

*Research Article***"Fate of Dysfunctional Bladder after Pediatric Renal Transplantation"****Ahmed M. Fawzy, Ehab R. Tawfik, Ahmed Z. Mohamed, Hani A. Morsi, and Fatina I. Fadel.**

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**Abstract**

**Introduction:** Graft function on long term into patients with LUTD is still a myth, So, we aimed know the natural history of LUTD and graft function into patient with abnormal lower urinary tract. **Patient and methods:** The study was conducted by retrospective review of 129 files of pediatric live renal transplant patients; Patients in either group had clinical evaluation of lower urinary tract function and assessment of graft functions at least one year after RT. **Results:** On evaluation the magnitude of change of cystometric variables we found 57% improvement of incidence of urodynamic detrusor overactivity and 48% improvement in patient categorized as poor/decreased compliance. There was 90% increase in the number of patients with adequate capacity. Patients showed 55.5% decrease in the number of patient with high PVR. **Conclusion:** Live donor renal transplant into pediatric patients with LUTD due to organic or neurogenic lower urinary tract pathology showed high serum creatinine on long term follow up.

**Key words:** ESRD - Follow up - Serum creatinine**Introduction**

Recent advances in surgical techniques in pediatric renal transplantation, preoperative and postoperative care, as well as immune-suppressive therapy have contributed to increase patient and graft survival for this population. However, important differences in the pediatric transplantation compared with adult especially for children who have lower urinary tract dysfunction LUTD which represents chronic problem in the context of renal transplantation.<sup>(1)</sup>

Data about the renal allograft function in cases with LUTD is limited and also, results of pediatric renal transplant patients with abnormal bladder have been conflicting. Some showed that these patients are poor candidates for renal transplant with poor graft and patient outcome. In contrast, other studies have shown that renal transplant is a safe and effective treatment for end-stage renal disease in children with lower urinary tract abnormalities.<sup>(2)</sup>

We aimed at assessing the impact of lower urinary tract dysfunction on renal allograft

function, graft survival and related morbidities.

**Patient and methods**

Our study included a retrospective cohort of 129 ESRD patient received live related donor renal allograft in the period between 2010 and 2016 at Aboul-Riche pediatric University Hospital. Patient was diagnosed for LUTD due to underlying different clinical conditions including PUV (39 patients), primary VUR (32 patients) and neurogenic bladder (20 patients) and urethral stricture disease (1 cases) remaining cases had no obvious LUTD.

Long term assessment of serum creatinine and clinically significant lower urinary tract manifestations were examined. Also, we studied the effect of pre, intra and post-operative variables together with lower tract parameters on last serum creatinine as a mirror of graft functions.

**Results**

Mean age of live donor was 38 years most of them were mother of the child with ESRD in 61.5%. Mean recipient age at

transplantation was 9 years with a mean weight at operation 26.5 Kg. (See table 1)

On comparing magnitude of change of cystometric variables in each group we found 57% of incidence of urodynamic detrusor overactivity and 48% improvement in patient categorized as poor/decreased

compliance. There was 90% increase in the number of patients with adequate capacity. Group B patients showed 55.5% decrease in the number of patient with high PVR.

Mean serum creatinine in last follow up was 1.3 with no graft failure or deaths. (See table 2)

#### Donor and recipient criteria in both study groups.

**Table 1: 61.5% of recipients were males with mean age at transplantation of 9.2 years Graft function outcome in both study groups in the end of the study:**

Parameter		Group B NO.(129)
Donor age	Mean $\pm$ SD	38.1 $\pm$ 8.5
Donor sex	Male	15 (38.5%)
	Female	24 (61.5%)
Recipient sex (%)	Males	24 (61.5%)
	Females	15 (38.5%)
Age at renal transplantation	Mean $\pm$ SD	9.2 $\pm$ 4.1
Weight at renal transplantation	Mean $\pm$ SD	26.5 $\pm$ 9.9

**Table 2: mean serum creatinine at the last follow up was 1.3 mg/dl in 3.6 to 7.8 years of follow up duration (median follow up 6 years).**

Parameter		Group B NO. (39)
Last Creatinine (mg/dl)	Mean $\pm$ SD	1.3 $\pm$ 0.9

#### Discussion

Our study in considered an a follow up of a second study was done on 123 pediatric renal transplant patient to compare the outcome of renal graft and related complication between two groups; control group of patient with non-urological cause of ESRD and group of patient who developed ESRD due to urological causes including mainly patients with LUTD. However, the above study did not report whether LUTD changes affects graft outcome.

Many studies reported 62.5% live related donors versus 37.5% cadaveric donor,

while in our studies only live donor was accepted by law. <sup>(4-13)</sup>

Mean age donor in the studies described before was calculated to be 35.4 years versus 38 year in our study which was similar to us. <sup>(4-13)</sup>

In our series, donor gender distribution between two groups showed no statistically significant difference where most of donor were female (70.5%) of total donors (See table 1). However in some studies; males (46.6%) were nearly equal female donors (53.4%) of 296 total donors reported. This difference could be attributed to presence of

more cadaveric donor in the mentioned studies and more live related donor in our study where mother is the main donor. <sup>(4-13)</sup>

There were different means of age at transplantation of some of studies ranged from 4.8 to 13.7 years. <sup>(4-13)</sup> similar to our study where mean age at operation in group A was 9 years in our study reflecting that patient with LUTD usually had more time of till development of ESRD more than renal group. But without statistical significance (*See table 1*).

Most of our study patients were males in 71% with no statistically significant difference between study groups. Similar to our study, other studies; males represented 64% of total cases reported. Also,, mean weight at transplantation of our study cases was 26.5 Kg. Only two studies among those described in table 1 reported weight at transplantation with no statistically significant difference between their groups. <sup>(5-6)</sup>

In our study, cases showed statistically significant differences on the baseline and final urodynamic parameters which forced us to study the magnitude of changes, on comparing the change of cystometric variables in each group. We found 57% improvement of incidence of urodynamic detrusor overactivity. Patients categorized as poor/decreased compliance showed 48% improvement associated with 44.9% significant increase in mean mL needed to rise detrusor pressure one unit i.e. compliance. There was 90% rise in the number of patients with adequate capacity which was reflected as 63.8% increase in the mean of mL needed to reach MCC. Patients showed 55.5% decrease in the number of patient with high PVR which was associated with 79.9% increase in the mean volume of PVR.

All cases in our study has negative panel reactive antibodies PRA according to standard protocol of the institute. The most common HLA crossmatch pattern in each group was 3 out of 6 with no significant difference in the distribution of different grades of HLA crossmatch between study groups. In a single cohort of pediatric renal

transplant recipient done in the same institute of us, median number of HLA crossmatch was 4 out of 6 crossmatch (39% of HLA crossmatch). Also, 42% of HLA cross match was 3 out of 6 HLA pairs similar to us. <sup>(3)</sup> Also, another comparative study reported no significant difference between the distributions of the number of HLA crossmatch in between both groups of patients, one of them included recipient with LUTD, <sup>(13)</sup>

Luke et al.,, 2003 reported increase in mean cystometric capacity by 63% from mean CC at baseline (186 ml). Also, there was a reduction in the mean of detrusor pressure before RT from 40 to 19 cmH<sub>2</sub>O after RT. <sup>(13)</sup>

High PVR was estimated in 45 out of 129 cases, there was no significant change in the mean of PVR from baseline towards the post-transplant follow up. In addition, voiding difficulties were expressed in additional <sup>(7)</sup> non-CIC Non toilet trained patients associated with 33% increase in the need for assisted voiding e.g. CIC after RT

After RT, need for urinary diversion appeared in 8 cases with LUTD reported in studies described in table 1, only 5 patients needed Mitrofanoff procedure mainly due to development of urethral stricture in CIC dependent patients and non-compliance and inadequate urethral drainage in patients with urogenital sinus as mentioned. <sup>(6-12)</sup> Vesicostomy was needed in two cases one of them was due to urethral stricture development in CIC patient.

Mean UTIs episodes of our cases was 5-6 UTIs episodes yearly occurred ranging from 1 to 11 episode.

Three studies described a significant difference in the incidence of UTIs as for the favor of high UTIs occurrence in LUTD patients. <sup>(4, 7, 12)</sup> Only 2 studies reported non-significant difference between their study and control group regarding UTIs incidence. <sup>(3, 5)</sup>

In another study, comparing between pediatric transplant patients with nephron-

logy versus urologic cause for ESRD. There was no significant difference between percentages of patient with UTIs between study groups before renal transplantation but after receiving graft the percentage of UTIs in the urologic group was markedly higher with high statistical significance. Which was similar to what was interpreted in our study that there was increase in the mean of UTIs episode in renal transplant patient with dysfunctional bladder against those with normal LUT.<sup>(14)</sup>

Serum creatinine at last follow up was high with a mean of 1.3 mg/dl. Only one study by Aki et al., 2015 reported significant difference between its groups regarding last serum creatinine (1.3 vs. 0.9 in LUTD+ve and LUTD-ve group respectively).<sup>(7)</sup>

Despite that remaining studies did not describe a statistically significant difference regarding serum creatinine or eGFR in between their groups, serum creatinine or eGFR usually higher in groups with LUTD.<sup>(4-13)</sup>

High serum creatinine at the last follow up forced us to seek for predictors of serum creatinine, UTIs was responsible for 45% of last serum creatinine changes. Thus incident UTIs results in 20% change of serum creatinine.

In previous study, results of multiple regression analysis for factors affecting graft function showed that underlying urological pathology have a significant risk for graft function and postoperative complication (OR = 0.2, p= 0.05).<sup>(5)</sup>

### Conclusions

Live donor renal transplant into pediatric patients with LUTD due to organic or neurogenic lower urinary tract pathology showed worse serum creatinine in patients with pathological LUTD. Comparing the effect of different LUT parameters on the net result of serum creatinine we found that UTIs account for 45% of serum creatinine result on the long term after receiving live donor transplantation.

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**Conflicts of interests:** None

**Ethical consideration:** All procedures performed were in accordance with the ethical standards of our local institutional research ethical committee of the faculty of Medicine, Minia Univ., Egypt. also in agreement with Helsinki Declaration as well as the Declaration of Istanbul 2008.

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