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Renal transplantation outcome in children with cystinosis

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Abstract

Background and Objective: Cystinosis is a rare inherited disease that leads to renal failure. Fanconi syndrome is the major renal involvement in cystinosis patients. Renal transplantation is the treatment of choice in cystinosis children with end-stage renal disease (ESRD). The study aimed to assess the outcome of renal transplantation in Iranian children with cystinosis.

Methods: This retrospective study is a follow up of 21 cystinosis children transplanted in Labafinejad Hospital, Tehran, Iran.

Results: Three cystinosis patients involved by primary non-function because of graft vein thrombosis and/or severe acute tubular necrosis. The remaining cystinosis patients had excellent graft survival rate and only one patient lost the graft 3 years post-transplant due to noncompliance. The graft survival rate after excluding the patients with primary non-function was 100%, 94%, 94% and 94% at 1,3,5 and 10 years after transplant. The mean serum creatinine in patients with functioning graft 10 years after transplant was 1.6 mg/dl.

Conclusion: We showed that cystinosis patients had good graft function in long term after transplantation.

Keywords: Renal Transplantation, Cystinosis, Failure

Introduction

Cystinosis is a rarely inherited disorder with autosomal recessive inheritance in which cysteine cannot be transported out of lysosomes of cells of many tissues of the body. Renal involvement as one the most important complications of infantile cystinosis may lead to renal failure during the first decade of life.

Renal transplantation is the best treatment of cystinosis patients with end-stage renal disease (ESRD). There is no recurrence of cytinosis nephropathy after transplantation. Graft biopsies have not shown cysteine accumulation in tubular and glomerular cells (1-3), but, cystine crystals are accumulated in infiltrating cells in graft without any effect on its function. The outcome of renal transplantation has even been reported better than other causes of ESRD in children (4-6).

The aim of our study was to assess the outcome of renal transplantation in Iranian children with cystinosis.

Methods

Between 1985 and 2012, twenty one children with cystinosis received kidney transplant at Pediatric Renal Transplantation Center at Labafi Nejad Hospital in Iran. The detail of immunosuppressive therapy has been mentioned in previous studies (7).

Acute rejection was defined as rapid serum creatinine rising under exclusion of other causes of serum creatinine increase. Some acute rejection episodes were confirmed by graft biopsy. We investigated the graft survival rate in cystinosis patients. Graft function was also assessed by measurement of serum creatinine.

Statistical analysis

Values were expressed as mean and standard deviation. Kaplan–Meier survival analysis was employed to calculate graft survival rate. The

SPSS v.18 was used for all analyses.

Results

The mean age of cystinosis patients at the time of transplantation was 8.3 ±2.5 years old (range: 2-15 yrs.). Sixteen patients (76.2%) were female, and the rest male. Fifteen patients (71.4%) had preemptive renal transplantation. The mean duration of dialysis before transplantation was 24 months in patients who dialyzed before transplantation. Twenty patients received graft from living donor and only one of them received renal transplant from cadaveric donor. Three patients (14.3%) were involved by acute rejection episodes. The mean follow up duration was 78.4 months (1mo-184 mo.). Figure 1 shows the serum creatinine at 6 months and then yearly after transplantation.

Four patients lost their graft. The etiology of graft failure was primary non-function in three patients and chronic graft nephropathy in one of them. Primary non-function was due to venous thrombosis and severe ischemia. Graft failure due to chronic allograft nephropathy in one of the patients was secondary to noncompliance.

The graft survival rate at 1, 3, 5,10 and 14

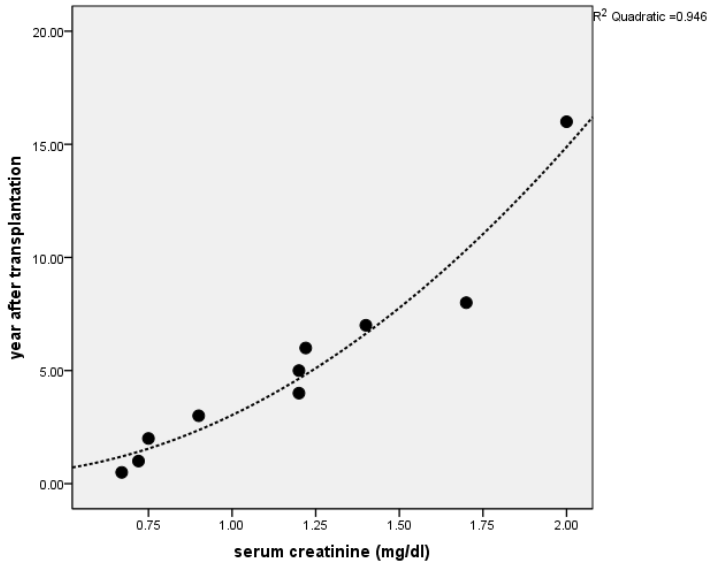

Fig 1. The mean of serum creatinine 6 months, and then yearly after transplantation in cystinosis patients

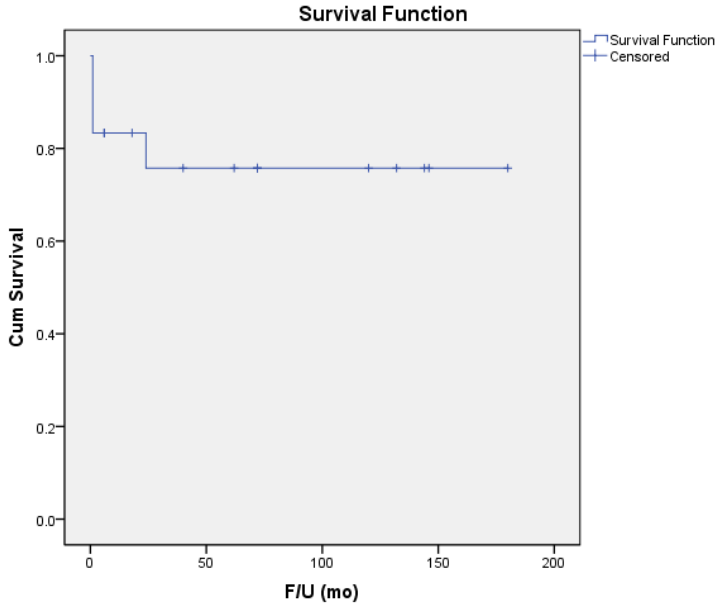

Fig 2. The graft survival rate in cystinosis patients

years post-transplant was 83%, 81%, 81%, 81%, 81%, respectively (Figure 2). We excluded the patients with primary non-function due to ischemia and thrombosis. The graft survival rates in remaining 18 patients at 1,3,5,10,14 years post-transplantation were 100%, 94%, 94%, 94% and 94%, respectively.

Discussion

Renal transplantation is the treatment of choice in children with cystinosis. Cystinosis does not influence negatively the outcome of graft. Kidney grafts can transport cysteine from lysosomes to cytoplasm, thus cysteine accumulation is not seen in tubular and glomerular cells of graft. However cysteine crystals are observed in graft interestitium with origin of host macrophages. The recurrence of cystinosis and Fanconi syndrome is not seen in renal transplant. Additionally outcome of renal transplantation has been reported to be better in cystinosis patients compared with children with other causes of ESRD (8-10). This better graft survival may be due to cysteine accumulation in immune cells that decrease immune response to allograft. However, it appears that this phenomenon does not affect the response of immune cells to microorganisms.

First Broyer et al showed better graft and patient survival in children with cystinosis in comparison with other causes of renal failure (8). Some other studies also confirmed this finding (9,10). Recently, Karlijin et al (10) assessed graft and patient survival in 114 pediatric patients from 18 countries with cystinosis. They showed significantly better 5-year graft survival in cystinosis patients than patients with other causes of ESRD (94% vs 84%, P=0.02).

In contrast to above studies Jochen et al performed a survival analysis on the 22 children with cystinosis who transplanted. They found no difference between patients with cystinosis and those with other causes of ESRD regarding graft survival (6). Almond et al also showed that graft and patient survival were not different between cystinosis patients and control group (10).

North American pediatric renal transplantation in its recent report (2010) showed a graft survival rate of 90.3% in living donor and 92.6% in deceased donor transplantation in cystinosis recipients. In this report, the graft and patient survival of 221 children with cystinosis compared with other inherited diseases and there were not any difference.

Four graft losses were found in our patients with cystinosis. Three of them were due to primary non-function (venous thrombosis and ischemia). These patients were small. Another patient lost her graft because of noncompliance. We showed that the graft survival rate in cystinosis patients without primary non-function was excellent especially in long term post-transplantation. The graft survival rate at the 14 years was 94%.

Conclusion

We showed that the outcome of renal transplantation in cystinosis patients was very good.

References

1. Lawson RK, Talwalkar YB, Hodges CV: Renal transplantation in cystinosis. J Urol 1975.113:552.

2. Hory B, Billerey C, Royer J, Saint Hillier Y: Glomerular lesions in juvenile cystinosis: report of 2 cases. Clin Nephrol 1994. 42:327

3. Chuang YW, Wen MC, Wu MJ, Shu KH, Cheng CH, Yu TM, et al. Follow-up and Treatment of Renal Transplantation with Nephropathic Cystinosis in Central Taiwan. Transplant Proc 2012. 44: 80–82.

4. Robert JJ, Tête MJ, Guest G, Gagnadoux MF, Niaudet P, Broyer M., Diabetes mellitus in patients with infantile cystinosis after renal transplantation, Pediatr Nephrol 1999.13(6):524-9.

5. Ehrich JHH, Brodehl J, Byrd DI, Hossfeld S, Hoyer PF, Leipert KP, et al. Renal transplantation in 22 children with nephropathic cystinosis. Ped Nephrol 1991. 5: 708-714.

6. Otukesh H, Hosein R, Fereshtehnejad SM, Riahifard A, Basiri A, Simforoosh N, et al. Short-term and long-term effects of slow graft function on graft survival in pediatric live donor renal transplantation, Pediatr Transplant. 2010,14(2):196-202.

7. Broyer M. Kidney transplantation in children, data from the EDTA registry. The EDTA Registry Committee. Transplant Proc 1989, 21:1985.

8. Theodorropoulos, DS, Krasnewich D, Kaiser Kupfer MI, Gohl WA. Classic nephropathic cystinosis as an adult disease. JAMA 1993. 270: 2200.

9. van Stralen KJ, Francesco E, Jager KJ, Verrina E, Schaefer F, Laube GF. Improvement in the renal prognosis in nephropathic cystinosis, Clin J Am Soc Nephrol 2011. 6:2485-2491.

10. Almond PS, Matas AJ, Nakhleh RE, Morel P, Troppmann C, Najarian JS, et al. Renal transplantation for infantile cystinosis: long-term follow-up. J Pediatr Surg. 1993.28(2):232-8.