

Post Renal Transplant Hydronephrosis – Obstructive or Not – A Longitudinal Single Centre Study

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Abstract

Introduction

The incidence of ureteric complications post-renal transplantation is 7 – 10 %. Not all radiologically detected hydronephrosis is truly obstructive. This study aimed to assess the incidence of radiological pelvicalyceal dilatation and, obstructive hydronephrosis and cost-benefit analysis of post stent removal ultrasound in a renal transplant population.

Patient and Methods

Prospectively collected data from 2011 to 2016 was reviewed. Stents were removed at 4 – 6 weeks following transplant and a post stent removal ultrasound 4 (4 – 7) days post-procedure.

Results

398 consecutive transplants were reviewed. 30 cases were excluded. The median follow-up was 3 years (3 – 60). Of the 368 13 had mild prominence of their collecting system and 20 showed hydronephrosis with pelvicalyceal dilatation.

None of the patients had a >10 % change in their baseline creatinine

10 of the 20 recipients with hydronephrosis underwent a ureteric reconstruction several months after stent removal when clinically indicated.

1 of 20 underwent ureteric re-implantation for worsening radiological hydronephrosis and had stable serum creatinine both before and after the procedure.

Conclusion

The incidence of post-transplant hydronephrosis (5.4 %) and true ureteric obstruction (2.7 %) is low.

Routine post stent removal ultrasound adds little to the overall management of a renal transplant recipient and increases the cost by \$300.00.

Keywords: Renal transplant; Hydronephrosis; Ultrasound

Introduction

Renal transplantation benefits patients in renal failure offering both better long-term survival and quality of life with studies showing improved 5-year survival rates and significantly reduced health care costs when compared to dialysis [1].

Ureteric complications after renal transplantation have an incidence of less than 10 % and are associated with significant morbidity [2]. They occur usually within the first three months after surgery and can occur in relation to the allograft ureter or vesicoureteric anastomosis. They present clinically either as a urinary leak or obstruction of the collecting system [2]. Ureteric complications increase both post-transplant morbidity, and healthcare costs. [3] Ureteric obstructions are early or late and account for 3 % of complications. Early ureteric obstruction is defined as occurring < 3 months post-renal transplant occurs usually distally and are usually secondary to ureteral devascularization causing ischemic strictures

[4]. The other causes of early ureteric obstruction include technical errors during ureteroneocystostomy, extrinsic compression via collections peri transplant, ureter kinking, ureteric stones, and peri-anastomosis edema [4]. Late ureteric obstruction defined as occurring > 3months post-renal transplant can occur from ischemia of ureter, acute rejection causing vasculitis, lymphocele causing extrinsic compression, immunosuppressive medications, BK virus nephropathy, and ureteric stones [4].

Clinically significant ureteric obstruction presents with a decline in renal function and decreased urine output rather than the classic symptoms of ureteral obstruction of pain and colic due to denervation of the renal allograft and when present are usually late symptoms. The diagnosis is made based on a change in baseline function associated with confirmatory non-invasive radiology. However, pelvicalyceal dilatation of a denervated system can be a

normal post-transplant finding and therefore a source of a dilemma when found.

The aims of this study were to assess the incidence of radiological post-transplant allograft pelvicalyceal dilatation in a renal transplant

population, b) the incidence of obstructive hydronephrosis and c) cost-benefit analysis of performing post stent removal ultrasound.

Methods

This study was an analysis of prospectively collected data of all adult renal transplants including both deceased and live donor transplants at a single renal transplant center over a five-year period from October 2011 to October 2016.

All patients had a stented ureteroneocystostomy performed using a Lich-Gregor technique. Transplants were performed by one of 3 consultant transplant surgeons. All recipients had a lich-Gregor 2-layer neoureterocystostomy, with a size 4.7 French Cook Medical ureteric stent across the anastomosis. The stent was removed after a median of 4 weeks (range 2 - 6) and a post stent removal ultrasound was performed after a median of 2 days (range 1 -5) following stent removal.

Our inclusion criteria were kidney transplants of all ages, all grafts, and both live and deceased donors. Our exclusion criteria included 20 unavailable ultrasound results, 4 dual transplants (double kidney

transplant), 3 kidney and pancreas transplants, 2 deaths unrelated to the renal transplant, and 1 renal transplant patient with urinary drainage from transplant kidney into an ileal conduit.

Post stent removal Ultrasonography results were assessed as either a normal study, mild prominence of the collecting system, or hydronephrosis. The results of the ultrasound were compared to the patient's renal function measured through serum creatinine levels.

The patients who went on to develop hydronephrosis were followed up further to observe their outcomes. Outcomes included follow-up surveillance ultrasound scans or interventional procedures such as ureteric stent reinsertion, nephrostomy tube insertion, or surgery for ureteric reconstruction.

The cost of an ultrasound scan at our institution was approximately \$300 per ultrasound scan performed.

Results

The total number of patients included in the study was 368. The median follow-up time was approximately 3 years. Ultrasound findings were reviewed in 3 categories (Normal ultrasound, Mild prominence on Ultrasound, and Hydronephrosis).

91 % of the renal transplant patients had a normal ultrasound scan after their stent was removed. In the remaining 9 % of patients, 3.6 % showed pelvicalyceal prominence, 5.4 % showed hydronephrosis and 2.9 % underwent ureteric subsequent reconstructions for worsening hydronephrosis on serial imaging or associated deterioration of renal function.

Over this 5-year analysis period, the total cost of a post ureteric stent removal ultrasound was also assessed, which totaled to an approximate cost of \$110 400.00 (Australian Dollars).

Figure 1 is a flowchart that summarises the results. 91 % of patients were found to have a normal US result.

3.5 % had a mild prominence in the US. These 2 groups of patients were found to have no shift in their baseline creatine (>10 %) after their stent was removed.

5.4 % were found to have hydronephrosis or pelvicalyceal dilatation. 45 % of these patients required no surgical intervention and showed no shift in baseline creatinine at the time of the ultrasound (or after stent removal). These patients were followed up with a repeat ultrasound scan approximately 1 month later, which showed resolution of their hydronephrosis.

55 % underwent surgical intervention. These patients were followed up with a repeat US 1 month later, which showed persistent or worsening hydronephrosis. These patients eventually had a nephrostomy tube inserted followed by ureteric reconstructions. 1 of these patients was found to have no change in their baseline renal function after their stent was removed or after surgical intervention. Most interestingly the majority of the patients that underwent surgical intervention, approximately 10 patients out of 11, were found to have renal dysfunction after their stent was removed and showed an improvement in their renal function after they underwent surgical intervention.

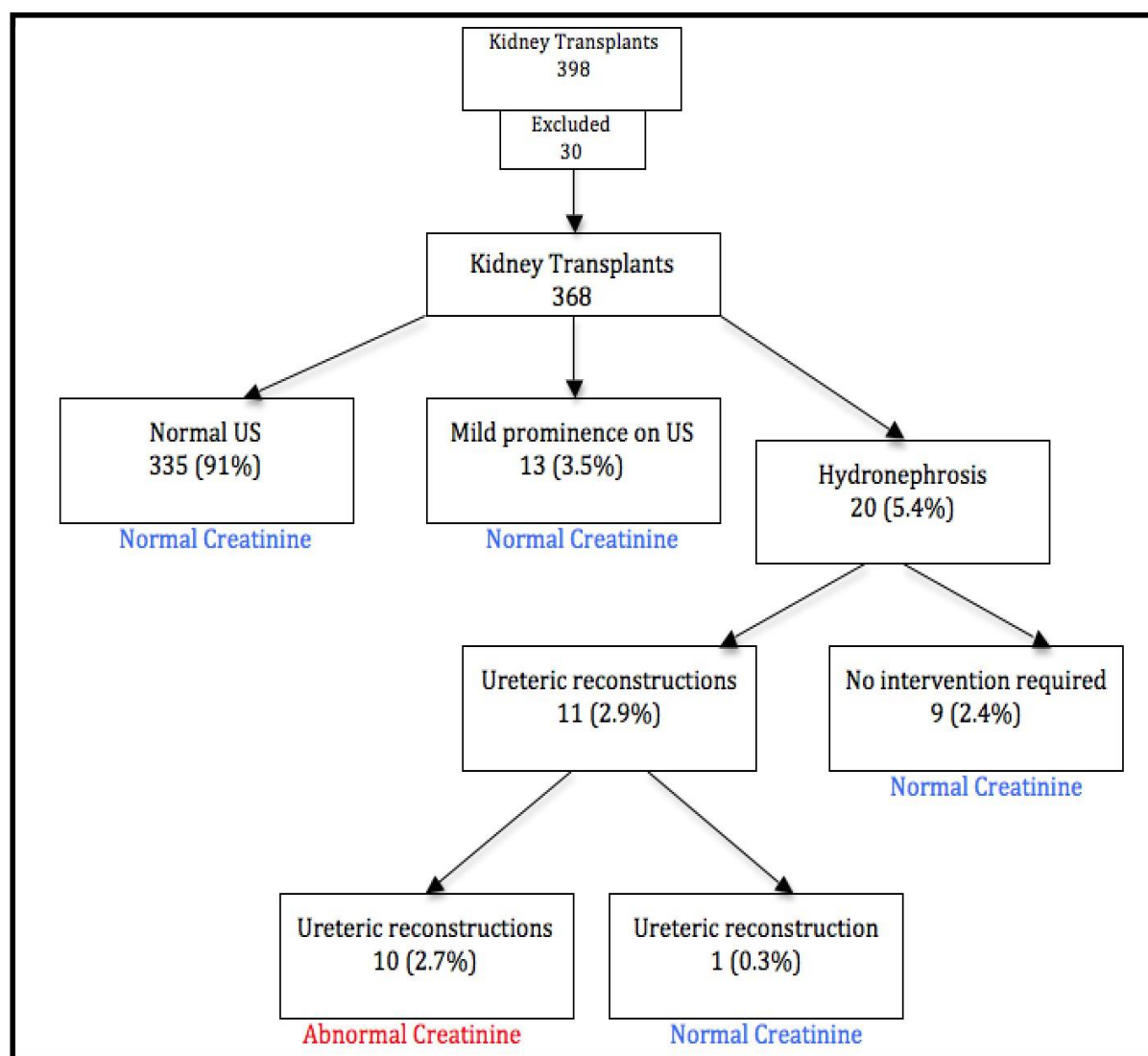


Figure 1: Flowchart summarizing results of recipients of single kidney transplants and outcome of post renal transplant ultrasounds with resulting management.

Discussion

A literature review performed showed minimal data on post ureteric stent removal ultrasounds. A similarly powered study performed overseas by Das et al showed from 2011 to 2013 found no evidence that routine ultrasound post-renal transplant ureteric stent removal within 2-3 weeks after elective stent removal provided any added valuable information beyond clinical and biochemical markers (2). Our results support this observation.

It is also important to note that the financial implications of doing a routine ultrasound scan for each of our transplant patients were considerable, costing the unit \$110 400.00 Australian dollars over a five-year period.

A laboratory blood test such as biochemistry costing 35 Australian dollars, has significant cost-benefit implications. Given that laboratory tests are performed routinely in the assessment of post-transplant patients, it is hardly of a burden to the patient or the unit.

In this perspective review of our data, we highlight that the incidence of post-transplant hydronephrosis is low with an incidence of only 5.4 % cases. The incidence of ureteric stricture needing intervention is lower in this study with the majority developing concurrent renal dysfunction. This suggests that routine post ureteric stent removal ultrasound adds little to the overall management of renal transplant recipients.

Conclusion:

In Conclusion, following ureteric stent removal, the emphasis should be on initially monitoring the renal function, and ultrasonography should be reserved and performed in the specific setting of progressive deterioration of renal function following a renal transplant.

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