TOP 10 PAPERS OF 2024

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Journal of Vascular Surgery

WVES | Winnipeg Vascular & Endovascular Symposium

Presenter Disclosure

Presenter: (Thomas Forbes)

- I have no current relationships with commercial entities

CRITERIA FOR SELECTION

- Published in 2024
- Importance to practice of vascular surgery
- Something new that we should be aware of
- Something different and interesting
- One surgeon’s opinion

J Vasc Surg 2024;80:1755-65

Editor's Choice – Short Term Cost Effectiveness of Radiofrequency Ablation and High Ligation and Stripping for Great Saphenous Vein Incompetence

Oskar Nelzén [a,*], Johan Skoog [b], Lars Bernfort [c], Helene Zachrisson [b]

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Eur J Vasc Endovasc Surg 2024;67:811-17

RFA versus Stripping for GSV incompetence

- First Scandinavian study analyzing cost effectiveness of superficial venous incompetence treatment options

- *Objective*: Economic analysis of ongoing RCT in patients with GSV incompetence (CEAP 2-6), comparing RFA, high ligation & stripping (HL/S) & conservative treatment with one year follow up

- 78 limbs treated with RFA & HL/S
- Conservative treatment was assumed to have zero treatment cost and no treatment benefit

Eur J Vasc Endovasc Surg 2024;67:811-17

RFA versus Stripping for GSV incompetence

Table 2. Demographic data of patients with great saphenous vein incompetence comparing radiofrequency ablation (RFA), high ligation and stripping (HL/S), and no treatment or conservative treatment with one year follow up

Characteristic	RFA	HL/S
Patients, bilateral	74 (4)	69 (9)
Limbs	78	78
Sex, female/male	51/27	45/33
Age − y	56 (31–82)	49 (22–75)
Diameter at proximal thigh − mm	7.40 (4.50–11.30)	7.20 (2.50–12.30)
CEAP clinical class, limbs		
C2	12	8
C3	25	32
C4	28	23
C5	9	14
C6	4	1

Data are presented as *n*, *n* (%), or mean (range). CEAP = Clinical-Etiology-Anatomy-Pathophysiology classification system.

Table 1. Unit costs from cost per patient analysis of patients with great saphenous vein incompetence comparing radiofrequency ablation (RFA), high ligation and stripping (HL/S), and no treatment or conservative treatment with one year follow up

Variable	Unit cost − SEK
Staff, cost per h	
Surgeon, Consultant	533
Surgeon, Registrar	423
Nurse	383
Assistant nurse	319
Theatre nurse	407
Operating theatre, mean per usage	
RFA	694
HL/S	1 267
Consumables, including RFA catheter	
RFA	4 606
HL/S	N/A

Eur J Vasc Endovasc Surg 2024;67:811-17

RFA versus Stripping for GSV incompetence

Table 3. Incremental cost effectiveness ratio (ICER) calculations in patients with great saphenous vein (GSV) incompetence comparing radiofrequency ablation (RFA), high ligation and stripping (HL/S), and no treatment or conservative treatment with one year follow up

Variable	RFA	HL/S	No treatment or conservative treatment (assumptions)
Direct costs			
SEK	14 217 ± 5 344	25 337 ± 4 406	0
€	1 292	2 303	
Days from work	1.16	8.31	0
Indirect costs			
SEK	2 779	19 911	
€	253	1 820	0
QALY gained	0.21	0.17	0
ICER HL/S *vs.* no treatment or conservative treatment, healthcare perspective	149 040 SEK/QALY (13 549 €/QALY)		
ICER HL/S *vs.* no treatment or conservative treatment, societal perspective	266 162 SEK/QALY (24 197 €/QALY)		
ICER for RFA *vs.* HL/S	RFA dominant (regardless of perspective)		

Costs are shown in Swedish krona (SEK) and euro (€) (conversion rate 11 SEK = 1€). Direct costs are calculated from cost per patient calculations, bootstrapped, and presented as mean values mean ± standard deviation. Indirect costs are based on mean days away from work for each method multiplied with mean daily salary in 2019. QALY = quality adjusted life years; ICER = incremental cost effectiveness ratio.

Eur J Vasc Endovasc Surg 2024;67:811-17

Take Home Messages

- In this economic analysis, RFA is more cost effective than HL/S and conservative treatment at one year
- Should be offered to not only patients with ulcers and skin changes, but also to the majority of patients with symptomatic veins
- HL/S is more expensive than RFA and should be reserved for situations where SFA is not possible
- Longer term follow up is needed to consider cost and clinical impact of recurrence and reinterventions

Eur J Vasc Endovasc Surg 2024;67:811-17

A registry-based study of paclitaxel drug-coated balloon angioplasty for the treatment of in-stent restenosis of the femoral-popliteal artery

Daniel J. Bertges, MD,[a] Jens Eldrup-Jorgensen, MD,[b] Rabih A. Chaer, MD,[c] Michael C. Stoner, MD,[d] Luke K. Marone, MD,[e] Kristina A. Giles, MD,[b] Brian G. DeRubertis, MD,[f] Glenn R. Jacobowitz, MD,[g] *and* Jack L. Cronenwett, MD,[h] For the Society for Vascular Surgery Vascular Quality Initiative, *Burlington, VT; Portland, ME; Pittsburgh, and Monongahela, PA; Rochester, and New York, NY; and Lebanon, NH*

J Vasc Surg 2024;79:1142-50

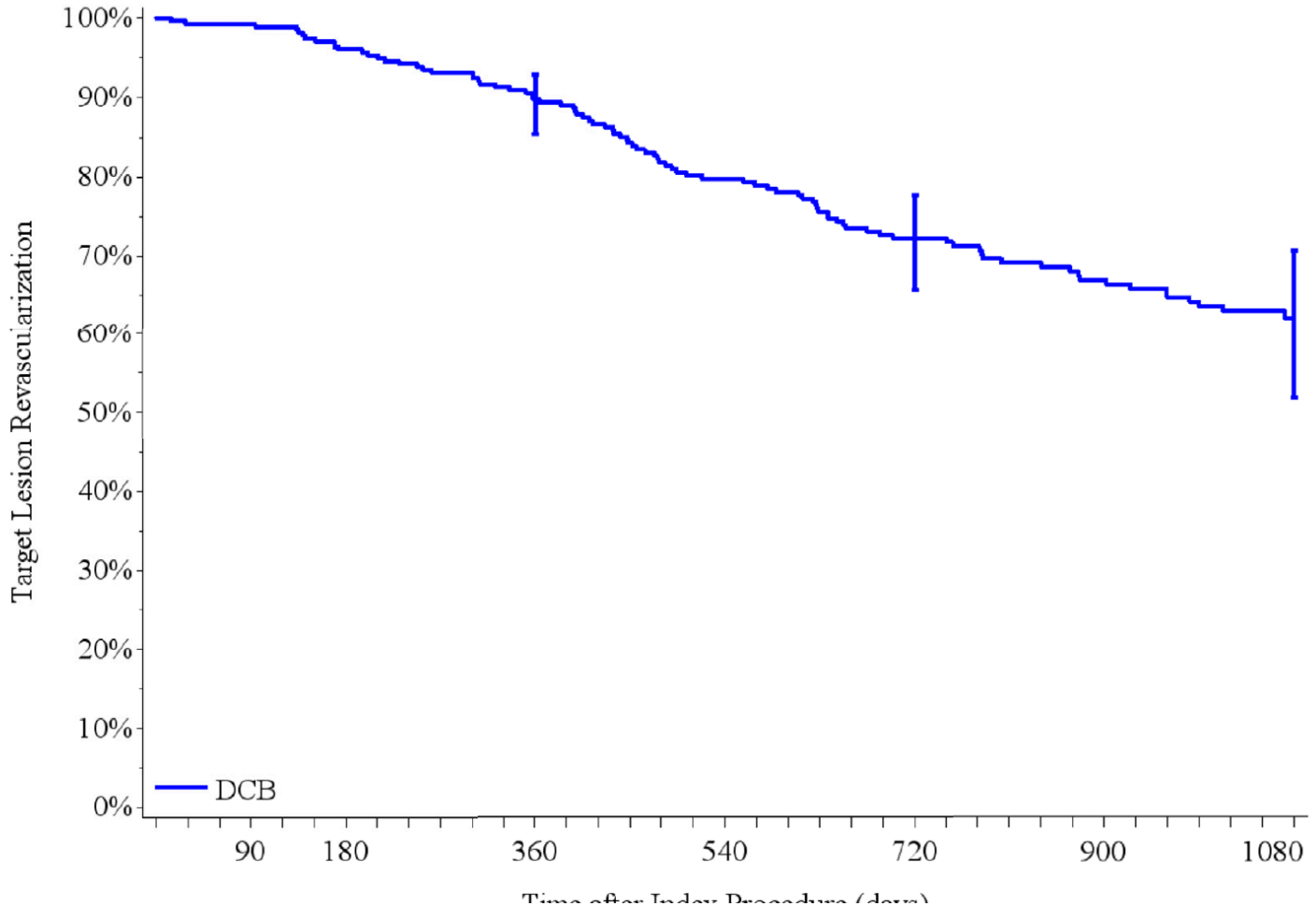
VQI Study of Paclitaxel Drug Coated Balloon

- Purpose of this VQI single armed study was to assess the safety and performance of a paclitaxel DCB in the treatment of SFA or popliteal in-stent restenosis
- 43 sites over a 4 year period with clinical outcomes to 3 years
- Primary endpoint: target vessel revascularization at 12 months
- Secondary endpoints: technical success, major amputation, all-cause mortality

J Vasc Surg 2024;79:1142-50

VQI Study of Paclitaxel Drug Coated Balloon

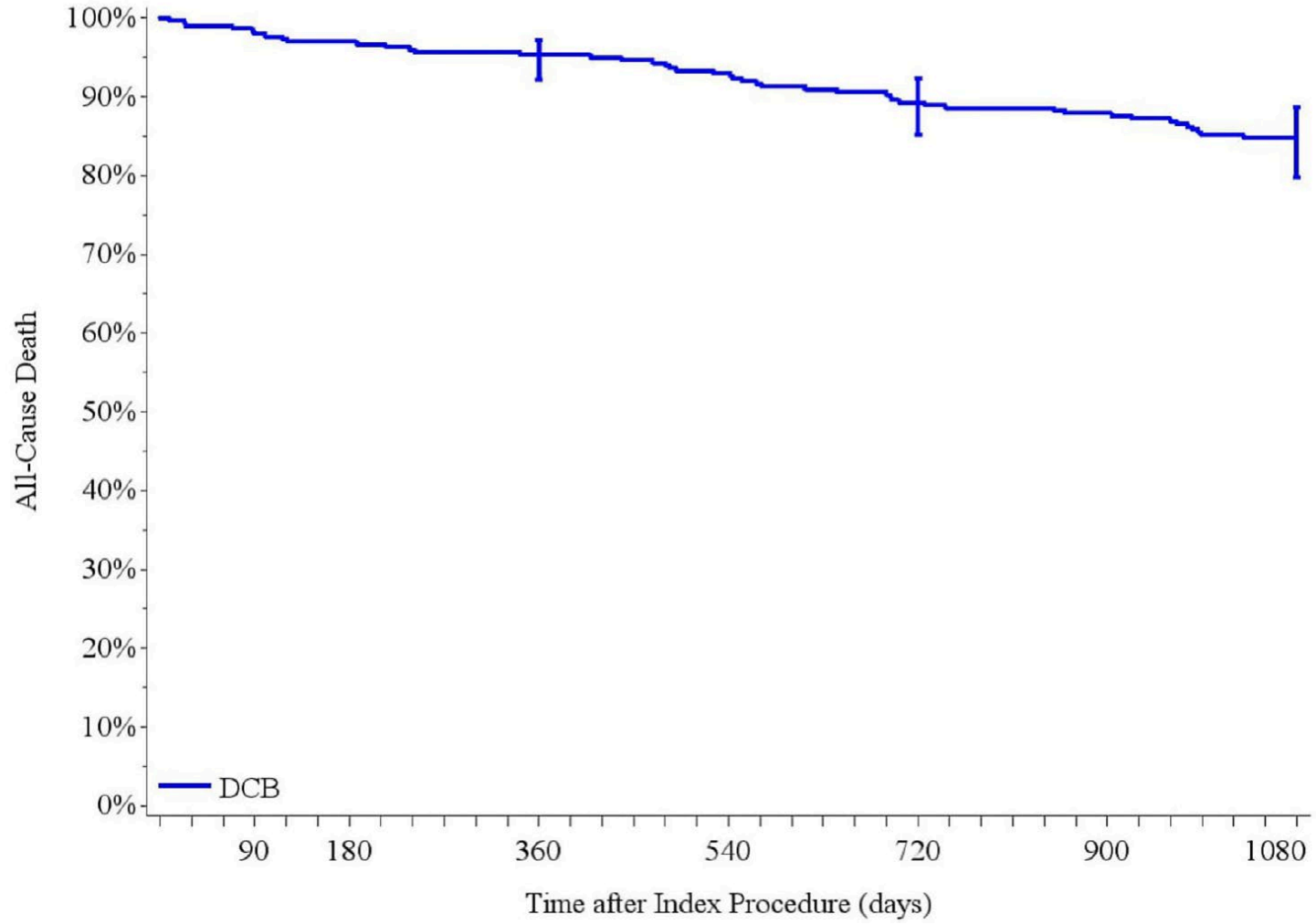
Target Vessel Revascularization



J Vasc Surg 2024;79:1142-50

VQI Study of Paclitaxel Drug Coated Balloon

All Cause Mortality



J Vasc Surg 2024;79:1142-50

Take Home Messages

- Paclitaxel DCB is an effective option for treating SFA & popliteal in-stent restenosis in symptomatic patients

- An example of a successful VQI registry driven post market evaluation of a peripheral device in partnership with industry and federal regulators

J Vasc Surg 2024;79:1142-50

DRUG-ELUTING RESORBABLE SCAFFOLD – LIFE-BTK

Drug-Eluting Resorbable Scaffold versus Angioplasty for Infrapopliteal Artery Disease

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Funded by Abbott

N Engl J Med 2024;390:9-19

DRUG-ELUTING RESORBABLE SCAFFOLD – LIFE-BTK

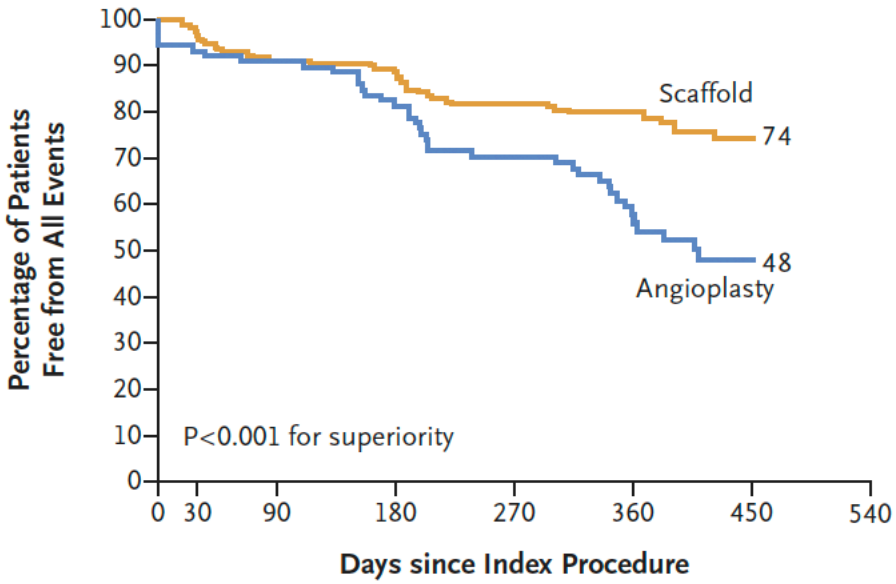
- In CLTI patient with BTK disease, angioplasty is associated with frequent reinterventions
- What is role of drug-eluting resorbable scaffolds?

- A single blind, multicenter RCT to evaluate safety & efficacy of a everolimus eluting resorbable scaffold (Esprit BTK, Abbott) in treating infrapopliteal disease in patient with CLTI
- 261 patients randomized
- Primary efficacy endpoint: 1 yr freedom from major amputation, vessel occlusion, clinically driven revascularization, binary restenosis
- Primary safety endopoint: 1 yr freedom from perioperative death & MALE

N Engl J Med 2024;390:9-19

DRUG-ELUTING RESORBABLE SCAFFOLD – LIFE-BTK

Efficacy



Days	0	30	90	180	365	453
No. at Risk						
Scaffold	173	163	152	142	95	42
Angioplasty	88	82	78	67	33	15
Patients Free from All Events (%)						
Scaffold	100	96	91	89	80	74
Angioplasty	94	93	91	81	54	48

N Engl J Med 2024;390:9-19

Take Home Messages

- In patients with CLTI due to infrapopliteal disease, an everolimus-eluting resorbable scaffold was superior to angioplasty with respect to primary efficacy endpoint
- Use of the scaffold was non-superior to angioplasty with primary safety endpoint

- Trial limitations
  - Highly selected trial participants with short lesions
  - Use of the scaffold was limited to the proximal two thirds of the infrapopliteal arteries.
  - Results can’t be extrapolated to other types and locations of lesions

N Engl J Med 2024;390:9-19

Editor's Choice – Bypass *versus* Angioplasty for Severe Ischaemia of the Leg (BASIL) Prospective Cohort Study and the Generalisability of the BASIL-2 Randomised Controlled Trial

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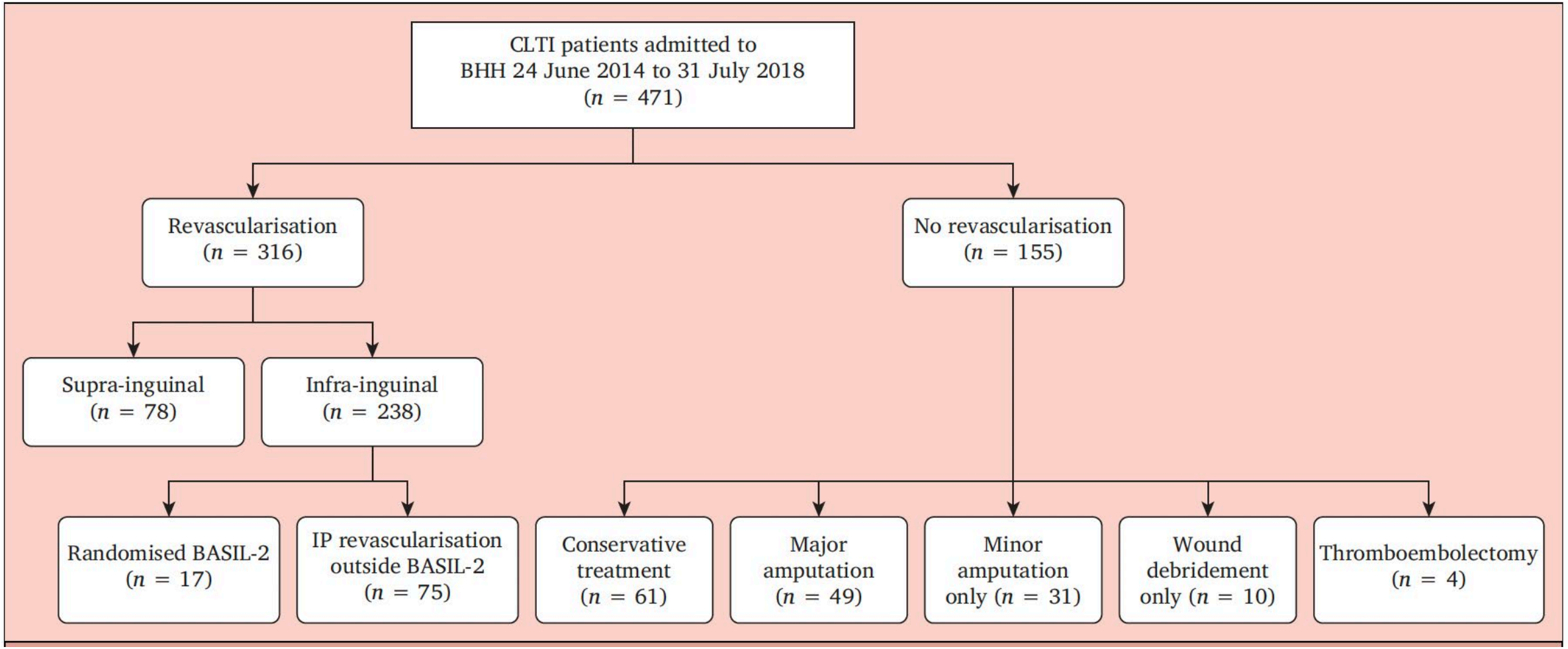
Eur J Vasc Endovasc Surg 2024;67:146-52

BASIL-2 GENERALISABILITY

- BASIL-2 RCT has shown that in patients with CLTI who require infrapopliteal revascularization, vein bypass first strategy had a 35% increased risk of major amputation or death compared to an endovascular first strategy
- Observational, single centre, observational study

Eur J Vasc Endovasc Surg 2024;67:146-52

BASIL-2 GENERALISABILITY



Eur J Vasc Endovasc Surg 2024;67:146-52

Take Home Messages

- Large number of patients presenting with CLTI were deemed unsuitable for enrollment in BASIL-2 for a variety of patient, limb, anatomic and operational reasons

- Results of BASIL-2 (and all RCTs) should be considered in this context

Eur J Vasc Endovasc Surg 2024;67:146-52

Editor's Choice – Reduction of Major Amputations after Surgery versus Endovascular Intervention: The BEST-CLI Randomised Trial

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Eur J Vasc Endovasc Surg 2024;68:590-7

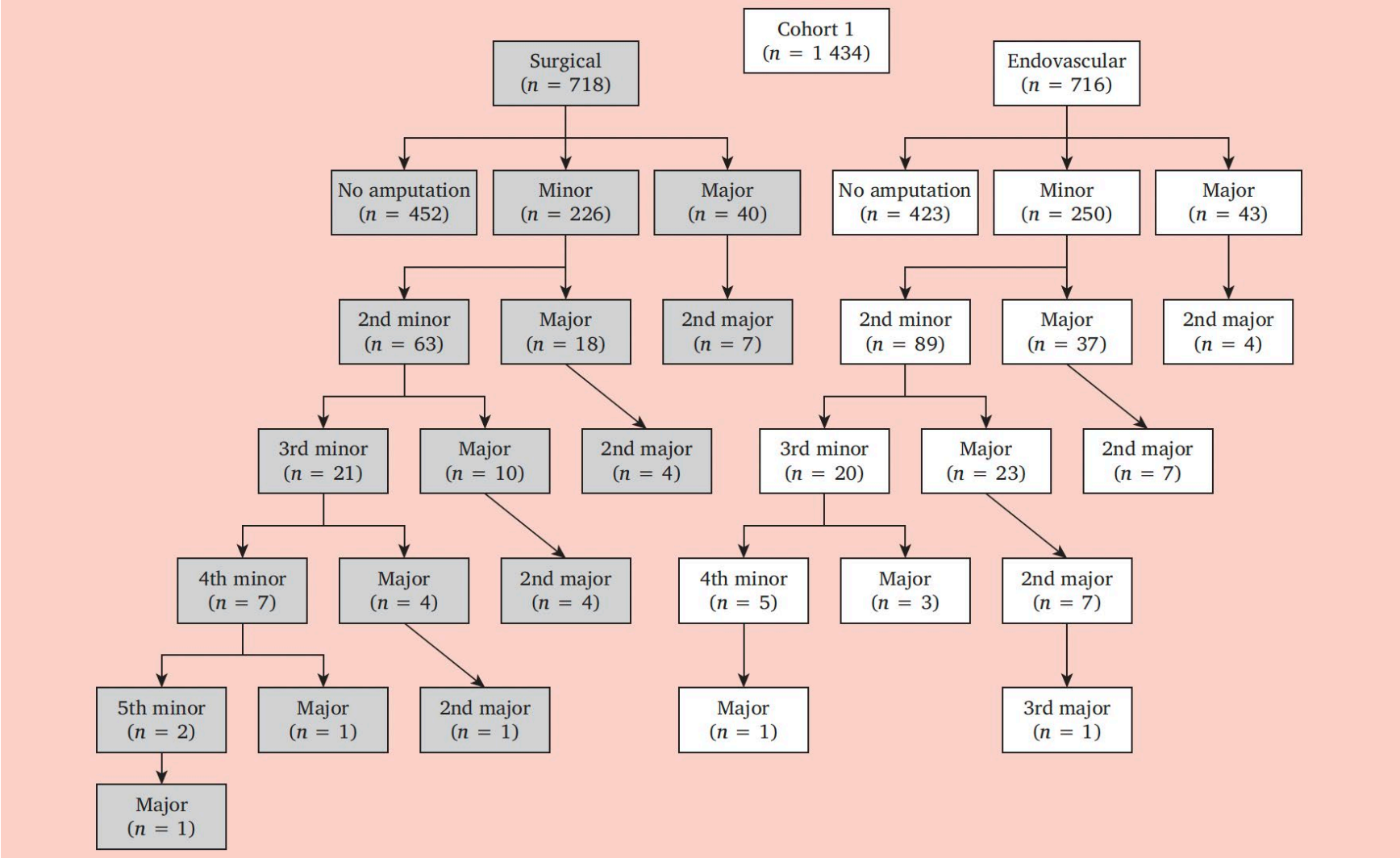
BEST-CLI and Major Amputations

- Prospective, multicenter, randomized controlled trial
- 1830 patients randomized to open surgical bypass (OPEN) or endovascular intervention (ENDO) for CLTI with infrainguinal arterial disease
- Primary results previously reported (NEJM 2022;387:2305-16)

- Cohort 1: adequate single segment GSV
- Cohort 2: without adequate GSV

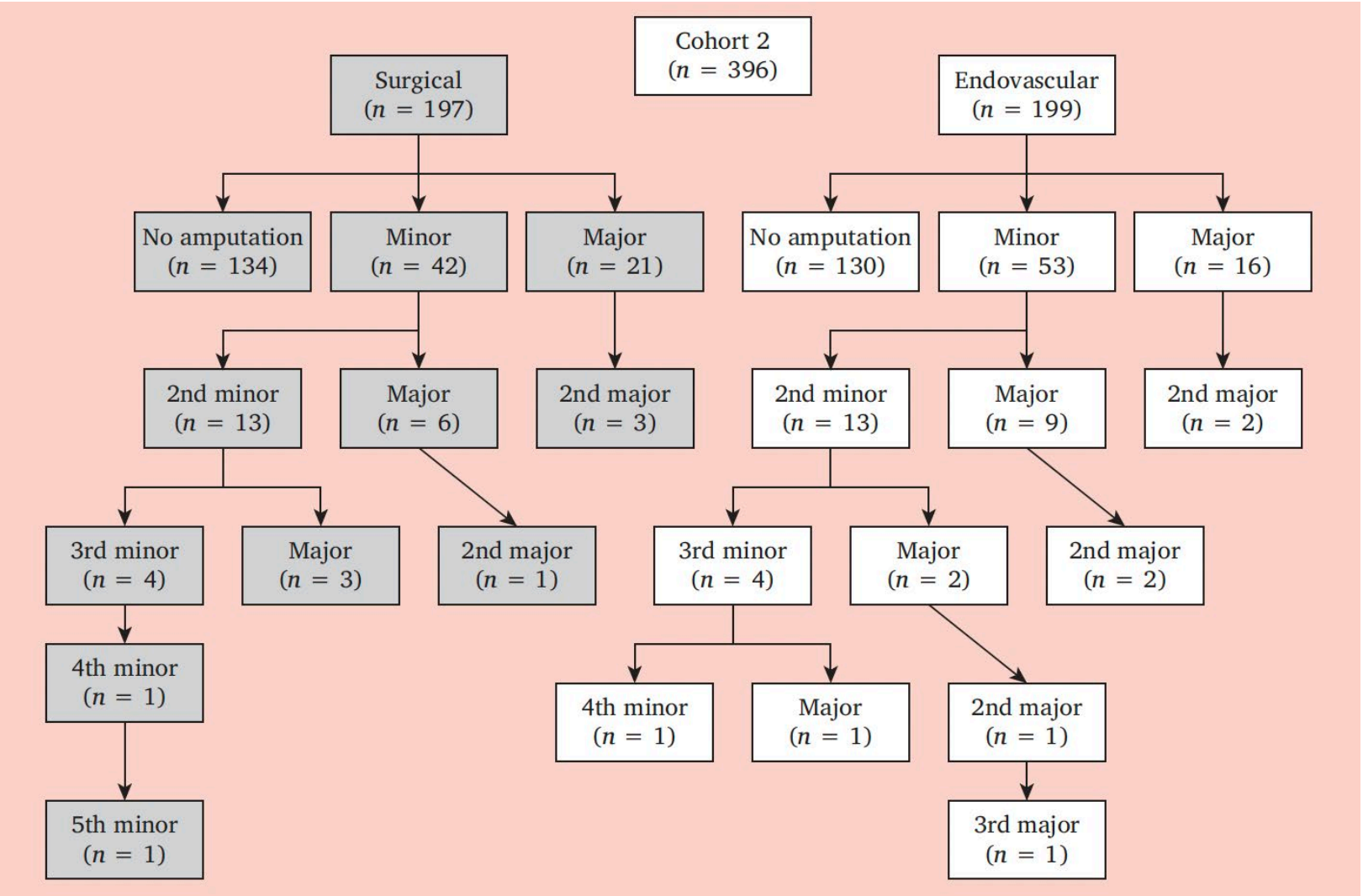
Eur J Vasc Endovasc Surg 2024;68:590-7

BEST-CLI and Major Amputations



Eur J Vasc Endovasc Surg 2024;68:590-7

BEST-CLI AND MAJOR AMPUTATIONS



Eur J Vasc Endovasc Surg 2024;68:590-7

Take Home Messages

- Cohort 1 (adequate single segment GSV)
  - Incidence of first major amputation was similar between surgical & endovascular group
  - BUT, incidence of major amputation after minor amputation (and total incidence of major amputations) was significantly higher in endovascular group compared to surgical group

- Cohort 2 (inadequate single segment GSV)
  - No difference between first major amputation, major amputation after minor amputation or total major amputations

Eur J Vasc Endovasc Surg 2024;68:590-7

The impact of revascularization strategy on clinical failure, hemodynamic failure, and chronic limb-threatening ischemia symptoms in the BEST-CLI Trial

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J Vasc Surg 2024;80:1755-65

REVASCULARIZATION STRATEGY IN BEST-CLI

- Prospective, multicenter, randomized controlled trial
- 1830 patients randomized to open surgical bypass (OPEN) or endovascular intervention (ENDO) for CLTI with infrainguinal arterial disease
- Primary results previously reported (NEJM 2022;387:2305-16)

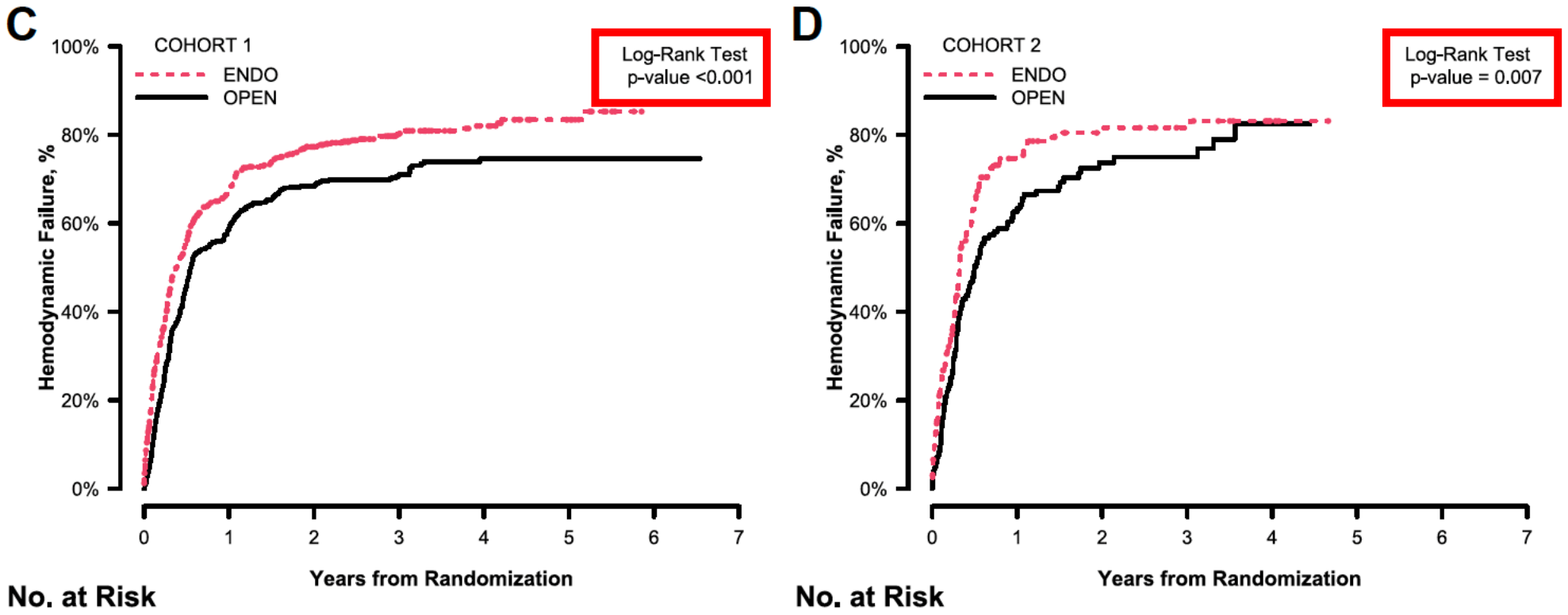
- Analysis of secondary endpoints (ITT):
  - *Hemodynamic failure*: composite of major amp, reintervention to maintain patency, failure to increase ABI by 0.15 or decrease of 0.15, >50% restenosis in treated limb
  - *Clinical failure*: composite of all cause death, major amp or reintervention, degradation of WIfI stage
  - *Resolution of CLTI symptoms*: time to rest pain resolution and/or healed tissue loss
  - *New/recurrent symptoms*: new/recurrent CLTI events

J Vasc Surg 2024;80:1755-65

REVASCULARIZATION STRATEGY IN BEST-CLI

- Cohort 1: 1434 patients with adequate GSV for single segment bypass
- Cohort 2: 396 patients without adequate GSV

Hemodynamic Failure

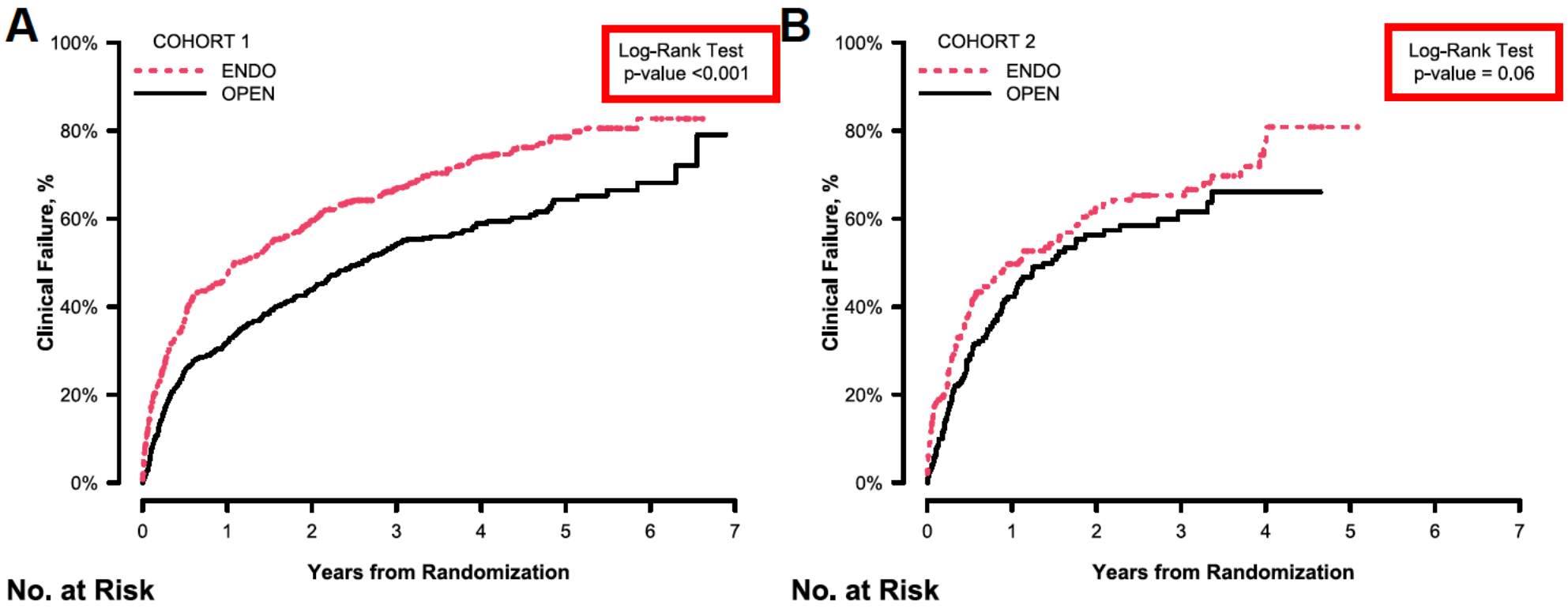


J Vasc Surg 2024;80:1755-65

REVASCULARIZATION STRATEGY IN BEST-CLI

- Cohort 1: 1434 patients with adequate GSV for single segment bypass
- Cohort 2: 396 patients without adequate GSV

Clinical Failure

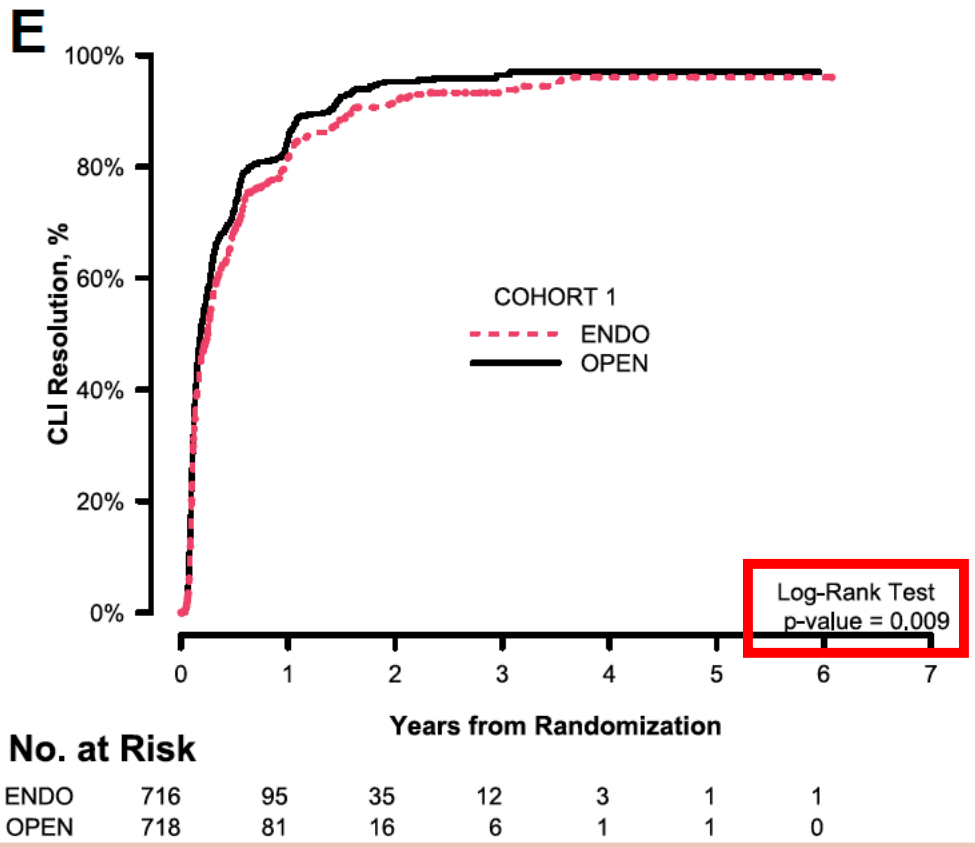


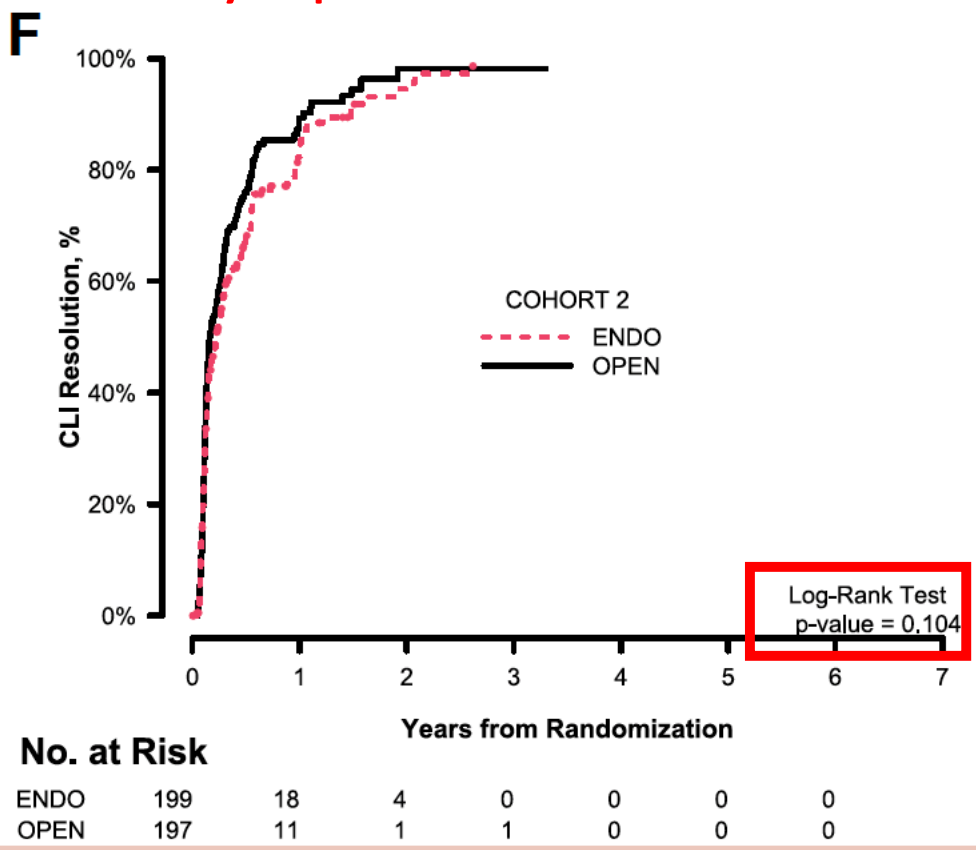
J Vasc Surg 2024;80:1755-65

REVASCULARIZATION STRATEGY IN BEST-CLI

- Cohort 1: 1434 patients with adequate GSV for single segment bypass
- Cohort 2: 396 patients without adequate GSV

Resolution of CLTI Symptoms





J Vasc Surg 2024;80:1755-65

Take Home Messages

- Open surgical bypass had lower rates of clinical & hemodynamic failure regardless of type of conduit used

- Open surgical bypass, especially with GSV, was more effective at healing wounds and preventing recurrent CLTI than endovascular therapy

J Vasc Surg 2024;80:1755-65

COMPLIANCE WITH SVS AAA GUIDELINES 4

Decreasing prevalence of centers meeting the Society for Vascular Surgery abdominal aortic aneurysm guidelines in the United States

Joel L. Ramirez, MD,[a,b] Zachary A. Matthay, MD,[a] Elizabeth Lancaster, MD,[a] Eric J. T. Smith, MD,[a] Warren J. Gasper, MD,[a] Devin S. Zarkowsky, MD,[c] Adam J. Doyle, MD,[d] Virendra I. Patel, MD,[e] Andres Schanzer, MD,[f] Michael S. Conte, MD,[a] *and* James C. Iannuzzi, MD, MPH,[a] *San Francisco and La Jolla, CA; Rochester and New York, NY; and Worcester, MA*

J Vasc Surg 2024;79:240-9

COMPLIANCE WITH SVS AAA GUIDELINES

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

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J Vasc Surg. 2018 Jan;67(1):2–77.e2

Elective EVAR to be performed in hospitals

- with documented mortality and conversion rate to open surgical repair of ≤ 2%, and
- that perform at least 10 EVAR cases/year.

Elective Open AAA to be performed in hospitals

- with a mortality rate < 5%, and
- that perform at least 10 open aortic operations of any type/year.

Compliance with SVS AAA Guidelines

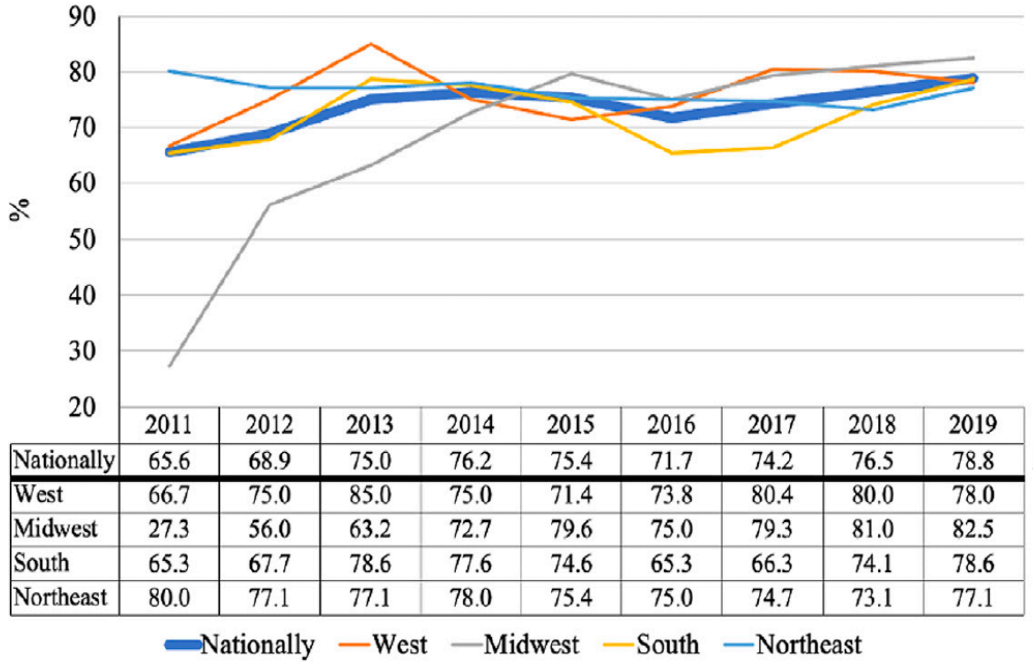
- VQI study between 2011 and 2019
  - Annual EVAR and OAR case volumes
  - Perioperative mortality
  - EVAR conversion to open repair

J Vasc Surg 2024;79:240-9

COMPLIANCE WITH SVS AAA GUIDELINES

EVAR

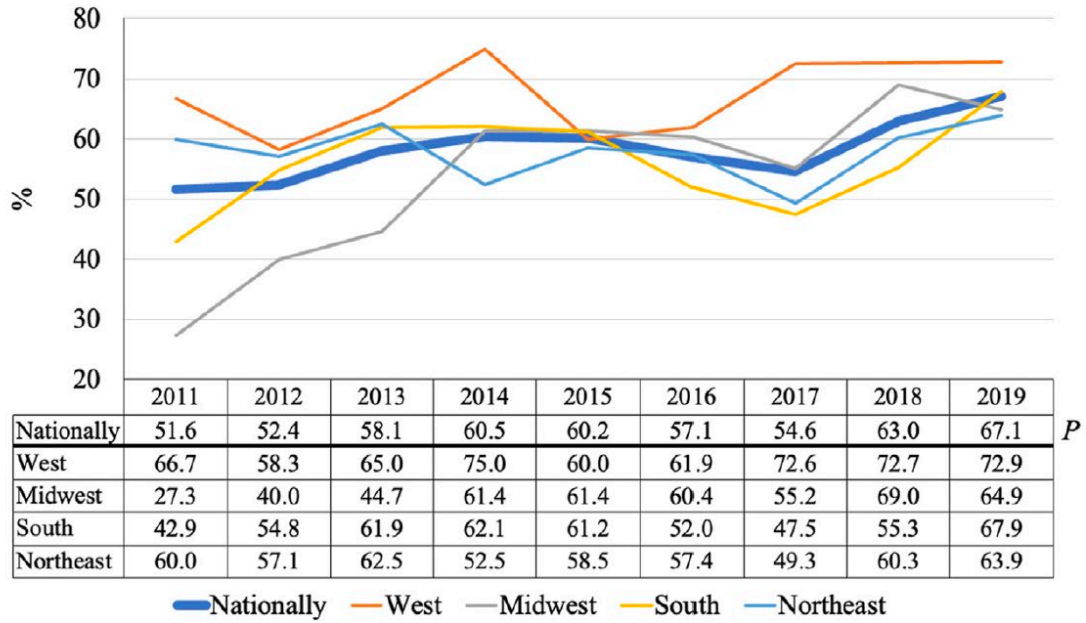
Institutions that Meet the SVS Guidelines for Annual Volume for EVAR



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Nationally	65.6	68.9	75.0	76.2	75.4	71.7	74.2	76.5	78.8
West	66.7	75.0	85.0	75.0	71.4	73.8	80.4	80.0	78.0
Midwest	27.3	56.0	63.2	72.7	79.6	75.0	79.3	81.0	82.5
South	65.3	67.7	78.6	77.6	74.6	65.3	66.3	74.1	78.6
Northeast	80.0	77.1	77.1	78.0	75.4	75.0	74.7	73.1	77.1

$P = 0.04$

Institutions that Meet the SVS Guidelines for Annual Mortality, Conversion to Open, and Volume for EVAR



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Nationally	51.6	52.4	58.1	60.5	60.2	57.1	54.6	63.0	67.1
West	66.7	58.3	65.0	75.0	60.0	61.9	72.6	72.7	72.9
Midwest	27.3	40.0	44.7	61.4	61.4	60.4	55.2	69.0	64.9
South	42.9	54.8	61.9	62.1	61.2	52.0	47.5	55.3	67.9
Northeast	60.0	57.1	62.5	52.5	58.5	57.4	49.3	60.3	63.9

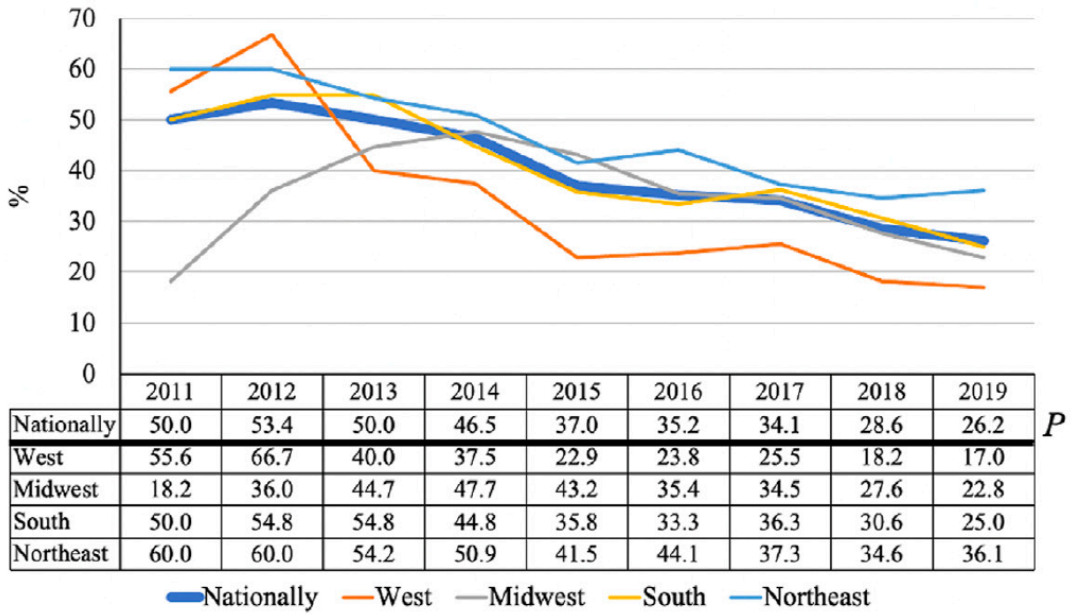
$P = 0.02$

J Vasc Surg 2024;79:240-9

COMPLIANCE WITH SVS AAA GUIDELINES

OAR

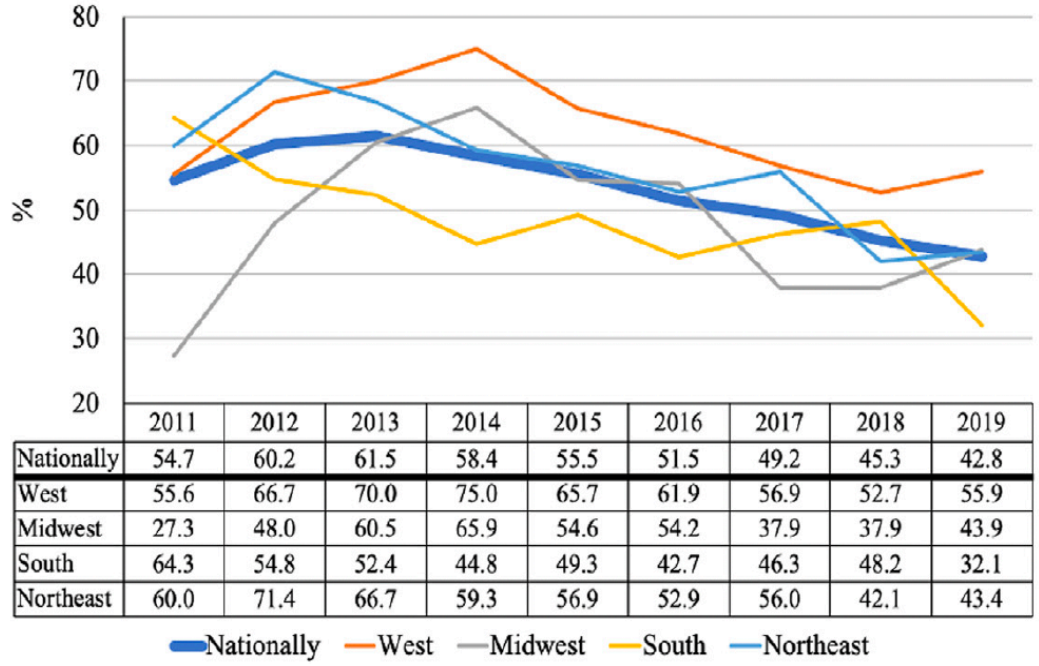
Institutions that Meet the SVS Guidelines for Annual Volume for OAR



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Nationally	50.0	53.4	50.0	46.5	37.0	35.2	34.1	28.6	26.2
West	55.6	66.7	40.0	37.5	22.9	23.8	25.5	18.2	17.0
Midwest	18.2	36.0	44.7	47.7	43.2	35.4	34.5	27.6	22.8
South	50.0	54.8	54.8	44.8	35.8	33.3	36.3	30.6	25.0
Northeast	60.0	60.0	54.2	50.9	41.5	44.1	37.3	34.6	36.1

$P < 0.01$

Institutions that Meet the SVS Guidelines for Annual Mortality for OAR



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Nationally	54.7	60.2	61.5	58.4	55.5	51.5	49.2	45.3	42.8
West	55.6	66.7	70.0	75.0	65.7	61.9	56.9	52.7	55.9
Midwest	27.3	48.0	60.5	65.9	54.6	54.2	37.9	37.9	43.9
South	64.3	54.8	52.4	44.8	49.3	42.7	46.3	48.2	32.1
Northeast	60.0	71.4	66.7	59.3	56.9	52.9	56.0	42.1	43.4

$P < 0.01$

J Vasc Surg 2024;79:240-9

Take Home Messages

- EVAR – increasing proportion of US hospitals meet SVS guidelines
- OAR – smaller proportion of US hospitals meet SVS guidelines with concerning downward trend. Implications for patient safety and training.
- Canadian experience?

J Vasc Surg 2024;79:240-9

Diagnosis and treatment of ischemia-producing coronary stenoses improves 5-year survival of patients undergoing major vascular surgery

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J Vasc Surg 2024;80:240-8

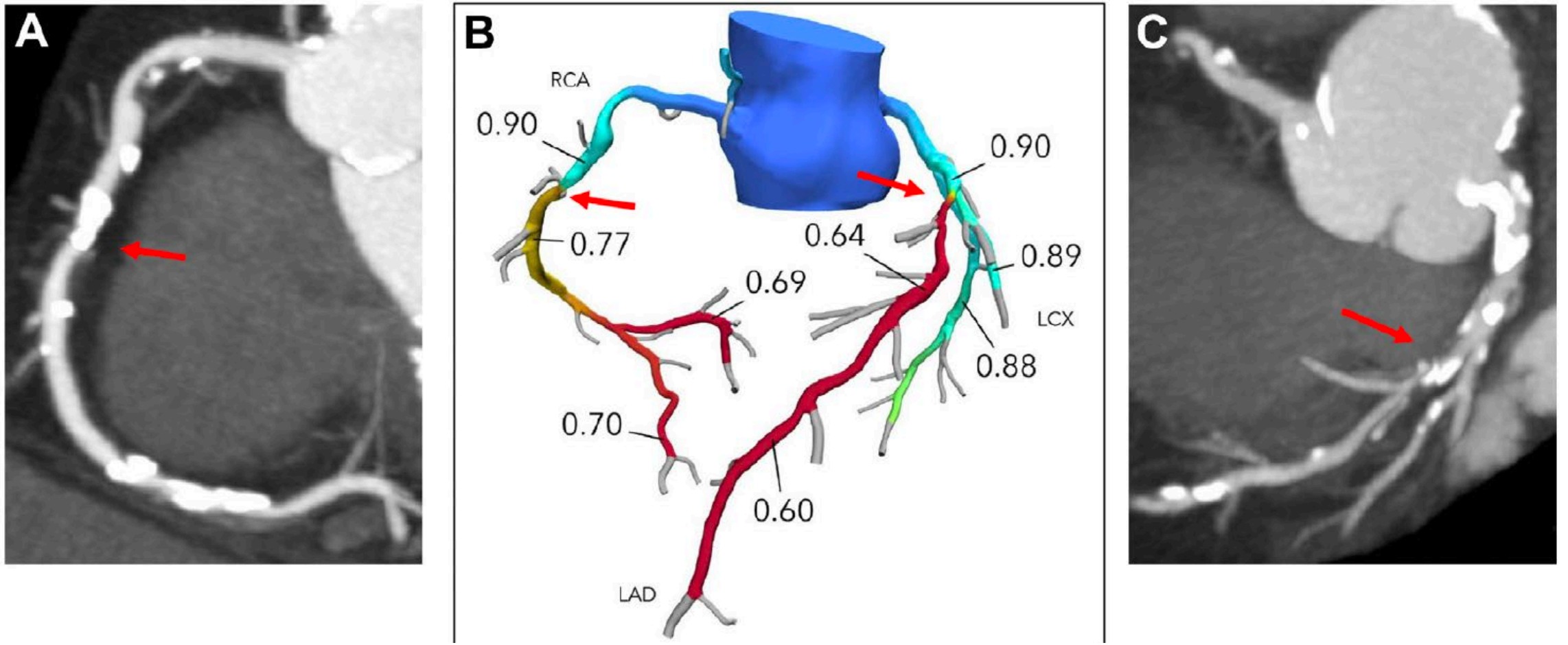
Silent Coronary ischemia and major vascular surgery

- Current guidelines of no cardiac testing or revascularization in patients with no cardiac symptoms prior to major vascular surgery are based on old RCTs where coronary angiograms were used to guide interventions
- Current standard is CT derived Fraction Flow Reserve (FFR) to identify hemodynamically significant stenosis

- Can preoperative CT-FFR and postoperative ischemia targeted coronary revascularization reduce cardiac events and improve survival following major vascular surgery
- Observational cohort of 552 patients with no coronary symptoms or history undergoing scheduled carotid, PAD, aneurysm surgery
  - Group 1 (228 patients): preop CT-FFR + selective postoperative coronary revascularization + BMT
  - Group 2 (234 matched controls): standard preoperative evaluation + BMT

J Vasc Surg 2024;80:240-8

Silent Coronary ischemia and major vascular surgery



J Vasc Surg 2024;80:240-8

SILENT CORONARY ISCHEMIA AND MAJOR VASCULAR SURGERY

Endpoints	FFR_{CT} guided (n = 288)	Usual Care (n = 234)	HR (95% CI)	*P* value
Endpoints at 1 year				
All-cause death	7 (2)	13 (6)	0.33 (0.11-1.01)	.063
Cardiovascular death	3 (1)	12 (5)	0.08 (0.01-0.61)	.006
Myocardial infarction	4 (1)	21 (9)	0.13 (0.04-0.40)	< .001
MACE (death, MI, or stroke)	13 (5)	26 (11)	0.28 (0.13-0.62)	.004
Endpoints at 5 years				
All-cause death	47 (16)	85 (36)	0.37 (0.22-0.60)	< .001
Cardiovascular death	11 (4)	50 (21)	0.11 (0.04-0.33)	< .001
Myocardial infarction	11 (4)	56 (24)	0.13 (0.05-0.33)	< .001
MACE (death, MI, or stroke)	57 (20)	111 (47)	0.36 (0.23-0.56)	< .001

CI, Confidence interval; *FFR_{CT}*, computed tomography fractional flow reserve; *HR*, hazard ratio; *MACE*, major adverse cardiac events.
Data presented as number (%).

J Vasc Surg 2024;80:240-8

Take Home Messages

- Cohort 1 (preoperative CT-FFR) had a 50% reduction in all-cause mortality, MI & MACE and improved 5-year survival compared to patients receiving usual care

- In patients undergoing major vascular surgery procedures the diagnosis of asymptomatic (silent) coronary ischemia and postoperative ischemia guided coronary revascularization may reduce the risk of cardiovascular death and myocardial infarction and improve long term survival

J Vasc Surg 2024;80:240-8

UK COMPLEX ANEURYSM STUDY (UK-COMPASS) 2

Editor's Choice – Comparison of Open Surgery and Endovascular Techniques for Juxtarenal and Complex Neck Aortic Aneurysms: The UK COMPlex AneurySm Study (UK-COMPASS) — Peri-operative and Midterm Outcomes

Srinivasa R. Vallabhaneni [a,b,*], Shaneel R. Patel [a,b], Bruce Campbell [c,d], Jonathan R. Boyle [e,f], Andrew Cook [g], Alastair Crosher [h], Sophie M. Holder [h], Michael P. Jenkins [i], David C. Ormesher [j], Anna Rosala-Hallas [k], Richard J. Jackson [k]

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[b] Department of Cardiovascular and Metabolic Medicine, University of Liverpool, Liverpool, UK
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[k] Liverpool Clinical Trials Centre, University of Liverpool, Liverpool, UK

Eur J Vasc Endovasc Surg 2024;67:540-53

UK COMPLEX ANEURYSM STUDY (UK-COMPASS)

- Cohort comparison with propensity stratification of short or complex neck aneurysms in England with corelab validation
- 2017 – 2019: All AAA procedures in England were identified, anatomy assessed in corelab & risk scores identified & propensity scores utilized
- Stratified by aneurysm neck length: 0-4 mm, 5-9 mm, >10 mm
- Stratified by high or standard risk
- Primary outcome measure: mortality

Eur J Vasc Endovasc Surg 2024;67:540-53

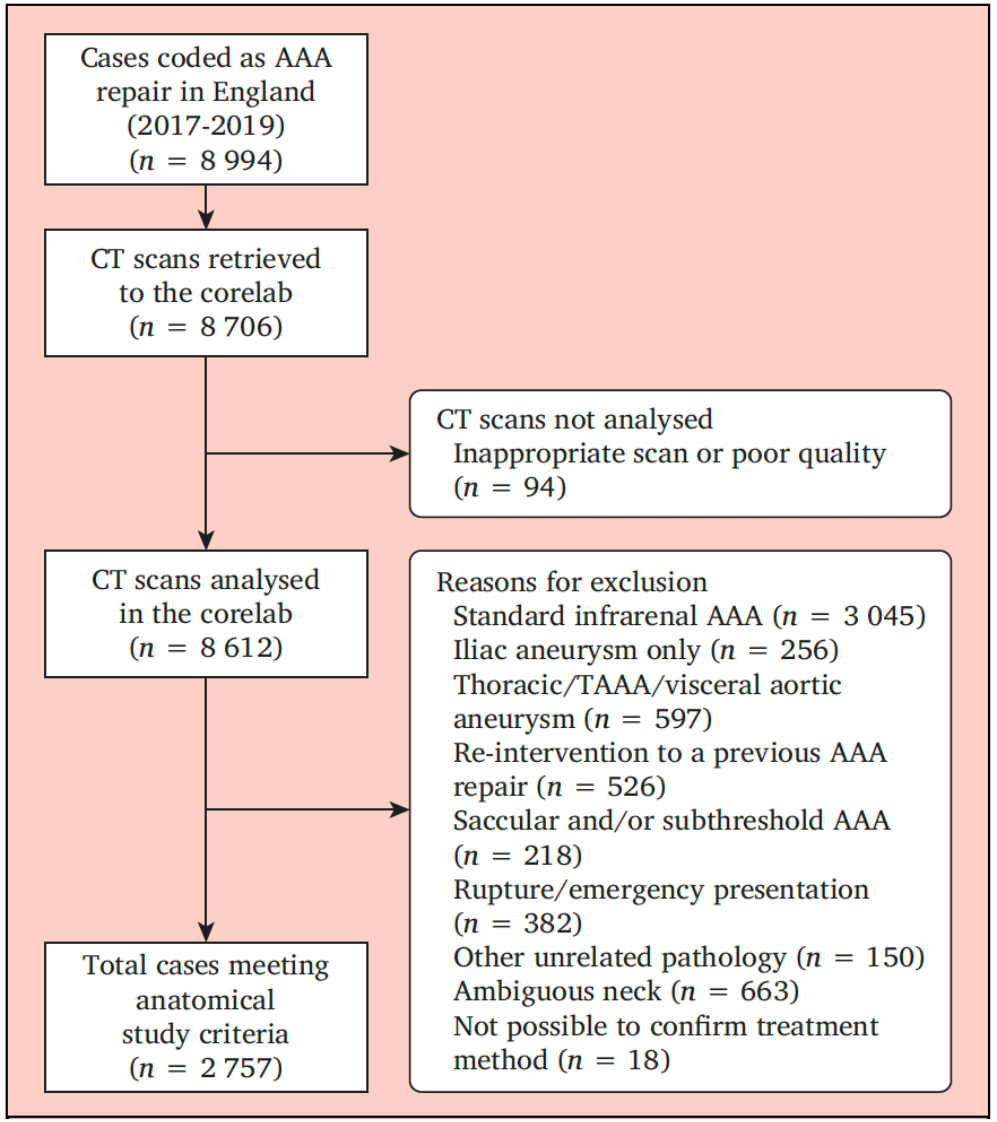
UK COMPLEX ANEURYSM STUDY (UK-COMPASS)

Table 1. Treatment strategies for juxtarenal and complex neck abdominal aortic aneurysms observed in this study

(1) Open surgical repair	Using sutured anastomoses of a surgical conduit, by any access approach
(2) Fenestrated EVAR (FEVAR)	Using one of the three commercial devices available in the UK during the study period: (a) Zenith Fenestrated (Cook Medical Ltd., Hitchin, UK) (b) Fenestrated Anaconda (Vascutek Ltd., Glasgow, UK) (c) Jotec Extra design Service (Jotec UK [latterly Artivion], Evesham, UK)
(3) Combination of standard EVAR with adjuncts	Standard EVAR combined with: (a) endoluminal screws (b) parallel stent grafts (chimney or snorkel)
(4) Off label standard EVAR	Use of an off the shelf unmodified commercial stent graft outside IFU in relation to aneurysm neck anatomy was referred to as off label standard EVAR

Eur J Vasc Endovasc Surg 2024;67:540-53

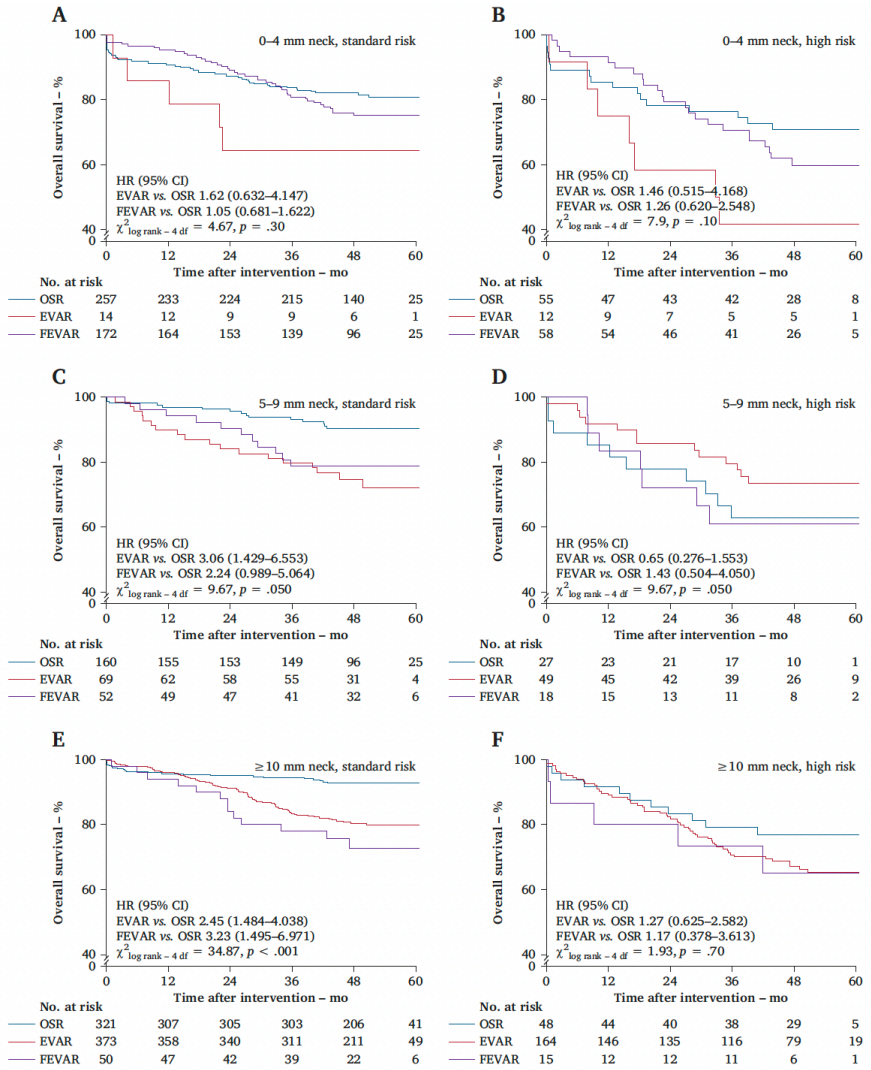
UK COMPLEX ANEURYSM STUDY (UK-COMPASS)



OSR – 940
EVAR – 866
FEVAR - 403

Eur J Vasc Endovasc Surg 2024;67:540-53

UK COMPLEX ANEURYSM STUDY (UK-COMPASS)



Eur J Vasc Endovasc Surg 2024;67:540-53

Take Home Messages

- Juxtarenal aneurysms (0-4 mm)
  - FEVAR safer than OSR in perioperative period with similar mid-term survival
  - Off label standard EVAR, even with adjuncts, performed poorly and is not recommended

- Short neck (5-9 mm) or Complex neck aneurysms (>10 mm but unsuitable for on-label standard EVAR)
  - OSR had significantly better mid-term survival than FEVAR & EVAR
  - Cannot be explained by aneurysm related mortality

- Calls for reappraisal of current clinical application of endovascular strategies in patients with limited survival or are high risk due to comorbidity and age

Eur J Vasc Endovasc Surg 2024;67:540-53

MICROPLASTICS IN ATHEROMAS

1

Microplastics and Nanoplastics in Atheromas and Cardiovascular Events

R. Marfella, F. Prattichizzo, C. Sardu, G. Fulgenzi, L. Graciotti, T. Spadoni, N. D'Onofrio, L. Scisciola, R. La Grotta, C. Frigé, V. Pellegrini, M. Municinò, M. Siniscalchi, F. Spinetti, G. Vigliotti, C. Vecchione, A. Carrizzo, G. Accarino, A. Squillante, G. Spaziano, D. Mirra, R. Esposito, S. Altieri, G. Falco, A. Fenti, S. Galoppo, S. Canzano, F.C. Sasso, G. Matacchione, F. Olivieri, F. Ferraraccio, I. Panarese, P. Paolisso, E. Barbato, C. Lubritto, M.L. Balestrieri, C. Mauro, A.E. Caballero, S. Rajagopalan, A. Ceriello, B. D'Agostino, P. Iovino, and G. Paolisso

N Engl J Med 2024;390:900-10

MICROPLASTICS IN ATHEROMAS

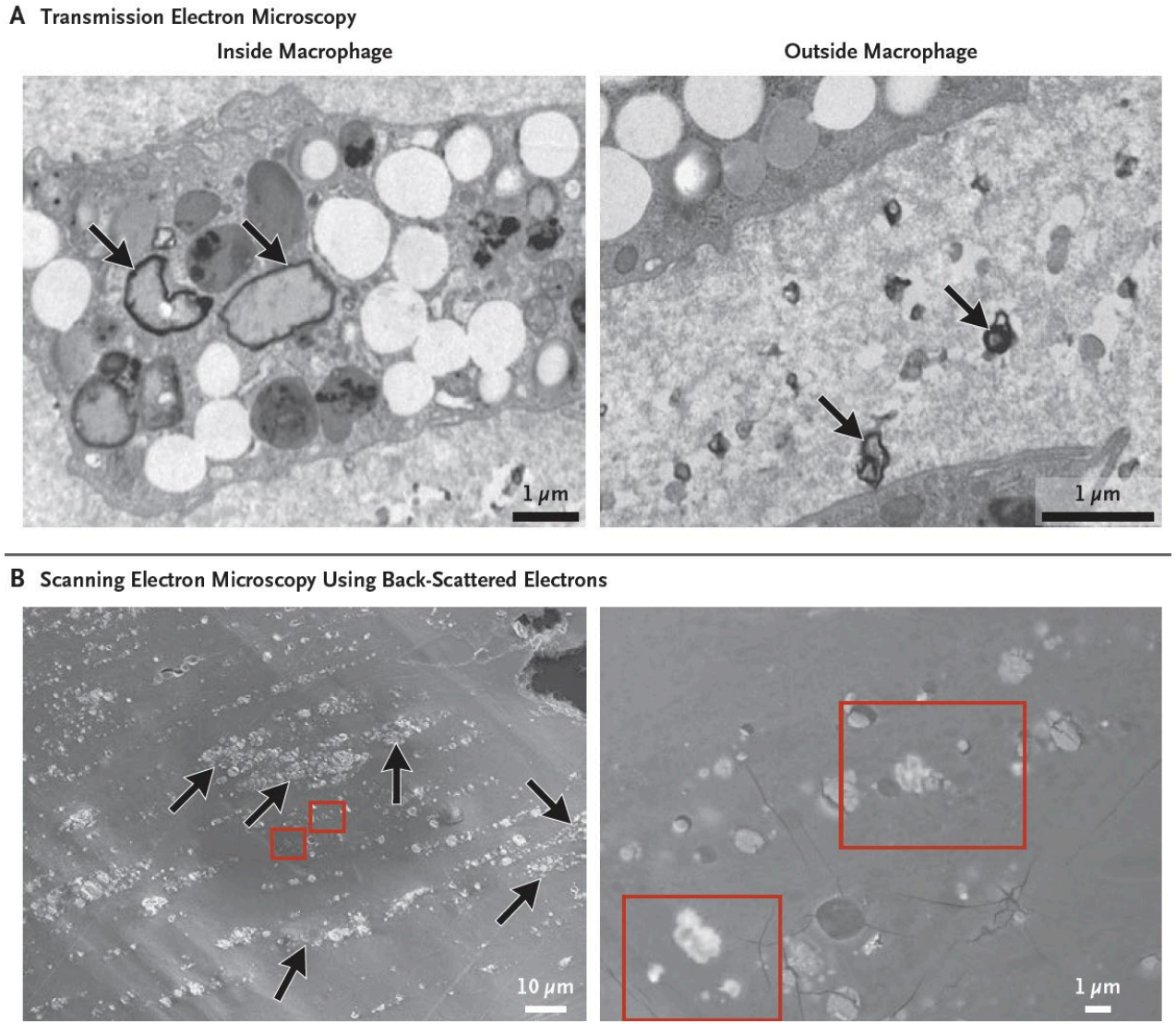
- Microplastics & Nanoplastics (MNPs) enter the body via ingestion, inhalation and skin exposure
- MNPs promote oxidative stress, inflammation and apoptosis in endothelial cells
- In animal models, MNPs promote endothelial dysfunction, myocardial fibrosis, altered heart rate
- No previous evidence in humans that MNPs infiltrate vascular lesions or are associated with cardiovascular disease
- Prospective, multicenter, observational study involving patients undergoing carotid endarterectomy for asymptomatic disease
- Carotid plaques analyzed for presence of MNPs using chromatography, spectrometry, electron microscopy
- Primary endpoint: composite of MI, stroke, all-cause mortality

N Engl J Med 2024;390:900-10

Microplastics in Atheromas

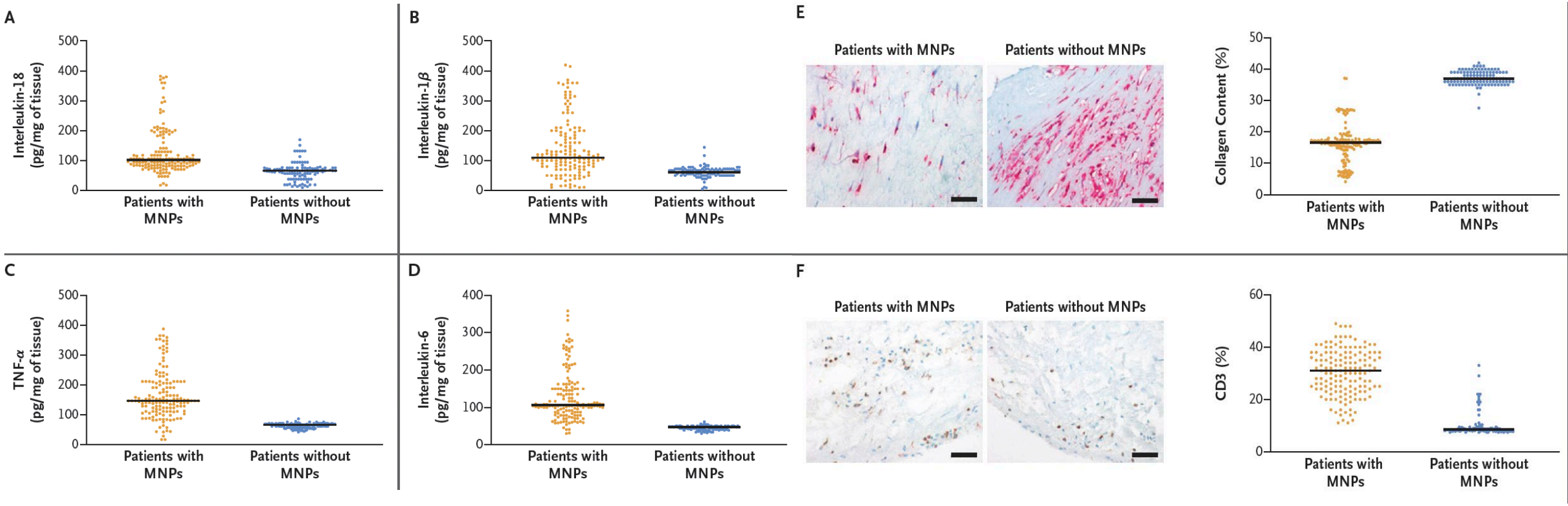
N Engl J Med 2024;390:900-10

Microplastics in Atheromas



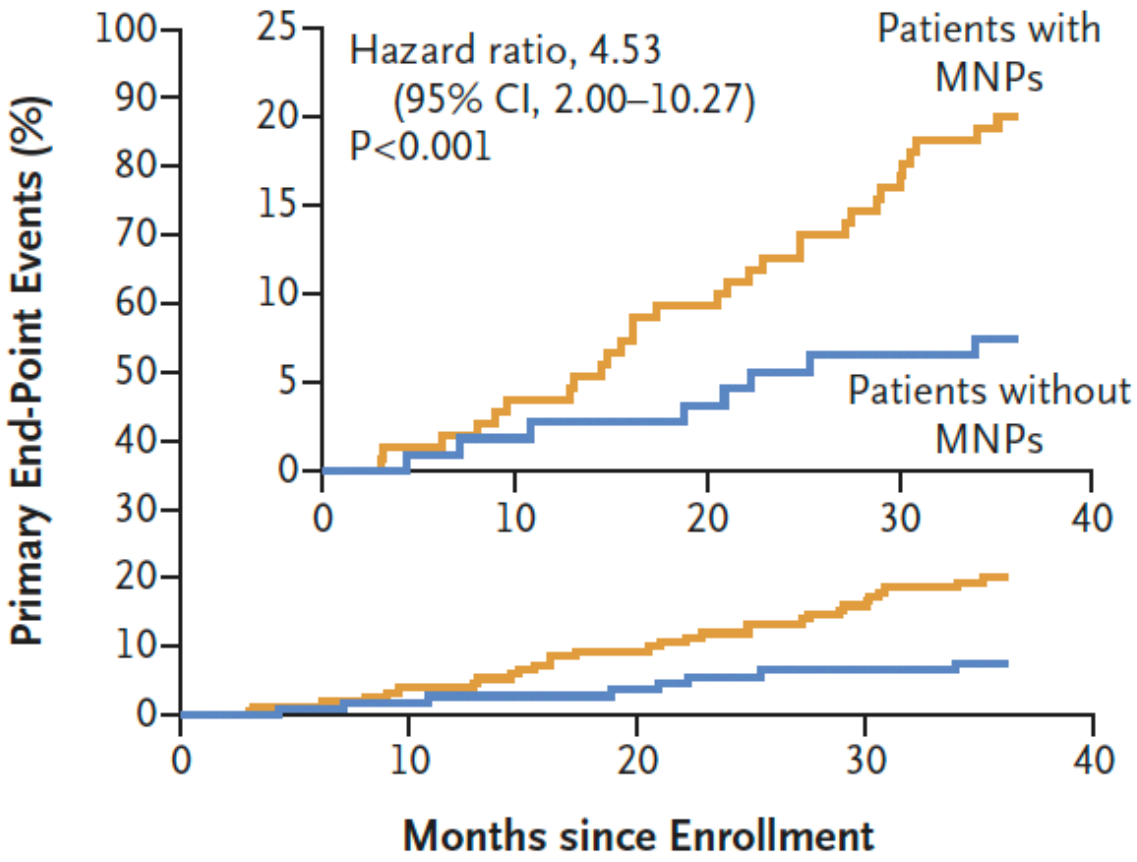
N Engl J Med 2024;390:900-10

MICROPLASTICS IN ATHEROMAS



N Engl J Med 2024;390:900-10

MICROPLASTICS IN ATHEROMAS



No. at Risk					
Patients with MNPs	150	144	136	126	120
Patients without MNPs	107	105	103	99	99

N Engl J Med 2024;390:900-10

Take Home Messages

- Patients with MNPs in carotid plaque have a higher risk of composite end point of MI, stroke or all-cause mortality at 34 months

N Engl J Med 2024;390:900-10

TOP 10 PAPERS OF 2024

Thomas L. Forbes, MD

Surgeon-in-Chief & James Wallace McCutcheon Chair

Sprott Department of Surgery, University Health Network

Professor & Vice-Chair, Department of Surgery

Temerty Faculty of Medicine, University of Toronto

Editor-in-Chief

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