

## Outcome of thigh arterio venous fistulae for haemodialysis in end stage renal failure

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### Abstract

A well- functioning arterio venous fistula (AVF) is an essential need in patients with End Stage Renal Failure (ESRF). However, due to the lack of suitable veins and central venous stenosis, this may not be always possible in the upper limb. We present a case series of 10 such patients who underwent thigh arterio venous fistulae (TAVF). The initial success rate of such TAVF in this series is 71.4%. We believe that this is an acceptable result in this cohort of patients and also better than having a tunnelled line or a synthetic graft which can be associated with higher rates of infection.

### Introduction

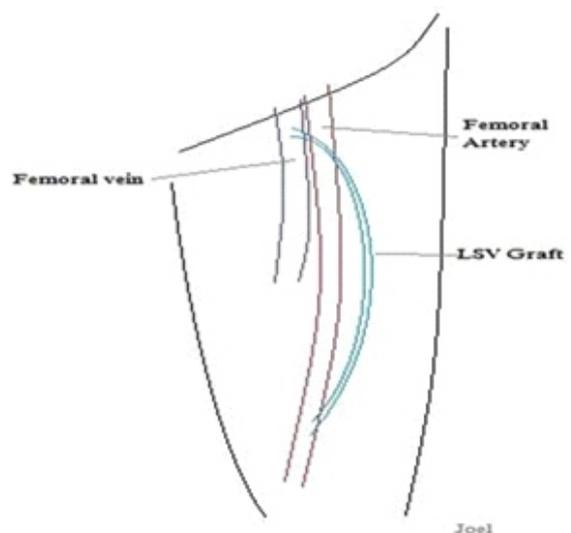
A well-functioning AVF is an essential need for haemodialysis in ESRF Patients. Majority of these patients are started on dialysis through temporarily inserted vascular catheters which are associated with many complications including central venous thrombosis and stenosis. It is best to have an upper extremity AVF due to higher long term patency rates and lesser morbidity and mortality (1). Certain complications like catheter related blood stream infection may result significant morbidity and at times death of the patient. However an upper extremity AVF may not be possible in many patients due to absence of suitable veins or presence of bilateral central venous stenosis. Available treatment options for such patients include angioplasty and/or stenting of central vein stenosis if these options are not possible.

A thigh Arterio Venous Fistula (TAVF) is the next option. A significant number of patients with multiple AVF failures and SVC obstructions due to previous dialysis line insertions present to our unit. Here we present a series of TAVF created in such patients.

### Methods

This is a retrospective analysis of patients who underwent TAVF at the Teaching Hospital Anuradhapura between January 2015 and August 2017). Inclusion criteria were patients with failed upper limb AVFs due to SVC obstruction. These patients were not suitable for further upper limb fistulae due to the presence of SVC obstruction, causing severe arm and facial swelling. All patients had previously undergone fistulograms and failed attempt at SVC angioplasty. Patients were explained regarding the surgery and examined for peripheral arterial disease clinically. TAVF were constructed under spinal anaesthesia. Patients who were not fit for anaesthesia were excluded. Patients who were lost to follow up were also excluded.

In all selected patients AVF was created between the Superficial Femoral Artery (SFA) and Long Saphenous Vein (LSV). The LSV was mobilised from sapheno-femoral junction to lower thigh level and was tunnelled subcutaneously in a gentle curve orientation. Anastomosis was done to lower SFA using 6/0 polypropylene in an end to side manner. Cefuroxime 1.5g IV was used as perioperative prophylaxis (one dose at induction and two more doses post operatively). All patients were operated by a single surgeon. No post operative anticoagulation was given.



**Figure 1.** Illustration showing the configuration of the saphenous vein

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**Table 01.** Summary of patients who had TAVF surgery over a period of 32 months.

Patient No	Date of surgery	Age (years)	Sex	Surgery	Outcome
1	03/03/2015	27	M	Left Thigh AVF	Functional at 6 weeks.
2	07/04/2015	39	F	Right Thigh AVF	Functioning well after two weeks.
3	09/07/2015	35	M	Right Thigh AVF	Post-Operative Haematoma. Managed conservatively. Functional at 6 weeks.
4	26/11/2015	33	F	Left Thigh AVF	Functional at 6 weeks.
5	10/02/2016	50	F	Right Thigh AVF	Poor thrill at 6 weeks.
6	11/02/2016	46	M	Left Thigh AVF	Died during immediate post op. period due
7	06/06/2016	43	M	Left Thigh AVF	Functional at 6 weeks.
8	17/08/2017	42	F	Left Thigh AVF	Died during immediate Post op. period due to sepsis.
9	14/09/2017	38	F	Left Thigh AVF	Defaulted follow up.
10	23/11/2017	29	F	Left Thigh AVF	Functional at 6 weeks.

## Results

A total of 10 patients underwent TAVF during this period. One patient was lost to follow up and the remaining 9 were included in the analysis. Two patients died during immediate post-operative period, one due to myocardial infarction and other due to sepsis as a result of surgical site infection. Among the 9 included, there were 4 males and 5 females. Mean age was 38.2 years. Fistula maturity was assessed clinically and 5 patients were able to dialyse using the TAVF at 6 weeks. Among the other two, one had TAVF thrombosis at 4 weeks and the other patient had poor thrill even after 6 weeks. Among the successful candidates, one had surgical site hematoma which was managed conservatively. However, at the end of study period (August 2017) there were only 3 patients who had functioning TAVF as two patients had died due to complications of chronic kidney disease. At our centre, the primary success rate of TAVF among patients who survived the initial post-operative period was 71.4% and the functional success rate in all patients is 55.6% (5/9) with a mortality of the procedure of 22%.



**Figure 2.** Mature thigh AVF used for dialysis

## Conclusion and Discussion

Haemodialysis through upper limb AVF remains the commonest modality of renal replacement therapy in Sri Lanka (2). It is also the gold standard all over the world. However, failure

of early evaluation for the need of AVF followed by repeated central venous catheterization results in the accumulation of a fair number of patients who have no viable venous access for AVF in the upper limbs. Peritoneal dialysis in our local regional setting is often impractical in most patients because of their poor home environment and lack of family support. In such patients, the next option would be a lower extremity AVF.

AV graft arm fistula (synthetic / thigh vein) also is not possible if it is definite central vein stenosis. Furthermore, considering the infection risk (3) and cost, it is better to offer autogenous lower extremity AVFs over synthetic graft AVFs as vascular access. The surgical technique used was looped Great saphenous vein-femoral artery fistula creation.

In our series, the primary success rate of TAVF was 71.4% among patients who survived the initial post-operative period. This is a desirable outcome and is better than tunnelled lines and synthetic grafts which are associated with higher rate of infection (1). Keeping the greater saphenous vein in a gentle curve position rather than loop orientation results in easier cannulation. However the factors like pain score, flow rate and cannulation difficulties were not assessed in this study which will be assessed in follow-up studies.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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