

## Acute Kidney Injury in a CKD Patient with a Prolapsed Uterus

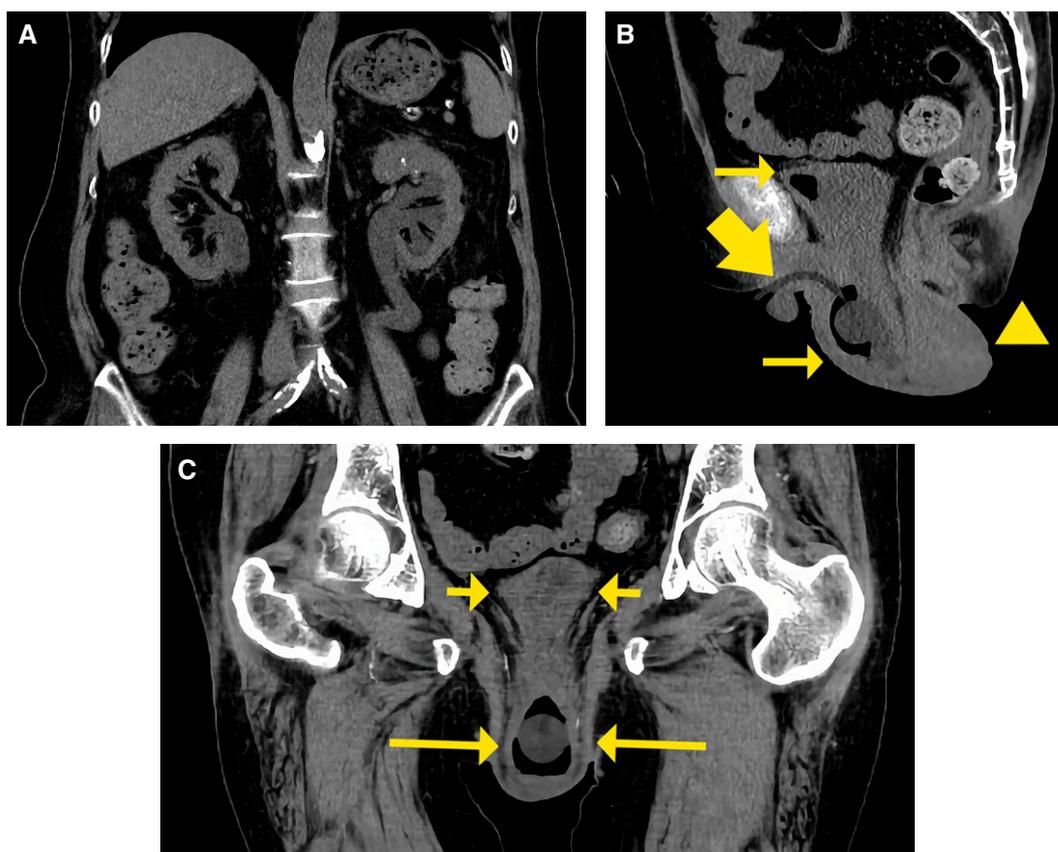
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### Case Description

A 62-year-old woman with CKD (serum creatinine level approximately 2.1 mg/dl) visited our hospital with a 1-month history of dysuria and a 3-day history of poor oral intake and chest pain. She had a uterine prolapse for many years, but it was not addressed. On admission, physical examination revealed costovertebral angle and uterine prolapse. Blood and urine tests showed pyuria along with elevated blood leukocyte counts and serum

creatinine levels (3.5 mg/dl). A diagnosis of uterine prolapse, urinary tract infection, and AKI was made. A bladder catheter was inserted, and antibiotic therapy was initiated. Although kidney function improved after starting treatment, the serum creatinine level did not decrease below 2.8 mg/dl. Therefore, the cause of AKI was further investigated. Computed tomography (CT) performed on the third day of admission revealed bilateral hydronephrosis (Figure 1A) and uterine and



**Figure 1.** | Computed tomography (CT) scan shows severe uterine prolapse. (A) CT scan image shows bilateral hydronephrosis. (B) CT scan image reveals uterus (arrowhead) and bladder (thin arrow) completely prolapsed from the pelvis and urinary catheter (thick arrow). (C) CT scan image shows bladder in the pelvis (short arrow) and bladder prolapsed from the pelvis (long arrow).

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bladder prolapse (Figure 1, B and C). The urethral catheter was seen in the prolapsed bladder. Accordingly, we diagnosed AKI due to urinary tract obstruction secondary to bladder prolapse associated with uterine prolapse. A gynecologist was consulted, and a pessary was inserted, after which the kidney function improved to the preadmission level. After completing antimicrobial therapy and improvement in her general condition, the patient was discharged on day 14 of hospitalization.

## Discussion

AKI due to uterine prolapse is rare and can easily be missed on physical examination. The vulva of patients with AKI should be carefully examined. In a previous study, hydronephrosis was observed in 13 (5%) of 257 cases of uterine prolapse, with improvement in hydronephrosis after surgical treatment seen in nine (4%) cases (1). In this case, post-renal AKI improved with the use of an indwelling urethral catheter followed by the insertion of a pessary. Several theories have been proposed to explain the mechanism by which uterine prolapse causes AKI and hydronephrosis. The first theory advocates that prolapse of the uterus causes urethral torsion and urinary retention (2). According to the second theory, the ureter becomes strained due to the genital hiatus, causing the ureter to become lodged at the bottom of the uterus, or the cardinal ligaments being pulled by the uterus to kink the lowered ureter. However, the second theory is not clearly understood (1). In this case of severe prolapse of the uterus, stricture of the urethra and ureter might have occurred, and the use of indwelling urethral catheters improved kidney function. Additionally, kidney function improved after the treatment of the uterine prolapse with a pessary. In this case, the course of kidney function conforms to the first and second theories. Although cases of successful pessary insertion have been reported earlier (3, 4), hysterectomy is often required to treat post-renal kidney injury due to uterine prolapse (2, 5). In severe uterine prolapse, bladder prolapse may cause AKI, and the cause of AKI should be thoroughly investigated using modalities such as CT.

## Teaching points

- Uterine prolapse should be considered in the differential diagnosis of AKI, and the vulva should be carefully examined.

- AKI due to uterine prolapse could be caused by urethral stricture or narrowing of the ureter due to traction from the bladder.
- Surgery or pessary insertion should be considered to treat postrenal kidney injury due to uterine or bladder prolapse.

## Disclosures

All authors have nothing to disclose.

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Informed consent was obtained from the patient.

## Author Contributions

S. Sakamoto was responsible for data curation, project administration, and visualization, wrote the original draft of the manuscript; S. Sakamoto and S. Sasaki were responsible for conceptualization; S. Sasaki was responsible for the methodology, supervision, and validation; and all authors critically revised the manuscript, commented on drafts of the manuscript, and approved the final manuscript.

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