

Kidney Transplantation

A Comparison of Augmentation Cystoplasty Before and After Renal Transplantation with the Control Group

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ABSTRACT

Purpose: We compared two surgical methods of augmentation cystoplasty (AC), before and after renal transplantation, and the outcomes of both methods with transplant patients with normal bladder function.

Materials and Methods: 1520 kidney transplantations were performed at Shahid Labbafinejad Center between March 1988 and February 2002 of which 36 cases was accompanied with AC. In 20 patients (group A) AC was performed before transplantation. This group consisted of 14 males and 6 females with a mean age of 26.1 (13-39) at the time of transplantation. Sixteen patients consisting of 11 males and 5 females (mean age 27.3, 12-44) underwent AC after transplantation. Eventually 40 transplant patients with normal bladder function were assigned in the control group including 18 males and 22 females with a mean age of 31.2 (11-55) (group C).

Results: Normal graft function was achieved in 16, 13, and 33 patients of groups A, B, and C respectively over the mean follow-up of 70, 59, and 76 months ($p < 0.7$). Mean serum creatinine during the follow-up was 1.48 ± 0.4 , 1.7 ± 1 , and 1.4 ± 0.55 for groups A, B, and C respectively. 9, 12, and 17 patients (26, 64, and 34 cases) with UTI requiring hospital admission were observed in the 3 groups respectively. The incident of UTI and the resultant hospitalization in group B was more than the one in group C ($p < 0.03$), but it did not differ significantly from group A to group C.

Conclusion: AC is a safe and effective method to improve the lower urinary system function and with the exception of increased risk of UTI following AC after transplantation (group B), there is no considerable difference in the complication rates between AC before and after renal transplantation. As a result, we can perform AC before or after kidney transplantation in patients with dysfunctional lower urinary tract system up to their specific conditions.

KEY WORDS: augmentation cystoplasty, renal transplantation, dysfunctional bladder

INTRODUCTION

The idea of kidney transplantation of patients with reconstructed bladder is fairly new. In 1966 Kelly and colleagues introduced kidney transplantation in a patient with dysfunctional bladder who had undergone ileal conduit.⁽¹⁾ In 1982 Marshall performed pyeloileocecostoplasty successfully in a patient with transplanted kidney hydronephrosis due to dysfunctional bladder.⁽²⁾ Since then a number of studies has been published reporting successful AC in renal transplant patients^(3, 4), but these few studies has been done with very small sample sizes and short term follow-ups. It is of controversy whether to perform AC before or after the transplant procedure and the appropriate time of AC in association with transplantation is not defined yet.

MATERIALS AND METHODS

1520 kidney transplant was performed at Shahid Labbafinejad Center between March 1988 and February 2002. 20 patients with dysfunctional lower urinary tract system not responded to conservative therapies had undergone AC during these years and afterwards they received transplanted kidney due to ESRD. The GI segments used in reconstruction were ileum in 15, sigmoid colon in 1, and gaster in 4 cases. These patients (group A) included 14 males and 6 females. Mean age was 26.1 (13-39) at the time of transplantation. Mean interval between transplantation and AC was 33.4 (6-52) months.

Group B consisted of 16 ESRD patients (11males and 5 females, mean age 27.3, 12-44) suffering from dysfunctional bladder in whom transplantation was performed and AC served as the next step. The GI segments used were ileum in 13, sigmoid colon in 2, and gaster in 1 cases. Mean interval between the two procedures was 27.2 (2-108) months.

We assigned 40 transplant patients with normal lower urinary system in group C as the control group. In order to avoid bias, the next 2 patients who underwent transplant just after each case of group A by the same surgeon were assigned. The resultant group included 18 males and 22 females and their mean age was 31.2 (11-55).

Graft function was evaluated by serum creati-

nine in this study and the three groups were assessed by measuring mean serum creatinine level, episodes of acute rejection, and episodes of fever due to UTI contributed to hospitalization. In addition, graft loss and mortality in each group were compared with another.

Results were analyzed by Chi-square test (Fisher's exact test) and Leven test. Significant P value was identified as $p < 0.05$.

RESULTS

Mean follow-up was 70 (14-85) months in group A, 59 (22-70) months in group B, and 76 (20-84) months in group C. no significant difference was seen between the mean follow-ups of them ($p > 0.1$). male to female ratio was 14/6 in group A, 11/5 in group B, and 18/22 in group C, indicating a difference between groups A and C ($p < 0.04$). mean ages of the three groups were 26.1 ± 9 , 27.3 ± 11 , and 31.2 ± 8 respectively, without any meaningful differences.

Frequency of acute rejection episodes was approximately similar in groups A, B, and C (1.3 ± 1.1 , 1.5 ± 0.9 , and 1.1 ± 1 respectively). 2.7 ± 2 , 3.8 ± 2.1 , and 1.2 ± 0.9 episodes of pyelonephritis occurred in the three groups respectively, showing a considerable difference between groups B and C ($p < 0.02$), but the differences between groups A and C ($p > 0.1$) and groups A and B ($p > 0.08$) was not significant. Graft loss was seen in 4(20%), 3(18%), and 7(17%) cases respectively, which was not meaningfully different from each group to another ($p > 0.7$). mortality rate was 2 in group A, one during the dialysis and one due to liver disease and cirrhosis. One patient died in group B of urosepsis following cystoplasty and one death occurred in group C while transplant procedure was in process. No statistic difference was seen in the mortality rates of the groups ($p > 0.07$). The mean duration of warm ischemia was 60 ± 14.4 seconds in group A, 78 ± 23 seconds in group B, and 91.9 ± 63 seconds in group C. There was one living related donor transplant in group A while there was no related donor in group B. In group C, 6 patients received kidney from related donors. A significant difference was observed between this group and group B ($p < 0.03$).

DISCUSSION

Appropriate function of lower urinary system is necessary in order to maintain kidneys intactness. Bladder must have a proper volume and a high compliance providing proper reservation and emptying with low pressure. Augmentation cystoplasty is a known method in the treatment of bladder dysfunction when it does not respond to conservative therapies.

In 1997 Alfery and coinvestigators reported the outcomes of performing AC prior to renal transplantation in 10 children with ESRD. Because of catastrophic complications they recommended performing urinary conduit before transplantation instead of AC.⁽⁵⁾ However, our study findings suggest that AC in ESRD patients before or after renal transplantation is safe and complications are tolerable.

No definite recommendation about the order of AC and renal transplantation has been yielded up to the present time. In 2000 Power and coworkers retrospectively studied the outcomes of renal transplantation in 10 patients who had previously undergone AC. over a 27 months follow-up no mortality was reported and one graft lost. They concluded that renal transplantation in patients who had undergone cystoplasty because of dysfunctional bladder is practicable.⁽⁶⁾ Thomolla and colleagues evaluated 8 transplant recipients in a retrospective study of whom 7 had augmented bladder prior to transplantation (group A) and 1 had undergone AC after transplantation (group B). In the latter case urinary leakage occurred contributing to additional surgery. They stated that in patients with low capacity and low compliance bladders not responded to conservative therapies, performing AC preceding renal transplantation in order to provide desirable bladder reservoir and high compliance is preferred.⁽⁷⁾ While McInerney and Mundy described the results of renal transplantation coupled with AC in 8 cases and according to complications such as mucous impaction and pyocystitis (dry cystoplasty) in patients with augmented cystoplasty prior to transplantation (group A) and probable injury to the pedicle of intestinal segment in transplantation in this group, they suggested a 3 to 6 months interval transplantation and subsequent AC.⁽⁸⁾ Fontaine presented the outcomes of 10 group A and 4 group B recipients of cadaveric kidneys over an 8 month fol-

low-up in his study. A complication such as dry cystoplasty was rare and he concluded that AC is safe to be done either prior or after renal transplantation.⁽⁹⁾

Our findings indicated that AC is viable in renal recipients and its complications are acceptable. As no dry cystoplasty was observed in group A, it seems to be a rare condition seen only in anuric and severe oliguric patients. Complications were similar in groups A and B with the exception of more UTI episodes in group B. no meaningful difference in graft function was observed. Eventually, it seems that AC is safe in renal transplant patients and viable either prior or after transplantation.

CONCLUSION

The decision of when to perform AC in ESRD patients seems to be dependent on the patient condition. For instance, in anuric or severe oliguric patients it is better to delay AC 3 to 6 months after transplantation, when urinary output has improved and immunosuppressive agents has reached the maintenance dose, in order to avoid dry cystoplasty complication.

Also in patients with low capacity and low compliance bladder in which irreversible fibrosis has not occurred yet, increasing urinary output may raise the bladder volume and a few months follow-up is preferred after transplantation as in some cases the improvement of bladder function may dispute the necessity of AC.

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