

Responsible Factors for Fistula Failure in End Stage Renal Disease

SYED LIAQUAT ALI KHAN¹, HABIBULLAH ISHAQUI², FAZAL MOHAMMAD MANDOKHAIL³

ABSTRACT

Background: Multiple factors are responsible for failure of Arterio venous fistula (AVF) in end stage renal disease patients. That require Maintenance Hemodialysis. Out of technical errors, site of insertion, Hypotension, size of vessels, diabetes and atherosclerosis are the common causes of failures in AVFs.

Aim: To determine the causes of failure of arteriovenous fistula in end stage renal failure patients.

Patients and Methods: This study was carried out at Department of Nephrology, Sandeman Provincial Hospital/Bolan Medical College, Quetta. Forty cases of end stage renal disease (ESRD) patients were referred for AVF during January 2007 to December 2009. They were selected and operated upon AVF by a given surgeon with a technique (end-to-side or side to side) and followed for two years regularly. In addition to underlying disease such as diabetes mellitus, atherosclerosis and inappropriate vessels, another factors such as hypotension and bleeding of aneurismal vessels were recorded when AVF failed.

Results: Four out of 44 patients were excluded from this study because of impossible insertion of AVF due to severe damage and thrombosis of peripheral vessels. Fifty (50) AVFs were inserted in 40 patients, 28 in snuff Box of left hand, 11 in distal of left fore arm, 9 nine cases in left arm and 2 in snuff box of Right hand, 28% failed primarily (Before Dialysis) commonly due to drop in Blood pressure and among the remaining 72%, 44% patient had functional AVF for at least 24 month and 28% of them 6.0 months functioned for then failed monthly due to Hypotension during hemodialysis.

Conclusion: Hypotension was the cardinal cause of failure of AVFs in ESRD patients. We can reduce failure rate by monitoring and controlling the Blood pressure during hemodialysis and prevent Hypotension by salted regimen intake.

Keywords: Arteriovenous fistula, end stage renal disease, hemodialysis

INTRODUCTION

The patients of acute and chronic renal failure require dialysis in the form of peritoneal or hemodialysis to wash the harmful products from the blood. For hemodialysis an arteriovenous fistula is being required for the high blood flow that is appropriate and frequent access. When we compare all type of fistulas Brescia-Cimino.¹⁻² Fistula is the standard one and most frequently used fistula. Patients, technician and physicians have been facing problems for making an arteriovenous fistula. The formation of arteriovenous fistula needs well experienced vascular, general surgeon and urologist, to make adequate collateral flow from the ulnar artery. For the purpose ALLEN test is required before surgery which will help to decrease ischemic problem of hands. The selection of fistula site is very important. For this purpose superficial veins distal arteries evaluation is very important.³ The failure of fistulas has many reasons wherein the two most important, are; the

inexperience hands, and the ischemic injury during the surgery specially in those patients having hypertension and diabetes.⁴ So arteriovenous fistula is very important in ESRD patients. In this study we analyzed the causes of fistulas failure and potency rate.

PATIENTS AND METHODS

The present study was conducted at Department of Nephrology Sandman Provincial Hospital/BMC Quetta. This is a prospective randomized study wherein 44 patients were analyzed from January 2007 to December 2009. In the initial stage the sex, age, personal complete history, vascular disease like diabetes mellitus, and hypertension were recorded. The site of fistula was chosen after recording blood pressure and performing the Allen test. According to the patients' status the best site of fistula was selected. During the surgery, different aspects were noted like intravascular thrombosis, diameter of the vessels, inflow of the artery and out flow of the vein. The side to side (S—S) and end of side (E—S) AVF was created if there was no contraindication. Those patients who were not fulfilled the criteria were excluded from the study. The presence of thrill and

^{1,3}Department of Nephrology, Bolan Medical College Quetta,
²Department of Surgery, Sheikh Zaid Hospital, Quetta
Correspondence to Dr. Syed Liaquat Ali Khan
Email: tabanliaquat@yahoo.com

checking the potency of fistula was the sign of working fistula. After observations of these signs patients were discharged. Review of the patients was done on first day, first week, and on third week. After third week, if potency of fistula was ensured then haemodialysis was started. On few haemodialysis sessions the following complication of fistula were recorded like hematoma, subcutaneous thrombosis, and blood pressure.

RESULTS

We inducted forty four (44) patients in the study. Four (4) patients out of them were excluded from the study because of impossible insertion of AVF due to severe damage and thrombosis of peripheral vessels. Fifty (50) fistulas were made in remaining patients, which included of 28 men (70%) 12(30%) women. Their age limits were from 16 to 60 years. In 29(58%) one fistula creation was appropriate, while the second operation was required in 13 patients (26%), and the third fistula were created in the remaining 8 patients (16%) the reason of repeated fistula creation was the failure of the former fistula. In 28 patients (56%) the fistula was created in left snuff box, 11(22%) cases in distal of left fore arm, in a 9(18%) cases the ante cubital vein to brachial artery fistula of left arm (the ulner artery to the basilica vein) and the remaining 2 cases (4%) in right wrist the minimum patency duration was 24 months in 22 cases (44%) while 14 cases (28%) mean 6.0 early failure occurred during the first two three weeks after insertion before Haemodialysis. In 8 patients (57%) of the latest group a sharp fall in Blood pressure (<100/80) was reported especially during haemodialysis though a subclavian of femoral catheters. Five patients (35%) needed thrombectomy and venous dilatation of the superficial veins due to fragility and inappropriate veins selected for fistula creation. Two out of five developed inter mittent blood pressure changes¹⁰ patient. (20%) patients were diabetic having arterio sclerosis Low blood pressure was the most common etiology of the AVF failure. as we had a report of 88% of Hypotension at the times of AVF failure. In early failure group 7 cases (50%) were in left wrist, 3 cases (21%) in left forearm, two cases (14%) were in left arm and two cases (14%) were in right arm. There was notable difference between the mentioned groups in early failure rate when compared with the total number of AVFs on specific site. In 36 cases the fistula was ready for haemodialysis. 23(63%) out of 36 had active fistula by the end of the study while in 13(36%) it was active for a period of 7.0 months. In this group 6 cases were in left wrist, 4 cases in left forearm and 3 cases in left arm. In 9 cases out of 13 cases Hypotension was the reason of AVF failure,

three of which were diabetic in remaining 4 patients bleeding and hematoma after frequent punctures and ensuing venous thrombosis was the etiology of AVF fistula.

DISCUSSION

End-stage renal disease patients need maintenance haemodialysis. For this purpose AV fistula of the upper limbs are the gold standard. The distal fistula of upper limb are more common, due to easy approach to superficial venous and less complication. While the proximal fistula of upper limb are greater and have large diameter and more complications. Moreover in different cases of disabling aneurism or bleeding in distal fistulas, it is not necessary to repair the fistula and ischemia, risk of distal limb decreases⁵. However some authors claimed in different studies that Brachial fistulas is another best choice if radiocephalic vein is not approachable⁶. Keeping in view that the risk of failure of distal fistulas implantation in the upper arm of patient is our first priority except in some cases where distal thrombosed vessels where it cannot be performed⁷.

In the present study we performed brachial fistula only in 14% and among them 28 % of all operation led to primary failure. In the modern era, the availability of micro vascular surgery and new technologies decreasing the complication and higher success rate⁸. It is even also highly possible to repair fistula. The falling of blood pressure, arterial atherosclerosis and diabetes mellitus are reported in 88% and 20% respectively in AVF failure cases. In this regards the previous work reported 55% success rate⁹. The main causes of failure were strong history of CVA and IHD as well as higher age and dependency to haemodialysis during surgery.¹⁰ Doppler ultrasound is suggested for better evaluation of elderly diabetic patients and peripheral atherosclerotic diseases¹¹.

The heparin in high dose, selection of bigger vein, mean BP of 8mm of hg or higher, appropriate technique and surgical system were major etiologies for success rate of up to 48%. In children success rate can be increased up to 74 % in ideal situation. The fistulas implanted in arm (14% at all cases in our study had the lowest rate of primary failure in comparison with radio cephalic and snuff box fistulas).The major reason for AVF failure (primary and secondary) in our study was fall in Blood pressure. (70%, 57% respectively).this probability can be increased due to any factors that change the led to blood pressure changes. the stable blood pressure (100/80mm Hg) along the good vascular selection is the most important factor .High blood pressure with the others complication of hypertension, increases the risk of bleeding in fistulas site which leads to fistulas failure .The low blood

pressure on the other hand also failed the AV fistulas due to thrombosis.¹² Prevention of hypotension by eating nuts and doing regular check-up of blood pressure during dialysis is suggested. It is also suggested finally to those patients who require AVF for haemodialysis, good blood pressure control is necessary by taking regular antihypertensive drugs and low salt diet.

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