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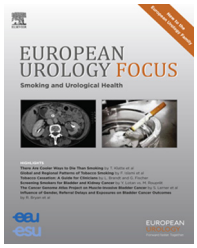

Stone Disease

Over 30-yr Experience on the Management of Graft Stones After Renal Transplantation

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Abstract

Background: Urolithiasis has been reported in up to 1.8% of patients after renal transplantation. Limited data are available regarding the treatment of such patients owing to this low prevalence.
Objective: To analyse a consecutive series of 2115 renal transplantations to elucidate the prevalence of renal graft stones (RGS) and their treatment.
Design, setting, and participants: A retrospective review was performed of a consecutive series of renal transplants from 1983 to 2017. Demographic and specific data regarding symptomatology, diagnosis, and treatment of RGS were recorded.
Outcome measurements and statistical analysis: Quantitative and qualitative variables were described. Differences in clinical variables were evaluated using unpaired *t* test. Statistical significance was set at $p < 0.05$.
Results and limitations: In total, 51 patients (2.4%) were diagnosed with de novo RGS. Mean stone size was 9 ± 6.5 mm, 31.4% being multiple stones. The distal ureter was the most common location (49%). Treatment modalities were extracorporeal shock wave lithotripsy (ESWL; 43.1%), active surveillance (25.4%), retrograde ureteroscopy (URS; 17.6%), antegrade URS (3.9%), percutaneous nephrolithotomy (3.9%), open approach (3.9%), and urine alkalisation (2%). Seven (13.7%) patients developed complications: two haematuria, three urinary tract infection, one steinstrasse, and one sepsis. Median follow-up was 72 mo. Overall stone-free rate was 52.9%. No significant differences were observed between mean glomerular filtration rate before and after treatment ($p = 0.642$). There were no cases of graft loss. Limitations include the retrospective nature of the study and limited number of patients.
Conclusions: RGS is an uncommon complication. ESWL, endoscopic surgery, and surveillance have been used to treat or follow up such patients. In well-selected patients, endourological surgery appears to achieve better outcomes. RGS does not have a long-term impact on graft function or graft survival.
Patient summary: It is uncommon to develop stones in the transplant kidney. If such stones are properly diagnosed, several minimally invasive treatment options can yield good results while maintaining good renal function.

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1. Introduction

The performance of renal transplantation has increased greatly and consistently worldwide since the 1990s. In Spain, the national transplantation registry reported 2997 renal transplants in 2016, with the highest rate of cadaveric renal transplantation in the world at 57 per million people [1].

De-novo urolithiasis is an infrequent complication in renal grafts after transplantation, occurring in up to 1.8% of patients with an average time to presentation of 1.6–3.5 yr [2–4]. The prevalence of stones in asymptomatic donors has been estimated to be 5% [5], which is commonly treated by performing in vivo or ex vivo stone removal before transplantation [6].

Renal graft stones (RGS) must be treated with extreme care as solitary kidney with complex anatomy. Several treatment options have been proposed, including extracorporeal shock wave lithotripsy (ESWL), flexible ureteroscopy (fURS), semirigid ureteroscopy (URS), percutaneous nephrolithotomy (PCNL), open approach (OA), or conservative management [7,8].

To date, limited data are available in the literature of such entity owing to the very low prevalence. The objective of this study was to analyse a consecutive series of 2115 renal transplantations in order to elucidate the prevalence and treatment of RGS.

2. Patients and methods

A retrospective review of a consecutive series of renal transplants from 1983 to 2017 was performed. Demographic and specific data regarding symptomatology, diagnosis, and treatment of RGS were recorded. Complications were graded according to the Clavien-Dindo (CD) classification.

All transplants were done by the kidney transplant team. The standard technique was employed, starting with a Gibson incision with an extraperitoneal access. The graft vein and artery are anastomosed to the external iliac vessels in an end-to-side fashion. The vast majority of patients had an extravesical ureteroneocystostomy (Table 1). A 7-Fr, 16-cm JJ stent was routinely placed and removed after 2 wk. Laparoscopic and robotic transplantations performed in this single-centre series were also included [9,10].

The standard immunosuppression therapy included cyclosporine, azathioprine, and corticosteroids until the late 1990s, until the combination of tacrolimus, azathioprine, and corticosteroids was introduced.

2.1. Statistical analysis

Quantitative variables were described using mean and standard deviation, and qualitative and categorical variables were described using percentages. An unpaired t test was employed with the SPSS version 22 (IBM Corp, SPSS Inc., Armonk, NY, USA). Statistical significance was set at $p < 0.05$.

3. Results

During a 34-yr period, 2115 renal transplants were performed in our institution and 51 patients (2.4%) were diagnosed with RGS during follow-up. All cases were de novo RGS. Mean age at diagnosis was 48.9 ± 12.3 yr, and 75% of patients were male. Six patients had stones in their native kidneys.

Table 1 – Demographic characteristics.

Sex, *n* (%)	
Male	39 (76.5)
Female	12 (23.5)
Age, yr, mean ± SD (range)	48.90 ± 12.32 (26–70)
History of stone disease in native kidney, *n* (%)	
Yes	6 (11.8)
No	45 (88.2)
Cause of ESRD, *n* (%)	
HTN	8 (15.7)
DM	3 (5.9)
Glomerulonephritis	20 (39.1)
Polycystic kidney	6 (11.8)
Stone disease	1 (2)
Unknown	13 (25.5)
Type of donor, *n* (%)	
Living	6 (11.8)
Deceased	45 (88.2)
Urinary anastomosis type, *n* (%)	
Taguchi	29 (56.9)
Lich-Grégoire	15 (29.4)
Leadbeter-Politano	5 (9.8)
Other	2 (3.9)
Postoperative kidney transplant complication (*n* = 27), *n* (%)	
Ureterovesical stenosis	5 (9.8)
Urinary fistula	3 (5.9)
Haematoma/bleeding	4 (7.8)
Acute rejection	15 (29.4)

DM = diabetes mellitus; ESRD = end-stage renal disease; HTN = hypertension; SD = standard deviation.

The causes of chronic kidney disease were as follows: glomerulonephritis (39.2%), arterial hypertension (15.7%), polycystic kidney disease (11.8%), diabetes (5.9%), stone disease (2%), and unknown (25.5%). Forty-five (88.2%) patients had undergone cadaveric donor transplantation. The most frequent techniques of ureteral reimplantation during kidney transplantation were the Taguchi technique (56.9%), Lich-Gregoir (29.4%), Leadbetter-Politano (9.8%), and other techniques (3.9%). Demographics are summarised in Table 1.

Median time from transplantation to diagnosis of RGS was 30.5 (10–63) mo. The mean stone size was 9 ± 6.5 mm, and the mean stone number 2 ± 1; 31.4% of patients had multiple stones. The distal ureter was the most common location (49%), followed by the lower calyx (17.6%), and renal pelvis (7.8%); the remaining 25% of cases were located in the upper and middle calyces (Table 2).

Regarding the clinical presentation, gross haematuria was observed in 23.5% of patients, acute renal failure in 23.5%, urinary tract infection (UTI) in 5.9%, and pain in 3.9%. However, incidental diagnosis during follow-up was the most frequent form of presentation (43.1%), with 80.3% of such cases being diagnosed by the kidney, ureter, and bladder (KUB) ultrasound (US) and 15% by computed tomography (CT). A nephrostomy tube was placed in 42.1% of patients.

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