

## Research Letter

## Complete bilateral ureteral obstruction following retrograde catheterization and radical hysterectomy

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An 89 kg, 39-year-old, previously healthy, obese woman was admitted to our ward owing to squamous cell carcinoma of the cervix, the International Federation of Gynecology and Obstetrics (FIGO) stage IIa2. She was scheduled for an radical hysterectomy, bilateral pelvic lymph node dissection and ovarian transposition. Preoperative laboratory data, including a hematogram, biochemical, and coagulation test results were normal. Before the operation, cystoscopy was performed and two 5-Fr side-hole ureteral catheters were smoothly inserted into each of the ureters to a length of 20 cm. Owing to severe pelvic adhesions and obesity, the operation took 245 minutes and blood loss was 800 ml. Hematuria was noted during the isolation of the ureters and unroofing of the tunnels. To control bleeding, Transamine-S (Taiwan) 1 gm q8h i.v. was administered for 48 hours. Naproxen 20 mg tid and Ketorolac 30 mg i.v. q6h were prescribed before and after the operation for pain control. During the first 24 hours after operation, 2110 mL of bloody urine was collected, but was followed immediately by oliguria, and then anuria. The situation did not improve upon replacement of the Foley catheter, fluid challenge, and the use of a diuretic. Blood urea nitrogen (BUN) and creatinine levels increased to 10 mg/dL and 2.0 mg/dL, respectively (from 9 mg/dL and 0.7 mg/dL before the operation). Meanwhile, the patient was looking well with no specific complaints other than wound pain. Her vital signs were stable, and a post-operative hematogram revealed that hemoglobin and hematocrit levels had dropped to 11.0 g/dL and 32.8% (from 14.2 g/dL and 42.6% before the operation). Under the impression of acute obstructive nephropathy, an emergent abdominal computed tomography (CT) without contrast was ordered; it revealed mild bilateral hydronephrosis (Fig. 1). Cystoscopy and ureteroscopy showed the occlusion of bilateral ureters by blood clots with minimal edema of the orifices

(Fig. 2). External compression was noticed near the right ureteral orifice (Fig. 2). Double J stents were inserted smoothly and 8100 mL of urine was collected in the following 24 hours. The levels of BUN and creatinine returned to normal (8 mg/dL and 0.9 mg/dL, respectively) two days later. The patient had a good recovery and the double J stents were removed one month later.

We report a case of acute renal failure following a major operation. Pre-renal causes, such as hypovolemia owing to blood loss, were excluded based on the following reasons: vital signs were stable; no peritoneal sign was observed; and anuria did not respond to a fluid challenge. The patient had no history of renal disease, and so acute renal failure owing to nonsteroidal anti-inflammatory drug (NSAID) use was unlikely. An iatrogenic obstruction of the urinary tract was thus assumed. As mechanical occlusion of the urinary tract during an operation was ruled out by the normal postoperative urine output, the most probable cause was ureteral injury following catheterization.

In a clinical study [1], 20% of patients with an open-ended ureteral catheter developed a transient rise in postoperative creatinine (1.7–3.5 mg/dl). Anuric complication post-retrograde ureteral catheterization is largely attributed to an edematous change in the ureteral orifice. In this reported case, only minimal edema of the ureteral orifices was noted. The medications used during and after the operation implied ureteral occlusion.

Two potent prostaglandin inhibitors, Naproxen and Ketorolac, were used before and after the operation in the case described herein. These NSAIDs are known to inhibit platelet aggregation, vasoconstriction, and reversible mild renal impairment in volume-contracted states [2]. These effects may aggravate the hemorrhage of injured ureters and the retention of blood within (Fig. 3). In a study of dogs, Ketorolac reduced the glomerular filtration rate by 35% within 15 minutes of administration in the case of a ureteral obstruction [3]. Furthermore, a spasm of the ureter may occur after a ureteral

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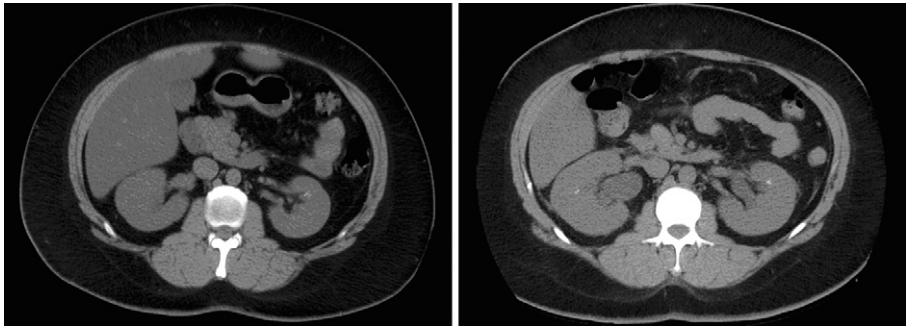


Fig. 1. Hydronephrosis developed after the operation, as shown by CT scans performed before (left) and after (right) surgery.

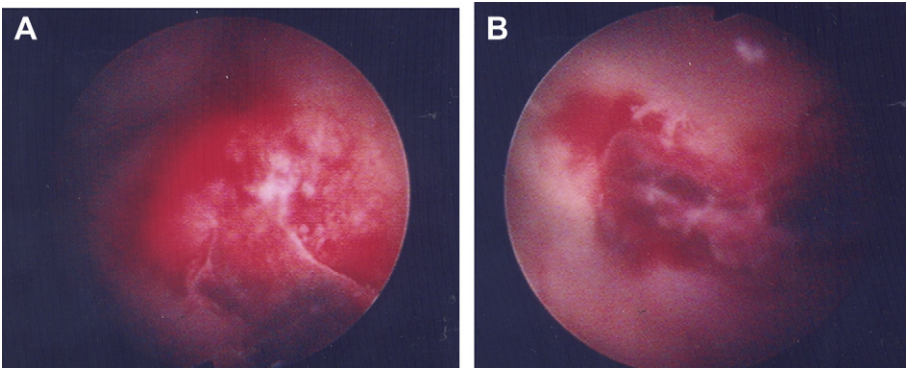
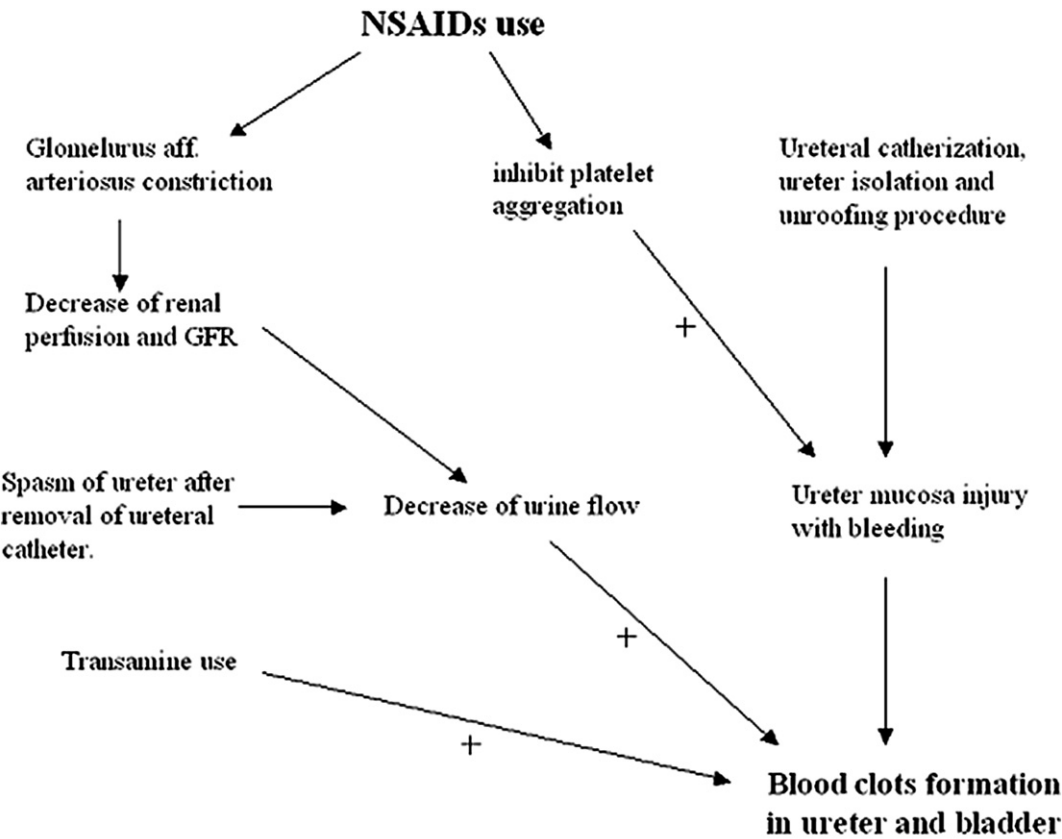


Fig. 2. Bilateral ureteral orifices are showed by cystoscope. (A) External compression. (B) Mild edema with blood clot.



GFR: Glomerular filtration rate ; +: aggravation

Fig. 3. Hypothesis to explain the pathophysiology of the complete bilateral ureteral obstruction by blood clots in this case.

catheter is removed, and the reduction of urine flow in both ureters causes further aggregation of blood clots therein (Fig. 3). However, the antifibrotic drug, Tranexamic acid (Transamine), that was used in this patient may further inhibit the dissolving of the blood clots in the ureters (Fig. 3).

The case reported herein raises the possibility of total blood occlusion of the ureters after retrograde catheterization if NSAIDs and Transamine are used simultaneously. Awareness of this complication is important. Although most blood clots dissolve in several days, cystoscopy with retrograde pyelogram and ureteral catheterization are indicated to support a definite diagnosis and treatment of complicated gynecology surgeries. Before complicated gynecology surgeries, a double J catheter may be an effective alternative to a classic retrograde pyelogram catheter because it can ensure urinary drainage postoperatively.

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