Transpl Int (1993) 6: 161–163

Transplant International

Aortoiliac reconstruction in preparation for renal transplantation

I.B. Brekke[1], B. Lien[1], G. Sødal[1], A. Jakobsen[1], Ø. Bentdal[1], P. Pfeffer[1], A. Flatmark[1], P. Fauchald[2]

[1] Department of Surgery B, Rikshospitalet, Pilestredet 32, N-0027 Oslo 1, Norway
[2] Department of Medicine B, Rikshospitalet, Pilestredet 32, N-0027 Oslo 1, Norway

Received: 10 January 1992/Received after revision: 12 July 1992/Accepted: 27 August 1992

Abstract. Aortoiliac angiography has always been an integral part of the pretransplantation work-up of renal transplant candidates in Norway. The present study was undertaken to investigate the value of this routine. Based on the angiograms of approximately 1400 patients evaluated for renal transplantation during the 7-year period 1984–1991, 26 were found to have aortic and/or iliac atherosclerosis requiring pretransplant vascular reconstruction. Fifteen of the 26 patients had aneurysm of the abdominal aorta and 11 had extensive aortoiliac occlusive disease. A prosthetic graft was inserted in 25 patients and endarterectomy of the aortic bifurcation was performed in one. The cause of death was coronary heart disease in four of six patients who died before, and in one patient who died after, transplantation. Sixteen patients received a renal transplant while four patients are still on the waiting list. Fifteen of the recipients are alive, 14 with functioning renal transplants. The low yield of patients below 40 years of age requiring vascular reconstruction calls into question the routine use of angiographic investigation of renal transplant candidates below this age. However, we recommend this routine for the higher age groups because it often provides the surgeon performing the transplantation with valuable information. Aortoiliac reconstruction as preparation for renal transplantation is advocated when atherosclerosis of a degree that may preclude transplantation is found. Because of the high risk of myocardial infarction in these patients, one must be especially aware of coronary atherosclerosis when evaluating patients for this procedure.

Key words: Arteriography, renal transplantation – Preoperative evaluation, renal transplantation – Kidney transplantation, preoperative evaluation

Correspondence to: I.B. Brekke

Introduction

Chronic renal failure and hemodialysis are associated with hypertension and lipid disorders that predispose to accelerated atherosclerosis [8, 9]. Furthermore, improved results have extended the indication for renal transplantation to include patients of almost any age group. During the last decade, the mean age of our recipients of cadaveric renal grafts has increased to 58 years at present, ranging up to 83 years. Consequently, we can expect a growing number of renal transplant candidates to present with aortoiliac atherosclerosis of a degree that may imply technical difficulties in performing a renal transplantation.

To detect these conditions and thus be able to perform pretransplantation vascular reconstruction or choose the best suited transplant site, aortoiliac angiography has been part of our routine investigation of candidates for renal transplantation. The outcome in 26 patients who underwent aortoiliac reconstruction as a preliminary to subsequent renal grafting is presented.

Patients and methods

Of 1400 patients investigated between 1984 and 1991 in connection with planned renal transplantation, 26 (1.86%) were judged by their angiograms to need reconstruction of the abdominal aorta and/or iliac vessels as a prerequisite for transplantation (Table 1). In the majority of patients, the pretransplantation work-up, including conventional abdominal aortography or intra-arterial digital subtraction angiography, was performed at distant hospitals. The indication for vascular reconstruction was defined by the transplant team and based mainly on the angiographic findings, considering the risk of rupture in cases of aortic aneurysms or technical obstacles for the renal transplantation caused by arterial stenoses. The cause of end-stage renal disease was chronic glomerulonephritis in 14 patients, polycystic disease in 4, type I diabetes in 2, nephrosclerosis in 5, and secondary amyloidosis in 1 patient. Three of the patients were diabetics. Coronary bypass was performed in four patients before, and in one after, aortoiliac reconstruction.

The indication for aortoiliac reconstruction was aneurysmal disease in 15 patients while 11 had atherosclerotic stenoses of the aorta and/or iliac vessels (Table 1). Eighteen patients were on regular dia-

Table 1. Aortoiliac reconstruction. Patient characteristics

No. of patients	Sex M/F	Age mean (range)	Aortic aneurysm	Stenosing atherosclerosis
26	19/7	60 (33–74)	15	11

Table 2. Renal transplantation after aortoiliacal reconstruction. CD, Cadaveric donor; LD, living related or unrelated donor

No. of patients	Sex M/F	Age mean (range)	Donor CD/LD	Anastomosis to: prosthesis	iliac artery
16	11/5	62 (46–75)	9/7	7	9

lysis treatment at the time of vascular surgery. Extensive endarterectomy of the aortic bifurcation was performed in one patient. One patient with a thoracoabdominal aneurysm first had a thoracoabdominal and later an aortoiliac bypass operation. Four patients received an aortic straight prosthesis, 13 received aortoiliac prostheses, and in 8 patients the prosthesis was brought down to the femoral artery on one or both sides. Concomitant nephrectomy was performed bilaterally in four and unilaterally in one patient.

Sixteen patients received a renal transplant 4–45 months (mean 16 months) after the vascular reconstruction. Five of the grafts were from living related donors, two were from living unrelated (spouse) donors, and nine were from cadaveric donors. The transplant artery was anastomosed to the vascular prosthesis in seven patients and to the iliac artery below the prosthesis in nine patients (Table 2). The renal vein was anastomosed to the external iliac vein in all patients. Ureteroneocystostomy was performed according to the method described by Paquin [10].

Results

There were two deaths within 2 months of the vascular reconstruction. One 59-year-old diabetic patient died of myocardial infarction at 1 month, and a 60-year-old man died of cerebral stroke at 1.5 months. Of the 24 patients placed on the waiting list for renal transplantation, 4 patients, 3 of whom were diabetics, died 4–14 months after the operation while waiting for a kidney. The cause of death was coronary heart disease in three patients and septicemia in one. Four patients are still on the transplant waiting list.

Of the 16 patients who received renal transplants, 1 died of myocardial infarction 1 week after transplantation. All five patients who underwent prophylactic myocardial revascularization are alive. Two patients rejected their primary grafts from living unrelated donors (spouses). One of these patients has a functioning retransplant from a cadaveric donor. Thirteen of the primary grafts are functioning at 3 months to 5 years, giving a 1-year graft survival of 81 %.

Discussion

Even severe atherosclerosis of the aorta and iliac arteries does not constitute an absolute contraindication to renal transplantation. Vascular reconstruction may be performed simultaneously with [2, 4, 11] or after the transplantation [3, 4, 6, 7]. In our opinion, however, it is preferable for the vascular surgery to be performed prior to renal transplantation, when it can be performed as an elective procedure. Aortoiliac angiography, performed at the local hospital, has therefore always been part of our routine investigation of adult candidates for renal transplantation. The low yield of less than 2 % of the patients in this series requiring vascular reconstruction calls into question the necessity of this routine, especially in non-diabetic patients below 40 years of age. In patients above this age, however, we consider routine angiograms to be useful not only in revealing conditions requiring vascular reconstruction but also in choosing the optimal recipient site. Of the currently available diagnostic methods, only angiography gives the accuracy needed for this purpose. Significant progression of renal dysfunction caused by the contrast material can usually be prevented by proper hydration of the predialytic patient at the time of examination.

Reports on aortoiliac reconstruction as preparation for renal grafting are rare. Piquet et al. [11] and Gouny et al. [4] each reported on two cases. Piquet and coworkers recommend performing the vascular surgery first and postponing kidney transplantation for a minimum of 6 weeks after the insertion of iliac prosthetic material in order to allow tissue to build up around the prosthesis [11]. Gouny et al. state that simultaneous renal transplantation and aortoiliac reconstruction carries a significant risk of infection, especially if urinary leakage occurs, and that a two-staged procedure should be preferred [4]. Renal artery anastomosis to a vascular prosthetic graft, as first described by Sterioff et al. in 1974 [13] and later by Ahlmén et al. [1], usually constitutes no technical difficulty.

The progression of aneurysmal or occlusive disease after renal transplantation may ultimately compromise the long-term outcome of transplantation, and any attempt at post-transplantation arterial reconstruction may jeopardize the renal graft. Vascular reconstruction should, therefore, be considered even in less extensive aortoiliac aneurysmal or occlusive disease when dialysis treatment of the patient is established or imminent.

Coronary artery disease is well recognized as the leading cause of mortality following abdominal aortic aneurysm repair, but the efficacy of prophylactic myocardial revascularization is a subject of debate [5, 12]. In the present series, 6 of 26 patients died after the aortoiliac reconstruction before receiving a renal transplant. Four of these deaths were caused by myocardial infarction and three of these occurred in diabetic patients. Furthermore, one patient died of myocardial infarction shortly after having received a renal transplant. Five patients who underwent prophylactic coronary artery bypass are alive with functioning renal grafts.

The high late mortality after abdominal aortic repair in these patients certainly raises the question of whether patients with end-stage renal disease and extensive atherosclerosis should be considered candidates for renal transplantation. The answer to this must be based on the general policy of each transplant center. Our own policy is to offer active treatment to all patients entering end-stage renal disease, and about 80 % of these patients actually receive a renal transplant.

We conclude that angiography is a valuable part of the routine investigation of renal transplant candidates over the age of 40. Furthermore, aortoiliac vascular surgery prior to, and as preparation for, renal transplantation is advocated in patients with considerable aortoiliac atherosclerosis. However, because of the high risk of myocardial infarction in these patients, special attention should be directed to coronary atherosclerosis, which may demand therapeutic priority.

References

1. Ahlmèn J, Henriksson C, Claes G, Gelin L-E, Thorèn O (1979) Successful kidney transplantation in a man with dacron "trouser" prosthesis. Scand J Urol Nephrol 13: 133–135
2. Cerilli J, Evans WE, Vaccaro PS (1977) Successful simultaneous renal transplantation and abdominal aortic aneurysmectomy. Arch Surg 112: 1218–1219
3. Gibbons GW, Madras PN, Wheelock FC, Sahyoun AI, Monaco AP (1982) Aortoiliacal reconstruction following renal transplantation. Surgery 91: 435–437
4. Gouny P, Lenot B, Decaix B, Rondeau E, Kitzis M, Lacave R, Bensenane J, Nussaume O (1991) Aortoiliac surgery and kidney transplantation. Ann Vasc Surg 5: 26–31
5. Hollier LH, Plate G, O'Brien PC, Kazmier FJ, Gloviczki P, Pairolero PC, Cherry KJ (1984) Late survival after abdominal aortic aneurysm repair: influence of coronary artery disease. J Vasc Surg 1: 290–299
6. Jivegård L, Blohmè I, Holm J, Karlberg I (1989) Abdominal aortic reconstruction without renal bypass in renal transplant patients. Surgery 106: 110–113
7. Lacombe M (1986) Abdominal aortic aneurysmectomy in renal transplant patients. Ann Surg 203: 62–68
8. Lacour B, Roullet J-B, Beyne P, Kreis H, Thevenin M, Drüeke T (1985) Comparison of several atherogenicity indices by the analysis of serum lipoprotein composition in patients with chronic renal failure with or without haemodialysis, and in renal transplant patients. J Clin Chem Clin Biochem 23: 805–810
9. Linder A, Charra B, Sherrard DJ, Scribner BH (1974) Accelerated atherosclerosis in prolonged maintenance hemodialysis. N Engl J Med 290: 697–701
10. Paquin AJ (1959) Ureterovesical anastomosis. The description and evaluation of a technique. J Urol 82: 573–583
11. Piquet P, Berland Y, Coulange C, Olmer M, Mercier C, Rampal M (1989) Aortoiliac reconstruction and renal transplantation: staged or simultaneous. Ann Vasc Surg 3: 251–256
12. Reigel MM, Hollier LH, Kazmier FJ, O'Brien PC, Pairolero PC, Cherry KJ, Hallett JW (1987) Late survival of abdominal aortic aneurysm patients: the role of selective myocardial revascularization on the basis of clinical symptoms. J Vasc Surg 5: 222–227
13. Sterioff S, Zachary JB, Williams GM (1974) Dacron vascular grafts in renal transplant patients. Am J Surg 127: 525–528