Women in vascular surgery

Croo Alexander, M.D. FEBVS
EVST UEMS representative
Ghent university hopital

70th ESCVS
International congress of the European Society for Cardiovascular and Endovascular Surgery

7th IMAD meeting

Outcome for women after AAA repair

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AAA in women

- Best medical treatment
- Prevalence of AAA
- Screening of AAA
- Threshold for treatment
- Outcome after EVAR or open repair
- EVAR & IFU

Best medical treatment in women

Journal of the American Heart Association

SYSTEMATIC REVIEW AND META-ANALYSIS

Sex Differences in Cardiovascular Medication Prescription in Primary Care: A Systematic Review and Meta-Analysis

	MEN	WOMEN
Aspirin	56%	41%
Statins	63%	60%
Antihypertensive med	69%	68%

CONCLUSIONS: Sex differences in the prescription of cardiovascular medication exist among patients at high risk or with established cardiovascular disease in primary care, with a lower prevalence of aspirin, statins, and angiotensin-converting enzyme inhibitors prescription in women and a lower prevalence of diuretics prescription in men.

AAA prevalence men/women 4/1

20% ?

kenmerk	DREAM (n = 351)		OVER (n = 881)		EVAR-1 (n = 1252)	
inclusieperiode	2000-2003		2002-2008		1999-2003	
follow-upduur in jaren; gemiddelde	6,4		5,2		6,0	
behandeling	**EVAR (n = 173)**	**open (n = 178)**	**EVAR (n = 444)**	**open (n = 437)**	**EVAR (n = 626)**	**open (n = 626)**
volledige follow-up; %	99,7	99,3	99	99	99	99
♂	161 (93,1)	161 (90,4)	441 (99,3)	435 (99,5)	565 (90,3)	570 (91,1)
leeftijd in jaren; gemiddelde	70,7	69,6	69,9	70,5	74,1	74,0
aneurysmadiameter in cm; gemiddelde	6,0	6,0	5,7	5,7	6,4	6,5
nu of ooit gerookt	111 (64,2)†	98 (55,1)†	428 (96,4)	413 (94,5)	553 (88,5)	580 (92,8)
cardiaal belast	71 (41)	83 (46,6)	174 (39,2)	185 (42,3)	269 (43)	261 (41,8)
BMI in kg/m^2; gemiddelde	26,3	26,6	28,6	28,7	26,5	26,5
gebruikt betablokker	76 (43,9)	92 (51,7)	282 (63,5)	282 (64,5)	NR	NR
gebruikt statine	63 (37,7)	72 (41,9)	NR	NR	216 (34,9)	224 (36,0)
gebruikt trombocytenaggregatieremmer	70 (40,5)	72 (40,4)	244 (55,0)	277 (63,4)	338 (54,0)	325 (51,9)

AAA screening

Recommendation 12	Class	Level	References
Population screening for abdominal aortic aneurysm with a single ultrasound scan for all men at age 65 years is recommended.	I	A	[132,390,408, 410,495,509, 614,690,691, 758]

Recommendation 14	Class	Level	References
Population screening for abdominal aortic aneurysm in women is not recommended.	III	B	[395,613,671, 672]

SVS

Recommendation 15	Class	Level	References
All men and women age[illegible] degree relative with an considered for abdomin ear intervals.	[illegible]	[illegible]	[illegible]380,743]

We recommend a one-time ultrasound screening for AAAs in men or women 65 to 75 years of age with a history of tobacco use.

Level of recommendation	1 (Strong)
Quality of evidence	A (High)

Recommendation 16	Class	Level	References
creening for abdomina ntervals may be consid rue peripheral arterial aneurysm.	[illegible]	[illegible]	[illegible]71]

AAA threshold for repair in women

- In relationship to body surface area
- Aortic index: ratio normal infrarenal

A registry-based rationale for discrete interventi thresholds for open and endovascular elective a aortic aneurysm repair in female patients

Stephanie M. Tomee, BS,[a] Niki Lijftogt, MD,[a] Anco Vahl, MD, PhD,[b] Jaap F. Ha
Jan H. N. Lindeman, MD, PhD,[a] *Leiden and Amsterdam, The Netherlands*

We recommend elective repair for the patient at low or acceptable surgical risk with a fusiform AAA that is ≥5.5 cm.	
Level of recommendation	1 (Strong)
Quality of evidence	A (High)
We suggest elective repair for the patient who presents with a saccular aneurysm.	
Level of recommendation	2 (Weak)
Quality of evidence	C (Low)
We suggest repair in women with AAA between 5.0 cm and 5.4 cm in maximum diameter.	
Level of recommendation	2 (Weak)

- Lower threshold = higher suitability & higher survival at younger age

Outcome after AAA repair in women

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

2017

THE LANCET

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

EVAR suitability

- 34% women

  OR 0,44 (95% CI 0,32 - 0,62)

- 54% men

- Morphological criteria
  - ✓**neck length**
    15mm to >7,5mm from 25% to 45%
  - ✓**iliac diameter**
    7,5- 8mm to 6mm from 27% to 39%
  - ✓**aneurysm diameter**
    >65mm no women suitable
    >65mm 30% men suitable

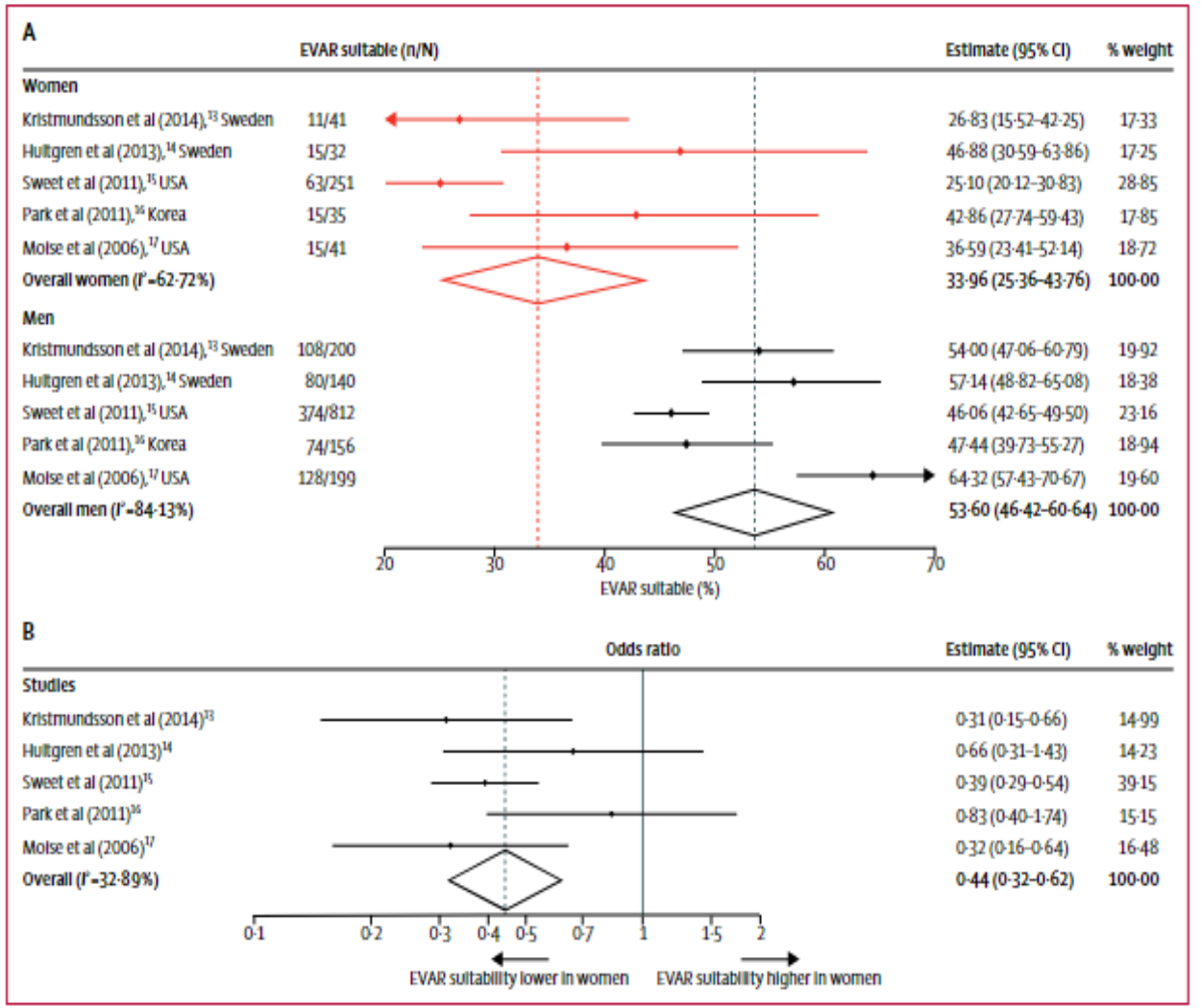


Figure 1: Forest plots of the proportion of aneurysm patients morphologically suitable for EVAR
(A) Women and men separately. (B) Women versus men. EVAR=endovascular repair.

EVAR instructions for use

- Women have increased juxtarenal angulation
- Women have smaller iliac arteries

TABLE 1. INSTRUCTIONS FOR USE FOR THREE ENDOVASCULAR GRAFT MANUFACTURERS

Limb Graft Occlusion Following Endovascular Aneurysm Repair for Infrarenal Abdominal Aortic Aneurysm with the Zenith Alpha, Excluder, and Endurant Devices: a Multicentre Cohort Study

Marko Bogdanovic [a], Otto Stackelberg [b,c], David Lindström [d], Samuel Ersryd [d,e], Manne Andersson [f,g], Håkan Roos [h,g], Antti Siika [a], Magnus Jonsson [a,i], Joy Roy [a,j,*]

*Gore & Associates; †Cook Medical; ‡Medtronic, Inc.

Non-intervention

- 34% women

  OR 2,27 (95% CI 1,21 - 4,23)

- 19% men

- Non-intervention after 3 years
  - only ⅓ alive
  - 37% died of rupture

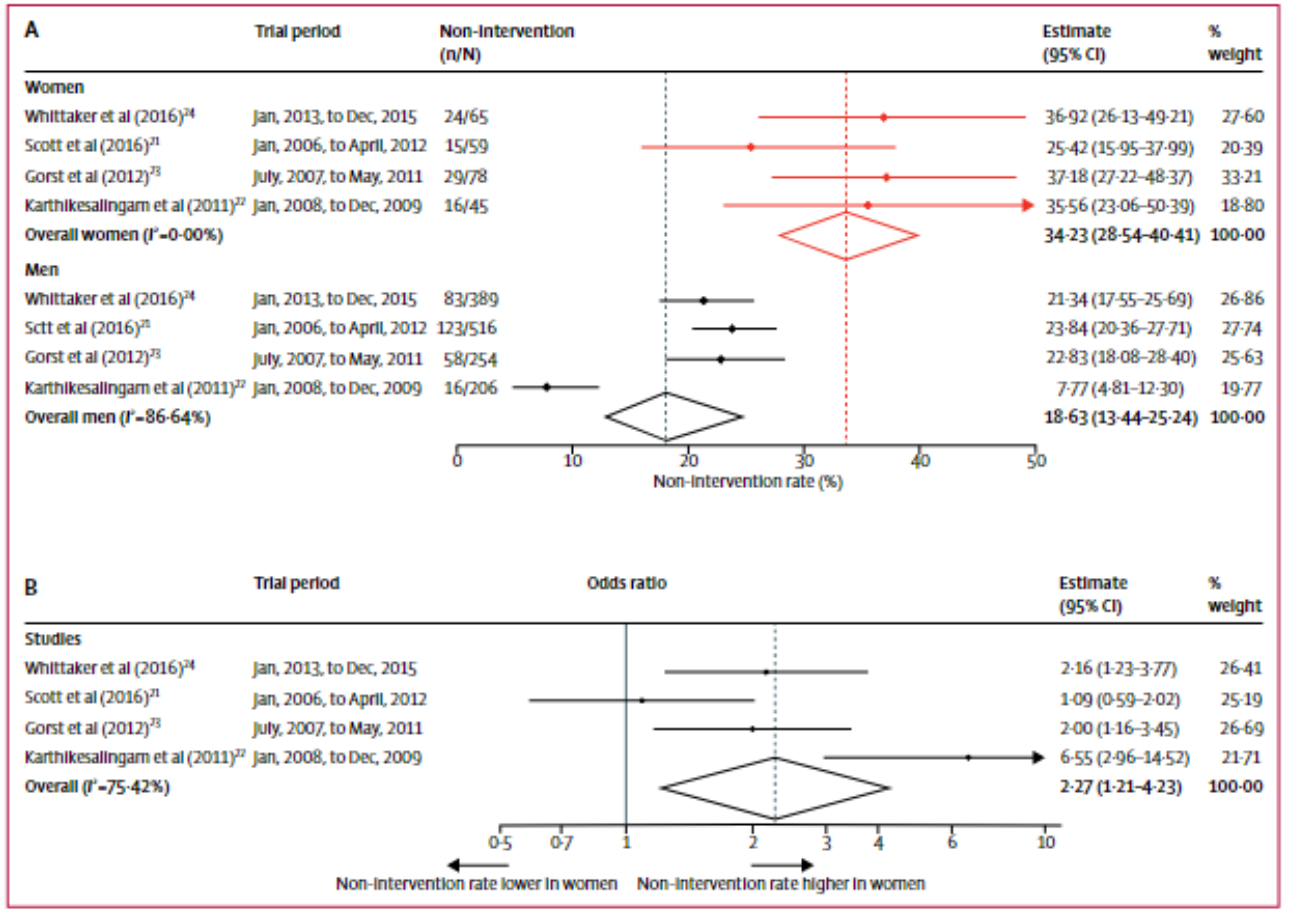


Figure 2: Forest plots of non-intervention rates in cohorts of patients assessed for intact abdominal aortic aneurysm repair
(A) Women and men separately. (B) Women versus men.

30-day mortality EVAR

- 2.31% women

  OR 1·67 (95% CI 1·38–2·04)

- 1.37% men

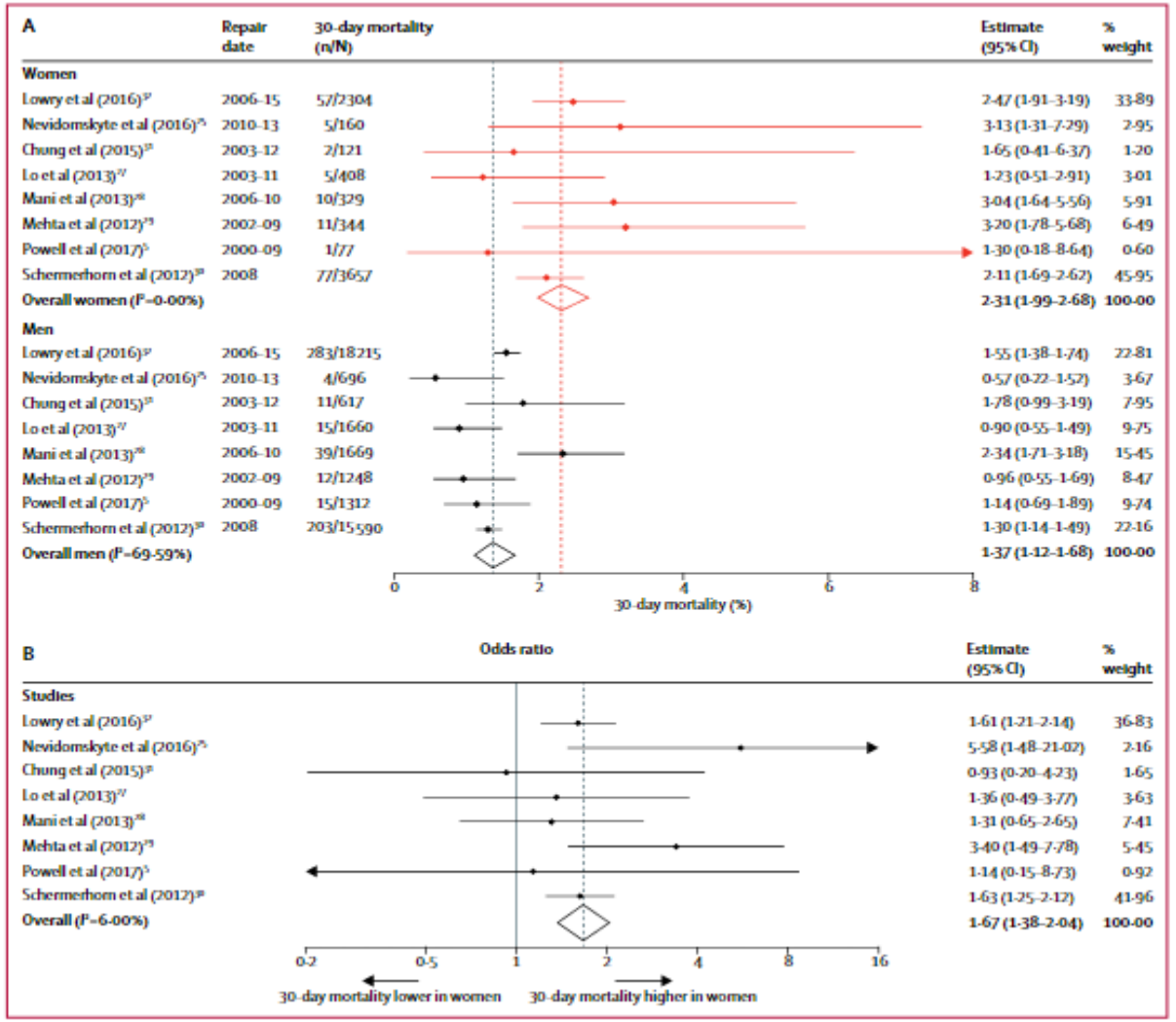


Figure 3: Forest plots of 30-day mortality after EVAR for intact abdominal aortic aneurysm
(A) Women and men separately. (B) Women versus men. EVAR=endovascular repair.

30-day mortality open repair

- 5.37% women

  OR 1·76 (1·35–2·30)

- 2.82% men

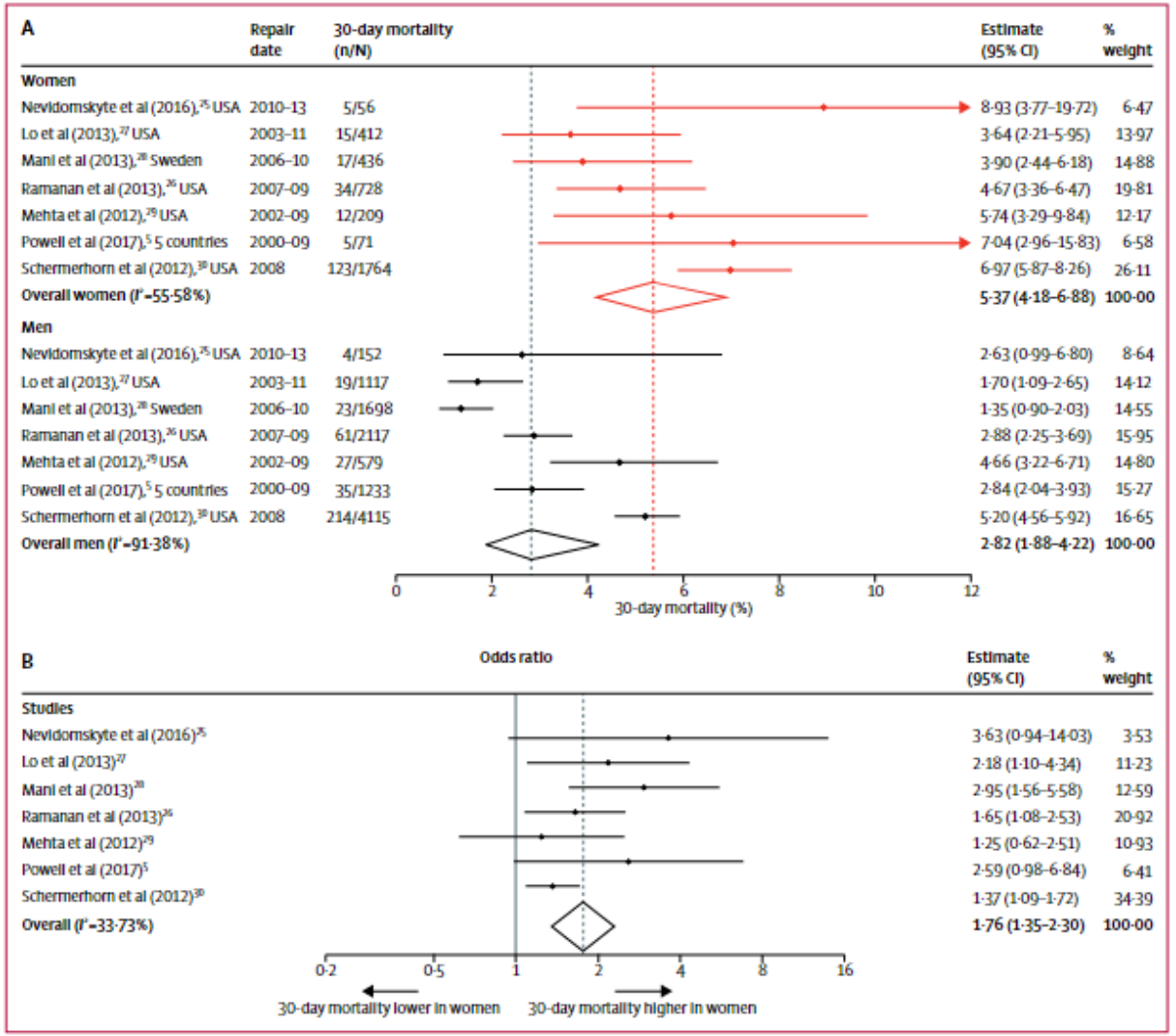


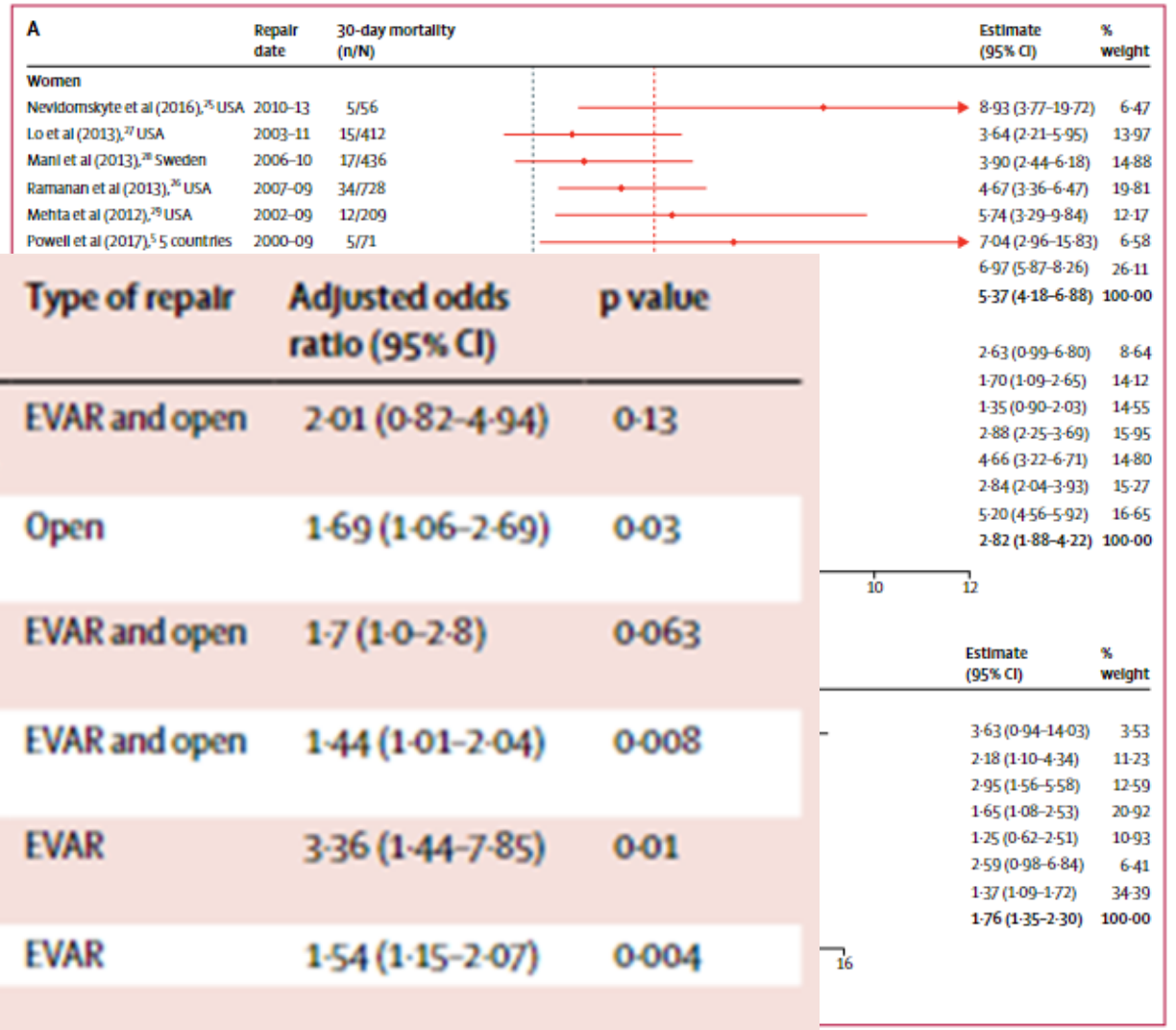
Figure 4: Forest plots of 30-day mortality after open repair for intact abdominal aortic aneurysm
(A) Women and men separately. (B) Women versus men.

30-day mortality open repair

- 5.37% v

OR

- 2.82% r



A	Repair date	30-day mortality (n/N)	Estimate (95% CI)	% weight
Women				
Nevidomskyte et al (2016),[25] USA	2010–13	5/56	8·93 (3·77–19·72)	6·47
Lo et al (2013),[27] USA	2003–11	15/412	3·64 (2·21–5·95)	13·97
Mani et al (2013),[28] Sweden	2006–10	17/436	3·90 (2·44–6·18)	14·88
Ramanan et al (2013),[26] USA	2007–09	34/728	4·67 (3·36–6·47)	19·81
Mehta et al (2012),[29] USA	2002–09	12/209	5·74 (3·29–9·84)	12·17
Powell et al (2017),[5] 5 countries	2000–09	5/71	7·04 (2·96–15·83)	6·58
			6·97 (5·87–8·26)	26·11
			5·37 (4·18–6·88)	100·00
			2·63 (0·99–6·80)	8·64
			1·70 (1·09–2·65)	14·12
			1·35 (0·90–2·03)	14·55
			2·88 (2·25–3·69)	15·95
			4·66 (3·22–6·71)	14·80
			2·84 (2·04–3·93)	15·27
			5·20 (4·56–5·92)	16·65
			2·82 (1·88–4·22)	100·00

10 12

	Estimate (95% CI)	% weight
	3·63 (0·94–14·03)	3·53
	2·18 (1·10–4·34)	11·23
	2·95 (1·56–5·58)	12·59
	1·65 (1·08–2·53)	20·92
	1·25 (0·62–2·51)	10·93
	2·59 (0·98–6·84)	6·41
	1·37 (1·09–1·72)	34·39
	1·76 (1·35–2·30)	100·00

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	Main adjustment factors	Type of repair	Adjusted odds ratio (95% CI)	p value
Powell et al (2017)[5]	Age, abdominal aortic aneurysm diameter, creatinine	EVAR and open	2·01 (0·82–4·94)	0·13
Ramanan et al (2013)[26]	Age, comorbidities	Open	1·69 (1·06–2·69)	0·03
Lo et al (2013)[27]	Age, comorbidities, type of repair	EVAR and open	1·7 (1·0–2·8)	0·063
Mani et al (2013)[28]	Age, comorbidities, type of repair	EVAR and open	1·44 (1·01–2·04)	0·008
Mehta et al (2012)[29]	Age, abdominal aortic aneurysm diameter	EVAR	3·36 (1·44–7·85)	0·01
Lowry et al (2016)[17]	Age, comorbidities, ethnicity	EVAR	1·54 (1·15–2·07)	0·004

Comorbidities were defined differently in each study.

70TH ESCVS CONGRESS & 7TH IMAD MEETING

20 I 23 JUNE 2022

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Systematic review and meta-analysis of sex differences in outcomes after endovascular aneurysm repair for infrarenal abdominal aortic aneurysm

Yang Liu, MD,[a,b] Yi Yang, MD,[a] Jichun Zhao, MD,[a] Xiyang Chen, Bin Huang, MD,[a] Ding Yuan, MD,[a] *and* Xiaojiong Du, MD,[a] *Cheng*

Outcomes	No. of cohorts	Effect measure	Effect estimate	95% CI	*P* value	I^2 (Q), %
Short-term outcomes						
30-day mortality						
Overall	22	OR	1.67	1.50-1.87	**<.001**	0
Intact	13	OR	1.7	1.44-2.02	**<.001**	12.9
Ruptured	5	OR	1.57	1.24-1.99	**<.001**	0
Indeterminate	4	OR	2.55	0.61-10.69	.199	19.4
Adjusted	5	OR	1.73	1.32-2.26	**<.001**	54
In-hospital mortality						
Overall	10	OR	1.9	1.43-2.53	**<.001**	46.4
Intact	7	OR	2.1	1.79-2.48	**<.001**	0
Ruptured	3	OR	0.93	0.38-2.28	.88	62.8
Limb ischemia						
Overall	9	OR	2.44	1.73-3.43	**<.001**	0
Intact	6	OR	2.48	1.60-3.84	**<.001**	16.2
Visceral/mesenteric ischemia						
Overall	8	OR	1.62	0.91-2.88	.098	0
Intact	6	OR	1.85	1.01-3.39	**.046**	0
Renal complications						
Overall	8	OR	1.73	1.12-2.67	**.028**	0
Intact	5	OR	1.66	1.05-2.61	**.013**	0
Cardiac complications						
Overall	8	OR	1.68	1.01-2.80	**.046**	25.3
Intact	6	OR	1.64	0.85-3.17	.138	45.2
30-day reinterventions						
Overall	6	OR	1.37	0.95-1.98	.095	59.8
Intact	5	OR	1.59	0.89-2.83	.116	66.5

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Long-term outcomes						
Long-term all-cause mortality						
Overall	10	HR	1.23	1.09-1.38	**.001**	53.7
Intact	8	HR	1.21	1.06-1.39	**.006**	50.9
Ruptured	2	HR	1.32	1.13-1.55	**.001**	0
Late endoleaks						
Overall	8	OR	1.18	0.88-1.56	.264	57.2
Intact	6	OR	1.21	0.88-1.66	.241	65.2
Late reinterventions						
Overall	10	OR	1.05	0.78-1.41	.741	64.4
Intact	9	OR	1.12	0.86-1.47	.388	58.3

Women at time of AAA repair

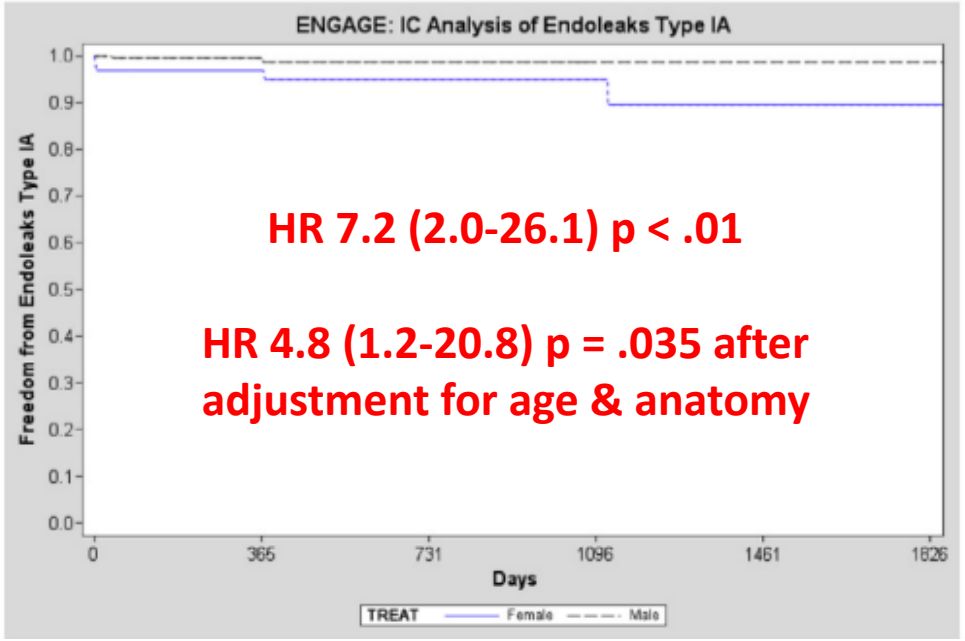
- Average aortic diameter -2mm for women versus men
  = relatively larger growth to reach 55mm

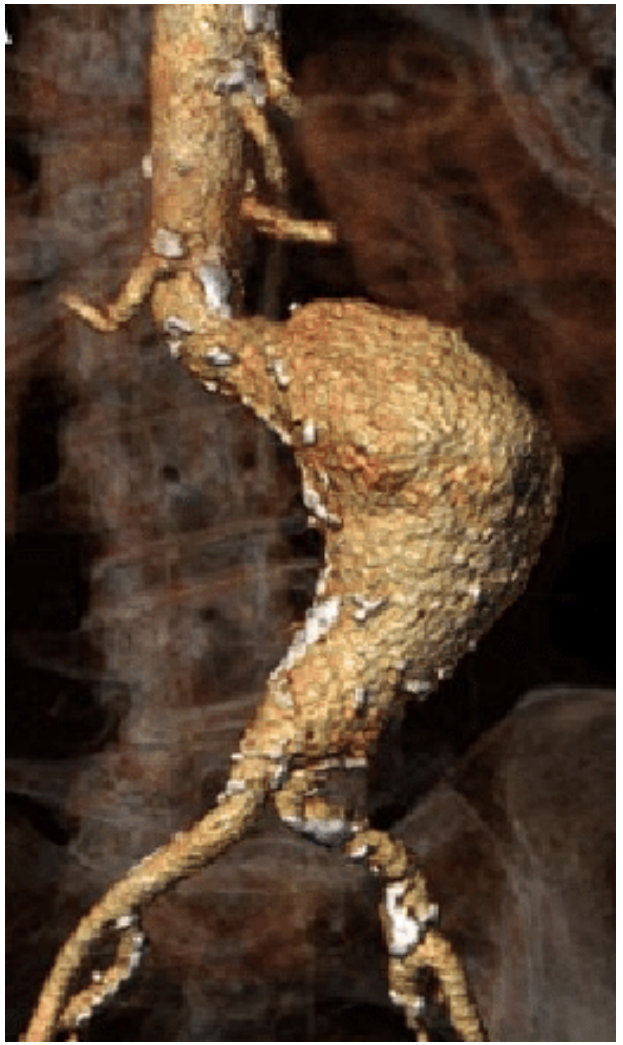
- 4x higher rupture risk & at smaller diameters

- Older at time of repair

Women at time of AAA repair

- Small access vessels
- Angulated infrarenal neck





CONCLUSION

- BMT is worse in women
- Low % female patients in EVAR trials
- Screening of female (ex)-smokers ?
- Lower threshold for treatment ?
- Less suitable for EVAR
- High non-intervention rate
- Higher morbidity & mortality

… comparable findings in PAD, carotid disease, TAAA

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