VASCULAR INTERVENTIONS IN PATIENTS WITH END STAGE CHRONIC RENAL FAILURE : 15-MONTHS' EXPERIENCE

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SUMMARY :

Purpose: *The aim of this study is to analyze the vascular interventions in patients with end stage chronic renal failure performed in our department in order to evaluate the success and complication rates and long term outcome.* ***Methods:*** *116 patients underwent 165 vascular operations between October 1, 1996 and December 31, 1997. Of these 165 operations, 123 were arteriovenous fistulas, 16 were vascular graft implantations, 13 were fistula closures and 13 were fistula revisions. 6/0 or 7/0 propylene suture materials and 3.5x magnification loop were used, and the patients who underwent fistula reconstructions received low molecular weight heparin and 10% Dextran solution for three days.* ***Results:*** *Total early success rate in 139 fistula and graft patients was 76.2 %. Early failure due to thrombosis was found in 13 patients (9 %). There were no infectious complications even in the graft implanted group.* ***Conclusion:*** *Vascular access in end stage chronic renal failure patients is important for maintenance of effective dialysis. Arteriovenous fistulas and vascular graft implantations are the most commonly used surgical methods for this purpose. Arteriovenous fistulas should be the procedure of choice until the patients' own vessels can no longer be used. The complications of vascular procedures can be prevented by using proper surgical techniques, suitable surgical material, and postoperative supportive therapy.*

Key Words: *Arteriovenous Fistula, Kidney Failure.*

INTRODUCTION

Kidney transplantation is the best therapeutic modality for the treatment of end stage chronic renal failure. In cases of organ shortage or the absence of suitable donor, hemodialysis is mandatory. Therefore, vascular interventions in end stage renal failure patients is of great importance. Vascular access for hemodialysis can be maintained either by arteriovenous (AV) fistulas or implanted vascular grafts.

Here we present the 15-months' experience in vascular interventions in our transplantation surgery unit.

PATIENTS AND METHODS

From October 1, 1996 to December 31, 1997, 165 vascular interventions have been performed to 116 patients in Gazi University, Transplantation Surgery Unit. Of these 116 patients, 57 (49 %) were male and 59 (51 %) were female. The age range was between 9 and 86, with an average of 47.7 years. One hundred and twenty-three of these interventions were AV fistulas, 16 were vascular

graft implantations, 13 were AV fistula closure and 13 were AV fistula revisions. The kinds of surgical procedures are shown in Table 1.

Surgical procedure	Number
AV fistula	
Snuff box	27
Brescia-Cimino	59
Elbow	37
Vascular graft	16
AV fistula closure	13
AV fistula revision	13

Table 1 : Types of surgical procedures.

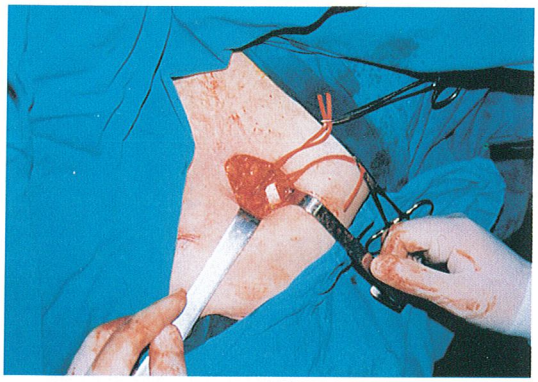

Fig - 1 : A vascular graft implanted in the lower extremity.

Two different techniques; single stay suture and 180^{o} open loop techniques were used for AV fistulas by using 7/0 propylene suture material. In patients for whom vascular grafts were used, 6/0 propylene was used with continuous one-layer suture technique (Fig. 1). The grafts were expanded Polytetrafluoroethylene (ePTFE) (Gore-tex, Gore and Associates, USA) spiral type, 6-8 mm. Of these 16 grafts, 13 were implanted to the upper extremity and 3 to the lower extremity. All of the patients received low molecular weight heparin therapy (Nadroparine calcium) (Fraxiparine, Sanofi-Doğu, Turkey) for the consecutive three days (2x0.3 ml/day subcutaneously). For the maintenance of intravascular volume expansion, volume expander 10% Dextran solution (Rheomacrodex, Eczacı-başı-Baxter, Turkey) was used (500 ml/day intravenously), if necessary.

Nonfunction or loss of function of AV fistulas or vascular grafts within the first 48 hours were accepted to be early failure and this occurred in 13 of the 139 cases (9 %). These cases underwent re-exploration and thrombectomy by using a Fogarty catheter.

Another 13 patients underwent closure of the pre-made AV fistulas because of some kind of complication.

RESULTS

Total early success rate in 139 patients was 76.2 %. Early failure due to thrombosis was found in 13 patients. A detailed information about the types of procedures and complications are shown in Table 2.

There were no infectious complications in any of the groups. Thirteen patients had thrombosis, five had steal syndrome, and two had venous hypertension. Figure 2 shows ulceration of upper distal extremity due to venous hypertension, and figure 3 shows a pseudoaneurysm as result of an elbow fistula in the same patient.

DISCUSSION

Since Kolff (1) described the use of hemodialysis as a therapeutic method in chronic renal failure in 1944, several techniques have been used for dialysis access. Some formerly used procedures (e.g. shunts) have been abandoned

	Number	Success (%)	Thrombus (%)	Steal syndrome (%)	Venous hypertension (%)
Snuff box	27	21 (77)	3 (11)	0 (0)	0 (0)
Brescia	59	44 (74)	7 (12)	0 (0)	0 (0)
Elbow	37	30 (81)	0 (0)	5 (13)	2 (5)
Graft	16	11 (69)	3 (19)	0 (0)	0 (0)
Total	*139*	*106 (76)*	*13 (9)*	*5 (3)*	*2 (1)*

Table 2 : Complications of the procedures.

Fig - 2 : Ulceration of the upper distal extremity due to venous hypertension.

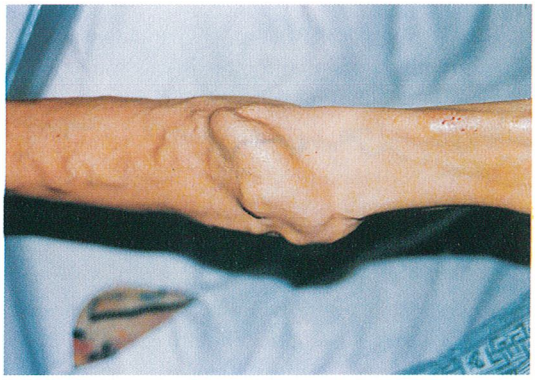

Fig - 3 : Pseudoaneurysm as a complication of an elbow fistula.

because of high infection, bleeding, and sepsis rates. In 1966, Brescia and Cimino (2) developed primary AV fistulas and although, this technique has been modified several times, it is still in use as the procedure of choice.

In AV fistulas, thrombosis is the most common complication. It usually occurs within two to four weeks and generally results from technical error or misjudgment regarding the suitability of the patient's vessels. Thrombosis within the first 24 hours mandates re-exploration and revision of the fistula. Early thrombosis was found in 13 (9 %) of our cases.

Infection is rare (2-%) in direct AV fistulas (3). We observed no infectious complications during a 15-month period. In vascular grafts, infection seems to be a major problem (4). Although the infection rate in vascular grafts is reported to be as high as 20 %, none of our patients had graft infection.

Venous hypertension of the hand manifested by swelling, cyanosis and sometimes ulceration of the fingers is also rarely seen in patients who underwent vascular procedures. In these patients, surgical correction of the AV fistula generally solves the problem (4), like we did in our patient.

One of the major aspects of AV fistulas is the importance of maintaining the fistula as distal as possible, in order to be able to reserve the proximal vessels for a possible revision, to prevent steal syndrome and venous hypertension (5).

The use of artificial prosthesis should be avoided unless the patient's own vessels can be used, because of the possibilities of graft infection and/or pseudoaneurysm formation (6).

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