

Management of cephalic arch stenosis: have stent grafts become the gold standard?

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LINC 2021

Disclosure

Speaker name:

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I have the following potential conflicts of interest to report:

Consulting/Honorarium : WL Gore, BD, Penumbra

Cephalic Arch Stenosis

Most common cause of BC AVF failure

Poor patency results with Venoplasty alone (42% 6months)

High rates of recoil and recurrence



Treatment options

Venoplasty

Plain balloons

Cutting balloons

Drug-coated balloons

Bare metal stents

Stent grafts

Surgery

Meta-analysis 2019

Review

JVA The Journal of Vascular Access

The Journal of Vascular Access
2019, Vol. 20(4) 345-355.
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DOI: 10.1177/1129729818814466
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Endovascular treatment of cephalic arch stenosis in brachiocephalic arteriovenous fistulas: A systematic review and meta-analysis

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and Tjun Yip Tang⁴

Abstract

Purpose: The aim of this study is to appraise the current literature on the endovascular management options and their outcomes of cephalic arch stenosis in the setting of a failing brachiocephalic fistula for hemodialysis.

Methods: A systematic search of the literature was performed using PubMed, Embase, and Google Scholar from January 2000 to December 2017 in accordance with the PRISMA guidelines to investigate the outcomes of endovascular management of cephalic arch stenosis. Data from randomized controlled trials and observational studies, published in the English language, were extracted to determine pooled proportion of primary and secondary patency, using a random-effects meta-analysis. Subgroup analyses of stent grafts, bare metal stents, and percutaneous transluminal angioplasty outcomes were performed.

Results: Of the 125 total studies, 11 were included for analysis by consensus. Overall, 457 patients were reviewed and analyzed for primary and secondary patency rates at 6 and 12 months post-treatment. There was significantly higher primary patency at both 6 and 12 months in the stent graft group compared to those who received bare metal stents or percutaneous transluminal angioplasty (relative risk = 0.30–0.31, relative risk = 0.34–0.59, respectively; $p < 0.01$). Higher secondary patency rates were noted in the bare metal stents cohort compared to the percutaneous transluminal angioplasty cohort at 12 months (relative risk = 0.17, 95% confidence interval = 0.07–0.26; $p < 0.01$).

Conclusion: This study demonstrated a significant benefit in using stent grafts in cephalic arch stenosis compared to bare metal stents or percutaneous transluminal angioplasty with higher primary and secondary patency rates.

Keywords

Angioplasty, cephalic arch stenosis, endovascular, stenting

Date received: 13 May 2018; accepted: 30 October 2018

Introduction

The surgically created arteriovenous fistula (AVF) is the most reliable form of vascular access for end-stage renal failure (ESRF) patients dependent on hemodialysis.¹ The radiocephalic fistula (RCF) is associated with excellent clinical outcomes with multiple venous outflows: the cephalic vein, the basilic vein, and the deep venous system. This allows for longer access survival, lower thrombosis rates, fewer access-related hospitalizations, and lower costs than AVFs at alternative sites.² However, when

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9 studies
473 patients

Significantly higher Primary Patency at 6 and 12 months in stent graft group ($p < 0.01$)

	6 month	12 month
SG	82.7%	44%
BMS	52.2%	12.9%
PTA	23.3%	9.5%

*Primary patency pooled rates

Venoplasty

First author	Year of publication	Dialysis access	Primary patency		
			3 months	6 months	12 months
Miller	2018	BC AVF	61% (44–72)	27% (9–30)	11% (3–24)
Davies	2017	BC AVF	–	70.8%	39.6%
Gogna	2016	Not specified	50%	0%	–
Rajan	2015	BC AVF	60% (29–100)	0%	0%
Aitken	2014	BC AVF	–	–	–
Kian	2008	BC AVF	23%	8%	0%
Rajan	2003	25 BC AVF; 1 RC AVF	76 % (68–84)	42% (32–52)	23% (14–32)

Venoplasty – Cutting Balloon

The Journal of Vascular Access 2010; 11: 41-45
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ORIGINAL ARTICLE

Cephalic arch stenosis in autogenous brachiocephalic hemodialysis fistulas: Results of cutting balloon angioplasty

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	3 months	6 months	12 months
Primary Patency	94%	81%	38%
Primary Assisted	100%	94%	77%

Mean number of re-interventions per patient –year = 0.9

Venoplasty – Drug Eluting Balloons

CLINICAL STUDY



The Lutonix AV Randomized Trial of Paclitaxel-Coated Balloons in Arteriovenous Fistula Stenosis: 2-Year Results and Subgroup Analysis

Scott O. Trerotola, MD, Theodore F. Saad, MD, and Prabir Roy-Chaudhury, MD; for the Lutonix AV Clinical Trial Investigators

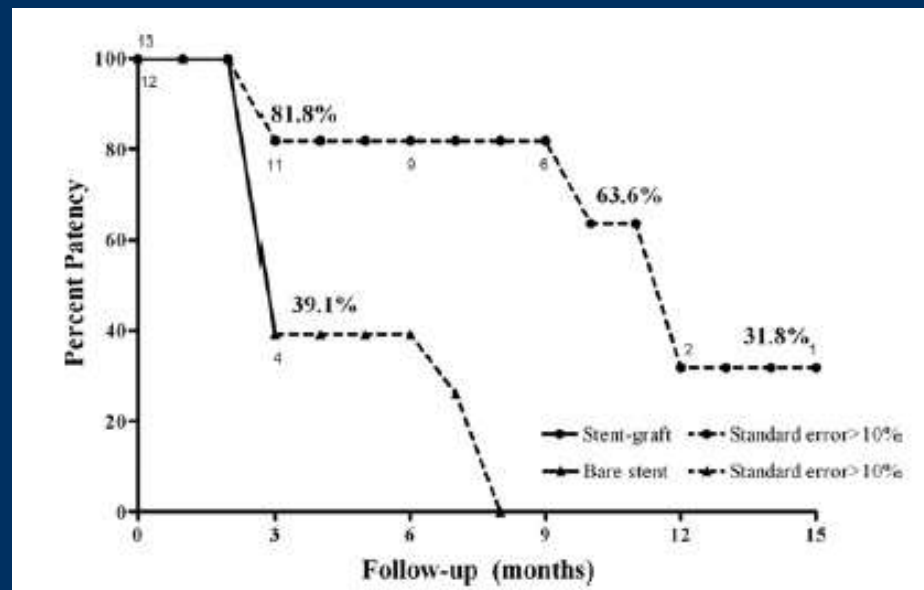
	TLPP 6 months	TLPP 12 months
DCB	52%	21%
Plain	45%	29%

*Cephalic arch subset analysis

Bare Metal Stents

Angioplasty with stent graft versus bare stent for recurrent cephalic arch stenosis in autogenous arteriovenous access for hemodialysis:
A prospective randomized clinical trial

David Shemesh, MD,^a Ilya Goldin, MD,^a Ibrahim Zaghaf, MD,^b Daniel Berlowitz MB, BChir,^b
David Raveh, MD,^c and Oded Olsha, MB, BS,^a *Jerusalem, Israel*

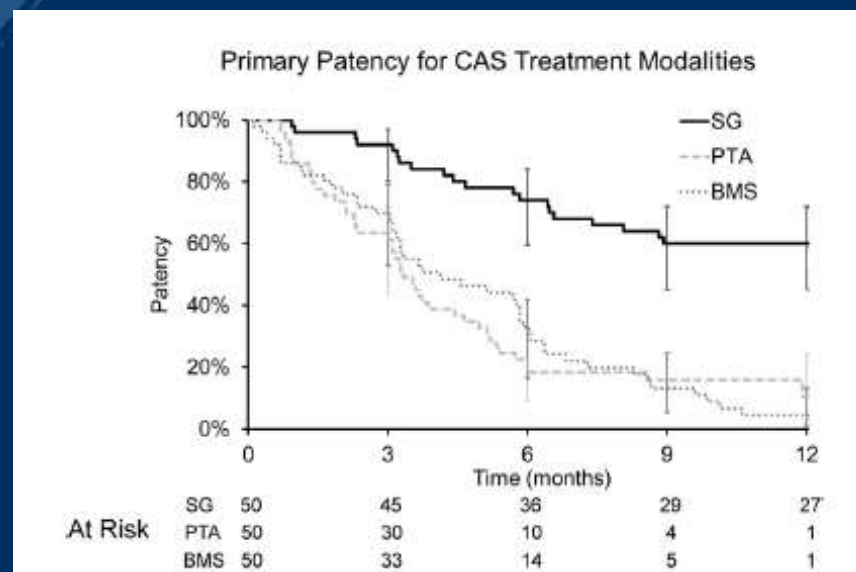


Bare Metal Stents

Use of the Viabahn stent graft for the treatment of recurrent cephalic arch stenosis in hemodialysis accesses



Gregg A. Miller, MD,^a Dean C. Preddie, MD,^a Yevgeny Savransky, MD,^a and Lawrence M. Spergel, MD,^b
Brooklyn, NY; and San Francisco, Calif



Stent Grafts

	Study Design	n =	Technical Success	Primary Patency 3, 6, 12 months
Shemesh et al J Vasc Surg 2008 [Fluency]	RCT (Stent-Graft vs Bare Metal)	13	100%	81%, 81%, 32% (39%, 39%, 0%)
Rajan and Falk JVIR 2015 [Viabahn]	RCT (Stent-Graft vs PTA)	9	100%	100%, 100%, 29% (60%, 0%, 0%)
Jones et al JVIR 2017 [Viabahn]	Retrospective	39	100%	85%, 67%, 42% (Venographic)
Miller et al J Vasc Surg 2018 [Viabahn]	Retrospective	50	100%	90%, 74%, 60%

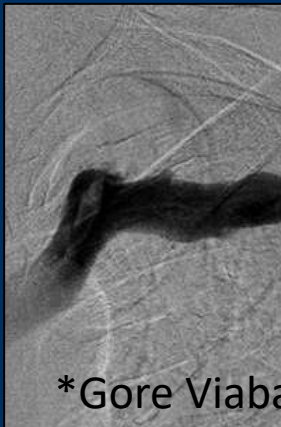
Stent Grafts

Pros

- Overcome recoil stenosis
- Flexible
- Conform
- Durable
- Patency better than PTA
- 'Create' a cephalic arch

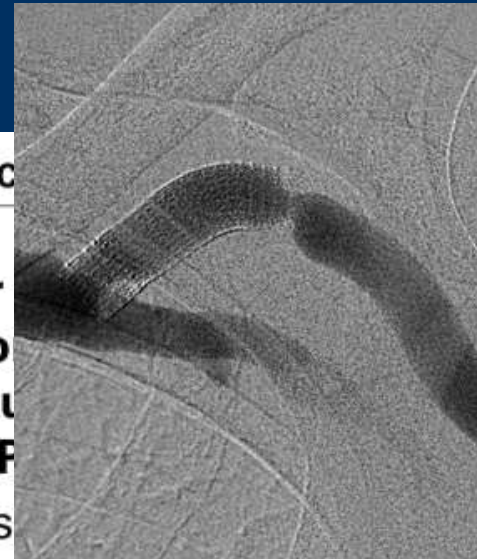
Cons

- Edge stenosis
- Potential compromise of central veins



CLINICAL
**Percutaneous Costoclavicular
for Thoracic Outlet Syndrome
Cephalic Arch Occlusion
Hemodialysis P**

Jeffrey Hull, MD, and James S



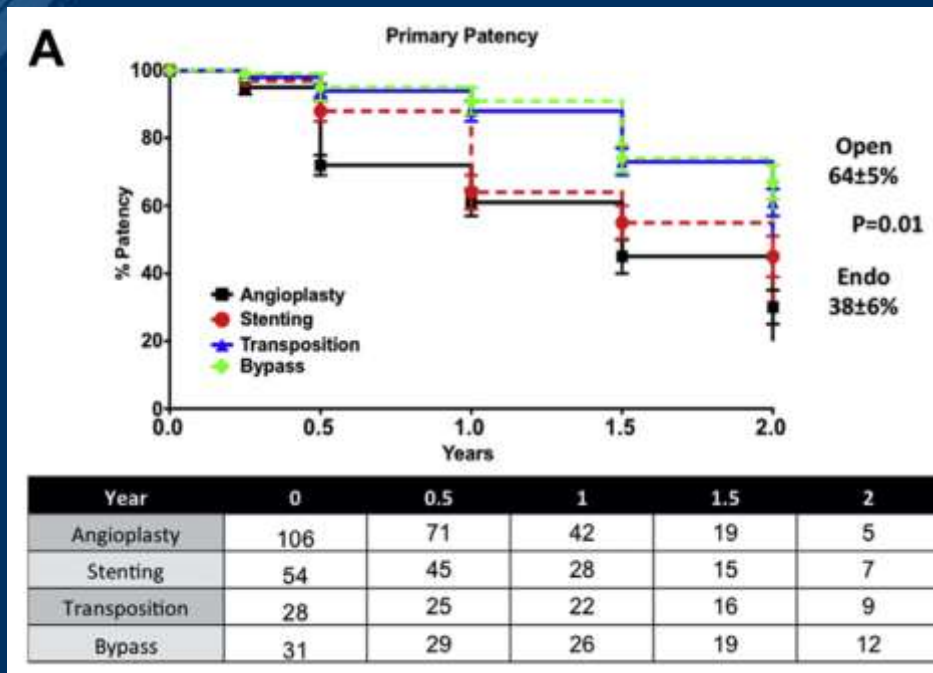
Surgery

From the Eastern Vascular Society

Outcomes of intervention for cephalic arch stenosis in brachiocephalic arteriovenous fistulas



Mark G. Davies, MD, PhD, MBA,^{a,b} Taylor D. Hicks, MD,^{a,b} George M. Haidar, MD,^{a,b} and Hosam F. El-Sayed, MD, PhD,^c *San Antonio, Tex; and Columbus, Ohio*



*Major adverse CV events higher in surgical groups (1% vs 0.3%) p=0.02

Summary – are stent grafts the gold standard?

'Yes'

...when venoplasty fails and when early recurrence of stenosis is encountered.

But

...more evidence is required.

Thank You