

Ketamine Abuse Associated with Bilateral Kidney Hydronephrosis

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INTRODUCTION

Ketamine was synthesized as a short-acting drug for general anesthesia in the 1970s. Most commonly, it is used for pediatric anesthesia, conscious sedation and anesthesia for patients with asthma [1]. Ketamine is a non-competitive N-methyl-D-aspartate receptor antagonist, and a single dose may produce acute impairment of working, episodic, and semantic memory along with psychotogenic and dissociative effects [2]. The incidence of long-term ketamine abuse has been increasing worldwide in Europe, Canada, Hong Kong, Taiwan, and Malaysia. Recently, there has been an increase in the excessive use of ketamine and 4-methylenedioxyamphetamine in the night-clubs in Taiwan [3]. Ketamine abusers are often referred to a urologist because they develop various features of lower urinary tract syndrome (LUTS). These clinical features include severe dysuria, hematuria, urgency, and frequent urination. Cystoscopic findings show decreased bladder capacity with erythematous changes, and biopsy results shows hemorrhagic cystitis. Severe complications such as renal impairment, hydronephrosis, and vesicoureteral reflux (VUR) can occur, and sometimes surgical intervention is required. Here, we reported a woman who had been overusing ketamine for 5 years who presented with acute renal failure and obstructive hydronephrosis in both kidneys.

CASE PRESENTATION AND MANAGEMENT

A 23-year-old woman presented with soreness in both flanks and right flank pain, which had persisted for 2 weeks. She had been addicted to ketamine for the past 5 years and had undergone stenting in both ureters 2 years previously. She visited our urology outpatient de-

partment where renal sonography revealed obstructive hydronephrosis in both kidneys (Fig. 1). Urinalysis showed acute cystitis, hematuria with proteinuria (white blood cells: >100/HPF, red blood cells: 25~50/HPF, protein: +), and a culture was positive for *Lactobacillus* (>10⁵/CFU/mL). Radiography revealed a tiny right renal stone. Laboratory data disclosed acute renal failure and chronic anemia with acute infection (creatinine: 2.5 mg/dL, hemoglobin: 8.9 g/dL, C-reactive protein: 14.3 mg/L). Therefore, she was admitted to our ward for surgical intervention.

Under general anesthesia, she underwent cystoscopic and ureteroscopic examination. Cystoscopy revealed relatively decreased bladder capacity (200 cc) with multiple polypoid tumors in the bladder; therefore, a biopsy was performed (Fig. 2). Ureteroscopy showed strictures in both upper ureters and no tumor; thus, double-J stenting was performed in both ureters. Bladder biopsy showed several polypoid lesions with urothelial mucosa denudation and chronic inflammatory cell infiltration in the stroma, including an increased number of eosinophils. A tubular structure lined by a single layer of cuboidal and hobnail cells was also identified. The above pathologic findings were suggestive of changes from chronic cystitis with nephrogenic metaplasia (Fig. 3). An abdominal computed tomography scan (Fig. 4) showed bilateral hydronephrosis with no tumor in the retroperitoneum. After the operation, the renal function was almost completely restored (creatinine: 1.6) and she was discharged uneventfully.

DISCUSSION

Long-term ketamine users have reported side effects such as inability to speak, blurred vision, lack of co-ordination and increased

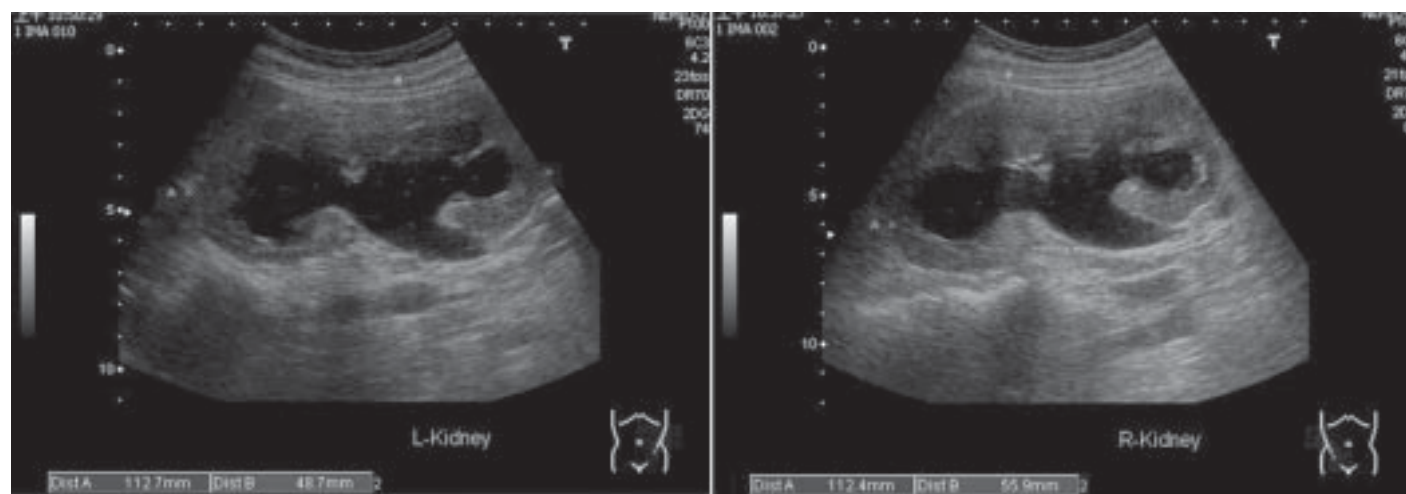


Fig. 1. Renal sonography showing obstructive hydronephrosis in both kidneys.

Clinical pearls — Genitourinary tract image

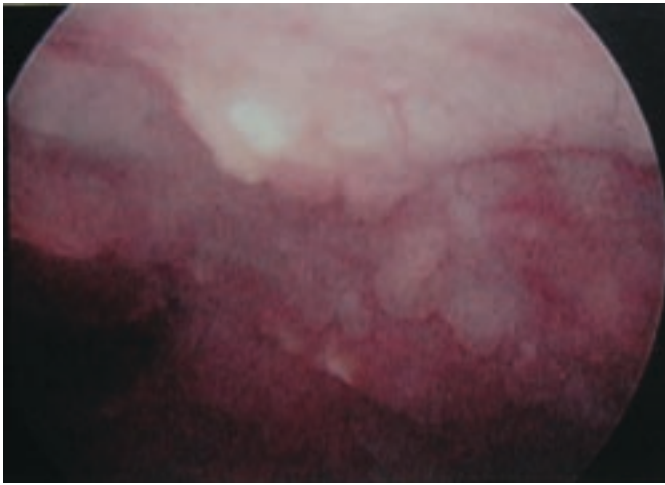


Fig. 2. Cystoscopy showing multiple polypoid tumors in the bladder.

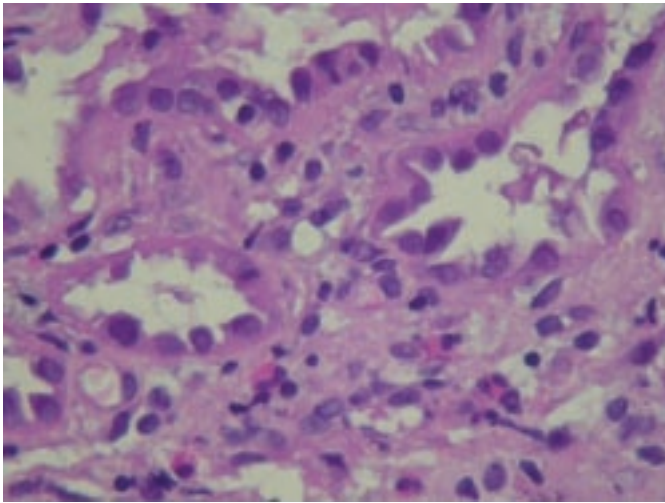


Fig. 3. High-power (400 \times) hematoxylin-eosin stain shows stromal increased eosinophils with nephrogenic metaplasia featuring tubular formation lined by a single layer of cuboidal and hobnail cells.

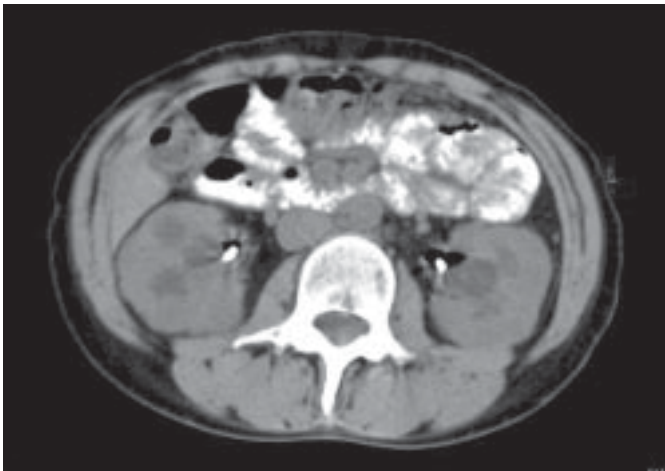


Fig. 4. Abdominal computed tomography scan showing hydronephrosis in both kidneys.

body temperature [4]. Because of these symptoms, some patients reduce or discontinue ketamine use. Many recent studies have shown the effects of excessive use of ketamine and reported on the incidence of ketamine-related deaths [5-7]. Apart from the psychological side effects such as hallucinations, the urinary tract system may be severely affected by ketamine overdoses. Moreover, ketamine addicts can develop various symptoms of LUTS such as frequent urination, urgency, dysuria, urge incontinence, and painful hematuria. Cystoscopic examination usually shows various degrees of epithelial inflammation similar to those observed in chronic interstitial cystitis. Detrusor overactivity and decreased bladder compliance with or without VUR are noted in urodynamic tests. Imaging studies show features of hydronephrosis or papillary necrosis [4]. Secondary renal damage can cause acute or chronic renal failure with increased serum creatinine levels, as in our patient.

Shahani et al were the first to describe a case series of 9 patients who had a new clinical entity called “ketamine-associated ulcerative cystitis”, but the mechanism of pathogenesis was unclear [1]. Most of these patients presented with severe LUTS and sterile urine, and imaging showed decreased bladder capacity with a thickened bladder wall. Further, Chu et al reported a new cystitis syndrome associated with a contracted bladder and secondary renal damage in 59 ketamine abusers [8]. Recently, Chiang et al documented a case of LUTS and VUR in a ketamine abuser [9].

Usually, antibiotic and steroid therapy are unsuccessful in controlling the symptoms of ketamine-associated ulcerative cystitis. Pentosan polysulfate (Elmiron), a medication intended to supplement the glycosaminoglycan layer of the bladder, was found to relieve the irritative symptoms [1]. The most important step should be the cessation of ketamine use. A multidisciplinary approach is important in managing these patients. Ketamine addicts usually face various socioeconomic problems; thus, social support is important in some cases.

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