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NATIVE FEMORAL ARTERY-SAPHENOUS VEIN FISTULA FOR HEMODIALYSIS

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ABSTRACT

Objective: To describe the outcome of the femoral artery-saphenous vein fistula as an alternative blood access site for maintenance hemodialysis in a prospective cohort of patients with end-stage renal failure.

Material and Methods: Sixty patients with vascular access failure in the arms and absence of previous saphenous vein surgery were admitted for up to two femoral artery-saphenous vein fistulas as a puncture site for hemodialysis. The major saphenous vein and the superficial femoral artery were isolated in the thigh and an U-shaped subcutaneous tunnel created where the vein was placed superficially for future punctures; arteriovenous anastomosis was accomplished by a running 6-0 prolene suture 2 centimeters below the inguinal ligament.

Results: A failing fistula was recognized by the absence of adequate blood flow for hemodialysis or thrombosis. Sixty three out of 73 fistulas allowed excellent blood flow from 2 months to 16 years; the one year failure rate was 32.9%; one patient died of massive bleeding in the immediate post-operative period; high output cardiac failure complicated another and 2 others had severe leg edema as indication for fistula closure.

Conclusions: Despite allowing adequate amount of blood for dialysis, the femoral artery-saphenous vein fistula was accompanied by a high failure rate, similar to the PTFE graft; it is however an alternative for the renal failure patient.

Key words: arteriovenous fistula; hemodialysis; femoral artery; saphenous vein
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INTRODUCTION

Vascular access failure imposes considerable threat to the end stage kidney patient and represents a situation of great concern for the nephrologists. There is no doubt on being the arteriovenous fistula the most important appendix for life support once kidney function is lost (1), everything else depending on its amount of blood delivered for diffusion and ultrafiltration.

When a radiocephalic or a brachiocephalic anastomosis is unable to mature or fails, polytetrafluoroethylene (PTFE) or a saphenous vein loop graft is placed in one arm as a substitute (2), but present experience shows their propensity for early venous outflow stenosis caused by endothelial and fibromuscular hyperplasia with subsequent failure, added cost and morbidity (3). Catheters can also be used but their failure rate and infection are also a problem.

We are showing our experience with an alternative vascular access, the saphenous vein to the superficial femoral artery anastomosis establishing a fistula for the maintenance hemodialysis and treatment of chronic uremia.

MATERIAL AND METHODS

Sixty uremic patients, 52 whites and 8 blacks, 38 female, age five to eighty one (40.5 ± 16.4; $\bar{x}$ ± SD) years, with native A-V fistulas and/or PTFE graft failure in the arms underwent 73 subsequent surgical creation of a femoral artery-saphenous loop by-pass for the purpose of blood access for hemodialysis. The patients were operated on in the supine position with

the inner aspect of the thigh to be used exposed. The femoral pulsation was felt and a 4-5 cm incision was made 2 cm below (paralleling) the inguinal ligament. The subcutaneous tissue was divided and a self-retaining retractor was placed to allow better field. The major saphenous vein and the superficial femoral artery were identified, isolated and repaired. The saphenous vein was then dissected downward to the knee where its distal end was ligated. This dissection was done through 2 or 3 longitudinal incisions. A U-shaped subcutaneous tunnel was created where the saphenous vein was placed in such a way that would facilitate future venipunctures. For the anastomosis between the saphenous vein and the superficial femoral artery, 4 individual stitches were first placed at a point 90° from each other and the anastomosis was fully accomplished by a running 6-0 prolene suture between these four points. Venipunctures using 16g needles were started around 15 days from the surgical procedure and repeated three times a week for its entire life span or renal transplantation. Overall, cumulative primary potency was calculated using Kaplan-Meier survival statistics

RESULTS

Sixty-three fistulas allowed excellent blood flow which lasted from 2 to 192 months before failure, patient transplantation or being in use at the end of this analysis. On average, the femoral artery-saphenous vein fistulas permitted the patient to be dialyzed for 15.7 months, the one-year failure rate being 32.9%.

In all, nine fistulas were lost because of the patient death, from day 4 to 82 months after the surgical procedure, only one being related to it (massive bleeding on the fourth day); 14 fistulas were functioning, 8 at the end of the study (13 to 192 months) and 6 maintained flow by the time of renal transplantation (2 to 20 months); 47 access went to failure, 9 due to thrombosis in the first 30 days and 38 after allowing dialysis for a period of up to 16 years; aneurismatic expansion was rare, and mainly at the repeated puncture sites (Figure). In 3 others the fistula underwent planned closure, two with severe leg edema, difficult walking and pain secondary to deep upstream vein thrombosis in the presence of good fistula flow and one in consequence of high output heart failure; surgical interruption of the blood flow through the fistula led to improvement of the symptoms.

Figure *- Aneurismatic expansion of a femoral artery-saphenous vein fistula.*

DISCUSSION

The primary preferred arteriovenous fistulas created anastomosing a cephalic vein to the radial artery is referred to fail at a rate of 30% from thrombosis or insufficient caliber to permit cannulation by one year and 30 to 40% is also the failure rate for the PTFE grafts at the same time period (4) but by 3 years most grafts have been lost to thrombosis or infection. In some uremic patients, upper extremity access failure even with exogenous grafts becomes a problem in their maintenance and our attempt to solve it using a leg vein was very successful in some patients, carrying their dialysis up to 16 years, but failed in 32.9% of the cases in one year and unexpectedly by 82% at 3 years, a figure referred in the literature as happening to PTFE grafts.

We observed one patient death by massive bleeding in the immediate postoperative period, incapacitating high output cardiac failure in another, severe obstructive edema of the leg in two others; the fistula high failure rate by 36 months raise concern on our future indication of this procedure, as it shows to be no better than a polytetrafluoroethylene graft in the arm, pointing to the need to look for new blood vessels access for the treatment of this population.

Despite allowing adequate amount of blood for dialysis, the femoral artery-saphenous vein fis-

tula was accompanied by a high failure rate, similar to the PTFE graft; it is however an alternative for the renal failure patient.

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