ORIGINAL ARTICLE

EVALUATION OF RADIO-CEPHALIC ARTERIOVENOUS FISTULA FOR LONG TERM VASCULAR ACCESS

Farid Anwar, Muhammad Aasim, Nazim Mohayuddin, Asad Khan, Mahmood ul Hassan
Department of Urology & Surgery, Rehman Medical Institute, Peshawar, Pakistan

ABSTRACT

Background: Arteriovenous fistulae of various types can be made to provide vascular access for haemodialysis. This study was conducted to evaluate radio-cephalic arteriovenous fistula.

Methodology: It was a cross-sectional interventional study conducted at Rehman Medical Institute, between 1st July 2009 and 30th August 2010. All patients with end stage renal disease requiring long term vascular access for haemodialysis were included in the study. Patients who previously had arteriovenous fistula were excluded. All the patients were operated by experienced surgeons under similar circumstances. In all patients, radio-cephalic fistula was created in the left forearm just above the wrist joint.

Results: Forty patients were studied; 29(72.5%) males and 11(27.5%) females, with male to female ratio of 2.6:1. Distribution of co-morbid factors showed diabetes in 27(67.5%), hypertension in 12(30%) and coronary artery disease in 6(15%) patients. The procedure remained successful with well-functioning AV fistula at one month follow up (until the first successful haemodialysis) in 36 (90%) of the patients in the first attempt. In 4(10%) patients it failed in the first attempt in whom re-do procedure was carried out successfully at another (cubital) site. In 1(2.5%) patient there was oedema of the fistula site and 1(2.5%) had late maturation of the fistula.

Conclusion: Radio-cephalic arteriovenous fistula in patients with end stage renal disease requiring long term vascular access for haemodialysis remains the procedure of choice if done by experienced hands.

KEY WORDS: Arteriovenous fistula, Radio-cephalic fistula, End stage renal disease, Haemodialysis.

INTRODUCTION

The incidence of renal failure is gradually increasing in Pakistan. There is increasing availability of renal replacement therapy in the form of dialysis and renal transplant in large cities of Pakistan.[1,2] As the survival after renal failure is increasing because of the availability of renal replacement therapy, there is increased demand for angio access.[3] For temporary angio access central double lumen catheter is passed either into an internal jugular, subclavian or common femoral vein.

Arteriovenous (AV) fistulae of various types are needed to provide vascular access for years. It can be made either at the anatomical snuffbox or the distal, mid or proximal forearm.

Sometimes polytetrafluorethylene grafts are placed between the artery and the vein because of the non-availability of good length veins in the superficial tissue.

The aim of this study was to evaluate the results of radio-cephalic AV fistula in patients of dialysis dependant end stage renal failure in our set-up.

MATERIAL AND METHODS

This cross-sectional study was carried out at Rehman Medical Institute over a period of one year from 1st July 2009 to 30th August 2010. Total 40 patients were studied. All the patients with end stage renal disease requiring arteriovenous fistula for the first time for long term vascular access for haemodialysis were included in the study. Patients who were coming for re-do surgery or who previously had undergone AV fistula were not included in the study.

All the patients were evaluated, examined, investigated and operated as per standard guidelines under similar circumstances. Data of the individual patient was recorded on a proforma and analyzed statistically on the basis of set parameters. Age, sex, AV fistula site, indication, co-morbidity, operation time, complications, hospital stay and success of the procedure at one month were the parameters considered in this study.

The procedure was performed under local anesthesia (xylocaine) with aseptic technique. The wrist site of the left (non-dominant) forearm of the patient was used to create a radiocephalic or

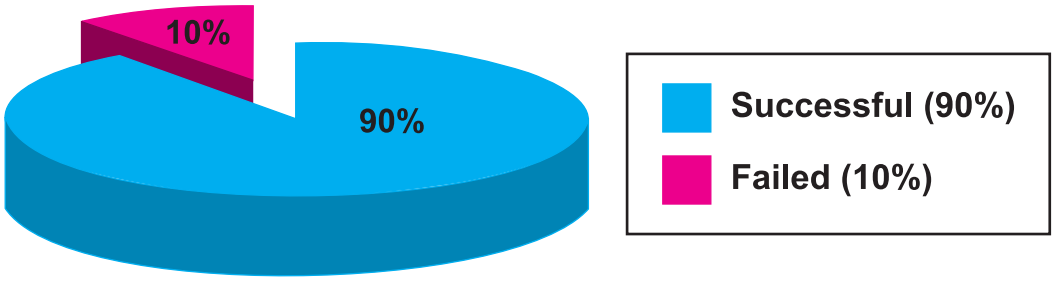

Figure 1: Outcome of radio-cephalic fistula.

Brescia-Cimino[4] fistula. In our study, the side to side anastomosis, as described by Cascardo was considered as the configuration of choice. The fistula was created end to side only when there was unsuitable anatomy or poor intra-operative fistula flow. Prolene 6-0/7-0 was used as suture material for the vascular anastomosis while Prolene 2-0/0-0 for the skin stitches.

RESULTS

A total of 40 patients were studied, 29 (72.5%) males and 11 (27.5%) females, with male to female ratio of 2.6:1.

Twenty-three (57.5%) patients were of age <50 years, while 17 (42.5%) were aged >50 years. The youngest patient was 18 years old and the eldest was 77 and the mean age was 49.3 years.

In all the patients the indication was end stage renal disease (ESRD) requiring long term vascular access for haemodialysis.

Distribution of co-morbid factors such as diabetes, hypertension and coronary artery disease in our study patients is shown in Table 1.

Table 1: Distribution of co-morbidities.

Co-morbidity	Number (Percentage)
Hypertension	27 (67.5%)
Diabetes	12 (30%)
Coronary artery disease	06 (15%)
Systemic lupus erythematosis	01 (2.5%)

The operation time ranged from 60 to 190 minutes, with a mean of 80 minutes.

The complication rate was very low with only one patient developing significant edema at the operation site and another patient having late maturation of the created AV fistula.

Hospital stay varied greatly ranging from 1 to 8 days with an average of 3.5 days. The prolonged stay in individual cases was mainly due to reasons other than the AV fistula surgery.

All patients were operated under local anesthesia by qualified, experienced surgeons under similar circumstances.

In all the patients, radio-cephalic fistula was created in the left forearm just above the wrist joint.

The procedure remained successful with well-functioning AV fistula at one month follow up (until the first successful haemodialysis) in 36 (90%) of the patients in the first attempt. In 4 (10%) patients it failed in the first attempt in whom re-do procedure was carried out successfully at another (cubital) site. (Fig. 1)

DISCUSSION

An upper arm vascular access is typically placed in patients whose vessels are unsuitable for a forearm fistula or in those with a failed forearm fistula. There are two major considerations in selecting the type of vascular access. First, the new access must mature adequately to be suitable for dialysis. That is, it must be cannulated reproducibly and achieve a dialysis blood flow sufficient to provide adequate dialysis. Second, once maturation has been achieved, the access should maintain long-term patency with a minimum of percutaneous or surgical interventions.[5] The two major types of upper arm access places are the brachiocephalic fistula and the upper arm graft. Once suitability for dialysis has been attained, the brachiocephalic fistula is superior to an upper arm graft, because it requires substantially fewer interventions to maintain long-term patency.[6]

The advantage of fistulas is counterbalanced by their higher suitability failure, which occurs in 20% to 60% of new fistulas in recent series, as compared with 10% to 20% of new grafts.[5-7] However, in our study we have got less failure rate of the AV fistula (i.e. 10%). Silva et al. reported a markedly lower primary failure rate of transposed fistulas, as compared with nontransposed fistulas, in the forearm (8% versus 38%).[7,9]

The importance of anastomotic configuration in the incidence of flow problems has been demonstrated. Side to side fistula is clearly shown to be at greater risk. With the side to side Cimino fistula a higher incidence of both arterial steal syndrome and venous hypertension is reported.[10,11]

Potentially avoidable death due to cardiac failure highlights a major cause for concern in AV fistula. Cardiac failure and arterial steal syndrome are commonly described complications with brachial artery fistulae[12-15] despite the relatively small number of cases reported in the literature.

CONCLUSION

Radio-cephalic AV fistula in patients with end stage renal disease requiring long term vascular access for haemodialysis remains the procedure of choice if made by experienced surgeons.

REFERENCES

1. Maqsood Akram, Eitezaz Ahmed Bashir. Vascular access for hemodialysis. Pak Armed Forces Med J 2007; 57: 253-7.
2. Bashir EA. Brachiobasilic fistula for vascular access. J Surg 2001; 23-24: 28-30.
3. Rabbani MA, Ahmad B, Shah SMA, Ahmad A. Ischemic Monomelic Neuropathy: A complication of vascular access procedure. J Pak Med Assoc 2005; 55: 400-1.
4. Brescia MJ, Cimino JE, Appel K, Hurwich BJ. Chronic haemodialysis using venepuncture and a surgically created arteriovenous fistula. N EngJ Med 1966; 275: 1089-92.
5. Allon M, Robbin ML. Increasing arteriovenous fistulas in hemodialysis patients: Problems and solutions. Kidney Int 2002; 62: 1109–24.
6. KDOQI clinical practice guidelines and clinical practice recommendations for vascular access 2006. Am J Kidney Dis 2006; 48 (Suppl 1): S176–S322.
7. Dember LM, Beck GJ, Allon M, Delmez JA, Dixon BS, Greenberg A, et al. Effect of clopidogrel on early failure of arteriovenous fistulas for hemodialysis. JAMA 2008; 299: 2164–71.
8. Silva MB, Hobson RW, Pappas PJ, Araki CT, Goldberg MC, Jamil Z, et al. Vein transposition in the forearm for autogenous hemodialysis access. J Vasc Surg 1997; 26: 981–8.
9. Silva MB, Hobson RW, Pappas PJ, Jamil Z, Araki CT, Goldberg MC, et al. A strategy for increasing use of autogenous hemodialysis access procedures: Impact of preoperative noninvasive evaluation. J Vasc Surg 1998; 27: 302–8.
10. Haimov M. Vascular access for hemodialysis. Surg Gynaecol Obstet 1975; 141: 619-25.
11. Wedgwood KR, Wiggins PA, Guillou PJ. A prospective study of end to side vs. side to side arteriovenous fistulae for haemodialysis. Br J Surg 1984; 71: 640-2.
12. Moris C, Kinnaert P. Arteriovenous fistula at the elbow for maintenance haemodialysis. In: Proc Int Cong Access Surgery. Lancaster: MTP Press 1983; p. 25-9.
13. Matolo N, Kastagir B, Stevens LE, Chrysanthakopoulos S, Weaver DH, Klinkman H. Neurovascular complications of brachial arteriovenous fistula. Am J Surg 197 1; 121: 716-9.
14. Thompson BW, Barbour G, Bisset J. Internal arteriovenous fistulas for hemodialysis. Am J Surg 1972; 124: 785-8.
15. Byrne JP, Stevens LE, Weaver DH, Maxwell JG, Resma K. Advantages of surgical arteriovenous fistulas for hemodialysis. Arch Surg 1971; 102: 359-62.

Corresponding author:

Dr. Farid Anwar

Flat No. 17-F, Askari II

Near Qayyum Stadium

Peshawar Cantt.

Peshawar, Pakistan

E-mail: farid.anwar@btinternet.com