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

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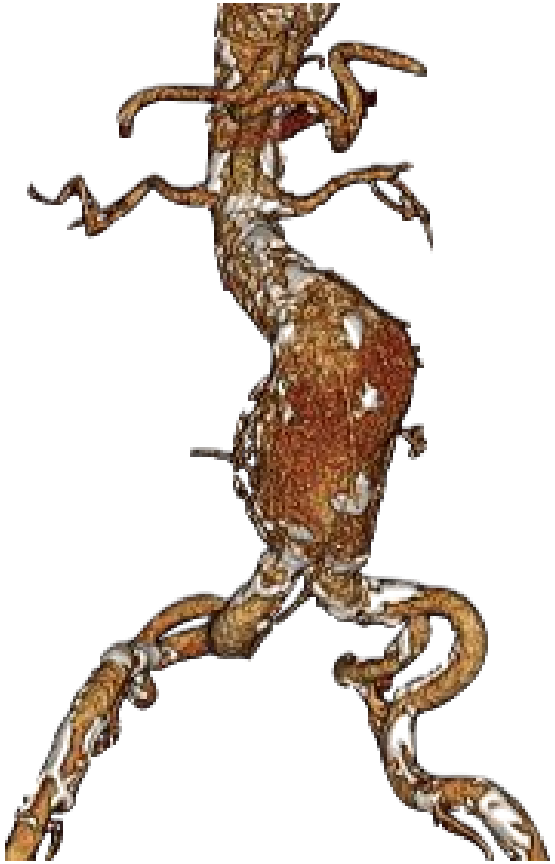

Early and long-term outcomes of endovascular aortic repair in young and low risk patients in the Global Registry for Endovascular Aortic Treatment

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UNIVERSITY OF PADOVA
DEPARTMENT OF VASCULAR AND ENDOVASCULAR SURGERY
Director: Prof. F. GREGO

I do not have any potential conflict of interest

INTRODUCTION

ADVANTAGES OF EVAR

Endovascular aneursym repair (EVAR) may be an attractive option for the treatment of infrarenal abdominal aortic aneurysm (AAA) in young/low-risk patients[1]:

- Low early morbidity and mortality rates
- Short length of hospitalization
- Fast return to work and daily life activities

However, these advantages may be limited by[2,3]:

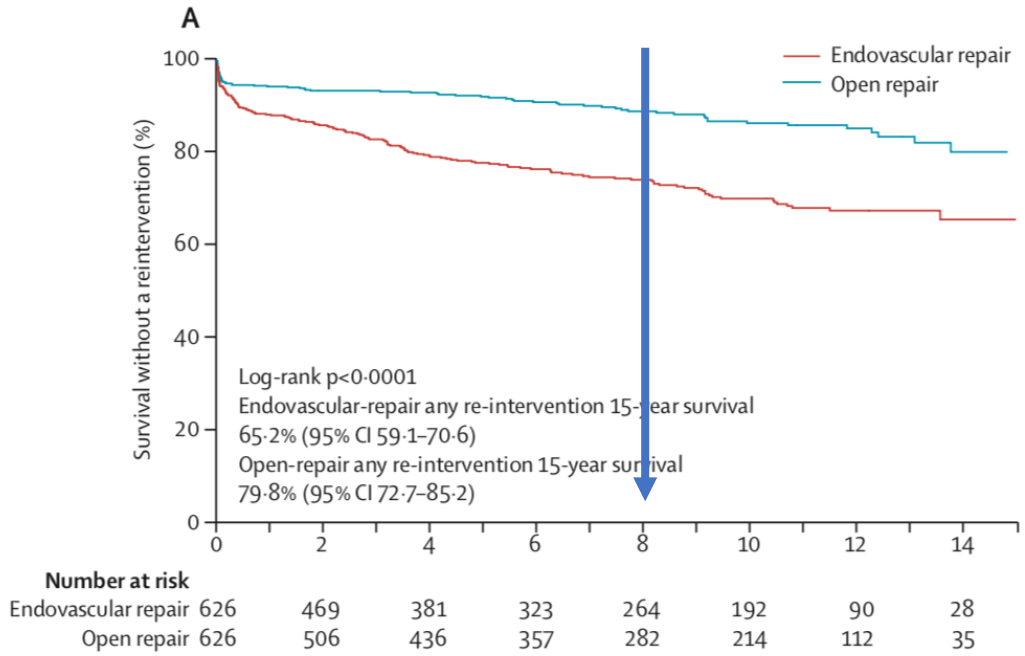
- Long-term reintervention rate
- Long-term aortic-related mortality

1. Chaikof EL, Dalman RL, Eskandari MK, Jackson BM, Lee WA, Mansour MA, et al. The Society for Vascular Surgery practice guidelines on the care of patients with an abdominal aortic aneurysm. J Vasc Surg. 2018 .
2. 2. Patel R, Sweeting MJ, Powell JT, Greenhalgh RM. 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. The Lancet. 2016 .
3. 3. van Schaik TG, Yeung KK, Verhagen HJ, de Bruin JL, van Sambeek MRHM, Balm R, et al. Long-term survival and secondary procedures after open or endovascular repair of abdominal aortic aneurysms. J Vasc Surg. 2017.

INTRODUCTION

LONG-TERM RESULTS OF EVAR

- The advantages of EVAR compared to OSR are lost after 8 years from the intervention
- Our knowledge on the long-term results of EVAR is essentially based on old generation endografts, without accounting for the evolution of the devices, techniques, and patient selection that has evolved in the last 10-15 years.



1. Lederle FA, Kyriakides TC, Stroupe KT, Freischlag JA, Padberg FT, Matsumura JS, et al. Open versus Endovascular Repair of Abdominal Aortic Aneurysm. N Engl J Med. 2019 May 30;380(22):2126–35.
2. Epstein, Greenhalgh. Long-term cost-effectiveness analysis of endovascular versus open repair for abdominal aortic aneurysm based on four randomized clinical trials. Br J Surg. 2014 May;101(6):623-31.
3. Patel, Greenalgh et al. 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 randomized controlled trial. Lancet 2016.

INTRODUCTION

EVAR IN YOUNG PATIENTS

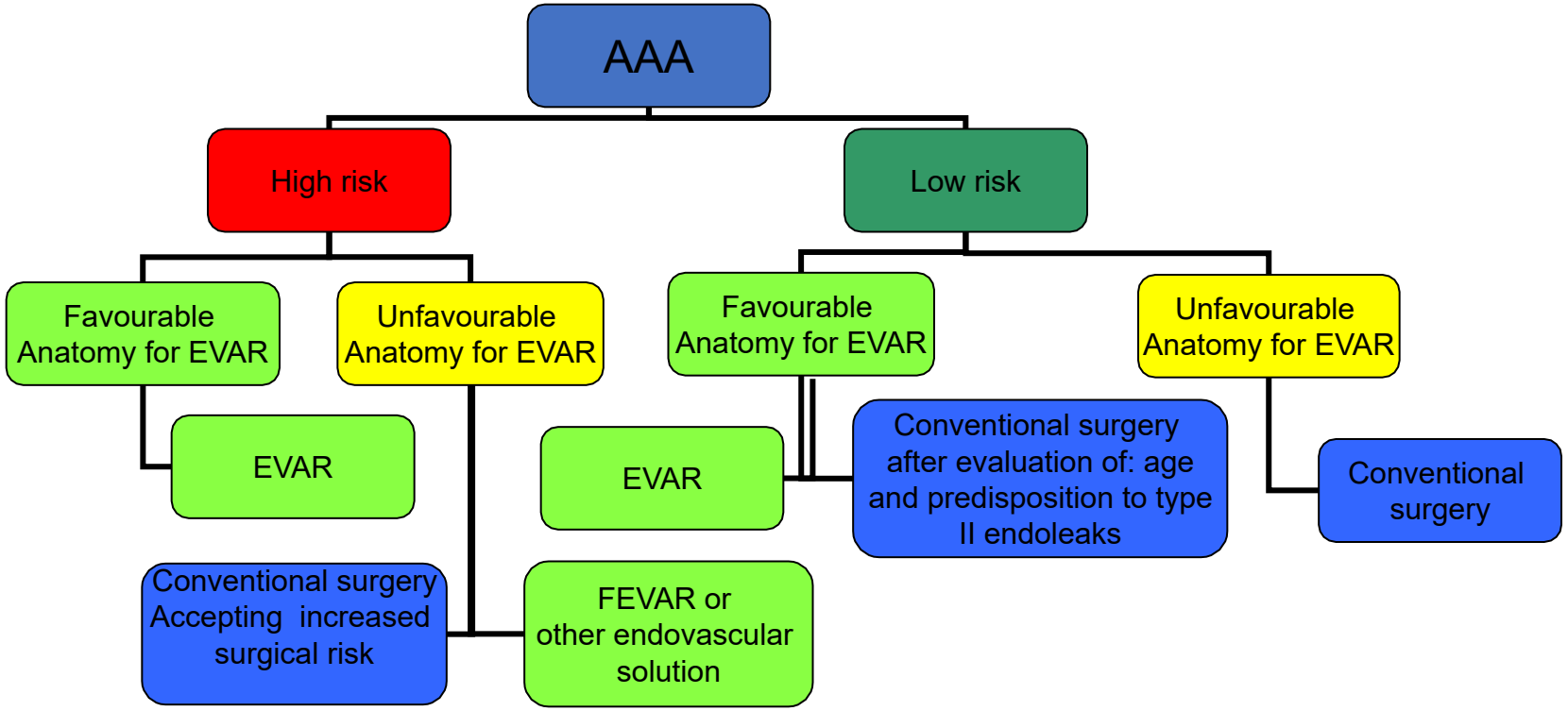
Is EVAR a valid option for young patients?

Is EVAR a valid option for low-risk patients?

PROPER PATIENT SELECTION IS THE KEY

CLINICAL RISK

OUR FLOW-CHART BASED ON OPERATIVE RISK AND ANATOMY



ANATOMICAL CHARACTERISTICS

PROXIMAL NECK MORPHOLOGY

Aneurysm … th worsened outcomes

- Length <10 mm

REVIEW ARTICLES

Richard P. Cambria, MD, Section Editor

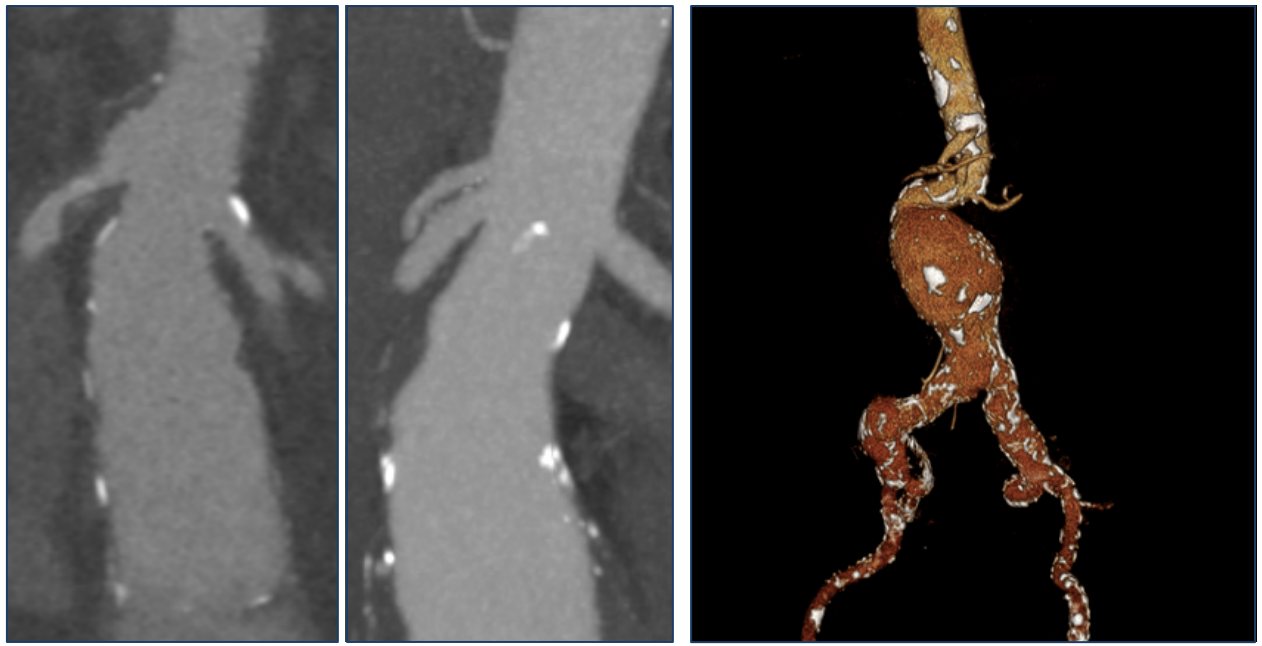
A meta-analysis of outcomes of endovascular abdominal aortic aneurysm repair in patients with hostile and friendly neck anatomy

George A. Antoniou, MD, PhD,[a] George S. Georgiadis, MD,[b] Stavros A. Antoniou, MD,[c] Ganesh Kuhan, MD, FRCS,[a] and David Murray, MD, FRCS,[a] *Manchester, United Kingdom; Alexandroupolis, Greece; and Marburg, Germany*

Table IV. Summary of meta-analysis outcomes

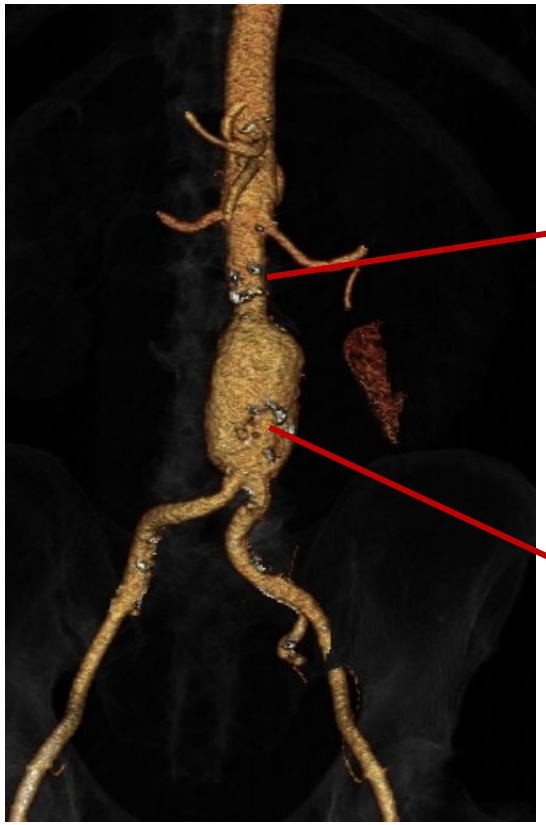
Outcome measure	*Meta-analysis model*	*OR (95% CI)*	P	P *for publication bias*
Adjunctive procedures	Fixed effects	3.050 (1.884-4.938)	<.001	.810
Technical success	Fixed effects	0.139 (0.015-1.275)	.081	NA
30-day mortality	Fixed effects	1.022 (0.419-2.493)	.962	.391
30-day morbidity	Fixed effects	2.278 (1.025-5.063)	.043	NA
Reintervention within 30 days	Fixed effects	1.082 (0.096-12.186)	.949	NA
Type I endoleak within 30 days	Fixed effects	2.467 (0.562-10.823)	.232	.574
Type I endoleak at 1 year	Fixed effects	4.563 (1.430-14.558)	.010	NA
Reinterventions at 1 year	Fixed effects	0.990 (0.547-1.792)	.974	.539
Aneurysm-related mortality at 1 year	Fixed effects	9.378 (1.595-55.137)	.013	.251

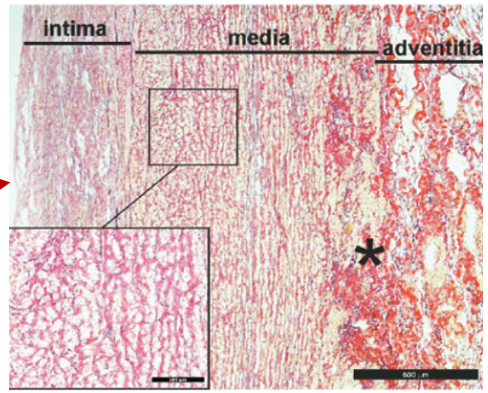
CI, Confidence interval; *OR,* odds ratio; *NA,* not applicable.

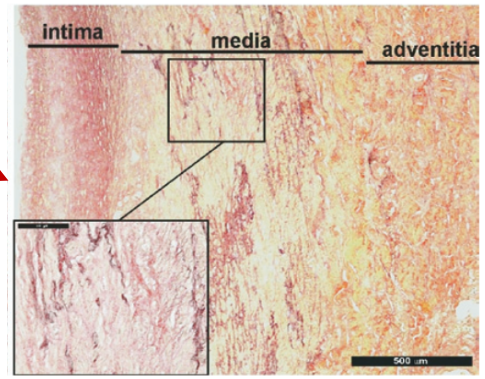


ANATOMICAL CHARACTERISTICS

PROXIMAL NECK HISTOLOGY







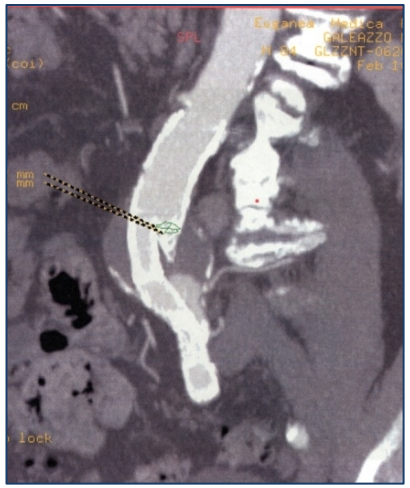
Severe structural damage of the seemingly non-diseased infrarenal aortic aneurysm neck

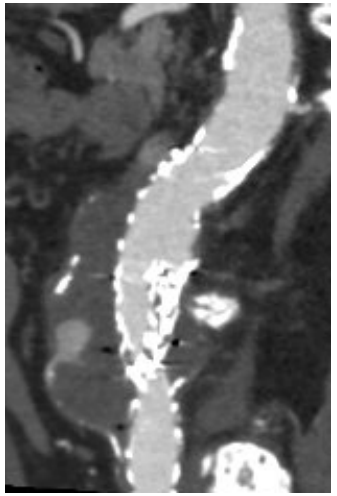
Nicolas Diehm, MD,[a] Stefano Di Santo, PhD,[a] Thomas Schaffner, MD,[b] Juerg Schmidli, MD,[c] Jan Völzmann, BMS,[a] Peter Jüni, MD,[d,e] Iris Baumgartner, MD,[a] and **Christoph Kalka, MD,[a]** *Bern, Switzerland*

ANATOMICAL CHARACTERISTICS

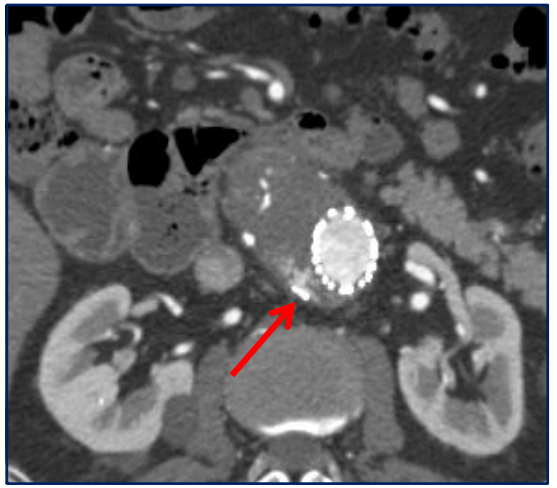
RISK FOR ENDOLEAK TYPE II

- Endoleak type II (EII), is the most frequent complication (10-40%) after EVAR





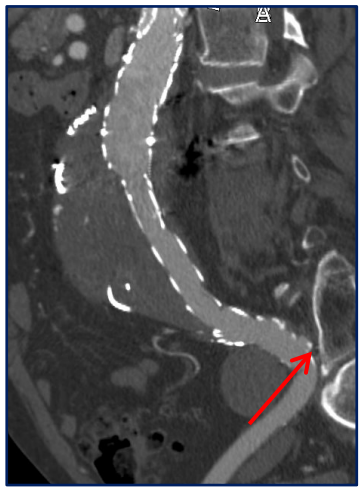
True El II



Concealed type I endoleak

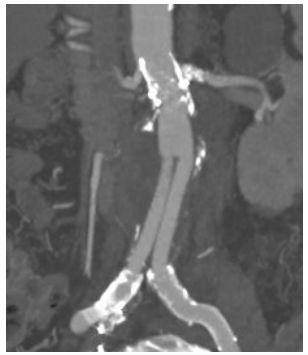
ANATOMICAL CHARACTERISTICS

RISK FOR ENDOLEAK TYPE II

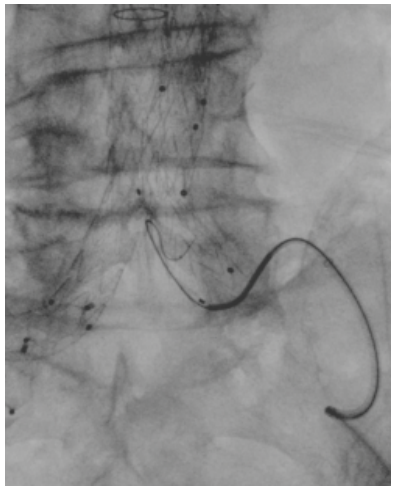


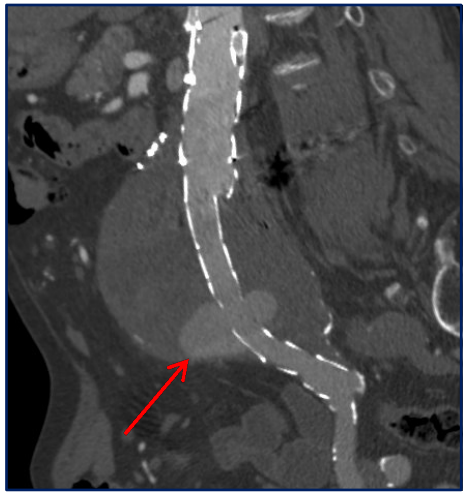
Loss of proximal or distal sealing

Post EVAR rupture



Emergency conversion





Type III endoleak after EI embolization

ANATOMICAL CHARACTERISTICS

RISK FACTORS FOR ENDOLEAK TYPE II

Definition of Type II Endoleak Risk Based on Preoperative Anatomical Characteristics

Michele Piazza, MD[1], Francesco Squizzato, MD[1], Tommaso Miccoli, MD[1], Sandro Lepidi, MD[1], Mirko Menegolo, MD[1], Franco Grego, MD[1], and Michele Antonello, MD[1]

Journal of Endovascular Therapy
1–7

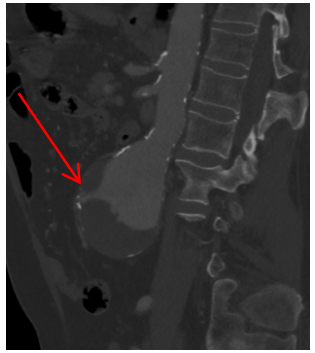
DOI: 10.1177/1526602817712511
www.jevt.org
SAGE

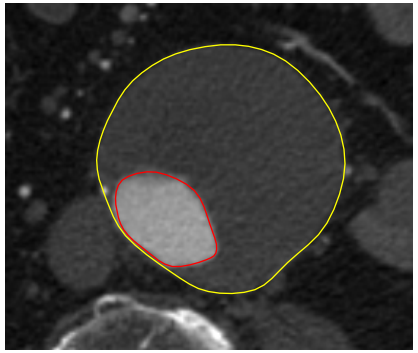
AT RISK: At least one of the following:

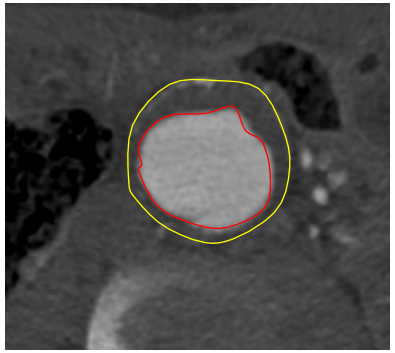
- IMA>3 mm
- 3 couples of lumbars
- 2 couples of lumbars + accessory renal artery/sacral artery/IMA<3mm

AT LOW RISK: All the remaining patients:

- Isolated IMA<3 mm
- 1 or 2 couples of lumbars
- 1 couple of lumbars + accessory renal artery/sacral artery/IMA<3mm







RESULTS FROM THE GREAT REGISTRY

Clinical Investigation

JOURNAL OF ENDOVASCULAR THERAPY

Journal of Endovascular Therapy
1–10

DOI: 10.1177/15266028211045703
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SAGE

Early and Long-Term Outcomes of Endovascular Aortic Repair in Young and Low Surgical Risk Patients in the Global Registry for Endovascular Aortic Treatment

Michele Piazza, MD[1*], Francesco Squizzato, MD[1*], Velipekka Suominen, MD, PhD[2], Franco Grego, MD[1], Santi Trimarchi, MD, PhD[3,4], and Michele Antonello, MD, PhD[1], on behalf of the GREAT Investigators

The GREAT is a prospective observational multicenter cohort registry using Gore endografts:

- Enrollement from 2010 to 2016
- 113 centers worldwide
- **5023** patients with aortic disease

RESULTS FROM THE GREAT REGISTRY

Clinical Investigation

JOURNAL OF ENDOVASCULAR THERAPY

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SAGE

Michele Piazza, MD[1*], Francesco Squizzato, MD[1*], Velipekka Suominen, MD, PhD[2], Franco Grego, MD[1], Santi Trimarchi, MD, PhD[3,4], and Michele Antonello, MD, PhD[1], on behalf of the GREAT Investigators

- **EXCLUSION CRITERIA**:
  - Prior AAA repair
  - Concomitant procedures (renal stenting, iliac branch devices)

  → **3217 patients with infrarenal AAA undergoing standard EVAR**

- **OUTCOMES**:
  - **Early (30-days) Major Advers Events (MAE):** death, myocardial infarction, respiratory insufficiency, acute kidney failure, type I or III endoleak or endograft migration
  - **5-years freedom from intervention**
  - **5-years overall mortality**

- **COMPARISON** of:
  - **Young** vs **old**
  - **Low risk** vs **moderate risk vs high risk**

RESULTS FROM THE GREAT REGISTRY

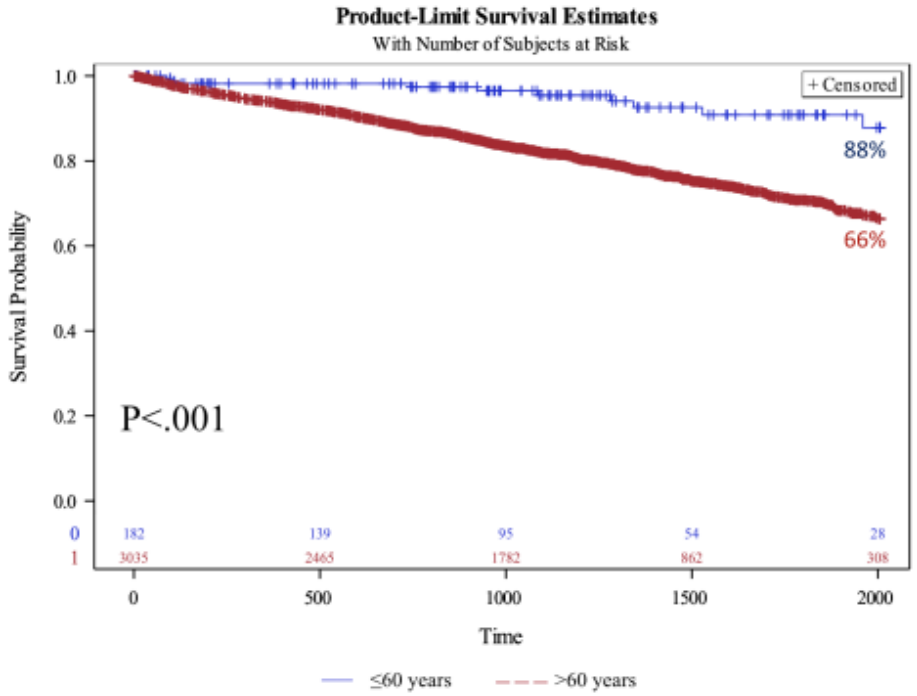
PREOPERATIVE CHARACTERISTICS

	Age			Operative risk			
Variable	**≤ 60 years (n=182)**	**> 60 years (n=3035)**	**P**	**Low risk (n=956)**	**Average risk (n=1561)**	**High risk (n=700)**	**P**
Demographics							
Male gender	158 (86.8)	2594 (85.4)	.617	956 (100.0)	1324 (84.8)	472 (67.4)	<.001
Anatomical factors							
Maximum diameter of Aortic Aneurysm, mm	56.5±13.6	57.1±11.0	. 130	57.3±11.6	56.6±11.0	57.7±11.0	.010
Maximum infrarenal neck angle, °	27.2±18.4	30.8±21.5	.052	29.6±21.8	30.1±20.6	33.1±22.2	.010
Proximal neck length, cm	2.7±1.1	2.8±1.5	518	2.9±1.7	2.8±1.3	2.7±1.3	015
Anything Outside IFU for Excluder	106(58.2)	1691(55.7)	.505	499(52.2)	901(57.7)	397(56.7)	.022
Proximal Neck Outside IFU[a]	11(6.3)	360(12.2)	.019	81(8.7)	187(12.3)	103(15.4)	.002

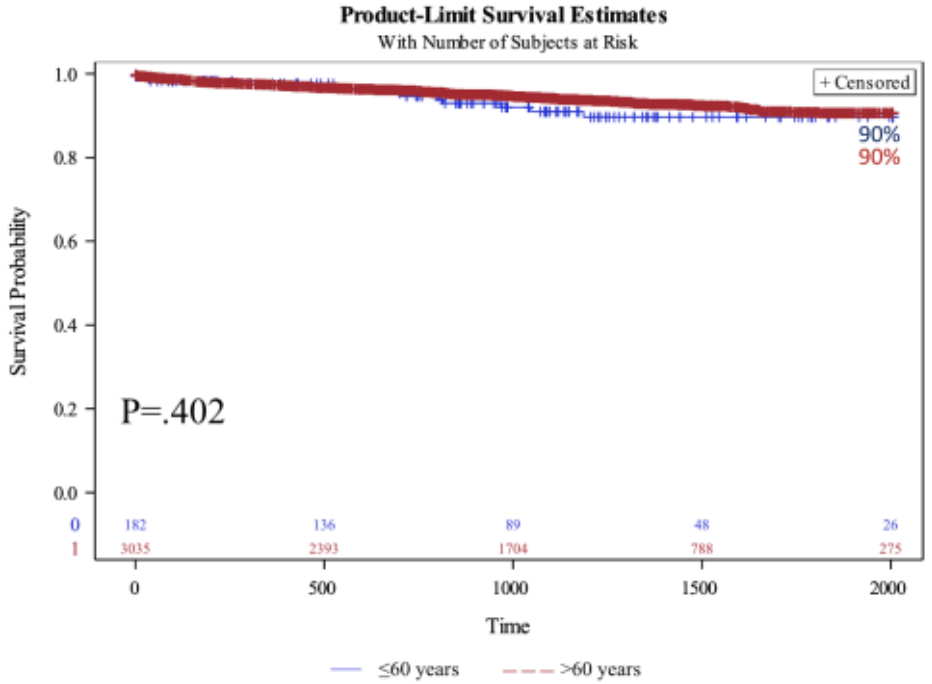
RESULTS

YOUNG PATIENTS

SURVIVAL



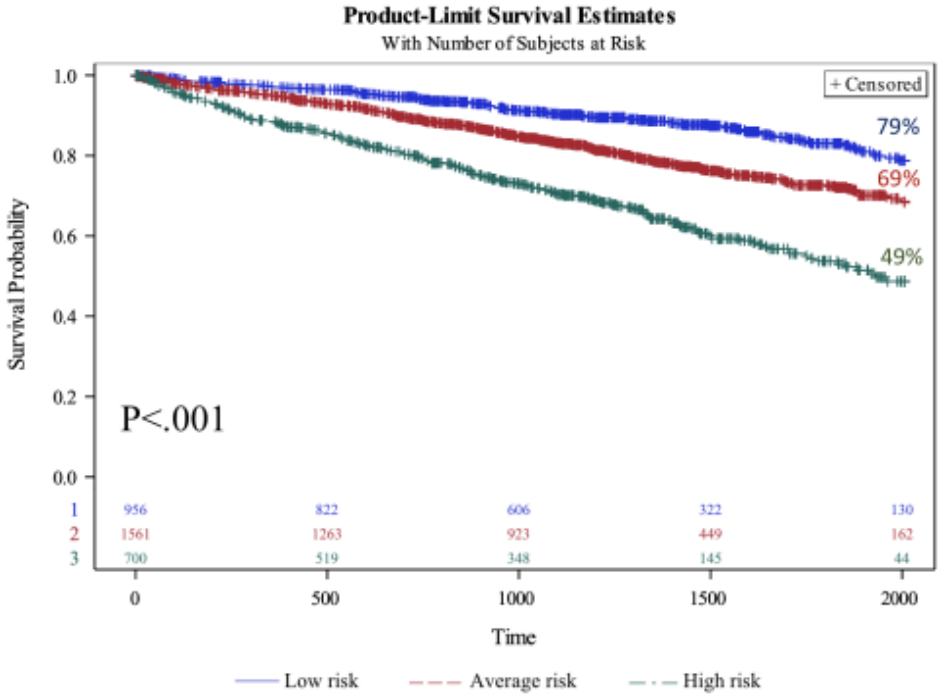
FREEDOM FROM REINTERVENTION



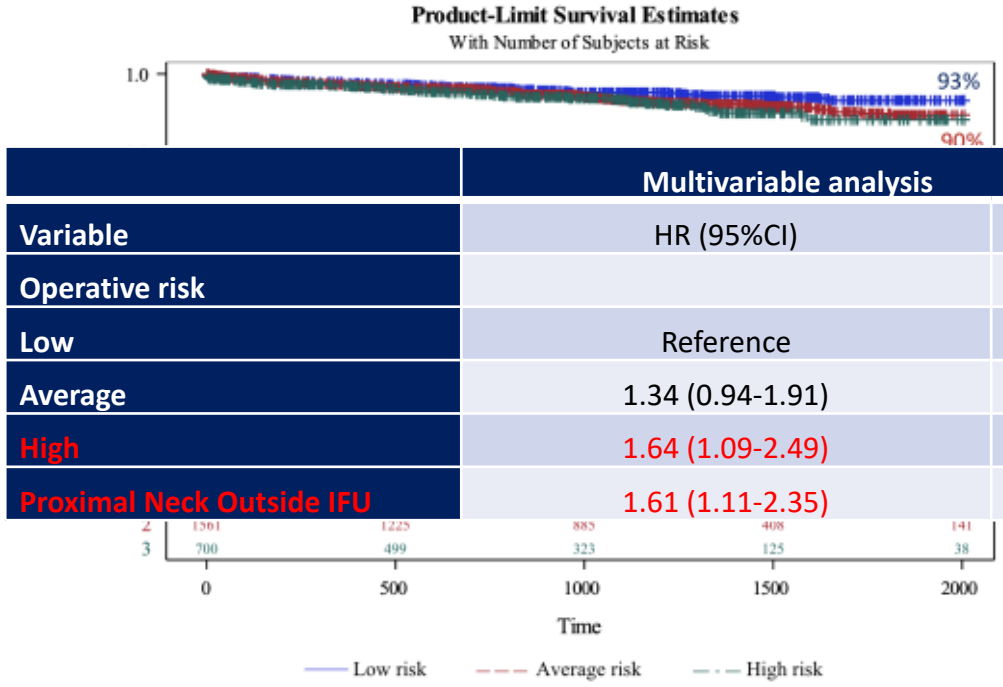
RESULTS

LOW-RISK PATIENTS

SURVIVAL



FREEDOM FROM REINTERVENTION



	Multivariable analysis	
Variable	HR (95%CI)	P
Operative risk		
Low	Reference	
Average	1.34 (0.94-1.91)	.108
High	1.64 (1.09-2.49)	.019
Proximal Neck Outside IFU	1.61 (1.11-2.35)	.013

CONCLUSION

- Long-term outcomes of EVAR with current devices are difficult to assess, owing to the continuous evoution of endovascular techniques and endografts.
- EVAR may represent a valid option for young patients, thanks to the low invasiveness, early return to job activities and daily life.
- Operative risk, rather than age alone, is a predictor of survival in patients undergoing EVAR.
- **If performed in patients with favorable anatomy**, EVAR can be safely offered also to low-risk patients as a valid solution, with particular regard to:
  - **Proximal neck characteristics**
  - **Risk for endoleak type II**
- **Open surgery still remains the gold standard for low-risk patients with unfavourable anatomy for EVAR**