CASE REPORT

Autotransplantation for the management of ketamine ureteritis

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SUMMARY

Ketamine-associated cystitis is a well-recognised syndrome; yet upper urinary tract involvement remains poorly understood. We present the case of a 33-year-old man who developed ketamine-associated cystitis and ureteritis. The patient's severe bladder symptoms required subtotal cystectomy and orthotopic reconstruction. However, the associated ureteritis led to bilateral ureteric obstruction and renal failure. Bilateral autotransplantation with pyelovesicostomy was performed. This first case of autotransplantation for ketamine uropathy helps to demonstrate the potentially devastating effects of ketamine on the urinary tract.

BACKGROUND

Ketamine cystitis was first identified by Shahani *et al*¹. It is characterised by irritative lower urinary tract symptoms and haematuria. Clinical findings include sterile pyuria and a low-capacity chronically inflamed bladder with ulceration. However, ketamine's effects on the upper tract remain largely unknown. We present this case of ketamine ureteritis to highlight its potentially devastating effects.

CASE PRESENTATION

A 33-year-old man presented with persistent dysuria, frequency and frank haematuria. At the time, the patient was using 1–2 g of ketamine per week and ketamine cystitis was diagnosed on cystoscopy. Initial upper tract imaging did not reveal any abnormalities. Biopsy showed a focally ulcerative cystitis. Initially conservative and medical management was attempted. The patient was advised to abstain from ketamine and treated with amitriptyline, solifenacin, cimetidine and gabapentin. Given there was no improvement, both intravesical dimethyl sulfoxide (DMSO) instillation and neuro-modulation were also trialled without any success.

The patient's worsening symptoms prompted the decision to perform a subtotal cystectomy with Studer orthotopic reconstruction. At operation, both ureters were severely scarred. Ureteric biopsy showed focal mucosal ulceration with a mononuclear cell infiltrate of the urothelium and tunica propria. The immediate postoperative period was uneventful, but in the following months the patient's renal function deteriorated with development of bilateral hydronephrosis and falling glomerular filtration rate (GFR; [figure 1](#)). Mercaptoacetyltryglycine (MAG3) renogram demonstrated 70% right split function with delayed drainage bilaterally worse on the left side.

Figure 1 Intravenous urogram showing bilateral ureteric stricturing and a contracted bladder.

Distal obstruction of the left ureter prompted refashioning of the left ureteric anastomosis. Severe scarring throughout the left ureter forced the procedure to be abandoned and a JJ stent was placed. Given the degree of ureteric damage, autotransplantation was considered. In view of the previous bladder reconstruction, ureteral reconstruction with bowel interposition was not possible given the risk of short bowel syndrome.

The patient's continued ketamine abuse forced the procedure to be delayed while he underwent drug rehabilitation. By this time, the patient's ketamine used had increased to 10–15 g/day. In the interim, the patient developed complete obstruction of the proximal right ureter. GFR fell to 50 mL/min/1.73 m².

Right autotransplantation was performed first. Mobilisation was complicated by the inflamed ureter which was firmly adherent to the IVC. Two renal arteries and a single renal vein were divided, and the kidney was explanted and perfused. The renal arteries were anastomosed end-to-side to the

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right common and external iliac arteries. The renal vein was anastomosed to the right external iliac vein before the kidney was successfully reperfused. Given the entire ureter was involved, pyelovesicostomy to the neobladder was performed. Histology from the ureter showed widespread urothelial ulceration now extending to the muscularis propria.

Left autotransplant was performed 3 months later using a similar technique. As before mobilisation of the kidney into the left iliac fossa was complicated by adhesions. However, during pyelovesicostomy, again necessary due to ureteric inflammation, the renal artery sustained a stretch injury. Subsequent arterial thrombosis required return to theatre and redo of the arterial anastomosis. Resultant ischaemic and intraoperative hypotension led to severe acute tubular necrosis of the left kidney.

OUTCOME AND FOLLOW-UP

The patient has remained under regular follow-up. Initially the right kidney continued to function well. The patient's renal function was impaired, however stable with estimated GFR (eGFR) 35 mL/min/1.73 m² for 18 months postoperatively. Subsequently the patient developed nephrogenic diabetes insipidus. In combination with bicarbonate loss from the ileal neobladder and resultant dehydration, there has been further deterioration of the patient's renal function with an eGFR of 20 mL/min/1.73 m².

DISCUSSION

Ketamine-associated injury of the urinary is a complex, challenging but increasingly prevalent syndrome. A patient-centred approach needs to address the disease and the patients' psychosocial comorbidities. Successful treatment relies on long-term compliance and abstinence.²

Various treatments for ketamine cystitis have been trialled. Medical management focuses on symptomatic control. Combinations of antimuscarinic, antibiotic, steroid and non-steroidal anti-inflammatory drugs have been tried.³ Similarities between ketamine cystitis and interstitial cystitis prompted the use of intravesical agents such as DMSO and hyaluronic acid (Cystistat). However, none have shown lasting or significant success, especially if ketamine abuse continues.² Treatment failure and disease progression often requires more invasive management ranging from hydrodistension to urinary diversion and augmentation cystoclasty.^{4 5} In contrast, few studies have commented on upper tract involvement. Ureteric transmural inflammation and ulceration have been reported with resultant stricturing and hydro-nephrosis.⁶ Yet current management strategies are limited to

stenting. We report the first case of autotransplantation and highlight the potential complications, as pyelovesicostomy is required in contrast to standard transplantation. Extensive ureteric injuries have been reconstructed with small bowel interposition. However, complications include metabolic abnormalities, mucus production, chronic bacteriuria and renal dysfunction. Additionally, if the patient has undergone prior small bowel resection, the risk of small bowel syndrome with renal stone formation, malabsorption and dehydration is high.

While ketamine cystitis is now a well-recognised condition, upper tract involvement has been reported only in passing. This case report highlights the potentially devastating effects of ureteric involvement and recommends the term ketamine uropathy to ensure awareness of ketamine's effects throughout the urinary tract.

Learning points

- Ketamine uropathy is an important differential in young patients with irritative lower urinary track symptoms, particularly in men.
- Upper tract involvement needs to be excluded in patients with ketamine-associated cystitis.
- Patients must be advised to abstain from ketamine use completely to prevent serious, long-term complications.

Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Shahani R, Streutker C, Dickson B, *et al*. Ketamine-associated ulcerative cystitis: a new clinical entity. *Urology* 2007;69:810–12.
- 2 Lai Y, Wu S, Ni L, *et al*. Ketamine-associated urinary tract dysfunction: an underrecognized clinical entity. *Urol Int* 2012;89:93–6.
- 3 Chu PS-K, Ma WK, Wong SC-W, *et al*. The destruction of the lower urinary tract by ketamine abuse: a new syndrome? *BJU Int* 2008;102:1616–22.
- 4 Ng C-F, Chiu PKF, Li M-L, *et al*. Clinical outcomes of augmentation cystoplasty in patients suffering from ketamine-related bladder contractures. *Int Urol Nephrol* 2013;45:1245–51.
- 5 Misra S, Chetwood A, Coker C, *et al*. Ketamine cystitis: practical considerations in management. *Scand J Urol* 2014;48:482–8.
- 6 Hopcroft SA, Cottrell AM, Mason K, *et al*. Ureteric intestinal metaplasia in association with chronic recreational ketamine abuse. *J Clin Pathol* 2011;64:551–2.

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