Use of infant feeding tube for arteriovenous fistula creation by Nephrologist–Surgical Technique and Outcomes

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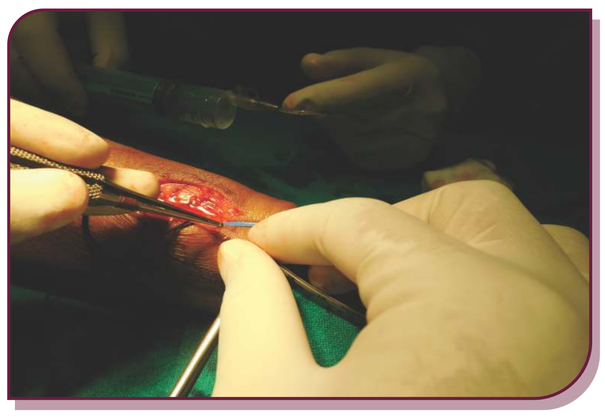
Introduction

Appropriate venous handling is crucial to a successful Arterio-venous fistula (AVF) creation. Conventional surgical techniques may cause trauma to the posterior venous wall, increasing the risk of thrombosis, spasm, and scar formation, thereby leading to torsion or kink of the vessel. These factors lead to suboptimal short- and long-term patency of the fistula. [1, 2]

The aim of our study was to describe the use of an infant feeding tube for venous cannulation in facilitating the creation of AVF, thus avoiding the above mentioned complications.

Material and Methods

All 502 AVFs created by the same technique from February 2012 to October 2016 were reviewed. Our technique involved ligating and cutting the distal end of vein after mobilizing. After exposing the lumen, infant feeding tube is gradually advanced up to axillary vein. Side to side anastomosis of radial artery and cephalic vein is done with continuous proline 6.0 sutures. After opening hemostatic slings the infant tube is gradually withdrawn while injecting heparinized saline with pressure in the venous side to dislodge thrombi, if any.



Inserting the infant tube into the vein

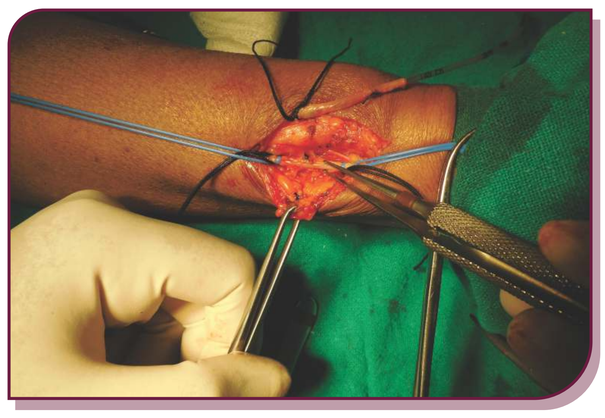
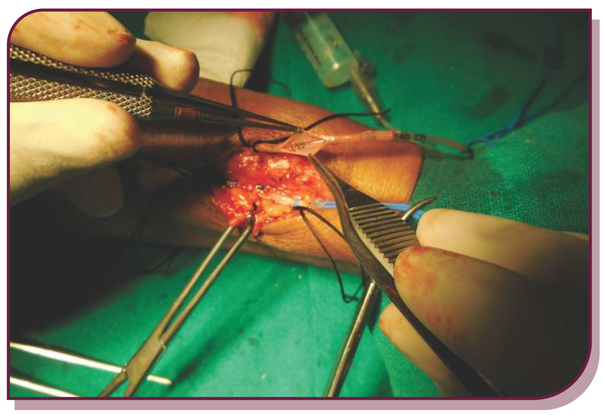
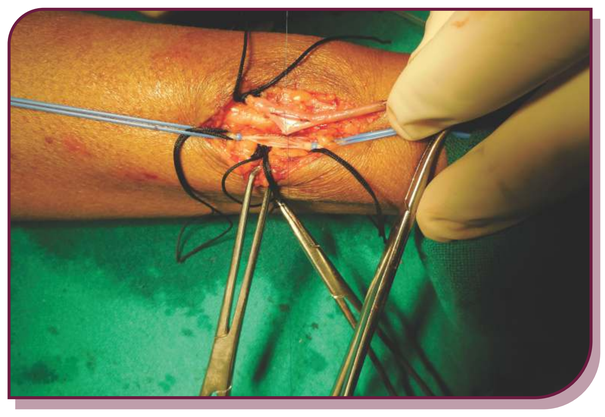


Figure showing artery & the vein before anastomosis



Approximately 7- 8mm incision is made on the vein



Anastomosis is started from center of the vein & artery

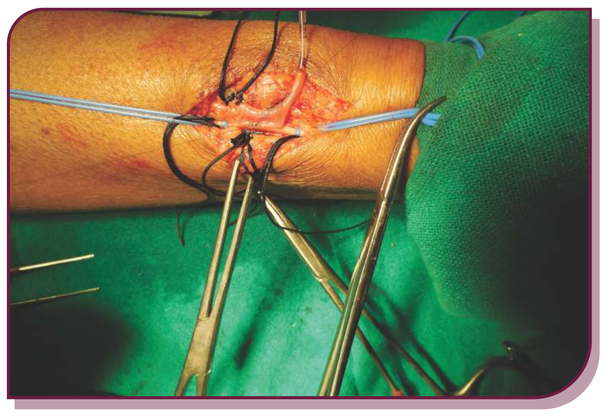
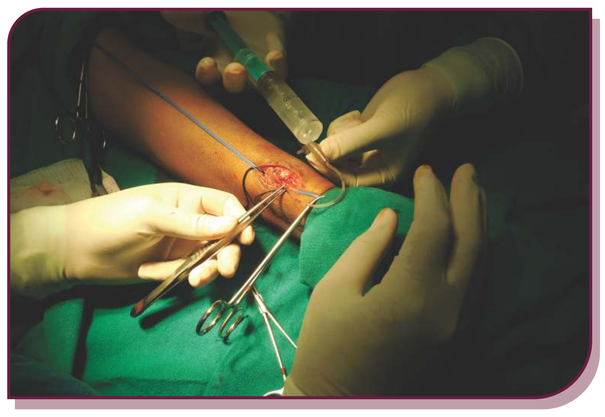


Figure showing the completed anastomosis



Infant tube is gradually withdrawn from the vein, while flushing with saline

Post procedure the vein is dilated with a strong thrill

Results

Patient characteristics and preoperative data	
Total fistula made	502
Mean age (years),	46.3 +/- 11.6
Gender (M:F)	370:132
Comorbidities • Diabetes	 188 (37.5%)
Site of fistula • Brachiocephalic • Radiocephalic	 45 457
Bruit on table	497 (99%)

Complications related to procedure	
v Bleeding	7
q Requiring re-exploration	3
v Thrombosis	2 extending upto the axillary vein
v Infection	1
v Seroma	2

Interval (months)	No. At risk at beginning of interval	No. of failed during interval	Lost to follow up during interval	No. of death	Interval failure rate	Cumulative patency rate
	Primary fistula patency, all patients					
0-1	497	13	2	2	0.026	97.4%
1-6	480	28	10	4	0.060	91.4%
6-12	438	6	21	7	0.014	89.6%

Infant feeding tube as a marker of patency

Length up to which tube was inserted	Patency at 1 year	Failed at 1 year	P value
<15cm	192	30	0.044
>15cm	212	17	

Conclusion

Infant feeding tube permits AVF creation by nephrologists safely with comparable patency rates. We believe the use of infant feeding tube has following advantages -

1. Easier surgical anastomosis.
2. Prevents posterior wall of vein from the needle during anastomosis of anterior wall, thus preventing venous luminal occlusion.
3. Establishes proximal patency of vein up to the shoulder and defines luminal adaptability before anastomosis.
4. Stasis and clot formation in the vein is prevented by periodic injection of heparinized saline
5. Prevents torsion of the vein and gives good AV alignment
6. Any spurt from the suture line is easily identified by pushing saline via the tube. This prevents blood loss as it helps in identifying bleeding point.

References

1. Konner K. The anastomosis of the arteriovenous fistula--common errors and their avoidance. Nephrol Dial Transplant. 2002 Mar;17(3):376-9.
2. Konner K, Nonnast-Daniel B, Ritz E. The arteriovenous fistula. J Am SocNephrol. 2003 Jun;14(6):1669-80.

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DOI: 10.3252/pso.eu.54ERA.2017
ePosters supported by F. Hoffmann- La Roche Ltd.
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