

A study of AV fistula salvage by angioplasty at tertiary health care center

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Abstract

Background: Arteriovenous fistula (AVF) is lifeline for patients with end-stage renal disease. A fistula ought to be mature enough to support economical hemodialysis. the foremost vital demand is adequate blood flow through the fistula. **Objectives:** to judge impact of angioplastic salvation of av fistula at our tertiary care hospital. **Material associated Methods:** This was an analytical study done on fifty cases requiring AVF. the requirement for intervention decided by examination and duplex ultrasound. All patients mentioned for AVFs were treated within the workplace underneath ultrasound steering, unless a central venous stenosis was suspected. All procedures were performed with the patient beneath anaesthesia by one surgeon, and preprocedure, periprocedure, and postprocedure ultrasounds were performed in a same hospital. **Results:** Out of total 50 cases, 30 (60%) were males and 20(40%) were females. With male: female ration of 1.5:1. Age range was 35-82 years, mean age was 62.3±18.2 years. Most common location of AVF was left arm (82%) and most were radiocephalic (71%). Most common comorbidities seen was hypertension (81%). Brachiocephalic AVF and antegrade access only PTA showed significantly shorter primary patency in multivariate analysis (HR 6.244; 95% CI (2.52-25.45); p=.03 and HR 8.096; 95% CI (1.88-42.12); P=.02) respectively. **Conclusions:** Angioplastic management in AVF is safe and effective for making the AVF.

Key Word: Arteriovenous fistula, Angioplasty, Primary and secondary patency

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INTRODUCTION

Arteriovenous fistula is the treatment of choice for hemodialysis in chronic renal failure patients. Back in early 20th century the arteriovenous shunting was started for hemodialysis.¹ In 1950's, the standard Quinton-Scribner silastic Teflon shunt infection and thrombosis were the main complications of arteriovenous shunts. Spontaneous dislocation was also a major issue.¹ To

overcome this problem Brescia, Cimino, and Hurl with made surgically created fistulae between cephalic vein and radial artery at the wrist. Such type of vascular access for hemodialysis was first described in the 1966.² Maintaining adequate dialysis access is essential in patients receiving hemodialysis. Native arteriovenous fistula (AVF) is regarded as favour able vascular access than arteriovenous graft(AVG) or central venous catheter because of lower access failure rate and mortality.^{3,4}Therefore, as many as a possible situation, AVF has been attempted as a first choice in patients receiving dialysis. However, maturation of AVF is still a major problem (up to 50%) in a large population^{5,6} and salvage of maturation failure AVF is an important part of successful access acquisition. AVFs are given preferences over AVGs ^{7,8}.The rationale for this preference is that fistulas have lower rates of thrombosis,⁹ have greater access lifespans,¹⁰ and maintain their patency with fewer secondary interventions and a low cost as compared with grafts. Most importantly, there is an approximate20%

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decreased mortality rate.¹¹ To keep these AVFs potent, endovascular management, like percutaneous transluminal angioplasty (PTA) has been regarded as an effective methods.^{12,13} The purpose of this study was to evaluate the outcomes of angioplastic management of arteriovenous fistula(AVF) at tertiary care hospital.

MATERIAL AND METHODS

This study was a 2 year prospective interventional follow up study conducted within the Department of Total of 50 cases were selected as they came to department. Cases were selected as per inclusion and exclusion criteria's. This study was approved by institutional review board. 50 consecutive patients from year were selected. Out of 50, total 30 men and 20 women formed the study sample. All patients had AVF and underwent the endovascular procedure for salvage of AVF. Written informed consents were obtained from all patients before the procedures were performed. Just In case of multiple lesions, the foremost severe lesion was used because the stricture degree measuring. Lesion location was classified as followings; artery, anastomosis, juxta-anastomosis vein, proximal draining vein, distal draining vein, cephalic arch, and central vein. However, for the statistical analysis, distal draining vein lesion was outlined as upper arm vein, cephalic arch and central vein in radiocephalic AVF, and cephalic arch and central vein in brachiocephalic AVF. Angioplasty was usually preceded by a color ultrasonography for the identification of the stenotic area. In cases of acute obliteration, angioplasty was performed after thrombolysis and angiography of the area of interest. Depending on the stenosis site, the insertion of wires and catheters was performed according to the direction or opposite of the blood flow direction or both. The balloons which will be utilized in angioplasty were of 3 types: "standard", "high pressure," or "cutting".¹⁴ angioplasty was amid the utilization of tubing or stent graft. Outcome assessment- Outcome and patency rates were outlined as per the reported standards of the Society of cardiovascular and Interventional Radiology.¹⁵ Primary patency was outlined as uninterrupted patency when intervention till succeeding access occlusion or repeat intervention. Secondary patency was outlined as patency achieved by all perennial endovascular interventions. Kaplan–Meier technique and therefore the log-rank take a look at were used for primary and secondary patency rates. Cox proportional-hazard regression models were accustomed calculate hazard ratios (HRs) with 95th confidence intervals (CIs) for AVF survival. A p value <0.05 was outlined to be statistically significant. the data was entered in Microsoft excel, SPSS version 20 was used for analysis.

RESULTS

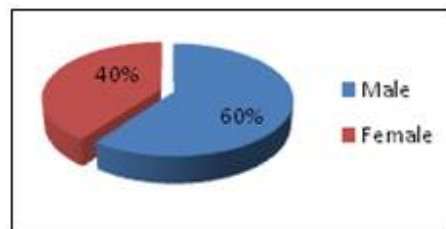


Diagram 1: Percentage distribution of gender

Out of total 50 cases, 30 (60%) were males and 20(40%) were females. With male: female ration of 1.5:1. Age range was 35-82 years, mean age was 62.3±18.2 years.

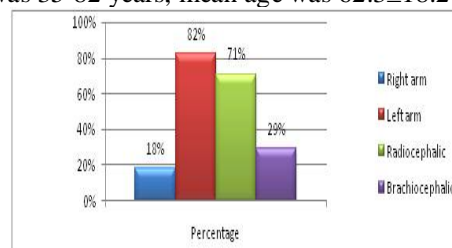


Diagram 2: Distribution as per location of AVF (shin)

Most common location of AVF was left arm (82%) and most were radiocephalic (71%).

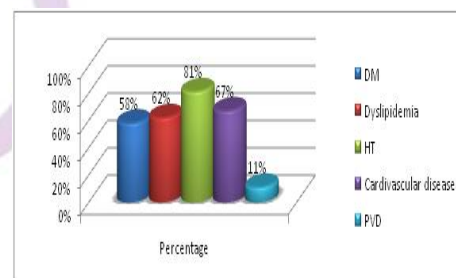


Diagram 3: Distribution as per associated co-morbidities in study population

Most common comorbidities seen was hypertension (81%), next ere cardiovascular diseases (67%).

Table 1: Cox regression analysis for primary and secondary patency

Variable	Hazard ratio	95% CI	p value
Primary patency			
> 63 years	1.22	0.41–14.25	.24
Right arm AVF	2.42	0.12–9.63	.48
Brachiocephalic AVF	6.244	2.52–25.45	.03
Ante grade access	8.096	1.88–42.12	.02
Distal vein lesion	1.273	0.37–6.48	.85
Secondary patency			
> 63 years	0.134	0.012–2.145	.07
Right arm AVF	6.53	0.586–125.2	.02
Brachiocephalic AVF	3.487	0.458–54.89	.34
Distal vein lesion	1.885	0.554–21.42	.84

Brachiocephalic AVF and antegrade access only PTA showed significantly shorter primary patency in multivariate analysis (HR 6.244; 95% CI (2.52-25.45));

$p=0.03$ and HR 8.096; 95% CI (1.88-42.12); $P=0.02$ respectively. For secondary patency, right arm AVF and brachiocephalic AVF showed significantly low patency in univariate analysis. There was no statistical significant factor.

DISCUSSION

The basic indication for angioplasty of AVF or AVG in a HD patient is once there's stricture $> 500\text{th}$ of lumen's diameter that is in the midst of previous occlusion, enhanced blood pressure throughout HD, worsening laboratory findings like symptom and azotaemia, diminished murmur on auscultation of the vascular access, and eventually drop of blood flow in color Doppler of the location.¹⁶ In this study males formed 60% of the study and female 40%. Similar results were seen in study done by Sahasrabudhe P *et al*¹⁷ male were 65% while in a study done by Tham WP *et al*¹⁸ males were 57%. Both of these findings were in accordance with our study. Similar observations were seen in Lee SJ *et al*¹⁹ study. Most common location of AVF was left arm (82%) and most were radiocephalic (71%). Similar observations were seen in a study done by Shahnawaz *et al*.²⁰ The kidney disease Outcomes and Quality Initiative (KDOQI) tips recommend that each one recently created fistulae should be examined for applicable maturation four to six weeks postoperatively, and if poor prognostic signs are evident, immediate referral ought to be required to the operating surgeon or interventionalist for prompt analysis and intervention.¹⁶ Overall primary and secondary patency rates were 62% and 82% in one year, 68% and 79% in a pair of years, that are comparable different studies despite the existence of various background.^{21,22} Right arm AVF and brachiocephalic AVF showed comparatively poor patency in our study. Though comparatively little variety of this condition, its statistical significance was evident in primary and secondary patency. Considering that the left arm radiocephalic AVF is sometimes the primary selection of operation site in most of the patients, right arm and/or brachiocephalic AVF means patients couldn't use a primary alternative vessel or already abandoned that access. However, the precise history of every patient wasn't obtained. Ultrasound analysis of AVF before the procedure is useful to find the pathology or clot and determine the vessel anatomy. Therefore, determination of puncture site becomes easier supported the ultrasound finding. We have a tendency to perform an ultrasound to judge the AVF and select the entry purpose. Therefore, antegrade access implies that there was no lesion close to the anastomosis site. That presumes the poor underlying vascular condition not connected with the operation. Woods *et al*²³ reported that a history of peripheral vascular disease was

related to the next risk of AV graft or fistula failure. However, despite these presumptions, concomitant vascular disease didn't show statistical significance associated with in our study. Age has been delineated as a very important issue influencing the AVF patency in many studies²⁴ however, no significance was discovered in our study. On the contrary, patients over 63 years older showed longer secondary patency, however this can be not all over with applied math significance in our study. Among the five patients with clinical failure, three underwent recreation of recent tube access and a couple of patients continuing haemodialysis with the central venous catheter. This was in accordance with Lee SJ *et al*¹⁹ study. Limitation of this study was it was done on small number of patients. Larger data and complicated data processing techniques would be more beneficial. In conclusion, endovascular management in AVF is safe and effective for making the AVF. Brachiocephalic AVF and antegrade access procedures were identified as the factors influencing the patency in multivariate analysis.

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