EVT Guidelines: What Has Been Changed?
Aortoiliac Disease: EVT vs. Surgery

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2016 ACC/AHA Guidelines

Recommendations for Endovascular Revascularization for Claudication

COR	LOE	RECOMMENDATIONS
I	A	Endovascular procedures are effective as a revascularization option for patients with lifestyle-limiting claudication and hemodynamically significant aortoiliac occlusive disease (13,25,26,190,194,196,201).
IIa	B-R	Endovascular procedures are reasonable as a revascularization option for patients with lifestyle-limiting claudication and hemodynamically significant femoropopliteal disease (190,197-200,205,206).
IIb	C-LD	The usefulness of endovascular procedures as a revascularization option for patients with claudication due to isolated infrapopliteal artery disease is unknown (211-213).
III: Harm	B-NR	Endovascular procedures should not be performed in patients with PAD solely to prevent progression to CLI (186-189,214-216).

Recommendations for Surgical Revascularization for Claudication

COR	LOE	RECOMMENDATIONS
I	A	When surgical revascularization is performed, bypass to the popliteal artery with autogenous vein is recommended in preference to prosthetic graft material (226-234).
IIa	B-NR	Surgical procedures are reasonable as a revascularization option for patients with lifestyle-limiting claudication with inadequate response to GDMT, acceptable perioperative risk, and technical factors suggesting advantages over endovascular procedures (190,230,235-237).
III: Harm	B-R	Femoral-tibial artery bypasses with prosthetic graft material should not be used for the treatment of claudication (238-240).
III: Harm	B-NR	Surgical procedures should not be performed in patients with PAD solely to prevent progression to CLI (186-189,241).

Circulation. 2017;135:e726–e779

2011 & 2017 ESC Guidelines

European Heart Journal
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ESC GUIDELINES

ESC Guidelines on the diagnosis and treatment of peripheral artery diseases

Document covering atherosclerotic disease of extracranial carotid and vertebral, mesenteric, renal, upper and lower extremity arteries

The Task Force on the Diagnosis and Treatment of Peripheral Artery Diseases of the European Society of Cardiology (ESC)

Endorsed by: the European Stroke Organisation (ESO)

Authors/Task Force Members: Michal Tendera (Chairperson)* (Poland), Victor Aboyans (Co-Chairperson)* (France), Marie-Louise Bartelink (The Netherlands), Iris Baumgartner (Switzerland), Denis Clément (Belgium), Jean-Philippe Collet (France), Alberto Cremonesi (Italy), Marco De Carlo (Italy), Raimund Erbel (Germany), F. Gerry R. Fowkes (UK), Magda Heras (Spain), Serge Kownator (France), Erich Minar (Austria), Jan Ostergren (Sweden), Don Poldermans (The Netherlands), Vincent Riambau (Spain), Marco Roffi (Switzerland), Joachim Röther† (Germany), Horst Sievert (Germany), Marc van Sambeek (The Netherlands), Thomas Zeller (Germany).

ESC European Society of Cardiology
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ESC GUIDELINES

2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS)

Document covering atherosclerotic disease of extracranial carotid and vertebral, mesenteric, renal, upper and lower extremity arteries

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The Task Force for the Diagnosis and Treatment of Peripheral Arterial Diseases of the European Society of Cardiology (ESC) and of the European Society for Vascular Surgery (ESVS)

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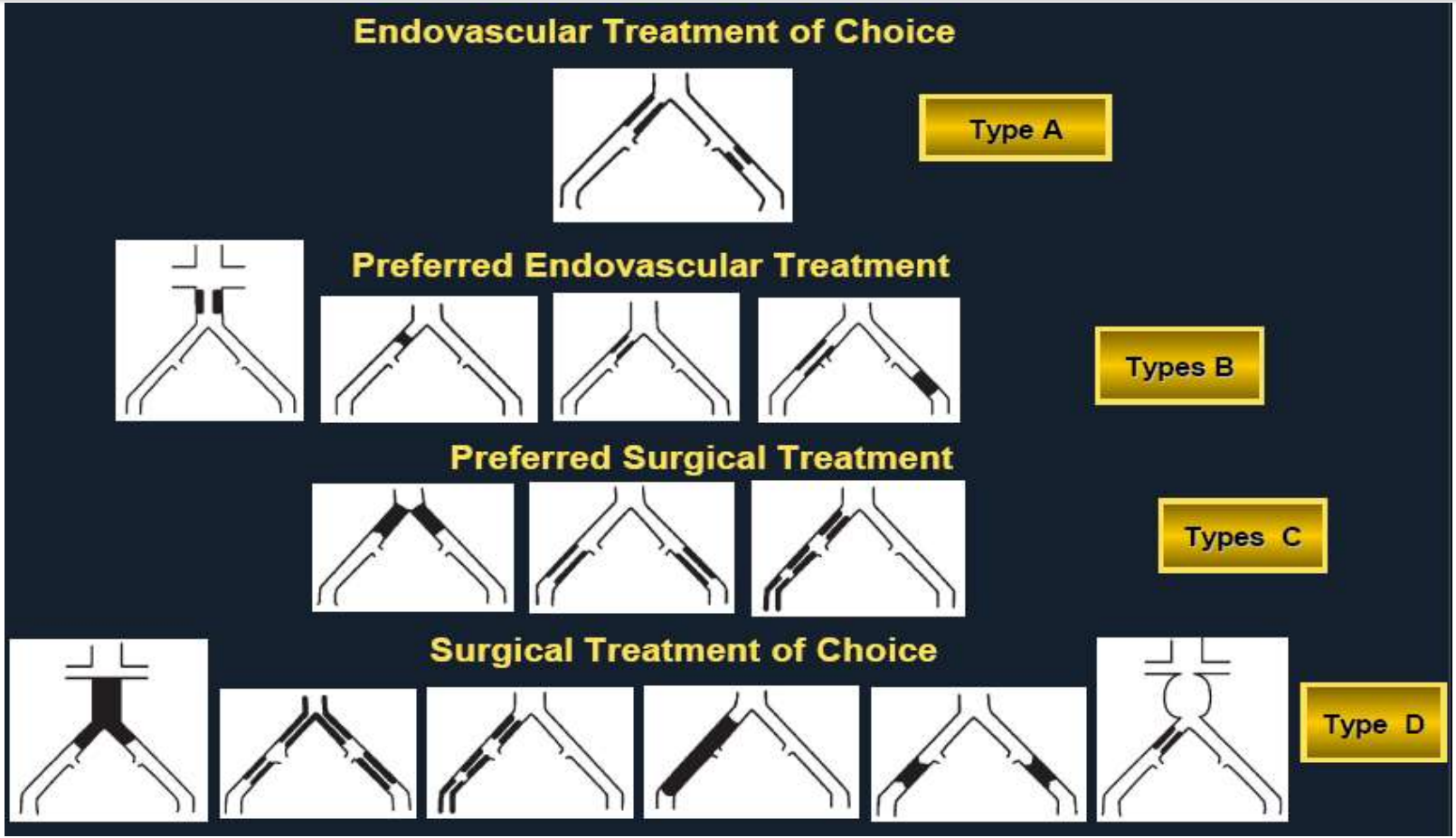
TASC II Classification of Iliac Artery Disease



2011 ESC Guidelines

Recommendations	Class[a]	Level[b]
When revascularization is indicated, an endovascular-first strategy is recommended in all aortoiliac TASC A–C lesions.	I	C
A primary endovascular approach may be considered in aortoiliac TASC D lesions in patients with severe comorbidities, if done by an experienced team.	IIb	C
Primary stent implantation rather than provisional stenting may be considered for aortoiliac lesions.	IIb	C

2017 ESC Guidelines on Revascularization of Aorto-iliac Occlusive Lesions

Recommendations	Class[a]	Level[b]
An endovascular-first strategy is recommended for short (i.e. <5 cm) occlusive lesions.[291]	I	C
In patients fit for surgery, aorto-(bi)femoral bypass should be considered in aorto-iliac occlusions.[281,292,293]	IIa	B
An endovascular-first strategy should be considered in long and/or bilateral lesions in patients with severe comorbidities.[288,294,295]	IIa	B
An endovascular-first strategy may be considered for aorto-iliac occlusive lesions if done by an experienced team and if it does not compromise subsequent surgical options.[76,281–283,286]	IIb	B
Primary stent implantation rather than provisional stenting should be considered.[294–296]	IIa	B
Open surgery should be considered in fit patients with an aortic occlusion extending up to the renal arteries.	IIa	C
In the case of ilio-femoral occlusive lesions, a hybrid procedure combining iliac stenting and femoral endarterectomy or bypass should be considered.[297–300]	IIa	C
Extra-anatomical bypass may be indicated for patients with no other alternatives for revascularization.[301]	IIb	C

Level C: Consensus of opinion of the experts and/or small studies, retrospective studies, registries

Change in ESC Guidelines I

- No recommendations according to TASC II lesion types
- An endovascular-first strategy should be considered in long and/or bilateral lesions in patients with severe comorbidities. (Class IIa)
- An endovascular-first strategy may be considered for aorto-iliac occlusive lesions if done by an experienced team and if it does not compromise subsequent surgical options. (Class IIa => IIb)
- Primary stenting rather than provisional stenting

  (class IIb => IIa)

Change in ESC Guidelines II

- Recommendation of bypass surgery for aorto-iliac or aorto-bi-femoral occlusions (class IIa) New!
- In the case of ilio-femoral occlusive lesions, a hybrid procedure combining iliac stenting and femoral endarterectomy or bypass should be considered. (class IIa) New!
- Extra-anatomical bypass may be indicated for patients with no other alternatives for revascularization (class IIb) New!

2017 Guideline in Full Text

10.5.3. Revascularization for intermittent claudication. The anatomical location and extension of arterial lesions has an impact on revascularization options.

10.5.3.1. Aorto-iliac lesions. Isolated aorto-iliac lesions are a common cause of claudication. In the case of short stenosis/occlusion (<5 cm) of iliac arteries, endovascular therapy gives good long-term patency (≥90% over 5 years) with a low risk of complications.[281] In cases of ilio-femoral lesions, a hybrid procedure is indicated, usually endarterectomy or bypass at the femoral level combined with endovascular therapy of iliac arteries, even with long occlusions. If the occlusion extends to the infrarenal aorta, covered endovascular reconstruction of an aortic bifurcation can be considered. In a small series, 1- and 2-year primary patency was 87% and 82%, respectively.[282] If the occlusion comprises the aorta up to the renal arteries and iliac arteries, aorto-bifemoral bypass surgery is indicated in fit patients with severe life-limiting claudication.[283] In these extensive lesions, endovascular therapy may be an option, but it is not free of perioperative risk and long-term occlusion. In the absence of any other alternative, extra-anatomic bypass (e.g. axillary to femoral bypass) may be considered.

?

References

281 Indes JE, Pfaff MJ, Farrokhyar F, Brown H, Hashim P, Cheung K, et al. Clinical outcomes of 5358 patients undergoing direct open bypass or endovascular treatment for aortoiliac occlusive disease: a systematic review and meta-analysis. *J Endovasc Ther* 2013;**20**:443–55.

282 Grimme FA, Goverde PC, Verbruggen PJ, Zeebregts CJ, Reijnen MM. Editor's choice—first results of the covered endovascular reconstruction of the aortic bifurcation (CERAB) technique for aortoiliac occlusive disease. *Eur J Vasc Endovasc Surg* 2015;**50**:638–47.

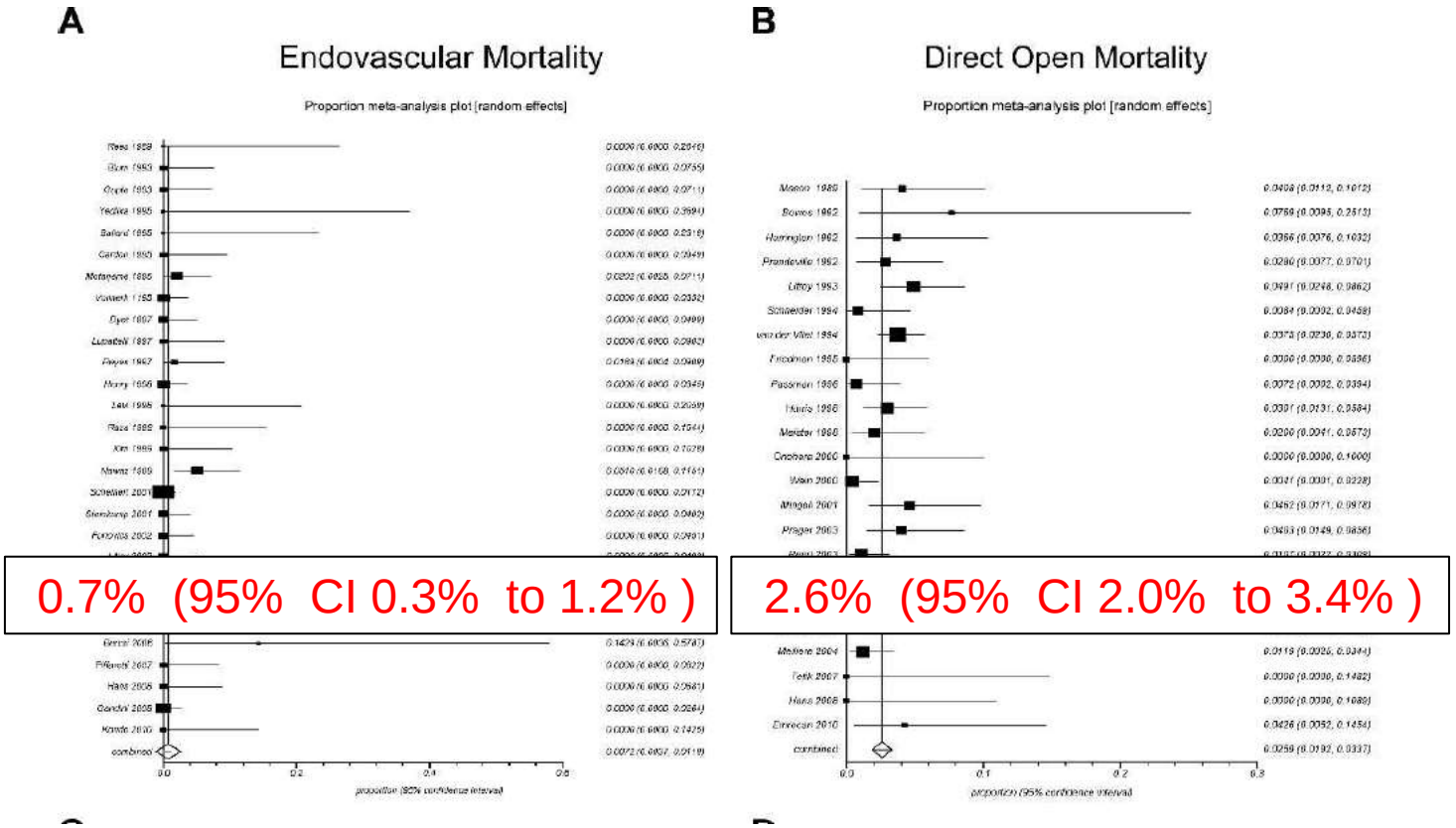
283 Anderson JL, Antman EM, Harold JG, Jessup M, O'Gara PT, Pinto FJ, et al. Clinical practice guidelines on perioperative cardiovascular evaluation: collaborative efforts among the ACC, AHA, and ESC. *Circulation* 2014;**130**:2213–4.

No RCT !

Limited large scale data!

Early Mortality: Endo vs. OP

29 open bypass studies (n=3733) and 28 endovascular Tx (n=16250)



Indes JE, J Endovasc Ther. 2013;20:443

Complications: Endo vs. OP

	Endovascular Treatment	Direct/Open Bypass	p
Any complication	13.4% (10.4% to 16.7%)	18.0% (11.0% to 25.0%)	<0.001
Cardiac	1.7% (0.3% to 4.1%)*	4.2% (2.4% to 6.6%)	0.020
Gastrointestinal	—	4.9% (2.4% to 8.2%)	
Pulmonary	—	3.4% (1.8% to 5.5%)	
Stroke	—	1.1% (0.5% to 2.0%)	
Renal	2.4% (0.4% to 6.0%)*	2.6% (1.8% to 3.6%)	1.0
Bleeding	2.9% (0.5% to 7.2%)*	1.5% (0.6% to 2.7%)	1.0
Early thrombosis	4.9% (2.7% to 7.6%)	3.4% (1.9% to 5.4%)	0.358
Early stent/vessel occlusion	3.8% (1.2% to 7.8%)	—	
Graft failure	—	1.1% (0.3% to 2.3%)*	
Pneumonia	—	1.4% (0.5% to 2.7%)	
Wound infection	—	4.6% (2.7% to 7.0%)	
Graft infection	—	1.0% (0.3% to 1.7%)	
Wound seroma	—	0.6% (0.1% to 1.6%)*	
Pseudoaneurysm	2.6% (1.4% to 4.2%)	—	
Arterial perforation/rupture	2.4% (1.2% to 4.1%)	—	
Arterial dissection	3.6% (2.1% to 5.4%)	—	
Distal embolization	4.9% (2.9% to 7.3%)	1.2% (0.1% to 3.4%)	0.084
Hematoma	4.4% (3.3% to 5.6%)	—	
Fever	11.3% (2.5% to 25.2%)*	—	
Lymphocele	—	2.2% (0.5% to 5.1%)	

Indes JE, J Endovasc Ther. 2013;20:443

Danish Vascular Registry

Mortality and complications after aortic bifurcated bypass procedures for chronic aortoiliac occlusive disease

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Objective: Open surgery has given way to endovascular grafting in patients with aortoiliac occlusive disease. The growing use of endovascular grafts means that fewer patients with aortoiliac occlusive disease have open surgery. The declining open surgery caseload challenges the surgeon's operative skills, particularly because open surgery is increasingly used in those patients who are unsuitable for endovascular repair and hence technically more demanding. We assessed the early outcome after aortic bifurcated bypass procedures during two decades of growing endovascular activity and identified preoperative risk factors.

Methods: Data on patients with chronic limb ischemia were prospectively collected during a 20-year period (1993 to 2012). The data were obtained from the Danish Vascular Registry, assessed, and merged with data from The Danish Civil Registration System.

Results: We identified 3623 aortobifemoral and 144 aortobiiliac bypass procedures. The annual caseload fell from 323 to 106 during the study period, but the 30-day mortality at 3.6% (95% confidence interval [CI], 3.0-4.1) and the 30-day major complication rate remained constant at 20% (95% CI, 18-21). Gangrene (odds ratio [OR], 3.3; 95% CI, 1.7-6.5; $P = .005$) was the most significant risk factor for 30-day mortality, followed by renal insufficiency (OR, 2.5; 95% CI, 1.1-5.8; $P = .035$) and cardiac disease (OR, 2.1; 95% CI, 1.4-3.1; $P < .001$). Multiorgan failure, mesenteric ischemia, need for dialysis, and cardiac complications were the most lethal complications, with mortality rates of 94%, 44%, 38%, and 34%, respectively.

Conclusions: Aortic bifurcated bypass is a high-risk procedure. Although open surgery has increasingly given way to endovascular repair, 30-day outcomes have remained stable during the past decade. Thus, it is still acceptable to consider an aortic bifurcated bypass whenever endovascular management is not feasible. (J Vasc Surg 2015;62:75-82.)

N=3767
30-day mortality: 3.6%
Major complication: 20%
Wound complication: 13%

Metaanalysis for TASC C/D lesions

Early and late outcomes of percutaneous treatment of TransAtlantic Inter-Society Consensus class C and D aorto-iliac lesions

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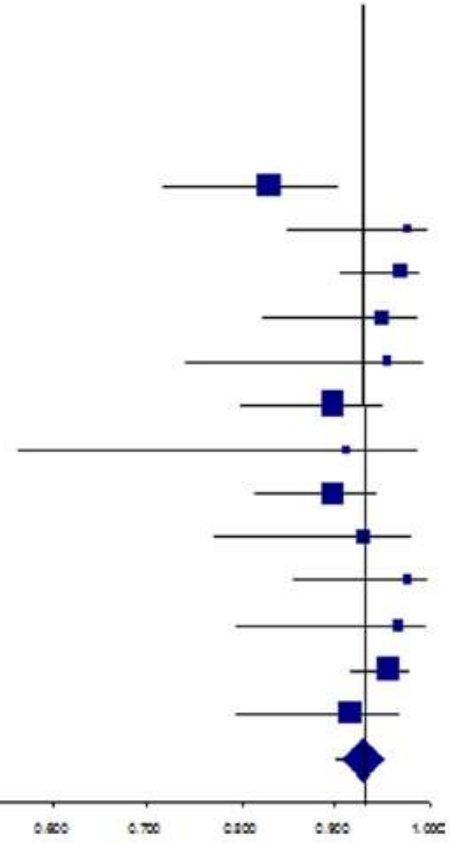
Objectives: The aim of this study was to analyze the technical success and long-term patency of the endovascular treatment of TransAtlantic Inter-Society Consensus (TASC) C and D aorto-iliac arterial lesions.
Methods: All studies reporting original series of patients published in English between 2000 and 2010 were enrolled into meta-analysis. Separate meta-analyses were performed for groups with immediate technical success, 12-month patency, and long-term outcomes. Subgroup analyses were performed to determine if there were differences in outcomes between patients with varying types of lesions (TASC C or D lesions) or between different stenting strategies, including primary or selective stenting.
Results: Sixteen articles consisting of 958 patients were enrolled in this meta-analysis. The pooled estimate for technical success was 92.8% (95% confidence interval [CI], 89.8%-95.0%, 749 cases). Primary patency at 12 months was 88.7% (95% CI, 85.9%-91.0%, 787 cases). Subgroup analyses demonstrated a technical success rate of 93.7% (95% CI, 88.9%-96.5%) and a 12-month primary patency rate of 89.6% (95% CI, 84.8%-93.0%) for TASC C lesions. For TASC D lesions, these rates were 90.1% (95% CI, 76.6%-96.2%) and 87.3% (95% CI, 82.5%-90.9%), respectively. The technical success and 12-month primary patency rates for primary stenting were 94.2% (95% CI, 91.8%-95.9%) and 92.1% (95% CI, 89.0%-94.3%), respectively; for selective stenting, these rates were 88.0% (95% CI, 67.9%-96.2%) and 82.9% (95% CI, 72.2%-90.0%), respectively. The long-term, primary patency rates for patients receiving primary stenting were significantly better than those receiving selective stenting. Publication bias was not significant for these analyses.
Conclusions: This study demonstrates that early and midterm outcomes of endovascular treatment for TASC C and D aorto-iliac lesions were acceptable, with a better patency for primary stenting than selective stenting. (J Vasc Surg 2011; 53:1728-37.)

Technical Success

Studies	weight	Technical success rate (%)	95%CI (%)
AbuRahma [8]	14.60%	83.0	71.5 to 90.5
Ahn [9]	3.30%	97.6	84.6 to 99.7
Balzer [10]	7.50%	96.9	90.4 to 99.0
Hans [13]	5.80%	95.0	82.1 to 98.7
Jackson [14]	3.30%	95.5	73.8 to 99.4
Kashyap[15]	12.50%	89.6	79.7 to 95.0
Krankenberg[16]	3.10%	91.0	56.3 to 98.7
Kumakura [17]	14.30%	89.6	81.3 to 94.5
Moise [18]	6.10%	93.0	77.0 to 98.1
Piffaretti [20]	3.30%	97.7	85.2 to 99.7
Powell [21]	3.30%	96.6	79.2 to 99.5
Sebastian [22]	13.70%	95.6	91.4 to 97.8
Sharafuddin [23]	9.20%	91.5	79.4 to 96.8
total	100.00%	92.8	89.8 to 95.0

Heterogeneity: $Tau^2 = 0.15$; $Chi^2 = 18.12$, df = 12 (P = 0.11); $I^2 = 34\%$

Test for overall effect: Z = 12.92 (P < 0.00001)

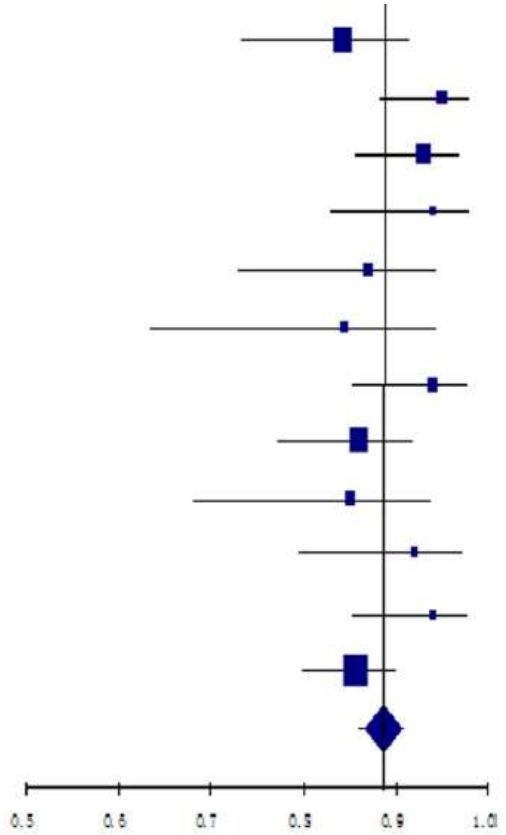


Je W, J Vasc Surg 2011;53:1728

Primary Patency at 12 months

Studies	weight	Primary patency rate at 12 months (%)	95%CI (%)
AbuRahma[8]	11.30%	84.3	73.0 to 91.4
Balzer [10]	6.40%	95.0	88.0 to 98.0
Bjo¨rses [11]	8.40%	93.0	85.5 to 96.8
Do [12]	4.20%	94.0	82.6 to 98.1
Hans [13]	6.80%	87.0	72.7 to 94.4
Jackson [14]	4.50%	84.4	63.1 to 94.5
Kashyap [15]	5.80%	94.0	85.1 to 97.7
Kumakura [17]	13.80%	86.0	77.1 to 91.8
Moise [18]	6.00%	85.0	67.8 to 93.8
Piffaretti [20]	4.90%	92.0	79.3 to 97.2
Powell [21]	4.90%	94.0	85.1 to 97.7
Sixt [22]	23.10%	85.7	79.8 to 90.1
Total	100%	88.7	85.9 to 91.0

Heterogeneity: $Tau^2 = 0.03$; $Chi^2 = 12.76$, df = 11 (P = 0.31); $I^2 = 14\%$
Test for overall effect: Z = 15.86 (P < 0.00001)



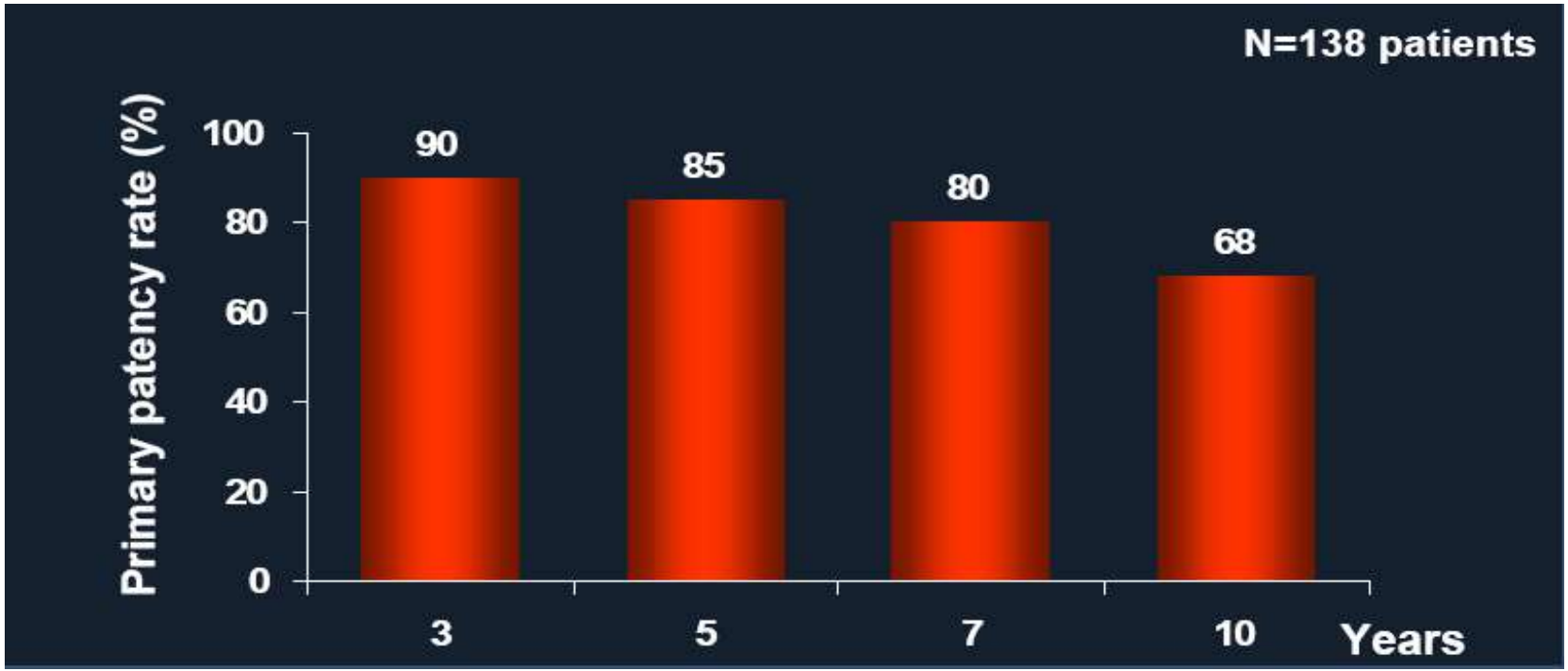
Je W, J Vasc Surg 2011;53:1728

Long-term Patency

Time period (months)	*Subgroup analysis*	*Studies (n)*	*Patients (n)*	*Primary patency (%)*	*Primary patency (%) 95% CI*		*Significance*
12	TASC C	6	279	89.6	84.8	93.0	NS
	TASC D	7	266	87.3	82.5	90.9	
	PS	8	433	92.1	89.0	94.3	NS
	SS	5	354	82.9	72.2	90.0	
24	TASC C	5	166	87.5	73.3	94.6	NS
	TASC D	6	200	79.3	70.9	85.7	
	PS	7	404	87.3	83.7	90.3	$P < .05$
	SS	5	354	72.6	63.6	80.0	
36	TASC C	5	166	79.9	64.8	89.6	NS
	TASC D	6	200	76.0	65.0	84.4	
	PS	6	382	82.3	76.3	87.0	$P < .05$
	SS	5	354	64.9	63.5	74.7	
48	TASC C	3	99	79.2	43.8	94.6	NS
	TASC D	3	62	66.2	47.6	80.8	
	PS	2	88	79.1	55.8	91.9	NS
	SS	3	310	64.4	49.7	76.7	
60	TASC C	4	124	61.8	36.7	81.9	NS
	TASC D	4	109	66.6	55.2	76.2	
	PS	2	120	67.1	53.8	78.0	NS
	SS	3	310	63.0	48.2	72.7	

Je W, J Vasc Surg 2011;53:1728

Percutaneous Treatment in Iliac Artery Occlusion: Long-term Results



Gandini R, Cardiovasc Intervent Radiol 2008;31:1069

Complications of Endovascular therapy

Perioperative Complications After Aorto-iliac Stenting: Associated Factors and Impact on Follow-up Cardiovascular Prognosis

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Objectives: To investigate factors associated with 30-day perioperative complications (POC) after aorto-iliac (AI) stenting, and to compare follow-up cardiovascular prognosis between patients with and without POC.

Materials and methods: This was a retrospective multicenter study. We used a multicenter database of 2012 consecutive patients who successfully underwent AI stenting for peripheral arterial disease in 18 centers in Japan from January 2005 to December 2009 to analyze independent predictors of POC and impact of POC on prognosis by logistic regression and a Cox proportional hazard regression model, respectively.

Results: Mean age was 71 ± 9 years (median: 72 years; range: 37–98 years), and 1,636 patients (81%) were men. POC occurred in 126 patients (6.3%). In multivariate logistic regression analysis, old age (≥80 years), critical limb ischemia (CLI), and Trans Atlantic Inter-Societal Consensus (TASC) II class C/D were independently associated with POC with adjusted odds ratios and 95% confidence intervals (CI) of 1.9 (1.3–2.9), 2.3 (1.5–3.4), and 2.4 (1.6–3.4), respectively. Out of 2012 patients, 1995 were followed up for more than 30 days (mean: 2.6 ± 1.5 years; range: 2–2,393 days). In a Cox hazard regression model adjusted for baseline clinical characteristics, POC was positively and independently associated with follow-up major adverse cardiac events (adjusted hazard ratio [HR]: 1.9; 95% CI: 1.3–2.8; $p = .002$), but not with major adverse limb events and target lesion revascularization (adjusted HR: 1.4; 95% CI: 0.7–2.7; $p = .25$; and adjusted HR: 1.2; 95% CI 0.6–2.6; $p = .568$), respectively.

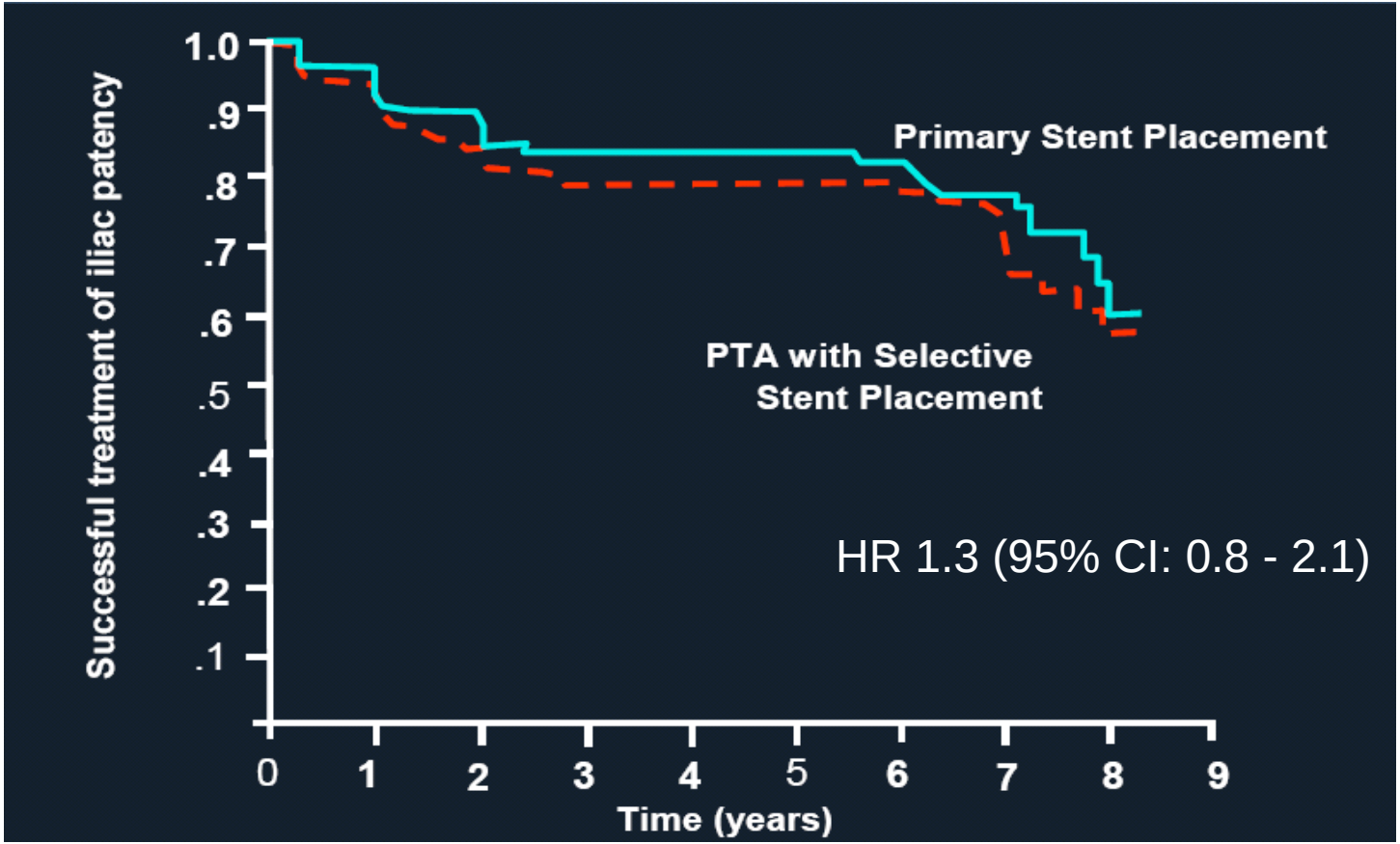
Conclusions: Age >80 years, CLI, and TASC C/D lesion were positively associated with POC after AI stenting. Occurrence of POC appears to adversely affect follow-up cardiovascular, but not limb and vessel prognosis.

Table 1. Perioperative complications at 30 days.

Variables %, *n*	6.3 (126/2012)
Death	0.3 (7)
Myocardial infarction	0.2 (3)
Stroke	0.4 (7)
Worsening of renal function	0.9 (17)
Intestinal bleeding	0.2 (4)
Stent thrombosis	0.3 (6)
Pseudoaneurysm	0.3 (6)
Vessel perforation	0.2 (4)
Distal embolization	1.6 (32)
Puncture site hematoma	1.6 (33)
Others	0.3 (7)

The Dutch Iliac Stent Trial

279 patients
with iliac a.
stenosis ≤10 cm
or
CTO ≤5 cm

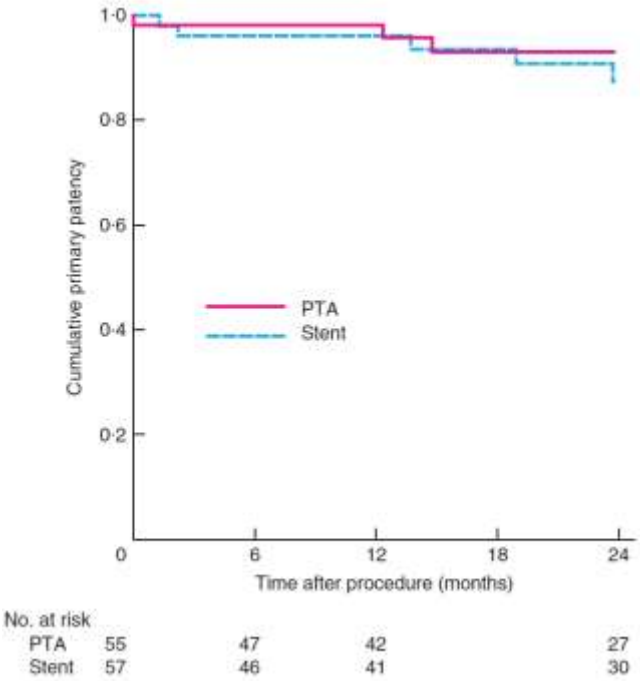


Klein WM, Radiology 2006;238:73

STAG Trial: Stent vs. PTA

Randomized trial (n=112)
Total occlusions
Lesion length < 8cm
Mean length: ~5 cm

	PTA ($n=55$)	Stent ($n=57$)	P†
Technical success	46 (84)	56 (98)	0·007
Secondary stenting procedure*	9 of 57 (16)	1 (2)	0·007
Secondary non-stenting procedure	9 (16)	3 (5)	0·050
Complications			
Major	11 (20)	3 (5)	0·010
Minor	2 (4)	1 (2)	0·537



Goode S, Br J Surg 2013;100:1148

Primary vs. Provisional Stenting: Meta-analysis

Technical success

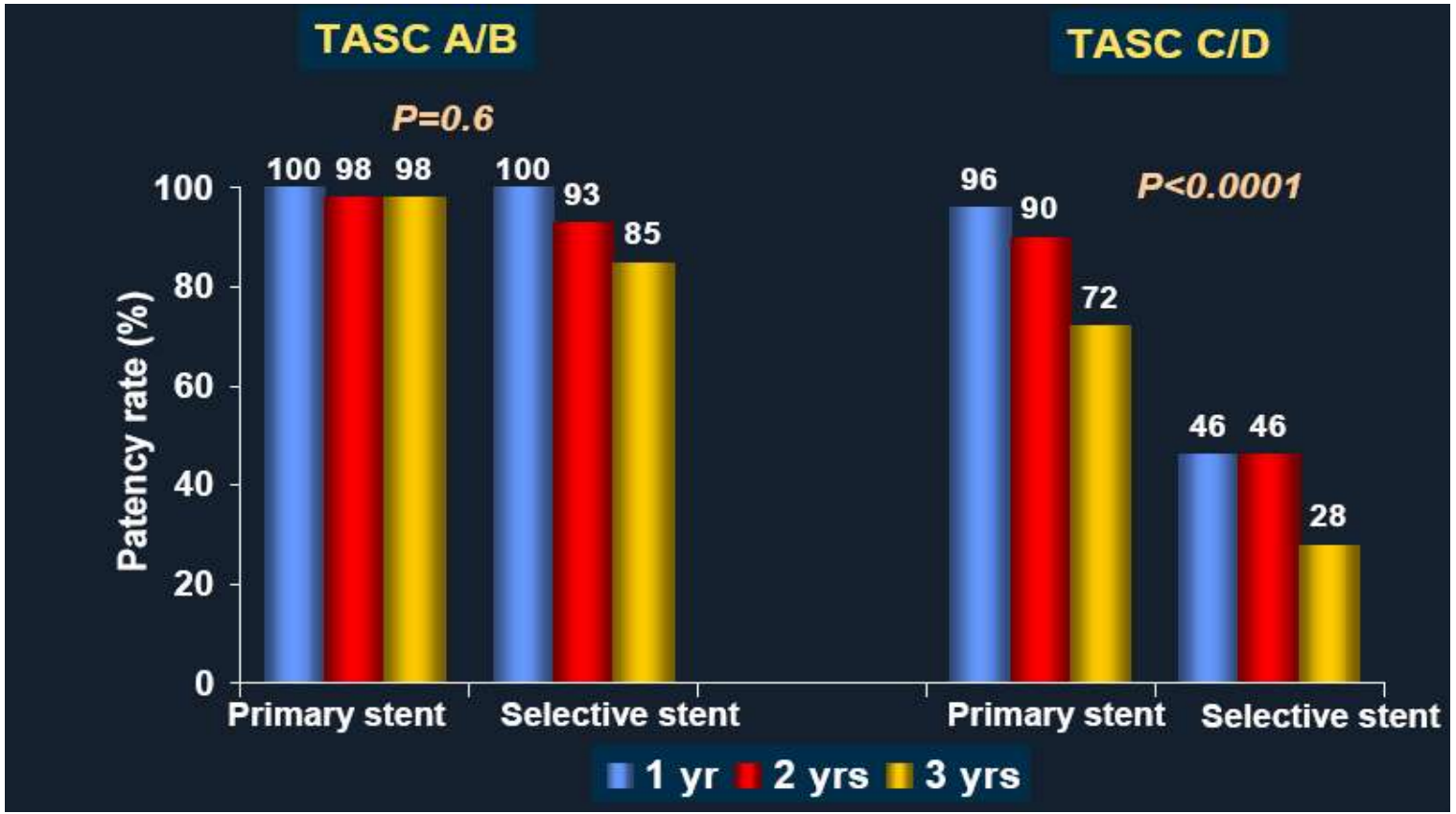
Subgroups	*Subgroups*	*Studies (n)*	*Patients (n)*	*Technical success (%)*	*Technical success 95% CI*		*Statistics: Tests used and results*
TASC classification	TASC C	3	176	93.7	88.9	96.5	Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = .78$, df = 2 ($P = .68$); $I^2 = 0\%$ Test for overall effect: $Z = 8.51$ ($P < .00001$)
	TASC D	3	158	90.1	76.6	96.2	Heterogeneity: $\tau^2 = 0.48$; $\chi^2 = 5.28$, df = 2 ($P = .07$); $I^2 = 62\%$ Test for overall effect: $Z = 4.24$ ($P < .0001$)
Stenting primary vs secondary	Primary	9	565	94.2	91.8	95.9	Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 6.31$, df = 8 ($P = .61$); $I^2 = 0\%$ Test for overall effect: $Z = 14.74$ ($P < .00001$)
	Selective	5	184	88	67.9	96.2	Heterogeneity: $\tau^2 = 1.46$; $\chi^2 = 18.40$, df = 4 ($P = .001$); $I^2 = 78\%$ Test for overall effect: $Z = 3.15$ ($P = .002$)

12 months primary patency

Subgroups	*Subgroups*	*Studies (n)*	*Patients (n)*	*12-month primary patency (%)*	*12-month primary patency 95% CI*		*Statistics: tests used and results*
TASC classification	TASC C	6	279	89.6	84.8	93.0	Heterogeneity: $\tau^2 = 0.02$; $\chi^2 = 5.30$, df = 5 ($P = .38$); $I^2 = 6\%$ Test for overall effect: $Z = 9.78$ ($P < .00001$)
	TASC D	7	266	87.3	82.5	90.9	Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 5.11$, df = 6 ($P = .53$); $I^2 = 0\%$ Test for overall effect: $Z = 10.02$ ($P < .00001$)
Stenting primary vs secondary	Primary stenting	8	433	92.1	89.0	94.3	Heterogeneity: $\tau^2 = 0.00$; $\chi^2 = 6.51$ df = 7 ($P = .48$); $I^2 = 0\%$ Test for overall effect: $Z = 13.18$ ($P < .00001$)
	Selective stenting	5	354	82.9	72.2	90.0	Heterogeneity: $\tau^2 = 0.33$; $\chi^2 = 13.24$, df = 4 ($P = .01$); $I^2 = 70\%$ Test for overall effect: $Z = 4.97$ ($P < .00001$)

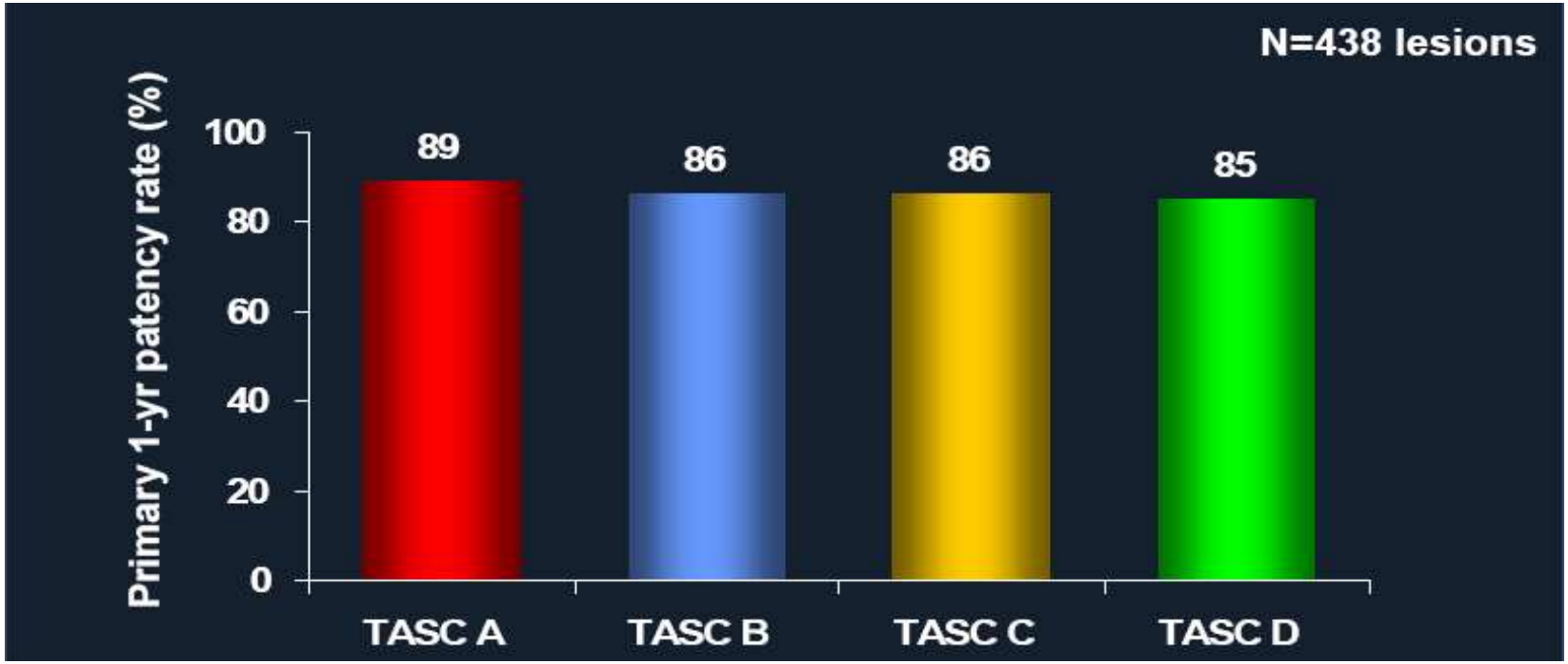
Je W, J Vasc Surg 2011;53:1728

Primary Iliac Stenting vs. Provisional Stenting



AbuRahma AF, J Vasc Surg 2007;46:965

Endovascular Therapy for Aortoiliac Occlusive Disease



Sixt S, J Endovasc Ther 2008;15:408

BRAVISSIMO Registry:

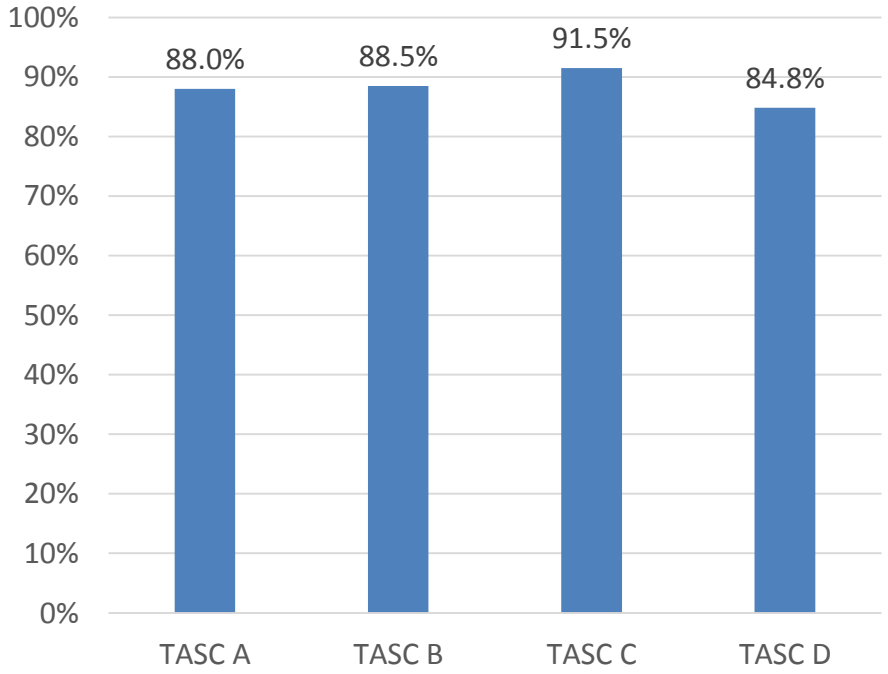
ELSEVIER CrossMark

24-Month Data from the BRAVISSIMO: A Large-Scale Prospective Registry on Iliac Stenting for TASC A & B and TASC C & D Lesions

Gianmarco de Donato,[1] Marc Bosiers,[2] Francesco Setacci,[3] Koen Deloose,[2] Giuseppe Galzerano,[1] Jürgen Verbist,[2] Patrick Peeters,[4] and Carlo Setacci,[3] Siena and Rome, Italy; and Dendermonde and Bonheiden, Belgium

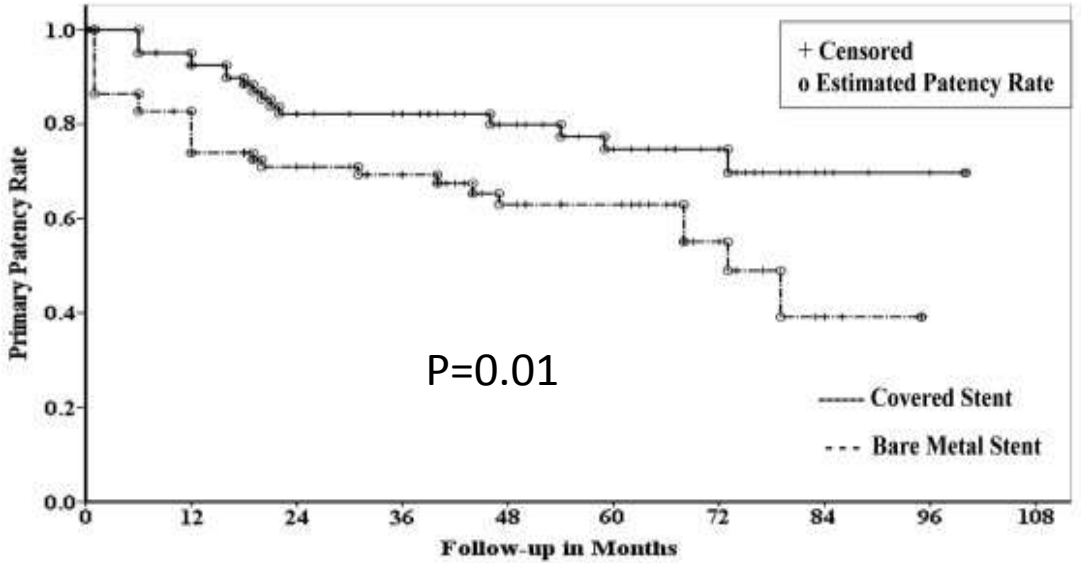
Background: To evaluate the 24-month outcome of stenting in Trans-Atlantic Inter-Society Consensus (TASC) A & B and TASC C & D iliac lesions in a controlled setting.
Methods: The BRAVISSIMO study is a prospective, nonrandomized, multicenter, multinational, monitored registry including 325 patients with aortoiliac lesions. The end point is the primary patency at 24 months, defined as a target lesion without a hemodynamically significant stenosis on duplex ultrasound (>50%, systolic velocity ratio >2.0). A separate analysis for TASC A & B versus TASC C & D population is performed.
Results: Between July 2009 and September 2010, 190 patients with TASC A or B and 135 patients with TASC C or D aortoiliac lesions were included. The demographic data were comparable for TASC A & B cohort and TASC C & D cohort. Technical success was 100%. Significantly more balloon-expandable stents were deployed in TASC A & B lesions, and considerably more self-expanding stents were placed in TASC C & D ($P = 0.01$). The 24-month primary patency rate after 24 months for the total population was 87.9% (88.0% for TASC A, 88.5% for TASC B, 91.9% for TASC C, and 84.8% for TASC D). No statistically significant difference was shown when comparing these groups. The 24-month primary patency rates were 92.1% for patients treated with the self-expanding stent, 85.2% for patients treated with the balloon-expandable stent, and 75.3% for patients treated with a combination of both stents ($P = 0.06$). Univariate and multivariable regression analyses using Cox proportional hazards model identified only kissing stent configuration ($P = 0.0012$) and obesity ($P = 0.0109$) as independent predictors of restenosis (primary patency failure). Interestingly, as all TASC groups enjoyed high levels of patency, neither TASC category nor lesion length was predictive of restenosis.
Conclusion: The 24-month data from this large, prospective, multicenter study confirm that endovascular therapy may be considered the preferred first-line treatment option of iliac lesions, irrespectively of TASC lesion category.

Primary Patency at 24 months



COBEST Trial: Covered Stent vs BMS

(Advanta V12; Atrium)



Time (Months)	0	12	24	36	48	60	72	84	96
Advanta V12 Stent (n. at risk)	83	74	52	47	35	28	17	5	2
Standard Error (%)	-	2.95	4.54	4.54	4.93	5.84	5.84	7.27	7.27
BMS (n. at risk)	85	66	46	40	28	23	10	3	1
Standard Error (%)	-	4.89	5.13	5.27	5.94	5.94	7.36	11.2	11.2

CERAB Technqiue

Three-year outcome of the covered endovascular reconstruction of the aortic bifurcation technique for aortoiliac occlusive disease

Kim Taeymans, MD,[a] Erik Groot Jebbink, MSc,[b,c] Suzanne Holewijn, PhD,[b] Jasper M. Martens, MD,[d] Michel Versluis, PhD,[c] Peter C. J. M. Goverde, MD,[a] and Michel M. P. J. Reijnen, MD, PhD,[b] *Antwerp, Belgium; and Arnhem and Enschede, The Netherlands*

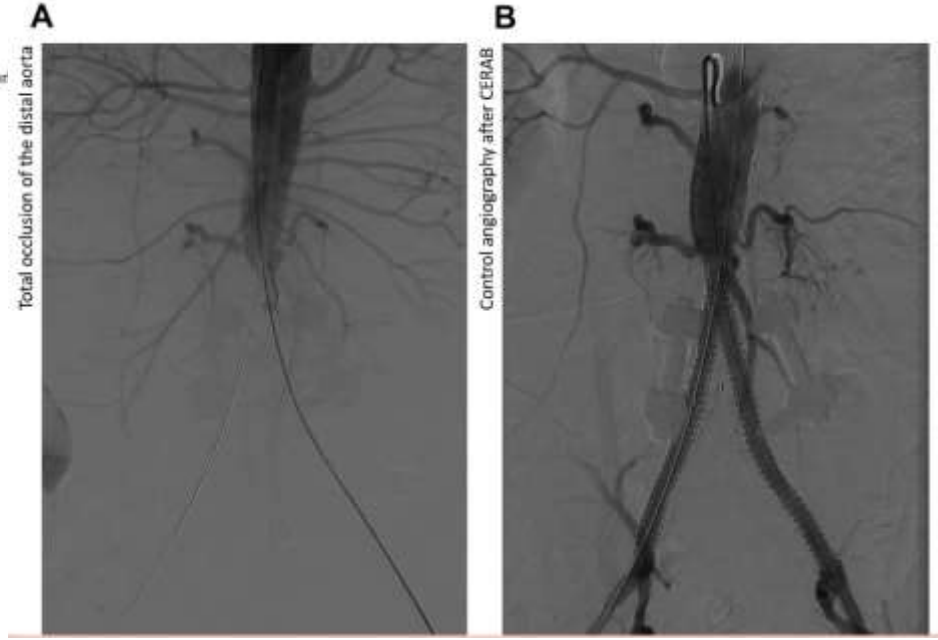
ABSTRACT

Objective: The objective of this study was to demonstrate the 3-year outcome of the covered endovascular reconstruction of the aortic bifurcation (CERAB) technique for the treatment of extensive aortoiliac occlusive disease (AIOD).

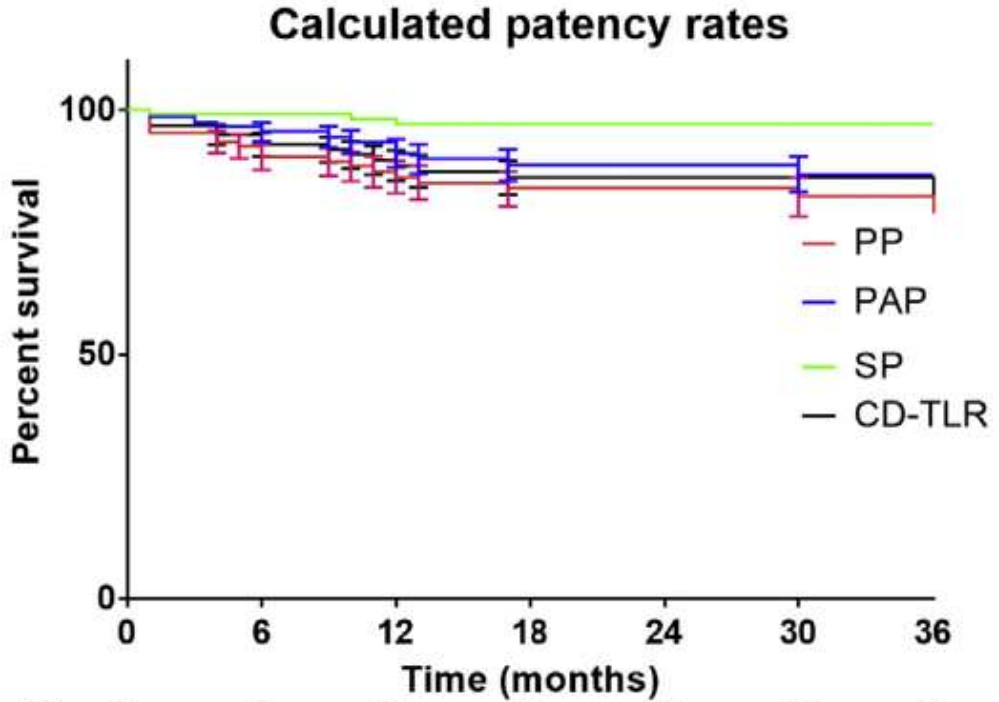
Methods: Between February 2009 and July 2016, all patients treated with the CERAB technique for AIOD were identified in the local databases of two centers and analyzed. Demographics and lesion characteristics were scored. Follow-up consisted of clinical assessment, duplex ultrasound, and ankle-brachial indices. Patency rates and clinically driven target lesion revascularization were calculated by Kaplan-Meier analysis.

Results: Of 130 patients (69 male and 61 female) treated, 68% were diagnosed with intermittent claudication and 32% suffered from critical limb ischemia. The majority (89%) were TransAtlantic Inter-Society Consensus II D lesions, and the remaining were B and C lesions (both 5%). Median follow-up was 24 months (range, 0-67 months). The technical success rate was 97%, and 67% of cases were performed completely percutaneously. The ankle-brachial index improved significantly from 0.65 ± 0.22 preoperatively to 0.88 ± 0.15 after the procedure. The 30-day minor and major complication rate was 33% and 7%. The median hospital stay was 2 days (range, 1-76 days). At 1 year and 3 years of follow-up, 94% and 96% of the patients clinically improved at least one Rutherford category (2% and 0% unchanged, 4% and 4% worsened). Limb salvage rate was 98% at 1 year and 97% at 3 years of follow-up. Primary, primary assisted, and secondary patency was 86%, 91%, and 97% at 1 year; 84%, 89%, and 97% at 2 years; and 82%, 87%, and 97% at 3 years. Freedom from clinically driven target lesion revascularization was 87% at 1-year follow-up and 86% at both 2-year and 3-year follow-up.

Conclusions: The CERAB technique is a safe and feasible technique for the treatment of extensive AIOD with good 3-year results regarding patency and clinical improvement. (J Vasc Surg 2018;67:1438-47.)



CERAB Technqiue



Primary patency (PP)	0	6	12	18	24	30	36
No. At Risk	126	91	79	69	56	47	37
Patency (%)	100	90.4	86.2	83.9	83.9	82.1	82.1
SE (%)	0.0	2.8	3.3	3.6	3.6	4.0	4.0

Hybrid Procedures

N = 60

N = 60

N = 40

Role of simple and complex hybrid revascularization procedures lower extremity occlusive di

Hasan H. Dosluoglu, MD,[a,b] Purandath Lall, MBBS,[a,b] G and Maciej L. Dryjski, MD,[b] *Buffalo, NY*

Objective: Hybrid reconstructions have been increasingly used fo have embraced endovascular interventions. The goal of this stud techniques in patients who need multilevel revascularization.
Methods: All patients undergoing arterial revascularization (endo May 2008 were included. Hybrid procedures were stratified as sim segment was TransAtlantic Society Consensus II (TASC) A/B, a
Results: Of the 684 patients, 770 limbs (67% critical limb ischemi and 108 (14%) had hybrid procedures (56 sHYBRID, 52 cHYB hypertension, chronic obstructive pulmonary disease, tions, with more ASA 4 in the cHYBRID than th significantly longer than the EV group, but less than inflow in 85%, for runoff in 5%, and for both inflow sHYBRID cases were staged, while all cHYBRID ca more frequent in cHYBRID (75% vs 23% in sHYB cHYBRID, the remainder being femoro-femoral bypasses (8% v interventions (91% in sHYBRID, 88% in cHYBRID). Thirty-d higher in the HYBRID than the EV group, with no difference with in the sHYBRID and cHYBRID groups, and comparable to the disease complexity. Limb salvage in patients who presented with c than other groups. Overall survival was similar in all groups.
Conclusions: Complex and simple hybrid procedures enable m comparable patency and limb salvage. Femoral endarterectomy pl An increase in perioperative morbidity and mortality was obse revascularization in higher risk patients. (J Vasc Surg 2010;51:1

Hybrid Endovascular and Open Treatment of Severe Multilevel Lower Extremity Arterial Disease

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Submitted 28 April 2009; accepted 20 June 2009
Available online 18 July 2009

Hybrid therapy:
Stents

Methods: Patients were divided into three groups: g underwent endovascular reconstruction proximal and respectively, whereas group 3 included patients who mal and distal endoluminal procedures. Patency and life tables. Univariate and multivariate analyses we risk factors on primary patency.
Results: Complete data were obtained from 60 patie procedures. Technical and haemodynamic success ra perioperative mortality rate was 3%. The primary months were 71% and 98%, respectively. Primary pa compared with groups 1 and 2 (log-rank test, $p = 0.$ pidaemia were independent predictors of decre $p = 0.014$, respectively).
Conclusions: Hybrid procedures provide an effect patients with multilevel lower extremity arterial dis and dyslipidaemia are associated with worse outcom
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Only small-sized feasibility data!

Hybrid external iliac selective endarterectomy surgical technique and outcomes

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Objective: Long or multisegmental external iliac-to-femoral arterial lesions treated by angioplasty and stenting have achieved disappointing results. Conventional, open approaches are often complicated by significant morbidity, and endovascular stenting alone typically requires additional outflow procedures. We hypothesized that a hybrid approach, te selective external iliac endarterectomy, produces superior outcomes in , with minimal associated morbidity.
all patients having undergone hybrid-based retrograde iliofemoral endarter- Ann Arbor, Michigan. Patient demographics, presenting complaints, operative rative patency was assessed by comparison of ankle-brachial index values and qualitative patient improvement. Data were analyzed by way of paired Student *t*-test with significance defined as $P < .05$.
Results: A total of 40 limbs were intervened upon on 33 patients. In 20 limbs, the procedure was performed for critical limb ischemia (rest pain, n = 9; tissue loss/gangrene, n = 11). By TransAtlantic Inter-Society Consensus II criteria, 83% of iliac lesions were class D. A more even distribution was noted in TransAtlantic Inter-Society Consensus II classification for femoral and popliteal disease. Seventeen percent of patients had one-vessel infrageniculate runoff. In 21 limbs (54%), external iliac artery (EIA) stenting was performed at the time of procedure, 18 (46%) had common iliac artery (CIA) stenting, and 7 (18%) had a bridging stent from the CIA to EIA. The modal EIA stent diameter was 10 mm (range, 8-10 mm), modal CIA stent diameter 8 mm (range, 7-9 mm). The preintervention ankle-brachial index was 0.45 ± 0.24 (n = 33 limbs) and significantly improved to 0.75 ± 0.27 (n = 29 limbs; $P < .001$). In addition, preintervention toe pressure of 34 ± 28 (n = 28 limbs) improved to 58 ± 26 (n = 23 limbs; $P < .001$). No intraoperative complications occurred, which necessitated abdominal or retroperitoneal exposure. Average follow-up after the intervention was 13 ± 14.6 months. One limb (3%) required an additional outflow bypass. The incidence of ipsilateral hypogastric occlusion increased from 35% to 55% post-operatively; however, no patients reported pelvic or buttock ischemia. One patient who had the procedure done bilaterally presented 655 days after the procedure with bilateral iliac artery thrombosis and underwent aortobifemoral bypass. No other patient needed subsequent primary assisted patency or additional infrainguinal revascularization.
Conclusions: Hybrid-based external iliac and femoral endarterectomy provides a minimally invasive approach to EIA occlusive disease comparable with aortofemoral bypass. Dramatic inflow improvement was observed in our series, and the need for additional outflow revascularization was minimal. The procedure was deemed technically feasible and safe, with a low number of adverse sequela and excellent primary patency achieved more than 1 year after the intervention. (J Vasc Surg 2016;64:1327-34.)

Take Home Messages

- Basically, not much has changed!
- There has been no randomized trial directly comparing surgery vs. endovascular Tx.
- Surgery showed excellent late primary patency, however associated with relatively high complication rates
- Endovascular demonstrated high technical success rates and favorable primary patency rates even in complex aortoiliac lesions.
- Thus, endovascular therapy can be considered as the first-line therapy even in complex lesions, especially when performed in experienced centers.


Thank you
for your attention!