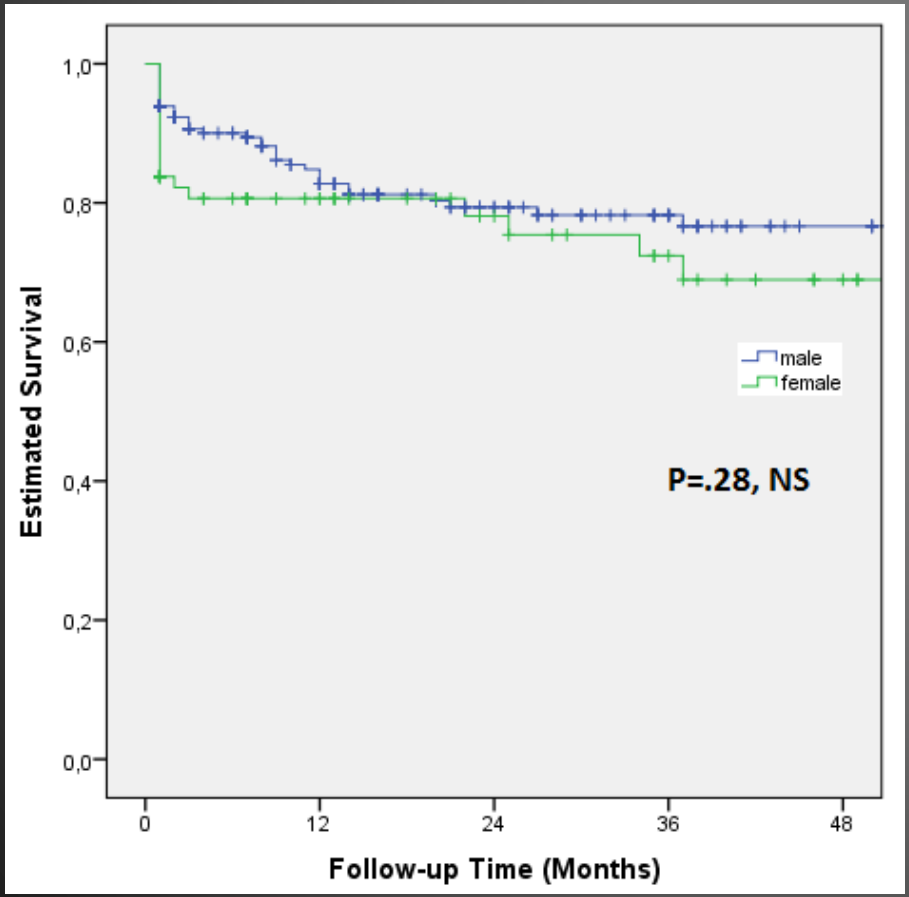


- Men
  - 79.1 ± 3.1% at 1 year
  - 67.7 ± 4.1% at 3 years
- Women
  - 86.1 ± 4.5% at 1 year
  - 80.0 ± 5.7% at 3 years

→ Women: ↓ Reinterventions during Follow-up

BEVAR
Follow-up (22 ± 18 months)

Survival



- Men
  - 85.0 ± 2.7% at 1 year
  - 78.2 ± 3.3% at 3 years
- Women
  - 80.6 ± 4.7% at 1 year
  - 72.4 ± 6.2% at 3 years

Conclusions

- EVAR
  - Literature: Women inferior outcomes vs men
  - Nuremberg Series: No differences observed
- FEVAR
  - Literature: Scarce
  - Nuremberg Series: No differences observed

Conclusions

- BEVAR
  - Literature: none
  - Nuremberg Series
    - Women ↑ 30d Mortality but ↓Late reintervention rate

→ Stricter selection for female patients?