Patient Survival After EVAR Was NOT Improved By Compliance With Surveillance Protocols: The EVAR Surveillance Paradox: From A Systematic Review and Meta-Analysis: What Is The Explanation

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No relationships with commercial companies.

Information presented in this lecture is based on evidence.

EVAR: mainstay of treatment for AAA

But long-term data have shown increased risk of:

- Reintervention
- Rupture
- Aneurysm-related mortality

Imaging surveillance is an integral part of EVAR to detect complications:

- Endoleak
- Migration
- Stent fracture
- Sac expansion

Drawbacks:

- Cost
- Quality of life
- Resources

Surveillance practices universally adopted across the world

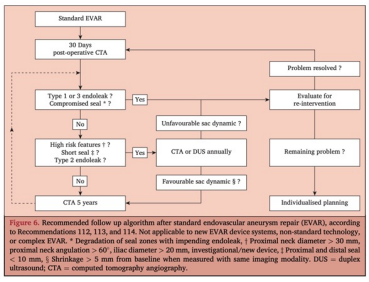


Figure 6. Recommended follow up algorithm after standard endovascular aneurysm repair (EVAR), according to Recommendations 112, 113, and 114. Not applicable to new EVAR device systems, non-standard technology, or complex EVAR. * Degradation of seal zones with impending endoleak, † Proximal neck diameter > 30 mm, proximal neck angulation > 60°, iliac diameter > 20 mm, investigational/new device, ‡ Proximal and distal seal < 10 mm, § Shrinkage > 5 mm from baseline when measured with same imaging modality. DUS = duplex ultrasound; CTA = computed tomography angiography.

European Society for Vascular Surgery (ESVS) 2024 Clinical Practice Guidelines on the Management of Abdominal Aorto-Iliac Artery Aneurysms

The Society for Vascular Surgery 2018 practice guidelines on the care of patients with an abdominal aortic aneurysm

- CT scan at 1 month.
- Concerning findings should prompt surveillance at 6 months.
- In the absence of a type I or type III endoleak and sac enlargement, surveillance can be performed with CT or colour duplex ultrasound.
- Annual duplex ultrasound is most likely sufficient for routine surveillance in the absence of new endoleak or sac enlargement.
- New findings should prompt CT imaging to evaluate for type I or type III endoleaks

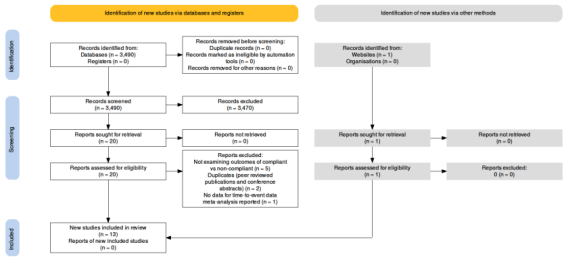
Hypothesis

Patients who are compliant with EVAR surveillance have better outcomes than patients who are NOT compliant:

- ➢ Lower rate of AAA rupture
- ➢ Lower aneurysm-related mortality
- ➢ Lower overall mortality

To test our hypothesis:

- Systematic review of the world literature
- Eligible studies reported comparative outcomes of patients who were compliant with EVAR surveillance versus those who were not
- Time to event data meta-analysis



Word literature on EVAR surveillance

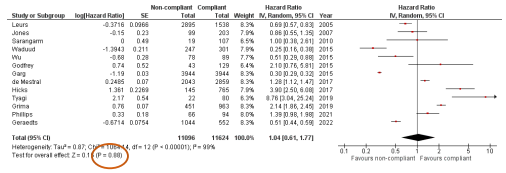
22,762 patients

Compliant: 11,633 Non-compliant: 11,129

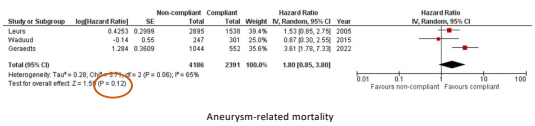
1st author / Year / Journal / Country	Retrospective / prospective	Single / multicentre / administrative database / registry	Treatment period	Length of follow-up	Compliance with surveillance	Total no/No of non-compliant/No of lost to follow-up/No of compliant
Geraedts / 2022 / Eur J Vasc Endovasc Surg / Netherlands	Retrospective	Multi	2007-2012	Median 65 months	35% (552/1596)	1596 / 1044 / NR / 552
Phillips / 2021/Ann Vasc Surg / USA	Retrospective	Multi	2003-2020	NR	41% (66/160)	160 / 47* / 47 / 66
Grima / 2019 / Eur J Vasc Endovasc Surg / UK	NR but probably retrospective	Multi	2007-2010	Median 4 years (IQR 2-5)	68% (963/1414)	1414 / 451 / NR / 963
Tyagi / 2019 / J Vasc Surg / USA	Retrospective	Single	2010-2014	NR	62% (89/144)	144 / 55 / NR / 89
de Mestral / 2017 / Eur J Vasc Endovasc Surg / Canada	Retrospective	Administrative database	2004-2014	Median 3.4 years (IQR 2-5.3)	58% (2859/4902)	4902 / 2043 / NR / 2859
Hicks / 2017 / J Vasc Surg / USA	NR but probably retrospective	Quality improvement registry	2003-2015	NR	84% (765/910)* - Lost to follow-up: 12% (123?/1087)	910 / NA* / 145 / 765
Wu / 2015 / J Vasc Surg / USA	Retrospective	Single	2001-2011	Median 25 months (IQR 9-45)	47% (89/188) - Lost to follow up: 41% (78/188)	188 / 21 / 78 / 89
Sorg / 2015 / JAMA Surg / USA	Retrospective	Administrative database	2002-2005	Median 6.1 years (IQR 2.6-7.4)	43% (4169/9695)	7888 / 3944 / NR / 3944
Wadud / 2015 / Cardiovasc Intervent Radiol / UK	Retrospective	Multi	NR	Median 3.03 years (IQR 1.66-4.55)	53% (301/569) - Lost to follow-up (no surveillance imaging): 3.7% (21/569)	569 / 247 / 21 / 301
Godfrey / 2015 / Cardiovasc Intervent Radiol / UK	Retrospective	Single	2008-2013	NR	75% (129/172)	172 / 43 / NR / 129
Sarangarm / 2010 /Ann Vasc Surg / USA	Retrospective	Single	1999-2006	Mean 52.1±25.9 months; median 52.9 months (range 12-94.5)	85% (107/126)	126 / 19 / NR / 107
Jones / 2007 / J Vasc Surg / USA	NR but probably retrospective	Single	1999-2005	Median 26 months; mean 29.6±22.3	67% (203/302)	302 / 99 /NR / 203
Leurs / 2005 / Ann Vasc Surg / Netherlands	NR but probably retrospective	Registry	1996-2004	NR	35% (1538/4433)	4433 / 2895 / NR / 1538

Pooled proportion of patients who were NOT compliant with EVAR surveillance: 43% (95% CI 36%-51%)

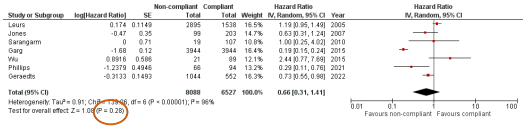
Pooled proportion of patients lost to follow-up or with no surveillance: 37% (95% CI 12%-71%)



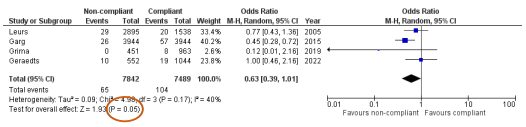
All-cause mortality



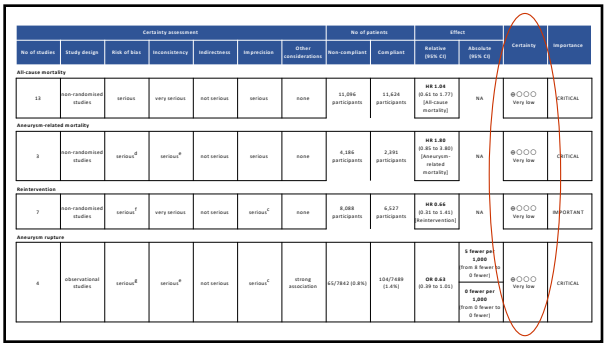
Aneurysm-related mortality



Reintervention



Rupture



Certainty assessment							No of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Non-compliant	Compliant	Relative (95% CI)	Absolute (95% CI)		
All-cause mortality												
13	non-randomised studies	serious	very serious	not serious	serious	none	11,096 participants	11,624 participants	**HR 1.04** (0.61 to 1.77) [All-cause mortality]	NA	⊕○○○ Very low	CRITICAL
Aneurysm-related mortality												
3	non-randomised studies	serious[a]	serious[b]	not serious	serious	none	4,186 participants	2,391 participants	**HR 1.80** (0.85 to 3.80) [Aneurysm-related mortality]	NA	⊕○○○ Very low	CRITICAL
Reintervention												
7	non-randomised studies	serious[a]	very serious	not serious	serious[c]	none	8,088 participants	6,527 participants	**HR 0.66** (0.31 to 1.41) [Reintervention]	NA	⊕○○○ Very low	IMPORTANT
Aneurysm rupture												
4	observational studies	serious[a]	serious[b]	not serious	serious[c]	strong association	65/7842 (0.8%)	104/7489 (1.4%)	**OR 0.63** (0.39 to 1.01)	**5 fewer per 1,000** [from 8 fewer to 0 fewer] **0 fewer per 1,000** [from 0 fewer to 0 fewer]	⊕○○○ Very low	CRITICAL

Meta-analysis of complete surveillance vs no surveillance

All-cause mortality: HR 1.10, 95% CI 0.43-2.80

Interpretation

- Complete EVAR surveillance does not prolong the life expectancy
  - Less intense surveillance should be applied in all patients
- Complete surveillance (positively) affects outcomes, but such benefit occurs only in a subset of patients with specific characteristics
  - More intense surveillance for patients meeting specific criteria and less intense surveillance in some other patient groups that do not fulfil such criteria

Take home messages

- A large proportion of patients who underwent EVAR in the participating institutions are not compliant with EVAR surveillance
- Compliance with EVAR surveillance does not appear to confer any survival advantage
- Such findings question the need for intense surveillance in all patients undergoing EVAR
- Call for further research on personalized surveillance