

ABSTRACT

Background: Repeated interventions to keep the well-functioning dialysis vascular access represent the Achilles heel for hemodialysis patients. Thrombosed permanent dialysis access, either arteriovenous fistula or graft remains one of the most common and debatable complications regarding frequency of occurrence and how to manage.

Methods: Between May 2016 and April 2019, 96 of 125 patients with first-time thrombosed dialysis AVGs were prospectively evaluated after block randomization for surgical patch angioplasty (group A) versus balloon angioplasty (group B) for venous anastomotic side after surgical thrombectomy in four tertiary referral hospitals in Egypt.

Results: immediate technical success was 100% with regaining graft functionality in 100% of patients in group A patients versus 89.6% (P=0.056) in group B with achieving optimum graft functionality in 100% of technically successful declotting procedures (43 patients) in group B. The primary patency at 6, 9, 12 and 18 months in group A was 66, 63.6, 52.3 and 31.8%, respectively, versus 48.8, 48.8, 37.2 and 18.6%, respectively, in group B. The secondary patency in group A at 6, 9, 12 and 18 months was 86.4, 100, 88.6 and 77.3%, respectively, versus 72.1, 90.7, 79.1 and 69.8%, respectively, that was not statistically significant except 12-month primary patency (P=0.014).

Conclusions: Our study found no statistically significant difference in 18-month outcomes between patients treated with surgical thrombectomy with patch angioplasty and surgical thrombectomy with balloon angioplasty for thrombosed AVGs regarding regaining functionality and patency

BACKGROUND

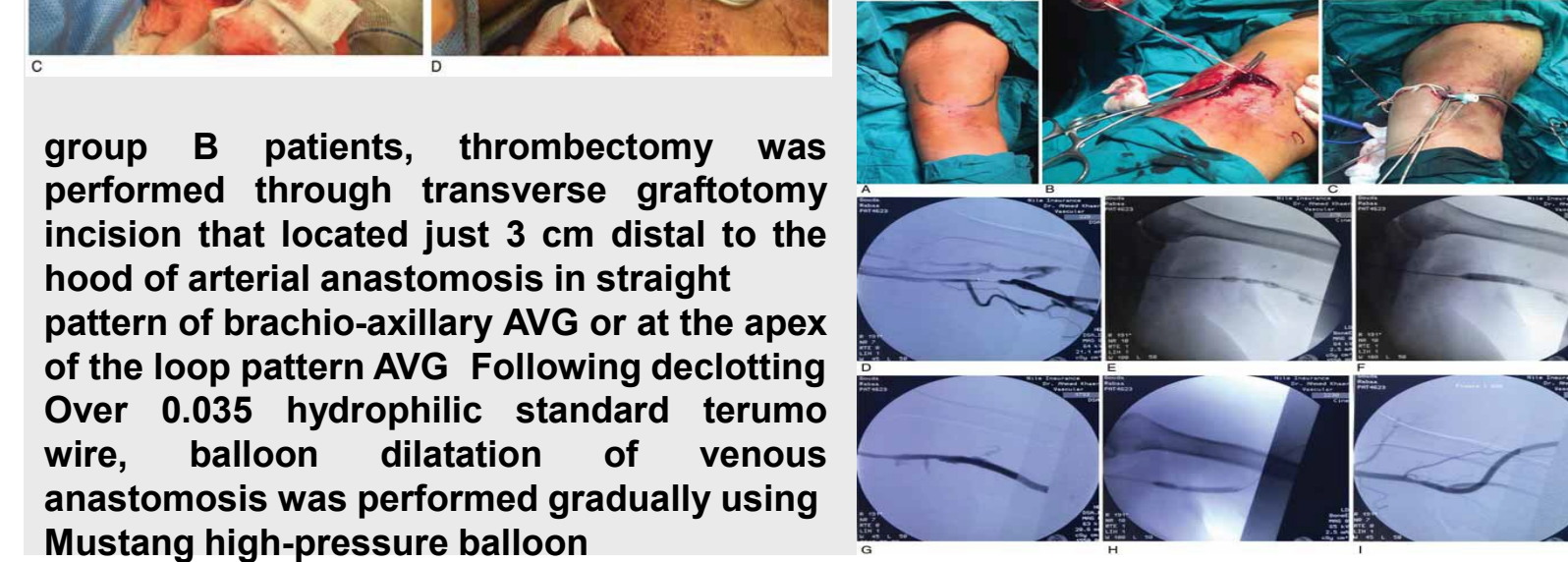
PTFE synthetic grafts are commonly used as an alternative hemodialysis access to native AVF, it may be utilized as a secondary option in patients with exhausted access or as a primary option in patients with unsuitable native veins, those requiring urgent dialysis and cannot tolerate waiting for maturation of native AVF with bridging temporary catheter.

PURPOSE

to evaluate mid-term outcomes of surgical thrombectomy of clotted AVG with adjunctive venous outflow procedures mainly patch angioplasty versus balloon dilatation to restore their function regarding patency as primary endpoint and safety as secondary endpoint.

METHODS

For group A, surgical thrombectomy was performed through longitudinal graftotomy incision just 2 cm proximal and extended to the hood of venous anastomosis including at least 2 cm of apparently healthy distal native vein we utilized the same skin incision used to implant the graft. Once patch angioplasty was decided after on-table completion venography Remodeling of venous anastomosis and closure of graftotomy incision using PTFE patch with 5/0 or 6/0 polypropylene suture

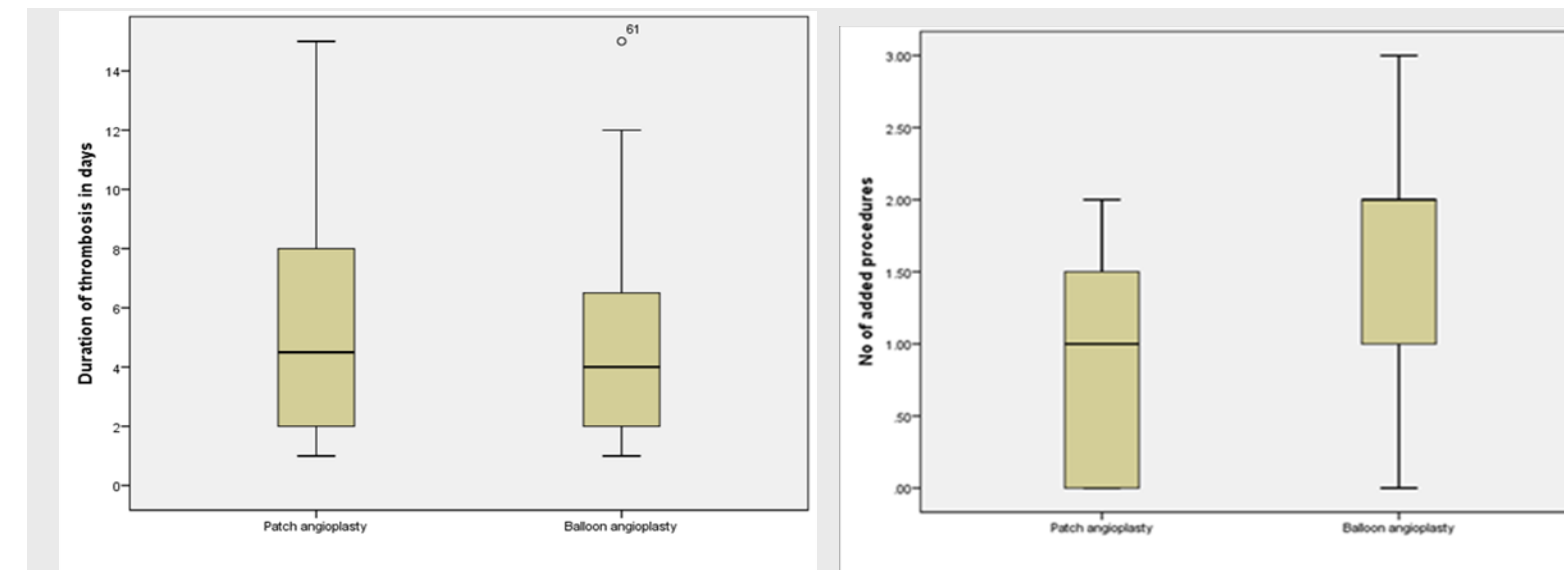


group B patients, thrombectomy was performed through transverse graftotomy incision that located just 3 cm distal to the hood of arterial anastomosis in straight pattern of brachio-axillary AVG or at the apex of the loop pattern AVG Following declotting Over 0.035 hydrophilic standard terumo wire, balloon dilatation of venous anastomosis was performed gradually using Mustang high-pressure balloon

RESULTS

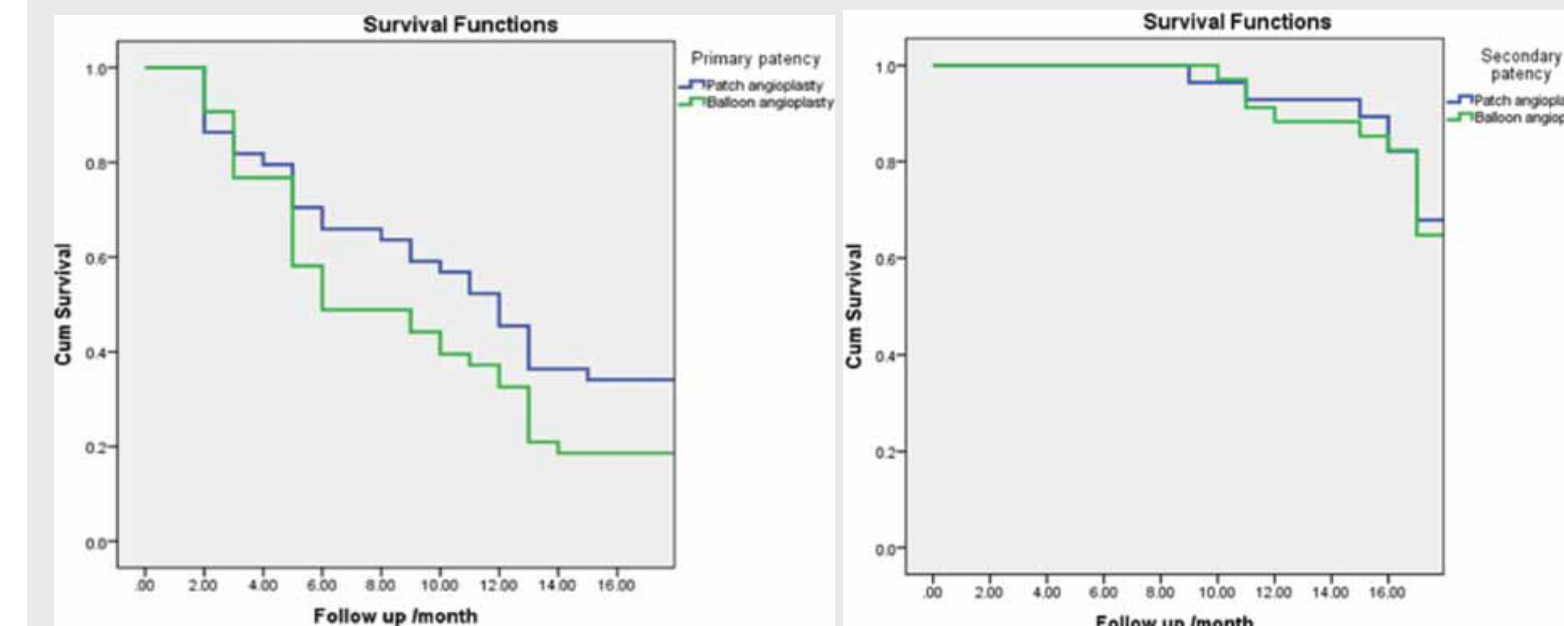
in our study 96 patients (59 male patients 61.5% and 37 females 38.5%) were enrolled with average age (49.27±7.67) and with three patterns of thrombosed AVG (arm straight brachio-axillary pattern in 70 patients (73%), chest wall axillo-axillary loop graft in 13 patients (13.5%) and axillo-axillary arm loop pattern in 13 patients (13.5%) were eligible to our inclusion criteria. Immediate technical success after surgical declotting was 100% in group A patients versus 89.6% in group B with required adjunctive procedure in 6.3% in group A versus 10.4% in group B (P value = 0.014*).

RESULTS



average thrombosis duration in days in patients treated with patch angioplasty vs balloon angioplasty

average number of additional secondary procedures to treat restenosis in patients treated with patch angioplasty vs balloon angioplasty.



Results of the studied groups.

	Angioplasty		Z		P value	
	Patch (44)	Balloon (43)	No	%		
Six months follow up						
Primary patency	29	21	21	48.8	1.62	0.11
Secondary patency	38	31	31	72.1	1.65	0.10
Malfunction	2	4	4	9.3	0.88	0.38
Thrombosed	4	8	8	18.6	1.28	0.20
Nine months follow up						
Primary patency	28	21	21	48.8	1.39	1.65
Secondary patency	44	39	39	90.7	2.07	0.04*
Malfunction	0	3	3	7.0	1.79	0.07
Thrombosed	0	1	1	2.3	1.01	0.31
Twelve months follow up						
Primary patency	23	16	16	37.2	2.46	0.014*
Secondary patency	39	34	34	79.1	1.21	0.23
Malfunction	0	1	1	2.3	1.01	0.31
Thrombosed	2	4	4	9.3	0.88	0.38
Ligated	2	3	3	7.0	0.50	0.62
Died	1	1	1	2.3	0.0	1.0
Eighteen months follow up						
Primary patency	14	8	8	18.6	1.42	0.16
Secondary patency	34	30	30	69.8	0.79	0.43
Thrombosed	5	8	8	18.6	0.94	0.35
Ligated	2	4	4	9.3	0.88	0.38
Died	3	1	1	2.3	1.0	0.32
Mortality						
Alive	41	42	42	87.7	0.59	0.56
Died	3	1	1	2.3	1.0	0.32

RESULTS

In group B, 5 patients (10.4%) showed residual outflow significant stenosis that was not resolved by repeated balloon angioplasty and required bailout stenting at graft outflow anastomosis. Those patients were excluded from our follow-up protocol. Adjunctive inflow arterial anastomosis angioplasty was done in 5 patients (10.4%) in group A versus 8 patients (16.7%) in group B (P=0.35). Intragraft stenosis was detected in 3 patients (6.25%) in group B (P=0.07). All patients of both groups showed successful post-procedure dialysis session with graft flow rate > 400 ml/min proved by duplex. Through 18-month follow-up period 6 AVGs (6.9%) were ligated; 2 in group A and 4 in group B. Puncture site related infection was the cause of ligation in 4 of 6 AVGs (66.7%) while the other 2 grafts were ligated after renal transplantation. Totally 39 additional secondary procedures were performed to preserve graft patency in group A, central vein angioplasty was the most secondary procedure performed (n=21, 53.8 %) with median IQR 1. While in group B, 59 secondary interventions were performed in form of outflow procedures including repeated angioplasty, stenting where patch angioplasty was the most commonly done (n=38, 64.4%) with median IQR 2 (P=0.007)

CONCLUSION

Our study found no statistically significant difference in mid-term outcomes between patients treated with surgical thrombectomy with patch angioplasty and surgical thrombectomy with balloon angioplasty for thrombosed AVG regarding regaining functionality and patency, however patients treated with balloon angioplasty required more additional secondary interventions and most of them were to manage graft venous anastomotic site restenosis. This may encourage future utilization of stent graft to decrease restenosis rate but also will be associated with increase procedure expenses.