

STONE DISEASE

Ex vivo ureteroscopic treatment of calculi in donor kidneys at renal transplantation

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Purpose: We evaluated the safety and efficacy of ex vivo ureteroscopy (ExURS) as a means of rendering the donated kidney stone-free at live donor renal transplantation.

Materials and Methods: A total of 10 suitable kidney donors with small, unilateral nonobstructive calculi underwent live donor nephrectomy (8 open flank, 2 hand assisted transperitoneal). Immediately after cold perfusion, ExURS was performed in an iced saline solution. Access to the collecting system was via the ureteral stump. Calculi were either removed with endoscopic baskets and/or completely fragmented with Holmium laser lithotripsy.

Results: Access to the renal collecting system was technically successful in all cases. A total of 10 stones, ranging in largest diameter from 1 to 8 mm (average 5.2) were visualized. Of the kidneys 6 had solitary stones, 2 had 2 stones and 1 had no stone. Of 10 stones 9 were successfully removed and/or fragmented with an average procedure time of 6.5 minutes (range 3 to 28). Indwelling ureteral stents were placed at transplantation in 5 of 10 kidneys. There were no intra-operative or postoperative ureteral complications. At 1 month after transplant serum creatinine ranged from 0.9 to 2.7 mg/dl (average 1.5). At a mean followup of 33.2 months new stones have not formed in any recipients and at mean 36.4-month followup no new calculi have formed in the remaining kidney of any donors.

Conclusions: ExURS is a technically feasible means of rendering a stone bearing kidney stone-free without compromising ureteral integrity or renal allograft function.

Editorial Comment

Because of the long list of patients awaiting renal transplantation, rules regarding the suitability of live kidney donors have been re-examined in recent years in hopes of expanding the donor pool. In this report, Rashid and colleagues harvested kidneys from donors with small, nonobstructing renal calculi in the donor kidney, then performed ex vivo ureteroscopy to remove the stones prior to transplantation. Although to date, no donor or recipient has had a stone recurrence, the practice of accepting kidney donors who have a systemic renal disease remains controversial.

With the widespread use of CT for renal imaging, the diagnosis of small, non-obstructing renal calculi has become more common, although the implication of this finding in otherwise asymptomatic patients without a history of stones is unknown. The authors of this paper noted that donors were evaluated metabolically to identify risk factors for stone formation, but they did not mention if donors were excluded based on metabolic abnormalities or if they were treated medically if donor nephrectomy was performed. Although the risk of renal loss associated with stone disease in a solitary kidney is decidedly low, the donor, now with a solitary kidney, requires careful radiographic surveillance, and every stone or symptomatic event requires intervention as for any patient with a solitary kidney. As such, follow-up and care of the donor becomes more involved. While this may constitute an acceptable risk for the donor, we as urologists with a primary concern for the donor must weigh the risk and benefits in our own mind before placing a healthy subject at risk for future renal compromise. As the authors suggest, the long term outcomes of these donors must be carefully followed so that future donors may be properly informed prior to donor nephrectomy.

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Nephrolithiasis associated with renal insufficiency: factors predicting outcome

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Background and Purpose: Renal calculous disease may be associated with various degrees of renal insufficiency secondary to a combination of obstruction, urinary infection, frequent surgical intervention, and coexisting medical disease. Herein, we present our data on the progression of renal function in patients with stones associated with renal insufficiency and assess the significance of various factors that could predict postoperative renal function deterioration.

Patients and Methods: Data were obtained from 4400 patients undergoing treatment for calculous disease at our institute since 1991. Renal insufficiency, defined as a baseline serum creatinine > 1.5 mg/dL, was present in 84 (1.9%). Predictive factors evaluated for renal function deterioration were preoperative (age, duration of symptomatology and nephrolithiasis, urinary tract infection, coexistent medical diseases, baseline serum creatinine, and stone burden), intraoperative (number of percutaneous tracts), and postoperative (recurrent infection, proteinuria, cortical atrophy, residual fragments, and stone recurrence).

Results: Over a mean follow-up of 2.2 years (range 6 months-6 years), 33 patients (39.3%) showed improvement, 24 (28.6%) showed stabilization, and 27 (32.1%) showed deterioration in their renal function. Higher baseline serum creatinine, proteinuria > 300 mg/day, renal cortical atrophy, stone burden > 1500 mm², recurrent urinary infection, and age < 15 years were significant predictors of subsequent renal function deterioration.

Conclusions: Patients with nephrolithiasis and mild to moderate renal insufficiency warrant aggressive treatment aimed at complete stone clearance and prevention of recurrence of stones and urinary infection. A higher baseline preoperative serum creatinine, proteinuria > 300 mg/day on follow-up, renal cortical atrophy, stone burden > 1500 mm², recurrent urinary infection, and age < 15 years are associated with a significantly higher likelihood of renal function deterioration after treatment of the calculous disease.

Editorial Comment

Although the short-term goal in treating obstructing renal and ureteral calculi is relief of pain and obstruction, the long-term goal is preservation of renal function. However, in some cases damage to renal parenchyma is irreversible and renal function is not fully recovered. Kekreja and colleagues reviewed their series of 4400 patients undergoing surgical management for renal or ureteral stones and identified 84 patients with renal insufficiency despite stabilization with nephrostomy drainage. At a mean of 2.2 years of follow-up, 32% of patients had deterioration in their renal function, and 44% of those went on to end-stage renal failure and dialysis. Among a variety of factors assessed, age < 15 years, atrophic renal parenchyma, large stone burden, significant proteinuria and recurrent urinary tract infections were found to be significant predictors of post-operative renal deterioration. Moreover, for patients with a pre-operative serum creatinine = 3, deterioration of renal function occurred during follow-up in 54% of patients, with a direct correlation between preoperative serum creatinine and post-operative renal deterioration.

This study suggests that although most patients with stones and mild renal insufficiency can avert further renal functional loss with aggressive treatment to remove stones and prevent recurrent stones and infection, the outcome for patients who have already sustained significant renal damage is poor despite aggressive surgical management. Furthermore, for patients with any of the poor prognostic factors determined in this study, renal functional deterioration is more likely. Nevertheless, complete stone clearance and careful follow-up is

recommended for all patients with stones and renal insufficiency in hopes of maximally preserving renal function and delaying renal functional deterioration.

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ENDOUROLOGY & LAPAROSCOPY

Laparoscopic versus open donor nephrectomy: ureteral complications in recipients

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Objectives: To describe our experience with laparoscopic donor nephrectomy (LDN) and open donor nephrectomy (ODN) regarding ureteral complications. LDN has proved to be safe and to offer significant benefits to the donor compared with ODN. Of major importance is the effect of the surgical technique on the graft. Studies have shown an increased incidence of ureteral complications in recipients of laparoscopically procured kidneys. Operative reconstruction results in additional morbidity for the recipient.

Methods: Living donors and their recipients, who underwent surgery from January 1994 to April 2002, were included in this retrospective study. A total of 122 LDN and 77 ODN recipients were included.

Results: Of the 122 LDN and 77 ODN recipients, 15 (12%) and 10 (13%), respectively, required percutaneous nephrostomy drainage. In total, 5 LDN (4.1%) and 5 ODN (6.5%) recipients required reconstruction of the ureter because of obstruction of the ureter or urine leakage (P value not statistically significant, excluding reconstruction required for technical errors). The operating time, warm ischemia time, and serum creatinine were comparable between recipients with or without ureter complications requiring reconstruction.

Conclusions: In our experience, LDN was not associated with an increased incidence of ureteral complications in the recipient compared with ODN.

Editorial Comment

Dr. Stephen Jacobs, one of the pioneers of laparoscopic donor nephrectomy, wrote an excellent commentary following this article that touched on all of the important points. He pointed out that, although the results of the study are reassuring with regards to no difference between the open surgical and laparoscopic kidneys in terms of recipient ureteral complications, the results must be interpreted cautiously because the groups were not synchronous and therefore significant bias could enter. Nonetheless, all recipients underwent ultrasonography and nuclear medicine scanning, and percutaneous nephrostomy tubes were used for initial management in all cases. In addition, in those patients who required operative repair the findings were similar. One criticism of the study that cannot be easily addressed is the low power for detecting a difference between groups, given the expected 3 – 5% frequency of transplant ureteral complications. That the incidence appears greater in this study (in both groups) is likely due at least in part to the routine assessment of all kidneys with ultrasonography and nuclear medicine scanning. What we can take home from this study is that any difference in ureteral complications between the 2 harvest methods is unlikely to be great. A small difference would have