Pediatric renal transplantation: our clinical experience

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We evaluated our experience with renal transplantation In children to determine its safety. Between June 1987 and September 1993, 12 renal transplantations were performed in 12 children, 6 to 16 years old (mean age 13 years). Of the recipients 6 had living related donors and 6 received cadaver organs. The mean follow up period was 38 months (25 to 76 months). Patient survival was 100%. Allograft survival was 100% 2 years after transplantation for living related donor recipients whereas 2-years graft survival was 66% for cadaveric graft recipients. Our study clearly .supports the safety of renal transplantation in children. [Turk J Med Res 1996; 14(1):23-25]

Children with end stage renal disease (ESRD) today have a large choice of acceptable therapeutic options. Continuous peritoneal dialysis and continuous cycling peritoneal dialysis frequently improve the quality of life over that seen with hemodialysis. Noetheless, the optimal therapeutic modality for children with ESRD is renal transplantation. Results of pediatric renal transplantation have been variable. Children differ from adults in that they are growing and developing. As a result there are technical, metabolic, immunologic, and psychological factors that make children and adolescents unique. Despite all of these problems, it is generally agreed that renal transplantation is the best mode of renal replacement therapy for children and adolescents. At all ages, pediatric renal transplant recipients have better survival than do dialysis patients of the same age (1). Moreover, successful transplantation confers a degree of physiological and psychological rehabilitation unequaled by any current dialysis modality (2).

MATERIALS AND METHODS

Between June 1987 and September 1993, 12 renal transplantations were performed in 12 children, 6 to 16

years old (mean age 13 years). All of the patients were on maintenance hemodialysis. The etiology of renal failure was nephrotic syndrome in 4, chronic glomerulonephritis in 3, reflux nephropathy in 3 and urolithiasis in 2 patients.

The children and their families were initially evaluated by pediatric nephrologist. Three of the living related donors were the mothers and three were the fathers of the recepients. The living related donors were evaluated with a through medical history, physical examination, complete laboratory analysis (complete blood count, serum chemistry profile, coagulation profile) and selective renal angiography. The recipients and the donors were admitted to the hospital the evening before the operation.

Of the recipients 6 had living related donors and 6 received cadaver organs. There were no transplants across ABO blood group compatibility bariers. All patients had HLA typing before transplantation. Among living donor recepient pairs 3 patients were full matched, 2 patients had unmatched haplotype, one in HLA-A and the other in HLA-B group and no matches in both B and DR loci occured in only one patient. A single A or B or DR locus match occured in 3 of cadaver transplants. Known matches ~f all six A, B and DR allels occured in non of the c«.laver transplants. Known matches of all six A, B and DR allels occured in non of the cadaver transplants.

The donor kidney was placed extraperitoneally in all of the cases. The renal artery was anastomosed to common iliac artery in 2, to internal iliac artery In 5

and to external iliac artery in 5 patients. The renal vein was anastomosed to external iliac vein in 11 and to inferior vena cava in 1 patient. 6.0 prolene suture material were used in vascular anastomosis. The ureter of the graft was anastomosed to bladder with Lich-Gregoir technique using 4.0 vicryl suture material. All of the patients left the operating room with urethral catheters and a hemovac or sump drain.

The mean warm and cold ischemia times in living related donor renal allografts were 48 (30-180) seconds and 46 (32-60) minutes, and in cadaveric renal allografts 70 (45-180) seconds and 186 (28-282) minutes respectively. Eurocollins solution was used for cold perfusion.

The living related donor recipients received a single dose of cyclosporine (2-4 mg/kg) and azathioprine (0.75-2 mg/kg) at the night before the operation day. Intraoperatively all patients were given prednisone (0.25-1.5 mg/kg). The prednisone was slowly tapered to an ultimate dose of 0.1 to 0.15 mg/kg per day. The cyclosporine dose was adjusted based up on the whole blood levels (radioimmunoassay). We also started oral care with nystatin solution. The patients were started on high dose steroid (2/12) or OKT3 (1/12) or antilymphocyte globulin (1/12) if there was delay in initial graft function and then changed to triple immunosuppression therapy with the return of renal function. Acute rejection was diagnosed by elevations in serum creatinine, fever, graft tenderness, oliguria, Increased body weight and/or deterioration noted on renal scan and Doppler ultrasonography. The graft biopsies were not performed. All of the patients were monitored with complete blood counts, serum and urine chemistry daily, throat and urine cultures twice weekly and whole blood cyclosporine levels once weekly. All recepient patients were evaluated with renal scan and Doppler ultrasonography on the first postoperative day as the basal function of the grafts. The patients were hospitalized for at least 3 weeks. The mean hospitalization period was 29 days (21-45). All patients were followed for at least 24 months.

RESULTS

Patient and Graft Survival: All of the patients are alive. All of the renal allografts functioned well for at least one year. One of the living related donor recipient and 3 patients with cadaver grafts had acute rejection episodes (reversed with high dose steroid in 2, OKT3 in 1 and antithymocyte globulin in 1). Of these, two cadaver kidneys were lost due to chronic rejection 2 years after transplantation, the others continued to have good graft function. All 6 living related donor kidney recipients had grafts functioning well (100%). Of 6 patients with cadaver grafts 4 had good function 2 years after transplantation (66%).

Hospital Course: There were no technical graft failures. Three patients were reexplored due to ureterovesical anastomosis leaking in 2 and haematoma in 1. The patients spent an average of 29 days in the hospital. The prolonged hospitalization was due to acute rejection episodes in 4 patients and surgical complications in 3 patients. Serum creatinine levels at hospital discharge ranged from 0.3 to 1.3 mg/dl (normal 0.4 to 1.4 mg/dl).

DISCUSSION

This report clearly supports that renal transplantation in children is safe and effective. There was no mortality. 100% of living related grafts and 66% of cadaver grafts were functioning well during 2 years of follow up. Our series as well as others demonstrates that excellent results can be obtained with living related donor renal transplantation (3,4).

There are a number of advantages of living related donation for recipient. Graft survival is excellent (5). Although mean hospitalization time was found to be high (29 days), in our clinic transplant patients were followed for at least 3 weeks which is one of the factors increasing the mean hospitalization time. Excluding this factor, recipients of living related donor allografts had a shorter time to the degree that they are ready for leaving the hospital. Also the delay in waiting for a cadaver graft is reduced dramatically, as a result young children may suffer less irremediable growth and developmental retardation (6). Furthermore the organ is unlikely to suffer the prenephrectomy insults usually experienced in the cadaveric donation situation and the subsequent rate of acute tubular necrosis is lower.

The donors had no mortality and no complication except incisional pain. In our follow up period non of the donors had any sign related to renal insufficiency. The medical risk to the donor has been reviewed recently by Levely and Milford (7). The incidence of mortality is 0.06% and 15% to 20% of donors have complications of incisional pain and hernia (8). 10 to 20 years after unilateral nephrectomy showed a glomerular filtration rate of 70% of initial values. Twenty-four hour protein excretion increased by 50-150 mg/day. The systolic and diastolic blood pressures increased by 5 mmHg, but there was no associated development of renal insufficiency over 10 to 30 years.

Reported results of cadaveric renal transplantation in children have been variable and inferior to the results obtained in adults. Reported one year cadaver graft survival in small children is 50-60% (9). Using sequential immunosupresive regimen of induction and therapy with prednisone, azathioprine and maintenance with CsA, prednisone and azathioprine improved cadaver graft survival in children dramatically (10). With the same regimen we had 100% 1 year graft survival in both groups. Although many factors affect bad outcome in children listed below (Table 1), some can be outhelmed by the surgical skill of the surgeon and short warm and cold ischemia times (11). Our two year cadaver graft survival is 66%, although the number of the cadaveric transplantation is too small to be conclusive. Recently, an improvement in 1

Table **1.** Problems of special significance in pediatric renal transplant recipients

1. Accelerated CsA metabolism and/or impaired absorption
2. Vascular thrombosis
3. Long term reanastomosis times with resultant early allograft dysfunction and acute tubular necrosis
4. High immunologic responsiveness in young children
5. Medication noncompliance
6. The use of small donors in small children
7. Recurrence of original disease in the transplant
8. Hyperlipemia
9. The need to optimize growth after transplantation
10. The effect of uremia on neuropsychological function

year actuarial graft survival from 33 to 90% has been reported with the use of quadruple immunosupression (ATG, CsA, prednisone, azathioprine) (12).

We only used oral care with nystatin solution against oral candidiasis and non of the patients had used prophylactic antibiotics. Posttransplant prophylaxis varies from center to center. Most use perioperative antibacterial prophylaxis for the first 24 to 48 hour because of the concern about graft contamination during harvesting. Some centers utilize trimethoprim-sulfomethaxazol for the first months after transplant as prophylaxis against P. carinii pneumonia, they also may use oral nystatin as prohpylaxis against oral and gastrointestinal fungal infections during this time (13).

Current dialysis techniques, particularly those using peritoneal dialysis, have improved dramatically the care of children with ESRD. Yet the remaining morbidity of dialysis and the incomplete rehabilitation attainable in dialyzed children made this a suboptimal treatment modality. A well functioning renal transplant provides the best possible outcome for a child with ESRD at this time.

Pediatric renal transplantation is a major focus at our institution. By encouraging living donation and assembling an experienced transplant team, we can be able to obtain equivalent results with renal transplantation at all age groups.

A better understanding of transplantation immunology and allograft rejection in near future may allow the development of specific immunologic unresponsiveness. Transplantation immunology's purpose is state of allograft tolerance. When this is achieved, the stigma of both ESRD and immunosupressive medications will disappear.

Çocukluk çağında böbrek nakli:
klinik tecrübemiz

Çocukluk çağında yapılan böbrek nakli ameliyatının güvenilirliğinin ortaya konulması amacıyla, Haziran 1987 ile Eylül 1993 yılları arasında çocuklarda gerçekleştirilen 12 böbrek nakli operasyonunun sonuçları değerlendirildi. Çocuklar 6 ile

16 yaşları arasındaydı (ortalama 13). 6 çocukta canlı akraba vericiden alınan böbrekler, 6 çocuktaysa kadavradan alınan böbrekler kullanıldı. Hastalar ortalama 38 ay (25-76 ay) izlendiler. Takip süresinde kaybedilen hiçbir hasta olmadı. 2 yıllık takip sonucunda canlı akraba vericilerden böbrek nakli yapılan hastaların %100'ünde, kadavradan nakil yapılan hastalarınsa %66'sında böbrekler fonksiyoneldi. Çalışmamız çocukluk çağında yapılan böbrek nakli operasyonlarının güvenilirliğini des teklemektedir.

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