



TWO STAGE BASILIC VEIN TRANSPOSITION (BVT) IN SMALL CALIBER BASILIC VEIN (<3 MM)

Surgery

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ABSTRACT

Background: Basilic vein transposition(BVT) either in single or two stage is an excellent autogenous access procedure when cephalic vein is not available. This study aims to analyse feasibility, patency of two-stage BVT in smaller caliber basilic vein (<3mm).

Method :20 basilic vein transposition were performed in basilic vein caliber 2.4 - 2.8mm.Two-stage technique was done and data collected to assess complications, maturity and patency of basilic vein at 6 months.

Results : Primary patency at 6 months was 90%.Although 20% of our patients experienced complications, the majority resolved spontaneously.

Conclusion : Initial results from our study has been encouraging for two-stage BVT even in vein <3mm diameter .

KEYWORDS

Basilic vein transposition, Dialysis, Artero Venous Fistula (AVF)

INTRODUCTION

The National kidney foundation dialysis outcomes quality initiative recommends use of autogenous arteriovenous (AV) access for primary hemodialysis access 1 . due to availability of affordable health care and dialysis centres, survival among renal failure patients have increased substantially which also resulted in depletion of cephalic vein accesses justifying use of basilic vein.Sizeable population are non-insured and belong to lower socio-economic status and use of prosthetic graft adds to cost in these group of patients.Hence attempt at autogenous access should be made which has better durability and has fewer complications than prosthetic grafts. Basilic vein is not routinely used for venipuncture because of its deep position in the arm, thus preventing scarring and thrombosis often seen in more superficial veins 2 .Establishing a durable dialysis access is often difficult in smaller caliber veins.

Though brachio basilic fistula had been firstly described in 1970 3 . It was not until 1976 that the first basilic vein transposition (BVT) was made 4 .

Different techniques for BVT have been described, which include endovascular transposition 5, single stage transposition 2, 6-13 , two stage transposition 13-15 and superficialisation 13-16.

Aim of the paper is to study the feasibility, patency and durability of two-stage BVT in small caliber basilic vein (< 3mm).The advantages of two-stage procedure are potential maturation of smaller veins before actual transposition, thereby potentially improving ultimate success of transposition.The study also aims to determine whether using two stage BVT in smaller caliber basilic vein improves fistula use and maturation rate.

METHODOLOGY

Study took place at two tertiary care hospitals between January 2017-June 2018.Total of 20 patients were selected in the age group of 30-60yrs.Each patient was evaluated with duplex ultrasound and those with size 2.4-2.8mm were included in the study. Those with < 2mm were excluded from the study and those with basilic vein of 3mm were also not included for this study.

Interval time between two stages was 3-4 weeks.By this time the basilic vein would have been arterialised and dilated .This was confirmed by ultrasound done 2 weeks after the first surgery.Once 2nd stage was done, suture removal was carried out on 14th post operative day and vein was assessed again using ultrasound and advised for cannulation accordingly if size of vein was at least 6 mm.

Technique

Surgical technique involves two operations. The first surgery is creation of brachio basilic fistula using a small transverse incision just below elbow under local anaesthesia. Patient was reviewed after 2weeks to assess the size and for any procedure related complications. If basilic vein size attains > 4.5 mm and in the absence of any complications, then patient was planned for 2nd stage surgery that is transposition of basilic vein.This was carried out under GA.In case of any procedure related complications like seroma, venous hypertension etc, procedure was delayed.Average time between the two stages was 3-4 weeks.

For 2nd stage , our technique involved a vertical incision along the course of basilic vein marked by pre operative duplex ultrasound. Full length incision was made and all the tributaries were ligated using 3-0 silk sutures.Anterior surface of vein was marked with methylene blue (Fig 1) to aid in minimising risk of kink during tunnelling process. Basilic vein was disconnected about 1-2cms from anastomosis level, transposed through a subcutaneous plane to superficial, anteromedially and reanastomosed to basilic vein in a spatulated fashion using 7-0 prolene suture (Fig 2).



Fig 1

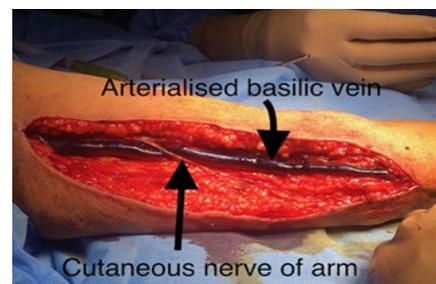


Fig 2



Fig 3

RESULTS

Among 20 patients selected for the present study 8 patients (40%) were male and 12 (60%) were females. Mean pre AVF diameter was 2.6 mm + 2 mm (Table 2). All patients were hypertensives and 80% were diabetics. BVT was primary procedure in 2 patients (10%), 14 patients (70%) had 1-2 AVF's and 4 patients (20%) had more than 3 AVF prior to our two-staged BVT (Table 3).

Table 1 Patient demographics

Age	45 + 15 yrs
Men	8
Women	12
Hypertension	20
Diabetes	16

Table 2 Basilic vein caliber

Pre AVF = 2.4 - 2.8 mm
Pre BVT = 4.5 - 6.5 mm

Table 3 Previous fistulas

0% = 2 patients
1-2 = 14 patients
> 3 = 4 patients

Patency

All patients had successful 1st stage but one patient had thrombosis of AVF prior to planned 2nd stage. Patient had hypotension during dialysis and AVF thrombosed. Another patient had thrombosed basilic vein transposition within two dialysis sessions. Remaining 18 patients had patent basilic vein transposition at 6 months.

Complications

Table 4 : Complications

Complication	No of patients	Percentage
Thrombosis	2	10%
Infection	1	5%
Steal	1	5%
Edema	2	10%
Seroma	3	15%
Hematoma at puncture site	4	20%

DISCUSSION

Basilic vein transposition is an important third line option for providing autogenous AV access in an attempt to reduce resorting to prosthetic grafts.

Large diameter of the basilic vein allows rapid maturation and early cannulation⁶.

Numerous clinical studies have compared outcomes after one stage and two stage BVT procedures. There are seven observational cohort studies have been published in the past decade along with one small randomised clinical trial. The results from these studies have been varying and non conclusive.

In studies published by Vrakas et al and Reynolds et al found that primary and secondary patency rates were significantly higher in two stage BVT compared with single stage 17,18. But these findings were contradicted by data published in two other studies by Syed et al and Agarwal et al during same time period showing significantly improved primary and secondary patency associated with one stage BVT construction compared with two stage BVT 21, 22.

A meta analysis comparing results of one stage vs two stage BVT showed no statistically significant differences between two groups in terms of patency, maturation and complication rates but authors highlighted the need of randomised clinical trials (RCT) with better methodology to draw more definitive conclusions^{17,23}.

The present study was conducted in two centres by a single experienced surgeon and as a protocol two stage BVT in basilic veins < 3mm. We believe several factors associated with two stage BVT that may account for improved outcomes compared with single stage. For example allowing the basilic vein to mature and become arteriatised facilitates surgical dissection of vessel upto axillary vein confluence and reduces vein injury during dissection. Also a mature basilic vein has a thickened wall that may make it easier to transpose and tunnel without being twisted or kinked.

This problem can occur at the swing point or within subcutaneous tunnel and is more likely to occur in manipulating a small thin walled vein.

Basilic vein often lengthens during maturation which allows greater ability to tunnel it in a gentle curvature in lateral upper arm without creating acute angles at swing points. Finally a staged transpositional approach to BVT creation has been shown to improve maturation rate of basilic vein < 4mm, allowing functional patency to be achieved over a wider range of starting vein diameter^{19,24,25}.

Two stage BVT approach also has ability to avoid a lengthier, more complex operation in the event of early primary failure due to lack of vein development, infection or severe steal syndrome.

As previously described by other groups 26,27, we found no impact of vein diameter on fistula patencies even when vein as small as 2.4-2.8 mm were used in the present study.

Single surgeon with experience in high volume dialysis access procedures and surgical technique have been contributed to higher primary patency rates in our centre at 6 months despite smaller caliber vein. In one patient, AVF thrombosed prior to 2nd stage and one failed by 2 cannulations. Although 20% of patients in this study experienced complications, the majority resolved spontaneously and this complication rate is lower than that reported for prosthetic graft which ranges from 60% to 100% 8, 28.

CONCLUSION

The results from our study have been encouraging for two stage BVT even in vein < 3mm diameter and this surgical technique associated with good primary patency rates and fewer complications compared to grafts. However small sample size and short term follow up are the limitations in our study. Owing to non randomisation and selection bias of patients may limit the generalisation of our findings.

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