Transpl Int (1996) 9: 513–516

BRIEF REPORT

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Venous thrombectomy in patients presenting with iliofemoral vein thrombosis after renal transplantation

Received: 26 June 1995
Received after revision: 12 February 1996
Accepted: 6 March 1996

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Abstract In this study 14 patients presented with 15 episodes of iliofemoral vein thrombosis after renal transplantation. Seven patients (group 1) had viable renal grafts and were treated with conventional anticoagulation. Eight patients (group 2) had non-viable renal grafts and were subjected to graft nephrectomy and simultaneous venous thrombectomy without anticoagulation. The patients in group 2 had rapid resolution of the signs and symptoms of the iliofemoral vein thrombosis, and noninvasive vascular investigation at follow-up revealed competent and patent deep veins in all patients. In contrast, only 50 % of the patients in group 1 had normal venous studies at follow-up. We recommend that renal transplant recipients who develop iliofemoral vein thrombosis and nonviable allograft postoperatively should be subjected to venous thrombectomy at the time of graft nephrectomy.

Key words Kidney transplantation, venous thrombectomy · Thrombectomy, venous, kidney transplantation

Introduction

Renal transplantation appears to be associated with an increased incidence of venous and arterial thromboembolic complications [2, 7]. Although several retrospective studies have implicated the use of cyclosporin as a significant risk factor in the development of thromboembolic events [8, 16], other studies, including a prospective randomized trial, have not confirmed this [3, 7, 11]. The renal transplant recipient is also at increased risk for developing iliofemoral vein thrombosis, and the sequelae can be devastating, with loss of the renal allograft.

Venous thrombectomy for iliofemoral vein thrombosis in non-transplant patients has been studied to a limited extent. Few studies have documented the late results after thrombectomy, but it has been sugested that it causes destruction of the valves [1, 5, 9, 14, 15]. Currently, the principle indication for venous thrombectomy is if the viability of the limb is threatened, as in phlegmasia cerulea dolens [10].

In this study we investigated the role of venous thrombectomy in patients with iliofemoral vein thrombosis after renal transplantation.

Patients and methods

Three hundred thirty-eight patients undergoing renal transplantation at Groote Schuur Hospital in Cape Town between January 1988 and December 1992 were retrospectively reviewed. Patients with venographically proven iliofemoral vein thrombosis were included in the study.

Conventional surgical techniques were used for the procurement of the kidneys from the donor and for the subsequent transplantation into the recipient. None of the patients received prophylactic systemic heparin, although topical heparin was used. All patients received standardized perioperative management, and the immunosuppression protocol consisted of cyclosporin, azathioprine and steroids.

Two groups of patients were identified. Patients in group 1 presented with a painful, swollen limb on the side of the transplant and had good renal allograft function as indicated by an adequate urine output and decreasing serum creatinine. Venography confirmed

the presence of an iliofemoral vein thrombosis. These patients were treated with intravenous systemic heparin for 7–10 days, followed by warfarin for 3 months.

The patients in group 2 presented with a painful, swollen limb on the side of the transplant as well as a painful, enlarged and tender graft. These patients were anuric or oliguric and had a rising serum creatinine indicating nonfunction of the renal allograft. The DTPA renal scan demonstrated nonperfusion of the graft. Venography again confirmed the presence of an iliofemoral vein thrombosis. These patients were subjected to graft nephrectomy and venous thrombectomy using a Fogarty catheter directed both proximally and distally. The patients in group 2 received no anticoagulation.

At follow-up the patients were evaluated by history, physical examination, venous Doppler ultrasonographic investigation for patency and competence of the femoral and popliteal veins, and determination of the refilling time with photoplethysmograph (PPG).

Data are presented as mean ± SEM; their statistical significance was evaluated with Student's *t*-test. Differences with *P* values lower than 0.05 were considered significant.

Table 1 Demographic data

	Group 1	Group 2
Number of patients	7	8
Age (Mean ± SEM) (Range)	37.5 ± 3.4 yrs (19–47)	29.6 ± 6.2 (9–57)
Sex	1 M:6 F	6 M:2 F
Side of transplant	R = 4; L = 3	R = 8; L = 0
Postoperative days (Mean ± SEM) (Range)	9.6 ± 3.5 (2–25)	2.1 ± 0.5 (1–5)

Table 2 Results of the noninvasive vascular investigation

	Group 1		Group 2	
	Normal	Abnormal	Normal	Abnormal
Photoplethysmography	++	++	+++++	–
Doppler	++	++	++++++	–

Results

During the study period 14 patients presented with 15 episodes of iliofemoral vein thrombosis. There were seven patients in group 1 (anticoagulation only) and eight patients in group 2 (graft nephrectomy and venous thrombectomy).

The patients in group 1 were older than the ones in group 2 (37.5 years vs 29.6 years; Table 1). All except one of the patients in group 1 were female whereas all but two patients in group 2 were male. The transplant and iliofemoral vein thrombosis occurred on the right side in all the patients in group 2, whereas in group 1, four were on the right and three were on the left. Patients in group 1 presented later postoperatively than those in group 2. The mean number of days postoperatively when patients presented with the thrombosis was 9.6 days in group 1 and 2.1 days in group 2 ($P < 0.05$).

The patients in group 2 had immediate resolution of the signs and symptoms of deep vein thrombosis following graft nephrectomy and venous thrombectomy and were able to mobilise within 2–3 days. In contrast, the resolution was much slower in patients treated with anticoagulation only, and they were confined to bed for at least 7 days.

One patient presented with an iliofemoral vein thrombosis following renal transplantation on two occasions. The first episode occurred 2 days after transplantation and required graft nephrectomy and venous thrombectomy. The second transplant, 8 months later on the opposite side, was complicated by an iliofemoral vein thrombosis on the side of the transplant on the 4th postoperative day and was managed with conventional anticoagulation.

Eleven out of 15 limbs were available for long-term study. Three patients returned to distant geographical areas and one local patient was not available for study. The venous studies were performed between 3 and 5 years following the thrombosis in nine patients and at 1 year in two patients.

The results of the noninvasive vascular investigations are shown in Table 2. None of the patients had symptoms related to post-phlebitic limb. The photoplethysmography (PPG) studies were normal (> 20 s) in all the limbs studied in group 2. In the patients in group 1, the PPG studies were assessed as being normal in two and abnormal in two. Doppler studies in group 2 revealed that both femoral and popliteal venous segments of the affected limb were patent and competent in all six patients assessed, whereas in group 1 two were normal and two demonstrated reflux. Thus, using noninvasive vascular tests, all the affected limbs in group 2 were found to be competent and patent deep veins at follow-up, whereas only 50 % of the affected limbs of the patients in group 1 were assessed as normal. The assessments of the nonaffected limbs were essentially normal.

Discussion

The initial enthusiasm for venous thrombectomy changed following the report by Lansing and Davis that demonstrated significant destruction of the deep valves in patients studied long-term [9]. Currently, venous thrombectomy is rarely used, and the principle indication is to treat iliofemoral vein thrombosis when the limb viability is threatened (phlegmasia cerulea dolens) [10]. Others have also advocated venous thrombectomy

for early femoral vein thrombosis (< 10 days) and free-floating iliac vein thrombosis [2]. Long-term studies have shown patency rates of 60 %–70 % with good function in more than 50 % [4, 6, 15]. However, objective criteria do not support surgical therapy over conservative anticoagulant therapy. The main advantage claimed for venous thrombectomy is the reduced incidence of post-thrombotic syndrome [6, 15]. Severe post-thrombotic syndromes occur in less than 10 % of patients [4, 6].

A number of modifications have been introduced to improve the results after venous thrombectomy. The addition of a temporary arteriovenous fistula, either proximally or distally, has been shown to decrease the risk of fatal pulmonary embolism and the later development of post-thrombotic syndrome by preserving the valve function [4, 13–15]. Combining thrombectomy with fibrinolysis was found to be more effective in the treatment of deep vein thrombosis than thrombolytic therapy alone [12].

This study included 14 patients who presented with venographically proven iliofemoral vein thrombosis after renal transplantation on 15 occasions. Two groups of patients were identified. The patients in group 1 presented at about 10 days postoperatively with signs and symptoms related to an iliofemoral vein thrombosis and a viable renal allograft. We believe these patients represented a conventional deep vein thrombosis in a post-surgical patient, and they were treated with anticoagulation. In contrast, eight patients (group 2) presented almost immediately post-transplantation with an iliofemoral vein thrombosis and a non-viable (clinical and renal DTPA scan) renal allograft. We suspect that in these patients the thrombosis may have been related to a technical problem. These patients were subjected to surgical exploration and graft nephrectomy because of a non-viable graft. Venous thrombectomy was performed at the same time and postoperative anticoagulation was not used. These two groups of patients are not comparable since the aetiology, mode and time of preservation were different. Therefore, no statistical analysis between the two groups was made.

The resolution of the pain and swelling was dramatic in the patients subjected to graft nephrectomy and venous thrombectomy. In contrast, the patients treated with anticoagulation took several days to improve. Interestingly, the noninvasive vascular studies at long-term follow-up (PPG and Doppler studies) demonstrated normal venous function in all the patients subjected to venous thrombectomy. In contrast, these tests were normal in only half of the patients treated with conventional anticoagulation. However, none of the patients had signs or symptoms related to postphlebitic limb.

The successful outcome of the patients in group 2 could have been related to the removal of the large, swollen, nonviable allograft and not to the venous thrombectomy. Although this is unlikely, it is impossible to prove one way or the other in this study. However, five of the eight patients in group 2 underwent a successful second transplant on the opposite side subsequently, and venous studies of these limbs at follow-up were essentially normal.

Thus, we believe that patients who present with iliofemoral vein thrombosis and a nonviable graft soon after renal transplantation and who require surgical exploration should be subjected to venous thrombectomy. It is technically easy to perform and safe, and the immediate resolution of the signs and symptoms is dramatic. Long-term follow-up has demonstrated that the veins are patent and competent. Furthermore, it abrogates the need for long-term anticoagulation and the complications associated with this therapy.

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