

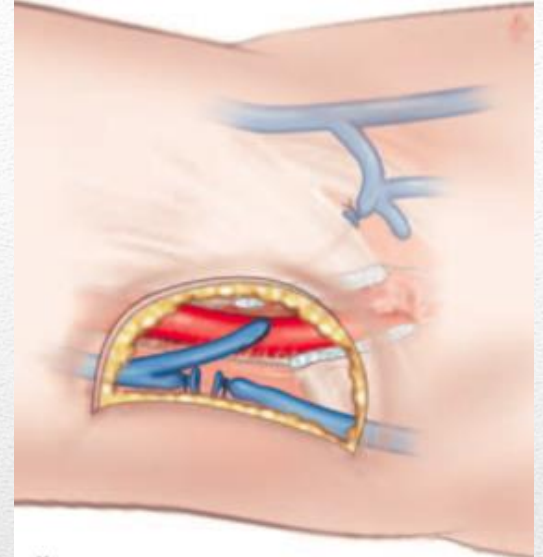
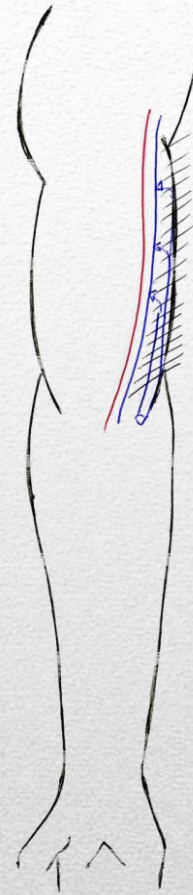
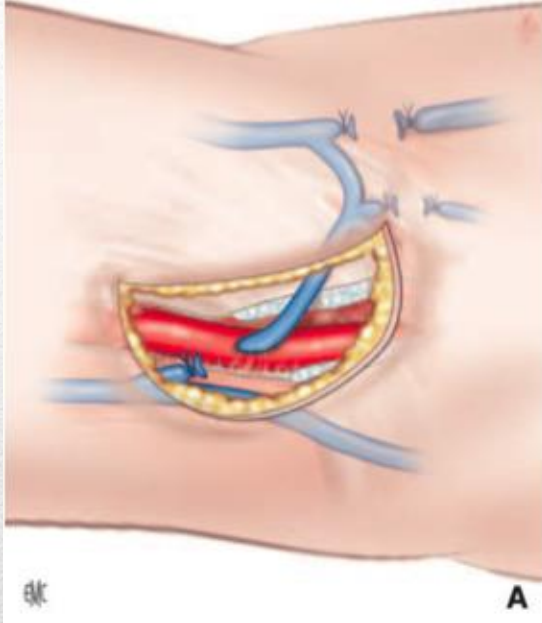
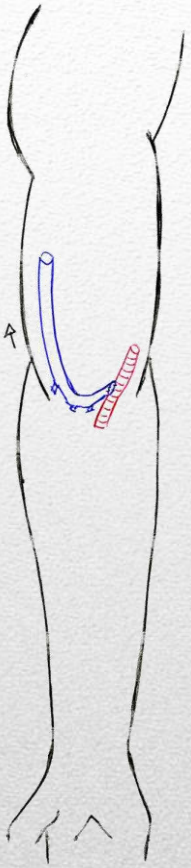
Basilic vein transposition: two stages

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Elbow fistulas



Case Report

Subfascial Hematoma Progressed to Arm Compartment Syndrome due to a Nontransposed Brachiobasilic Fistula

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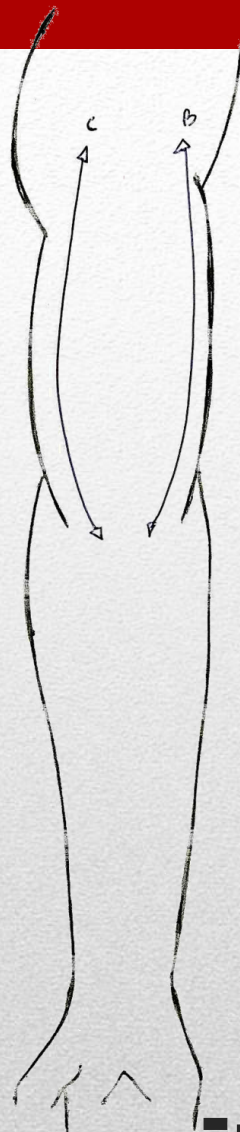
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<http://dx.doi.org/10.1053/j.ajkd.2006.08.020>, How to Cite or Link Using DOI

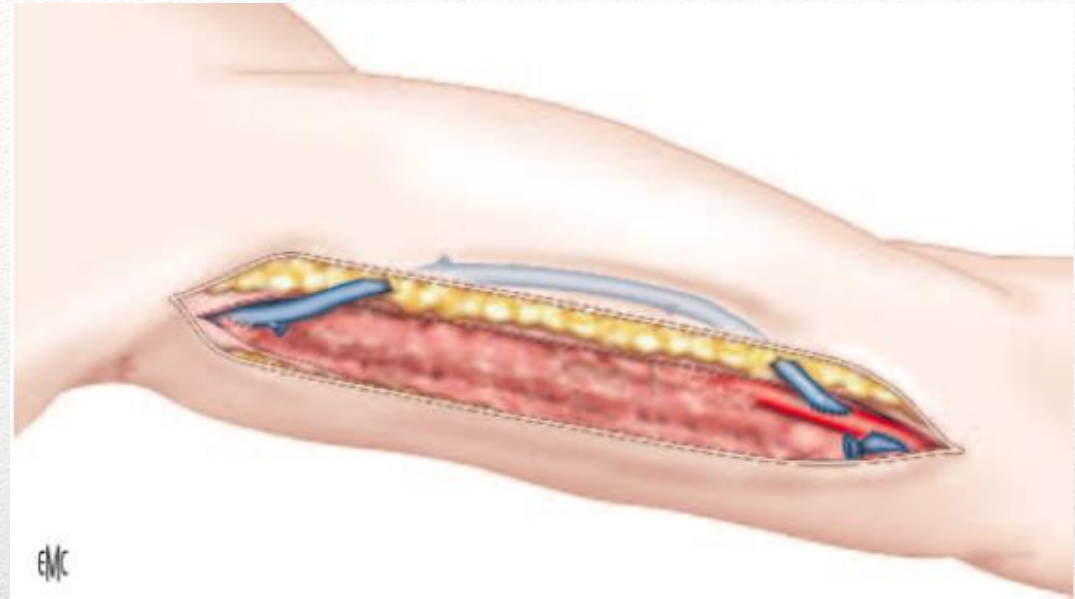
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Vascular access–associated compartment syndrome is reported rarely in hemodialysis patients. A 62-year-old female hemodialysis patient experienced left-arm compartment syndrome caused by a nontransposed brachiobasilic arteriovenous fistula. A subfascial hematoma that developed because of perforation of the posterior wall of the basilic vein was not detected by Doppler ultrasound initially, and subsequent heparinized hemodialysis caused progression of the hematoma. Neuromuscular sequelae were prevented by performing an emergent fasciotomy, and transposition of the arterialized basilic vein was performed later to prevent similar complications in the future. This case report shows the risk for the occurrence of such a devastating complication if the nontransposed brachiobasilic fistula is used for hemodialysis vascular access.





**Basilic vein transposition:
3 approaches...**



Basilic vein transposition: techniques

- Quicker method: single operation
- Earlier functional patency
- Shorter total stay in hospital
- Shorter duration with a CVC

- Absence of maturation and arterialization before transposition

One stage

- Mobilization of a large arterialized vein
- Vein is less susceptible to torque and devascularization during mobilization
- Revision for potential postanastomotic stenosis is easily performed
- Avoid the use of significant surgical dissection in case of early failure

- Necessitates two hospitalizations and operations
- Longer delay before acquisition of a permanent dialysis access

Two stages: techniques

A comparison between one- and two-stage brachiobasilic arteriovenous fistulas

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Objectives: Brachiobasilic arteriovenous fistulas (BBAVF) can be performed in one or two stages. We compared primary failure rates, as well as primary and secondary patency rates of one- and two-stage BBAVF at two institutions.

Methods: Patients undergoing one- and two-stage BBAVF at two institutions were compared retrospectively with respect to age, sex, body mass index, use of preoperative venous duplex ultrasound, diabetes, hypertension, and cause of end-stage renal disease. Categorical variables were compared using chi-square and Fisher's exact test, whereas the Wilcoxon rank-sum test was used to compare continuous variables. Patency rates were assessed using the Kaplan-Meier survival analysis and the Cox proportional hazards model with propensity analysis to determine hazard ratios.

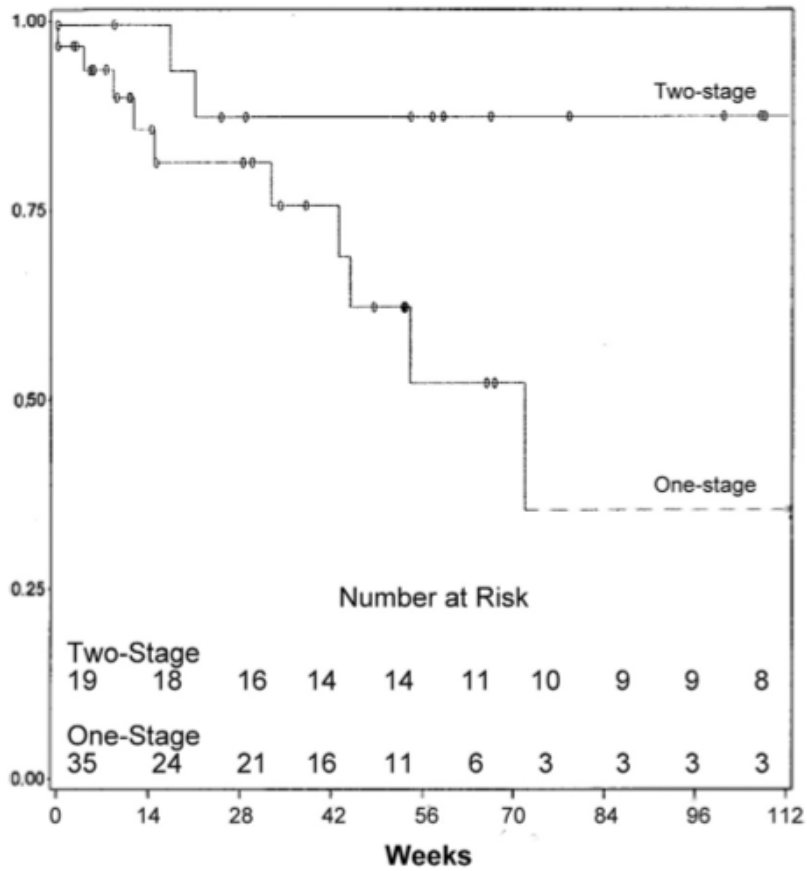
Results: Ninety patients (60 one-stage and 30 two-stage) were identified. Mean follow-up was 14.2 months and the mean time interval between the first and second stage was 11.2 weeks. Although no significant difference in early failure existed (one-stage, 22.9% vs two-stage, 9.1%; $P = .20$), the two-stage BBAVF showed significantly improved primary functional patency at 1 year at 88% vs 61% ($P = .047$) (hazard ratio, 0.2 (95% confidence interval [CI], .04-.80; $P = .03$). Patency for one-stage BBAVF markedly decreased to 34% at 2 years compared with 88% for the two-stage procedure ($P = .047$). Median primary functional patency for one-stage BBAVF was 31 weeks (interquartile range [IQR], 11-54) vs 79 weeks (IQR, 29-131 weeks) for the two-stage procedure, respectively ($P = .0015$). Two-year secondary functional patency for one- and two-stage procedures were 41% and 94%, respectively ($P = .015$).

Conclusions: Primary and secondary patency at 1 and 2 years as well as functional patency is improved with the two-stage BBAVF when compared with the one-stage procedure. Lower primary failure rates prior to dialysis with the two-stage procedure approached, but did not reach statistical significance. While reasons for these findings are unclear, certain technical aspects of the procedure may play a role. (J Vasc Surg 2011;53:1632-9.)

Table II. Primary failure, primary patency, and secondary patency rates for one-stage vs two-stage BBAVF

	<i>One-stage BBAVF (n = 60)</i>	<i>Two-stage BBAVF (n = 30)</i>	<i>P value</i>
Primary failure	22.9% (11)	9.1% (2)	.20
Primary patency			
One year	78%	84%	.046
Two year	34%	84%	
Secondary patency			
One year	82%	89%	.01
Two year	41%	89%	
Primary functional patency			
One year	61%	88%	.047
Two year	34%	88%	
Secondary functional patency			
One year	80%	94%	.015
Two year	41%	94%	

Primary Functional Patency (weeks)



Secondary Functional Patency (weeks)

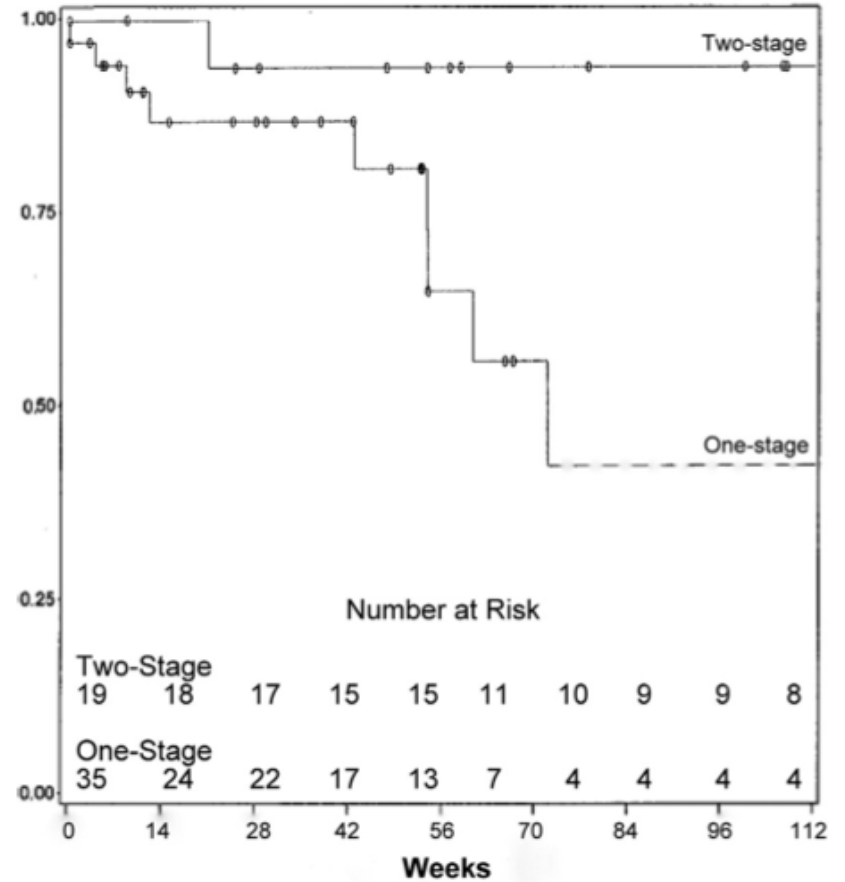


Table IV. Complication rates for one-stage vs two-stage BBAVF

	<i>One-stage</i> (<i>n</i> = 60) %	<i>Two-stage</i> (<i>n</i> = 30) %	<i>P value</i>
Complication <30 day	27.1%	17.5%	.62
Infection	4.2	4.2	.053
Seroma	0	4.2	NA
Primary failure	22.9	9.1	.17
Minor complication >30 day	6.3%	9.1%	.54
Pseudoaneurysm	2.1	4.5	.18
AV fistula	2.1	0	NA
Hematoma	2.1	4.5	.18
Major complication >30 day	66%	16.7%	.046
Stenosis	18.8	9.1	.08
Steal syndrome	2.1	4.5	.18
Thrombosis/ligation	45.1	3.1	.029

Brachiobasilic Fistula Formation — Single versus Two Stage Procedure

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WHAT THIS PAPER ADDS

This is an original article comparing one and two stage methods of brachiobasilic fistula formation. We identified no difference between the two methods in terms of patency. Fistulae created prior to starting dialysis had a significantly longer survival compared to those created in patients who were already undergoing dialysis treatment at the time of creation.

Background: Brachial Basilic (BB) fistulae are a form of vascular access for patients requiring dialysis. They are indicated when the cephalic vein is unsuitable for use. This fistula can be created with either a single stage or a two stage procedure. We aimed to compare the two techniques.

Methods: 73 BB fistulae (29 single and 44 two-stage) were created over a 5-year period (2003–2008). Data including sex, age, dialysis and diabetic status was collected from the case notes. Patency and time to maturity data was collected prospectively on an electronic database within the dialysis unit.

Results: There was no significant difference in functional patency rates between the two methods. A significant difference was identified between patients who had their fistula created prior to starting dialysis compared to those who had their fistula created after starting dialysis, in both initial patency rate ($p = 0.017$) and long term survival of the fistulae ($p = 0.002$).

Conclusion: We identified no significant difference of patency between the two methods. This implies that a single stage procedure has benefits, by offering a quicker form of vascular access. Patients who had their fistulae created prior to dialysis had improved patency rates.

Survival Functions

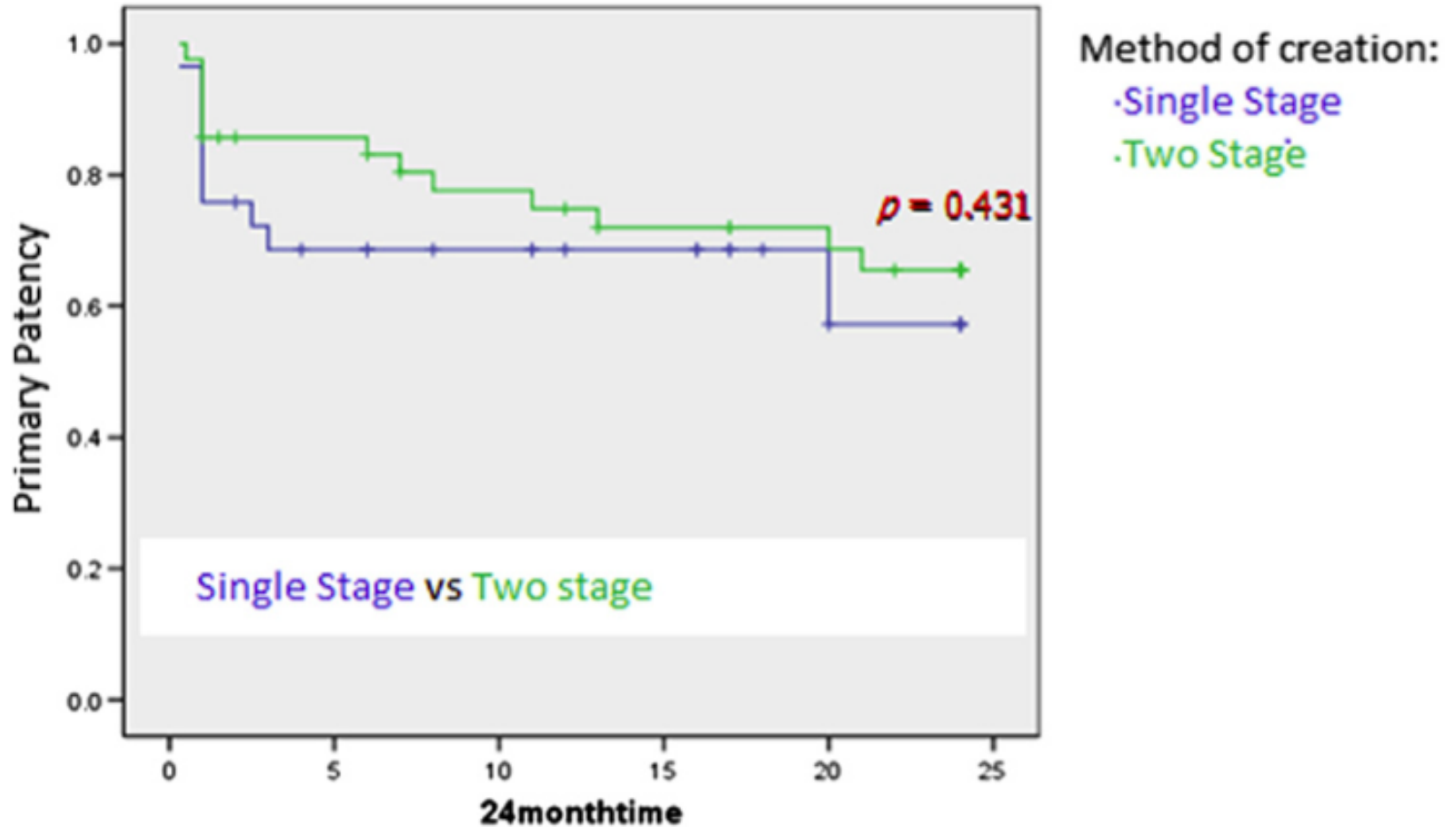


Figure 1. Primary patency rates comparing 1 stage vs 2 stage BB fistulae ($p = 0.431$).

A comparison of the outcomes of one-stage and two-stage brachiobasilic arteriovenous fistulas

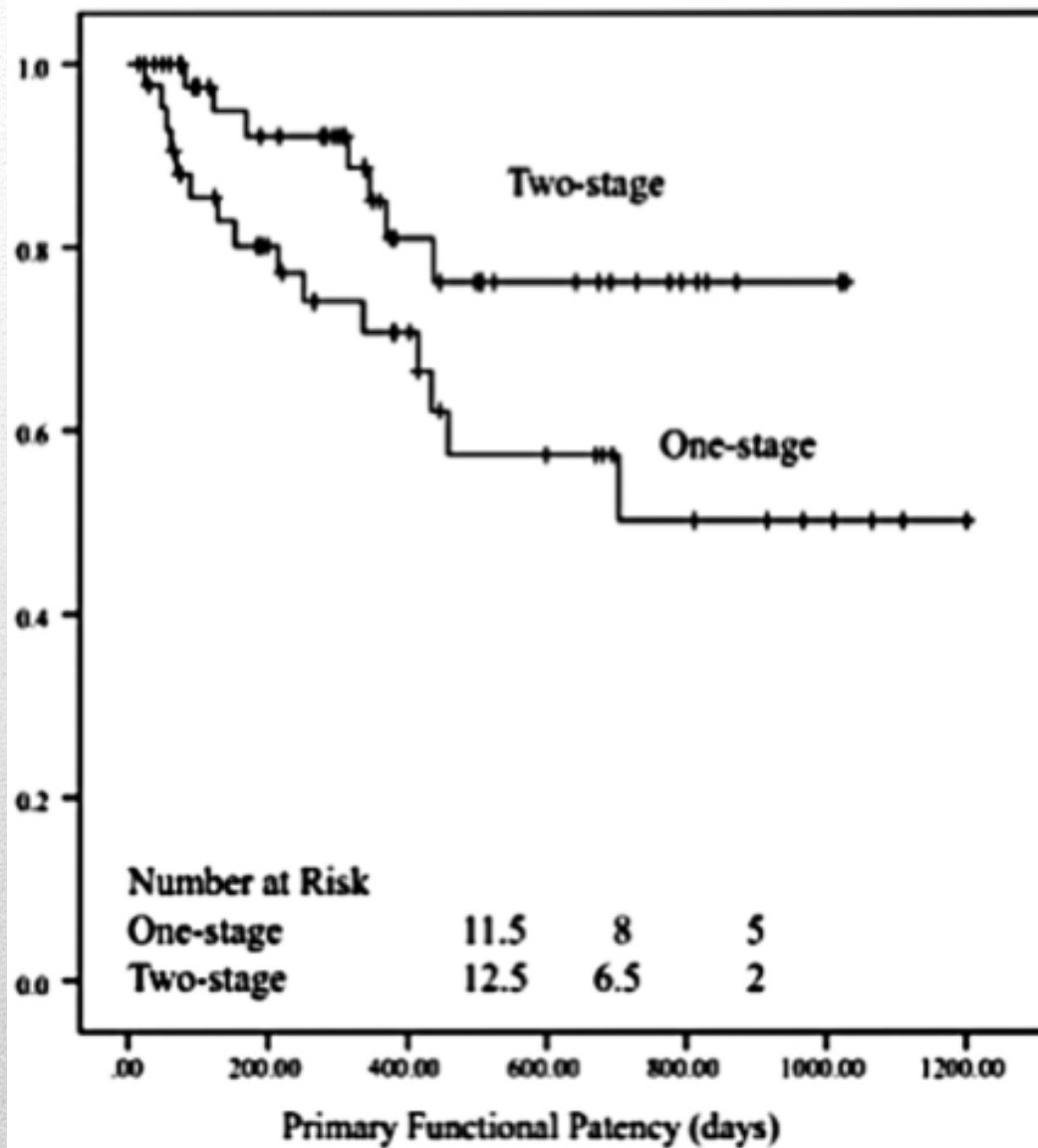
Georgios Vrakas, MD, MSc,^{a,b} Fatima Defigueiredo,^a Sam Turner, MBBS, MRCS,^{a,b} Chris Jones, PhD,^a John Taylor, MBBS, FRCS,^{a,b} and Francis Calder, MB, FRCS,^{a,b} *London, United Kingdom*

Objective: The brachiobasilic arteriovenous fistula (BBAVF) can be formed in one or two stages. This study examined the failure rates and functional patencies of one-stage vs two-stage brachiobasilic transposition fistulas to compare the two surgical techniques.

Methods: We retrospectively identified all the patients who underwent BBAVF access surgery at King's College Hospital between January 1, 2009, and December 31, 2011 (3 years). Patients were divided into two groups according to one-stage or two-stage procedure. All patients were seen in the access clinic 4 to 6 weeks postoperatively, and their fistulas were scanned (duplex). The surveillance of fistulas consists of duplex scans every 6 months to assess volume flow.

Results: During the study interval, 149 brachiobasilic transpositions (65 one-stage and 84 two-stage) were performed in 141 patients. Patients undergoing the two-stage procedure had a smaller mean preoperative vein diameter (4.0 ± 1.1 vs 3.6 ± 1.3 mm; $P = .041$) and tended to be older (58 ± 15 vs 63 ± 15 years; $P = .062$). Mean overall follow-up was 559 ± 333 days. There was no difference in primary failure between the two groups (45% vs 42%; $P = .718$). At 1 year, the two-stage BBAVFs had significantly better primary (71% vs 87%; $P = .034$), assisted primary (77% vs 95%; $P = .017$), and secondary functional (79% vs 95%; $P = .026$) patencies. The same applied to 2-year primary (53% vs 75%; $P = .034$), assisted primary (57% vs 77%; $P = .017$), and secondary functional (57% vs 77%; $P = .026$) patencies. Multivariate Cox regression showed that the one-stage procedure was 3.2 times more likely to fail ($P = .028$). Men were 2.7 times more likely to lose their access ($P = .054$).

Conclusions: This study describes a large series of BBAVFs and makes an extensive comparison between the one-stage and two-stage operations. Significantly improved overall functional patency is demonstrated for the two-stage operation. (J Vasc Surg 2013;58:1300-4.)



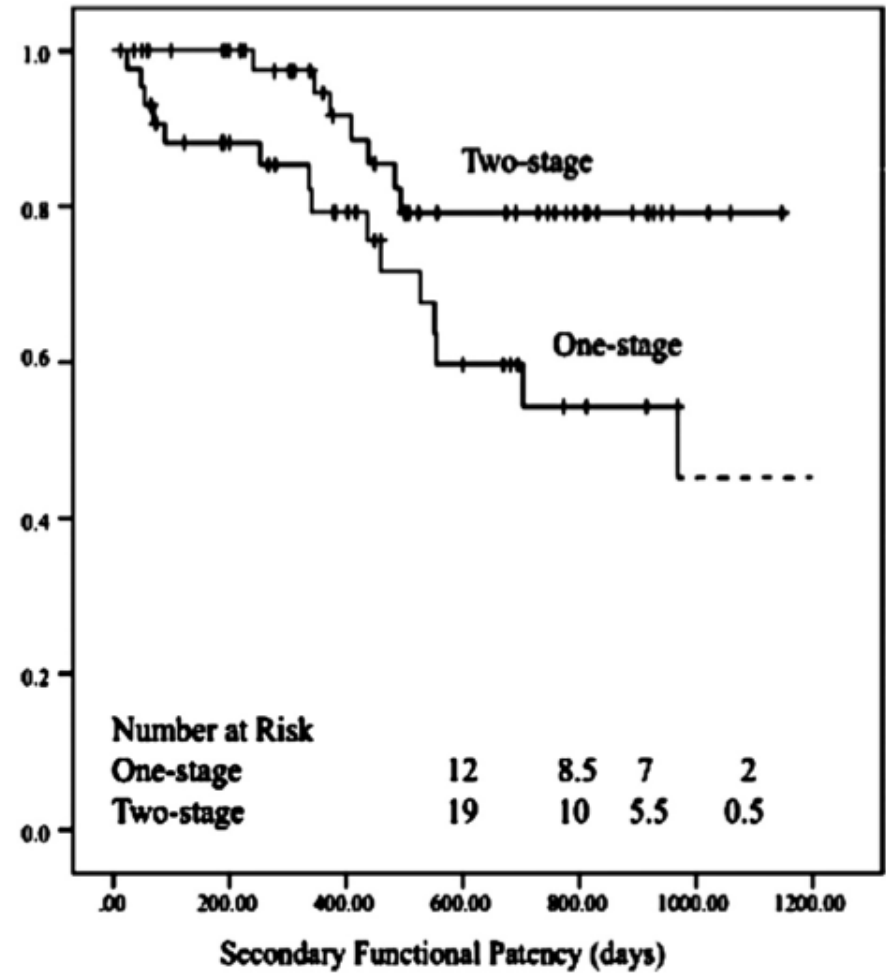
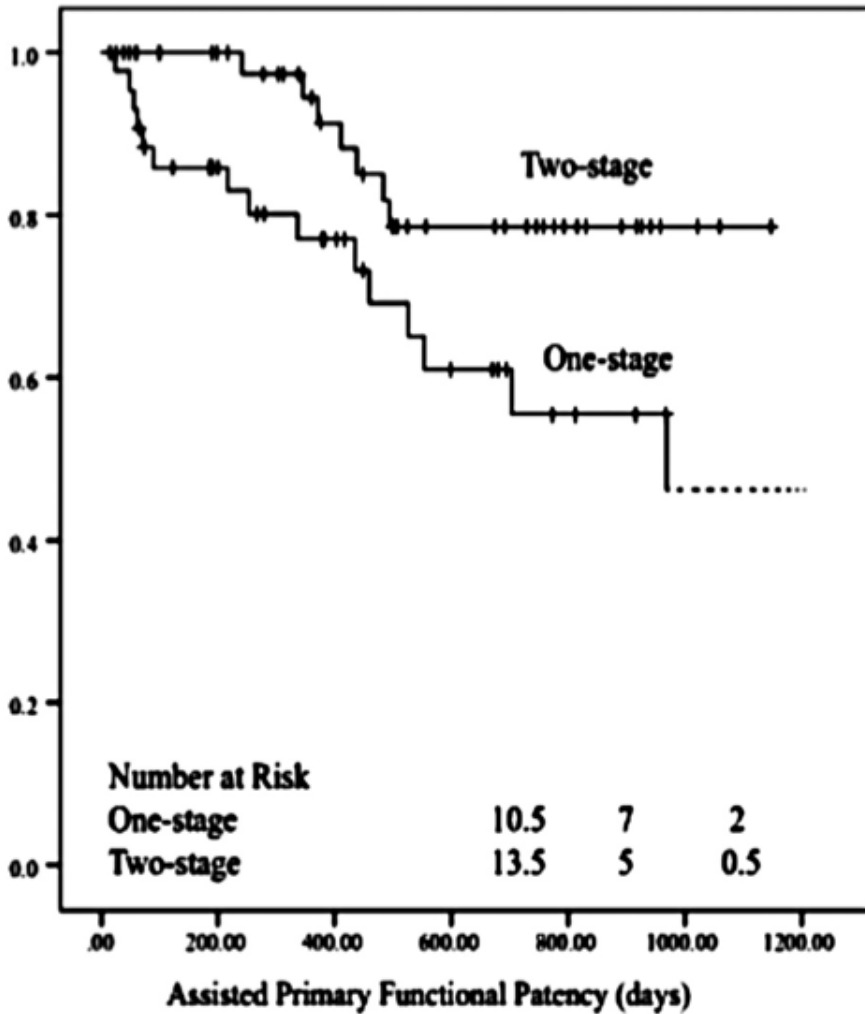


Table III. Patency rates at 1 and 2 years

<i>Interval</i>	<i>Functional patency</i>	<i>One-stage, %</i>	<i>Two-stage, %</i>	<i>P</i>
1 year	Primary	71	87	.034
	Assisted	77	95	.017
	Secondary	79	95	.026
2 years	Primary	53	75	.034
	Assisted	57	77	.017
	Secondary	57	77	.026

Table V. Complications

<i>Variable</i>	<i>One-stage</i> <i>(n = 65), %</i>	<i>Two-stage</i> <i>(n = 84), %</i>	<i>P</i>
Overall	24	30	.715
Infection	3	2	.297
Hematoma	3	3	.504
Thrombosis	4	1	.079
Steal syndrome	2	3	.1
Venous hypertension	2	1	.318
Stenosis	9	20	.06

- Both the one and two-stage techniques have advantages and disadvantages
- Better results in terms of patency might be achieved with the two-stage technique

Conclusions



- The two-stage technique avoids extensive tunneling of a non-matured, thin walled vein
- Basilic vein is less prone to ischemia, injury, kinking and compression that may lead to subsequent stenosis and thrombosis
- Whether to divide and tunnel the vein or simply move the undivided vein more anterolaterally need to be specifically addressed

Conclusions



- Two-stage procedure unless the basilic vein has already been arterialized by a former distal fistula
- Avoid unnecessary ligation and re-anastomosis
- Need for further prospective randomized trials

Personal choices

