Recent updates of long-term outcomes after surgical/endovascular AAA repair

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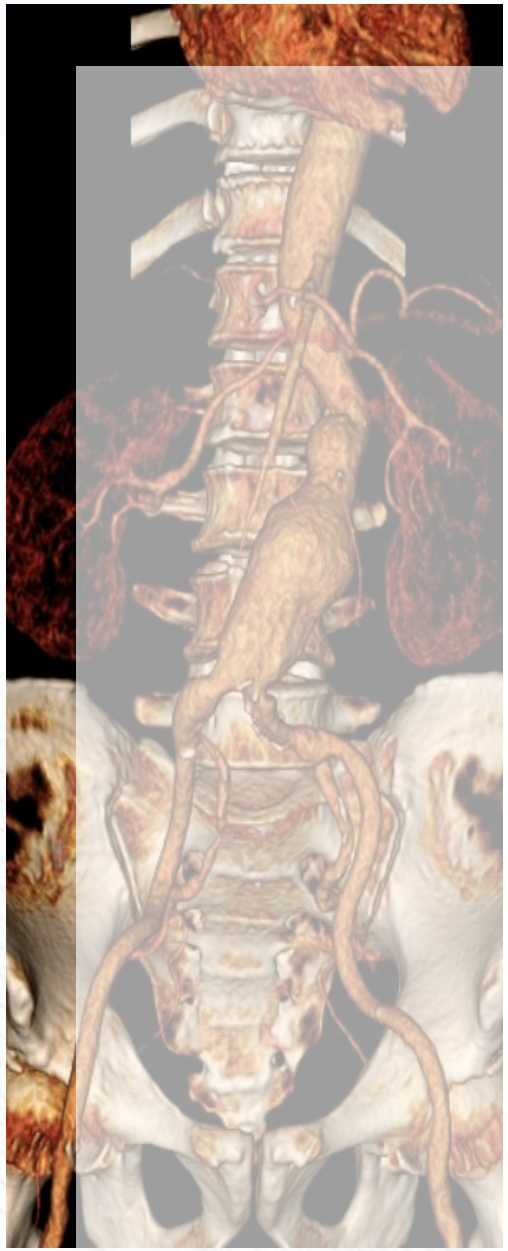
Disclosure

- I have no potential conflicts of interest to disclose regarding the topic of this presentation.



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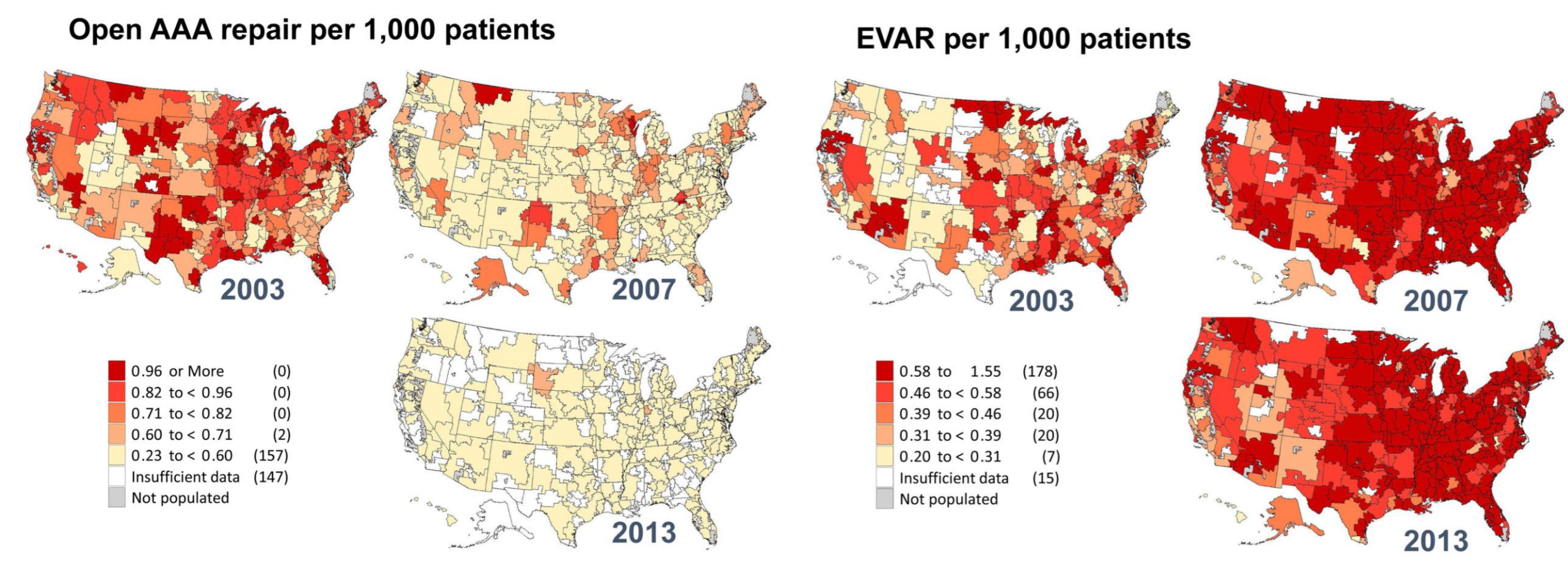
Trends in open surgical, endovascular aortic aneurysm repair

EVAR has been replacing open surgical repair as the preferred treatment for AAA.



J Vasc Surg. 2018 Jun;67(6):1690-1697

Guideline for Management of AAA

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease

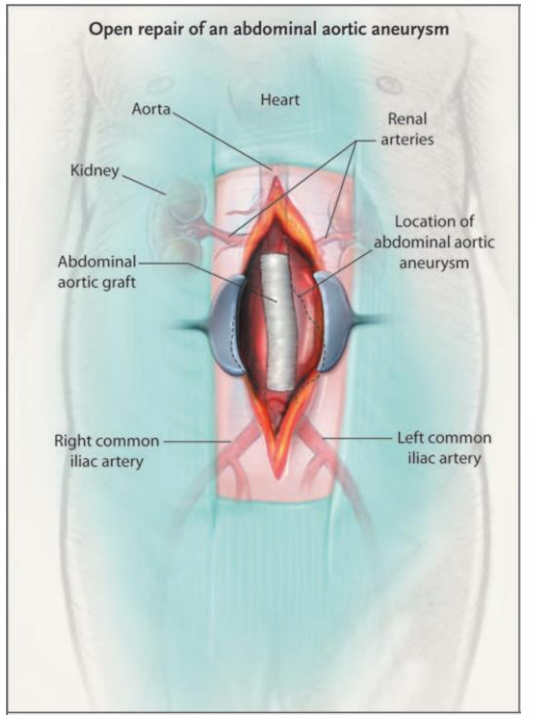
6.5.5.3. Threshold for AAA Repair

COR	LOE	Recommendations
1	A	1. In patients with unruptured AAA, repair is recommended in those with a maximal aneurysm diameter of ≥5.5 cm in men or ≥5.0 cm in women.[1-6]

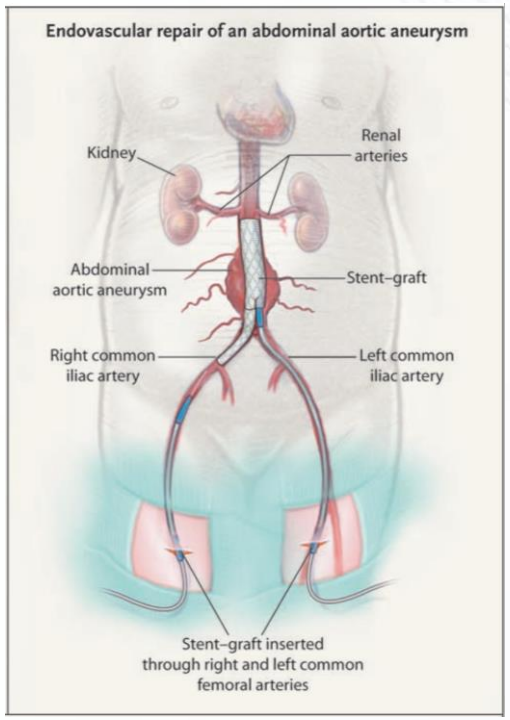
6.5.5.4. Open Versus Endovascular Repair of AAA

1	A	1. In patients with nonruptured AAA with low to moderate operative risk and who have anatomy suitable for either open or EVAR, a shared decision-making process weighing the risks and benefits of each approach is recommended.[1-11]
1	B-NR	2. In patients undergoing elective endovascular repair for nonruptured AAA, adherence to manufacturer's instructions for use is recommended.[12-16]
2a	B-NR	3. In patients with nonruptured AAA and a high perioperative risk, EVAR is reasonable to reduce the risk of 30-day morbidity, mortality, or both.[9,10]

Open surgical repair



Endovascular Repair



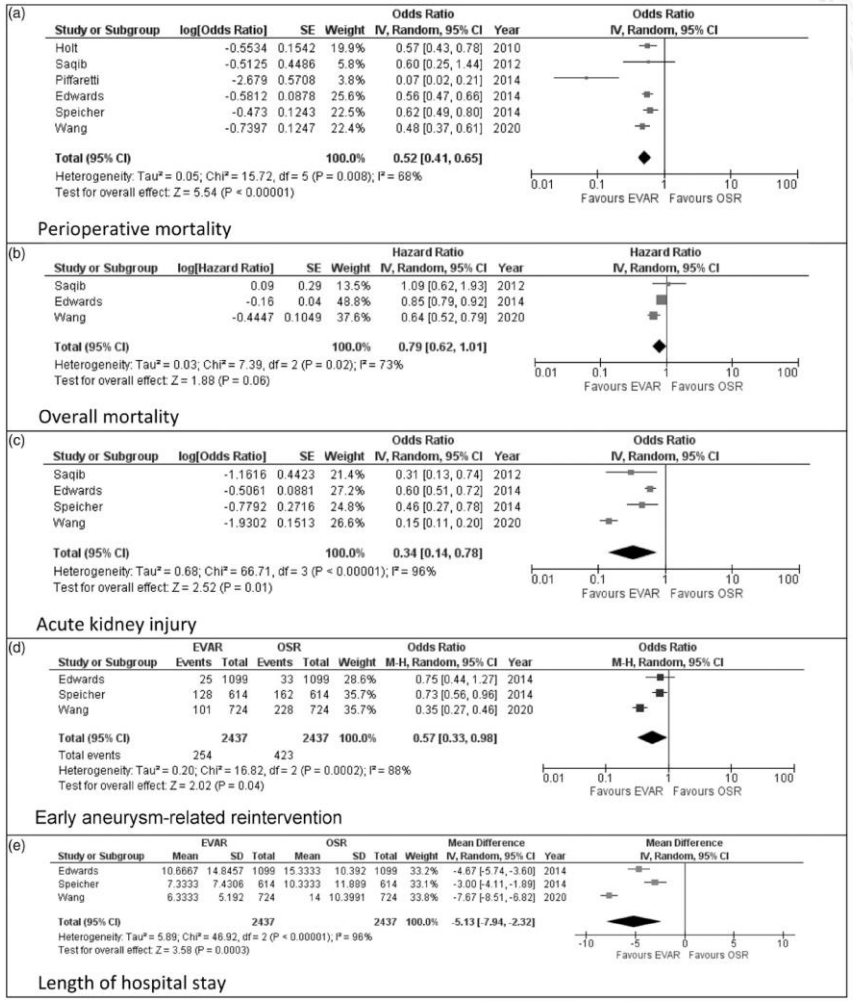
N Engl J Med 2008;358:464-74
Circulation. 2022;146:e334–e482

Abdominal Aorta Aneurysm

2022 ACC/AHA Guideline for the Diagnosis and Management of Aortic Disease

Recommendations for Repair of Ruptured AAA
Referenced studies that support the recommendations are summarized in the Online Data Supplement.

COR	LOE	Recommendations
1	B-R	1. In patients presenting with ruptured AAA who are hemodynamically stable, CT imaging is recommended to evaluate whether the AAA is amenable to endovascular repair.[1-3]
1	B-R	2. In patients presenting with ruptured AAA who have suitable anatomy, endovascular repair is recommended over open repair to reduce the risk of morbidity and mortality.[1,4-6]
2a	B-NR	3. In patients undergoing endovascular repair for ruptured AAA, local anesthesia is preferred to general anesthesia to reduce risk of perioperative mortality.[7-9]
2a	C-LD	4. In patients with ruptured AAA, permissive hypotension can be beneficial to decrease the rate of bleeding.[1,3,10-12]



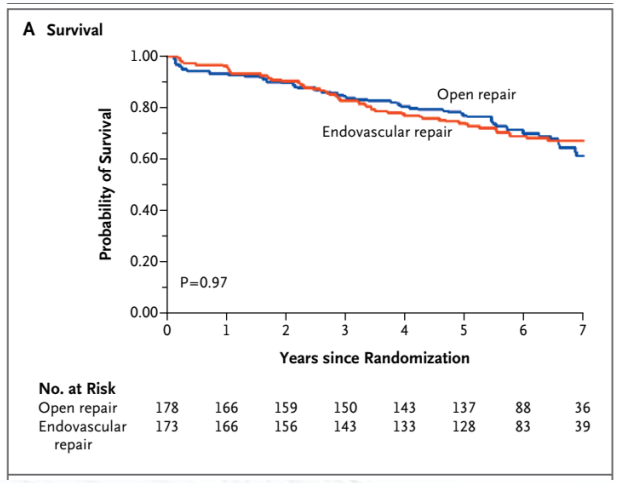
Circulation. 2022;146:e334–e482, Vascular. 2022 Aug;30(4):628-638

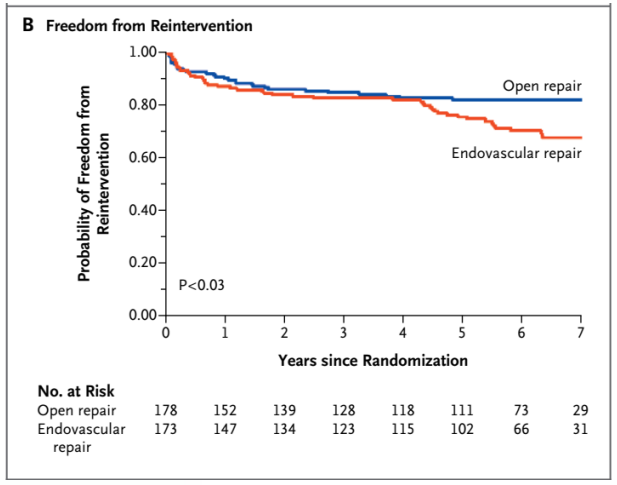
EVAR vs. Open repair of AAA: RCT (DREAM, EVAR trial 1)

ORIGINAL ARTICLE

Long-Term Outcome of Open or Endovascular Repair of Abdominal Aortic Aneurysm

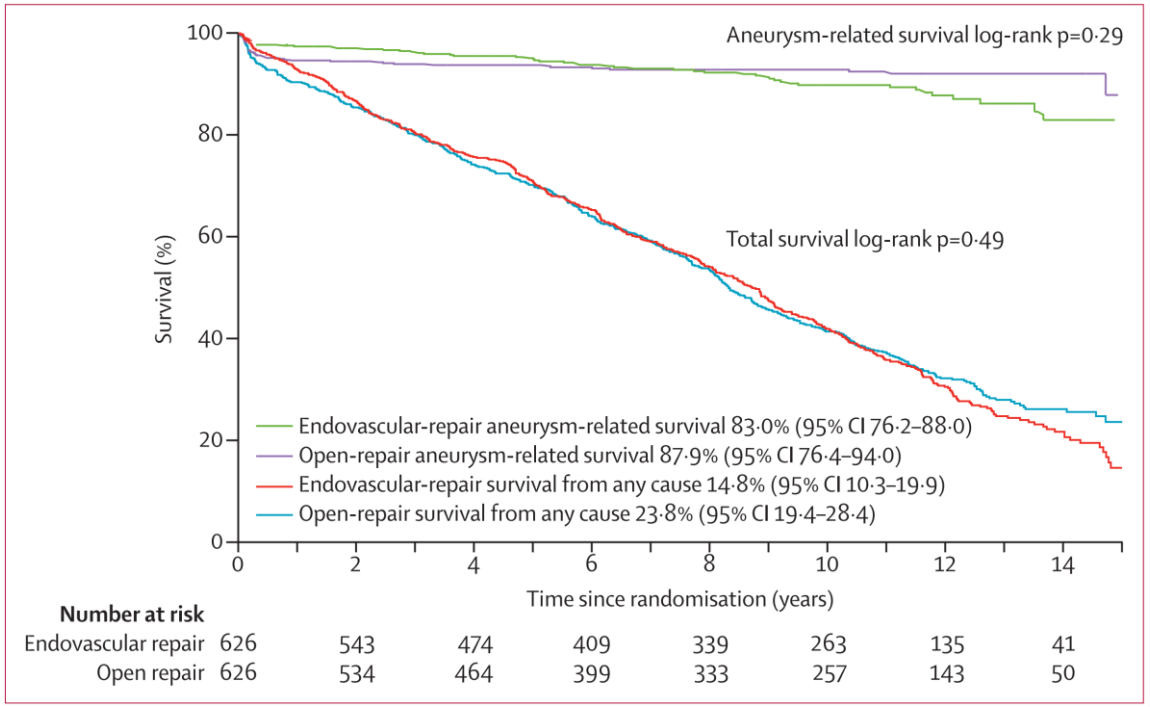
- DREAM (Dutch Randomized Endovascular Aneurysm Repair) Trial
- 2000-2003
- EVAR 173 vs. Open 178
- Median follow-up: 6.4 years
- Previously DREAM trial showed that EVAR was better than Open surgery in the 30-day mortality.





Endovascular versus open repair of abdominal aortic aneurysm in 15-years' follow-up of the UK endovascular aneurysm repair trial 1 (EVAR trial 1): a randomised controlled trial

- EVAR (UK Endovascular Aneurysm Repair trial) Trial 1
- 1999-2004
- EVAR 626 vs. Open 626
- Median follow-up: 12.4 years



N Engl J Med 2010;362:1881-9, Lancet 2016; 388: 2366–74

EVAR vs. Open repair of AAA: RCT (OVER trial)

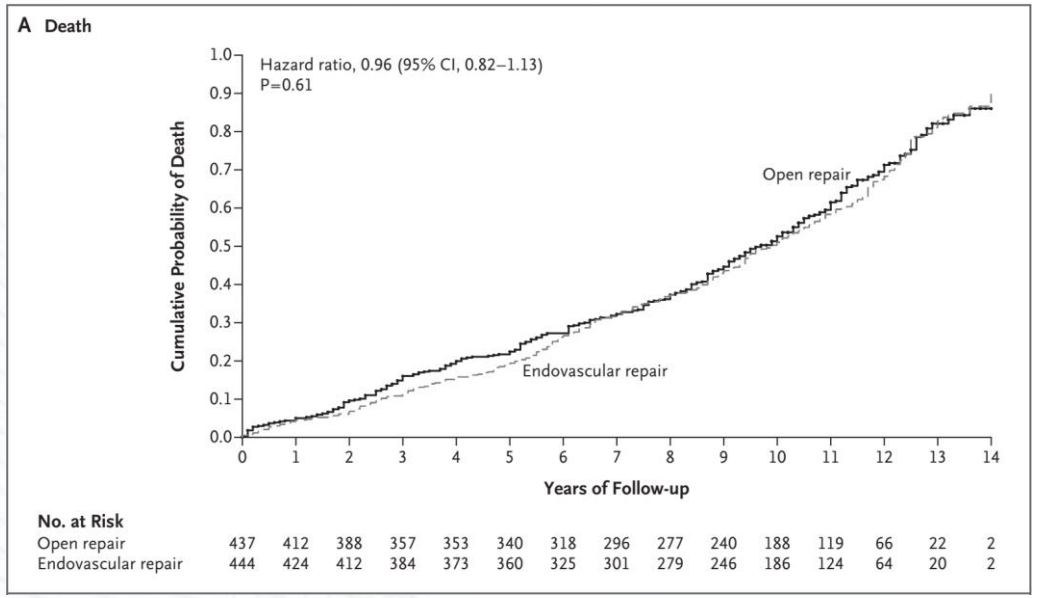
ORIGINAL ARTICLE

Open versus Endovascular Repair of Abdominal Aortic Aneurysm

- **OVER (Open Versus Endovascular Repair) Trial**
- **2002-2008**
- **EVAR 444 vs. Open 437**
- **Median follow-up: 8.4 years**

Table 2. Deaths from Any Cause According to Time since Randomization.*

Time since Randomization	Endovascular Repair	Open Repair	Hazard Ratio (95% CI)	P Value	P Value for Interaction†
	no. of deaths/total no. (%)				
Any time	302/444 (68.0)	306/437 (70.0)	0.96 (0.82–1.13)	0.61	0.25
0 to 6 mo	11/444 (2.5)	14/437 (3.2)	0.77 (0.35–1.69)	0.51	0.43
>6 mo to 4 yr	59/433 (13.6)	70/423 (16.5)	0.81 (0.57–1.14)	0.22	0.88
>4 to 8 yr	93/374 (24.9)	76/353 (21.5)	1.18 (0.87–1.60)	0.29	0.50
>8 yr	139/281 (49.5)	146/277 (52.7)	0.94 (0.74–1.18)	0.59	0.25



- Endovascular-repair devices, techniques, and strategies were changing rapidly.
- Evaluation strategies in the early years of endovascular repair involved high doses of radiation, which may have been responsible for the significantly higher number of deaths from cancer in the endovascular-repair group.
- Postoperative mortality was lower.

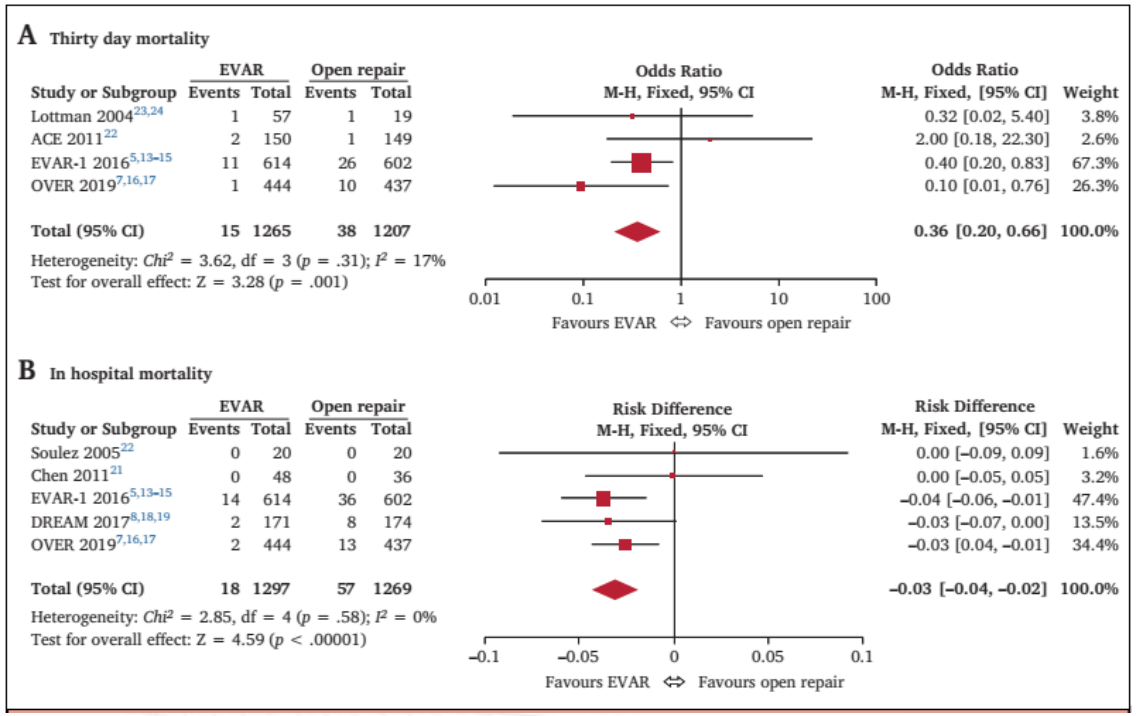
N Engl J Med 2019;380:2126-35

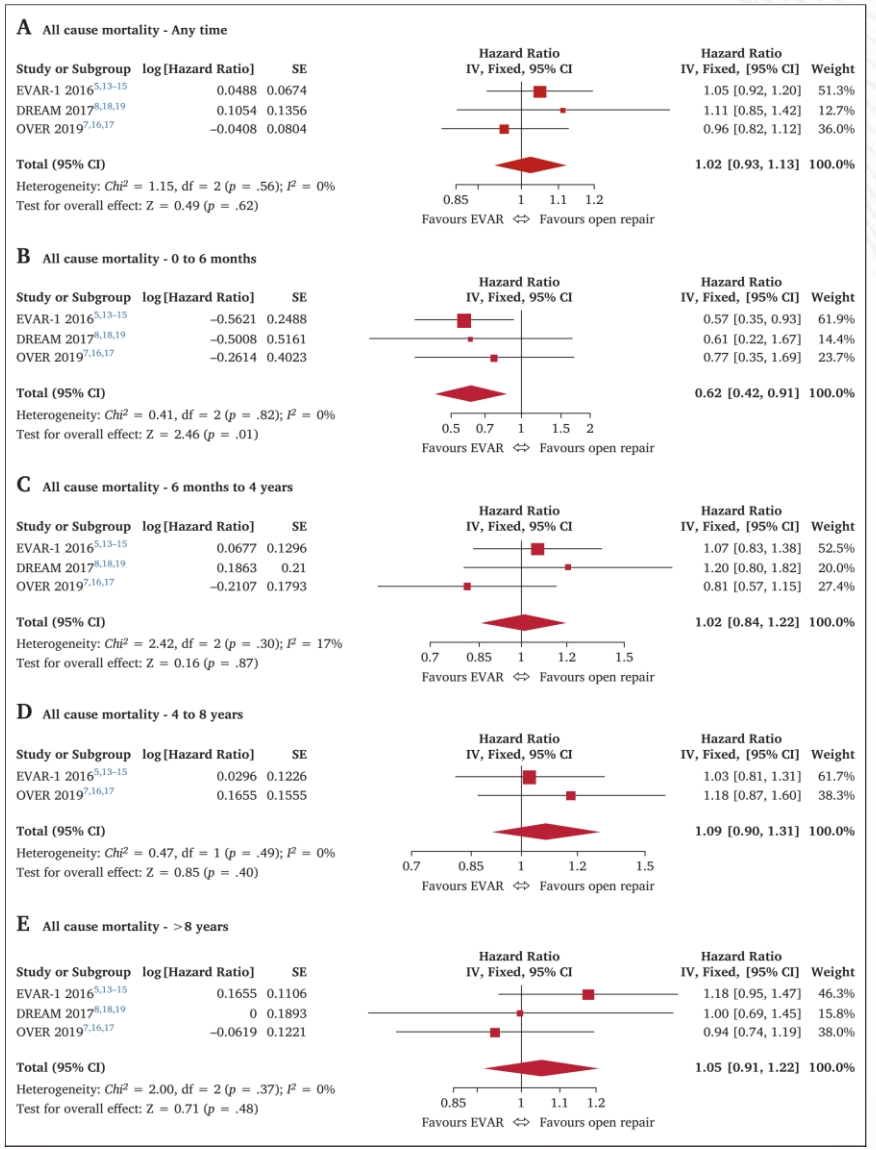
EVAR vs. Open repair of AAA: META-ANALYSIS

SYSTEMATIC REVIEW

Editor's Choice – Endovascular *vs.* Open Repair for Abdominal Aortic Aneurysm: Systematic Review and Meta-analysis of Updated Peri-operative and Long Term Data of Randomised Controlled Trials

- Meta-analysis of 7 RCTs (n=2,983)
  : ACE, DREAM, OVER, EVAR-1, Chen et al, Lottman et al, Soulez et al.





Eur J Vasc Endovasc Surg (2020) 59, 385e397

EVAR vs. Open repair of AAA: Large cohort study

Original Investigation | Surgery

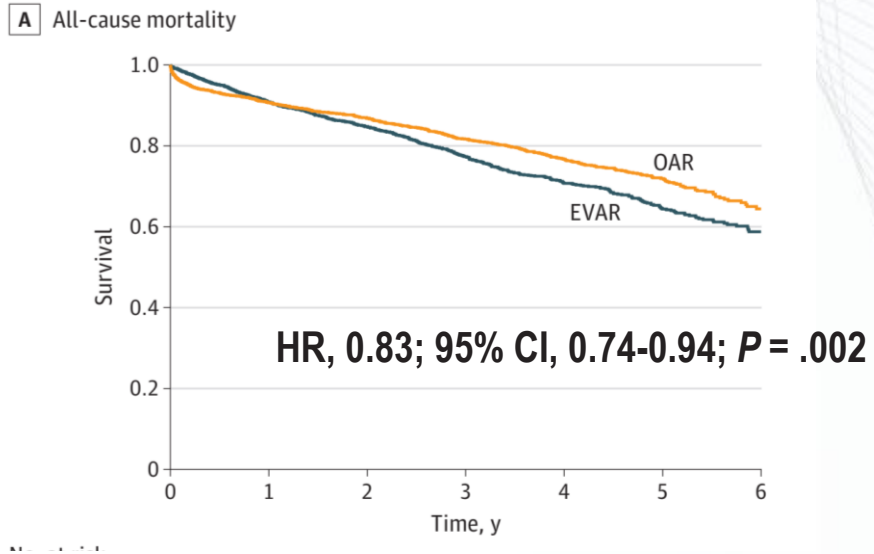
Long-term Outcomes Associated With Open vs Endovascular Abdominal Aortic Aneurysm Repair in a Medicare-Matched Database

Kevin Yei, BS; Asma Mathlouthi, MD; Isaac Naazie, MD, MPH; Nadin Elsayed, MD; Bryan Clary, MD; Mahmoud Malas, MD, MHS

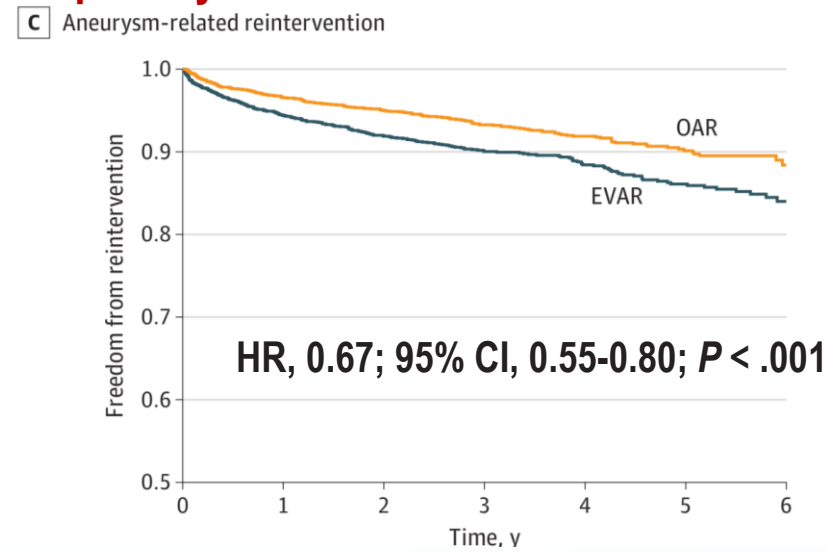
- **2003-2015**
- **Retrospective large cohort study from the US analyzed data from the VQI-VISION database**
- **EVAR (n=28,281) vs. Surgery (n=4,479)**
- **Propensity score matching**
- **Analysis of nearly 3,000 paired patients**

- **Primary outcome**
  6-year all-cause mortality, rupture, and reintervention.
- **Secondary outcomes**
  30-day mortality and perioperative leg ischemia, intestinal ischemia, MI, respiratory complications, and nonhome discharge.

Propensity-Matched 6-Year Mortality



Propensity-Matched 6-Year Reintervention



JAMA Network Open. 2022;5(5):e2212081

Updated real-world registry

Editor's Choice — Five Year Outcomes of the Endurant Stent Graft for Endovascular Abdominal Aortic Aneurysm Repair in the ENGAGE Registry

Joep A.W. Teijink [a,*], Adam H. Power [b], Dittmar Böckler [c], Patrick Peeters [d], Steven van Sterkenburg [e], Lee H. Bouwman [f], Hence J. Verhagen [g], Marc Bosiers [h], Vincente Riambau [i], Jean-Pierre Becquemin [j], Philippe Cuypers [a], Marc van Sambeek [a]

[a] Catharina Hospital Eindhoven, Eindhoven, the Netherlands
[b] Western University, London, Ontario, Canada

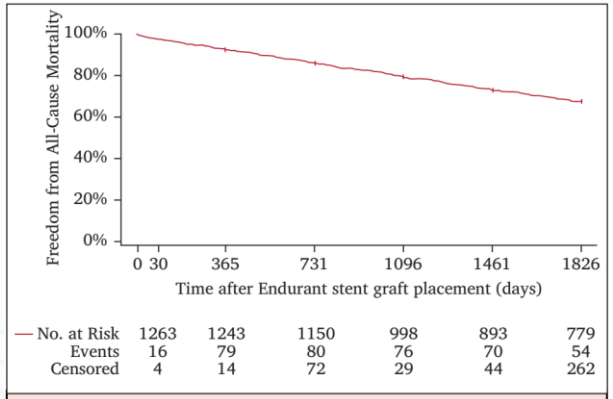


Figure 2. Cumulative Kaplan-Meier estimate of freedom from all cause mortality through to five years. Number at risk represents patients at risk at beginning of interval; estimate made at end of time interval.

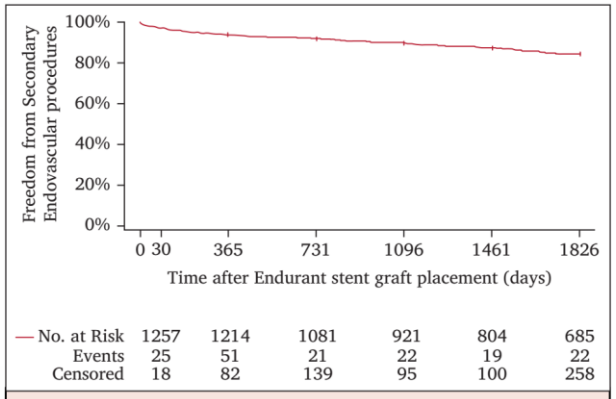


Figure 3. Cumulative Kaplan-Meier estimate of freedom from secondary endovascular procedures through to five years. Number at risk represents patients at risk at beginning of interval; estimate made at end of time interval.

- Long-term outcomes of advanced stent grafts
- Freedom from reintervention at 5 years: 80% in ENGAGE registry
- In DREAM Trial,
  Freedom from secondary interventions at 6 years
  : **81.9% for open surgical repair**
  70.4% for EVAR

Endurant stent graft proves efficacious and durable in ENGAGE 10-year data

27th April 2023 865

Hence Verhagen

"The ENGAGE registry evaluated more than 1,200 patients. The 10-year data, which included follow-up from approximately 400 of these patients, **showed a 94.7% freedom from aneurysm-related mortality** and 64.1% sac regression (or decreased AAA sac diameter) at 10 years."
"acceptable long-term durability of these advanced stent grafts"

Eur J Vasc Endovasc Surg. 2019 Aug;58(2):175-181.
ENGAGE 10-year data. Data on file at Medtronic

Conclusion

1. Despite of early benefit of survival, **longer follow-up** of these trials showed **similar mortality** between EVAR and open surgery.

2. In recent **meta-analysis and large cohort study** of EVAR vs. open surgery of AAA, **long-term outcomes show mixed results.**

3. Significant advancements have been made in EVAR technology over the years, including graft design, deployment techniques, and imaging modalities. **Newer-generation endografts with longer follow-up** are needed to better understand the outcomes of modern EVAR.

4. **Shared decision-making** between interventionist and surgeon, or patients, is crucial in selecting the most appropriate treatment option for AAA.