

# A Case of Recurrent Bilateral Hydronephrosis and Pyelonephritis Due to Pelvic Organ Prolapse

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**Abstract:** Although bilateral hydronephrosis caused by pelvic organ prolapse (POP) is not rare, it does not usually cause severe pyelonephritis or acute renal failure. Recurrence of POP accompanied with hydronephrosis and pyelonephritis following curative surgery for POP has been rarely reported. We describe a case of recurrent pyelonephritis due to POP. A 79-year-old woman visited our hospital with anorexia. She was diagnosed with right pyelonephritis, acute renal failure with bilateral hydroureteronephrosis, uterine prolapse, and cystocele. She underwent right nephrostomy and received antibiotics, and her condition then improved. Two months later, she revisited us with left pyelonephritis. She underwent left nephrostomy and received antibiotics. As POP seemed to cause bilateral ureteral obstructions, laparoscopic hysterectomy and uterosacral ligament suspension was performed. Although her POP and ureteral obstructions improved temporarily cystocele and ureteral obstructions with left pyelonephritis recurred two months later. Subsequent pessary treatment managed POP and ureteral obstructions during 1-year follow-up. Pyelonephritis in patients with POP is rare. In the review of literature, all of patients undergoing nephrostomy or ureteral stent survived whereas some of patients not undergoing such interventions died. Additionally, most of patients undergoing POP management survived whereas more than half of patients not undergoing POP management died. We encountered a case of recurrent bilateral hydronephrosis and pyelonephritis caused by POP. There was a clear association of POP occurrence with ureteral obstruction and pyelonephritis, suggesting the importance of managing POP and ureteral obstruction appropriately in such case.

**Keywords:** Hydronephrosis, Pelvic Organ Prolapse, Pyelonephritis, Uterosacral Ligament Suspension, Pessary

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## 1. Introduction

Hydronephrosis with pelvic organ prolapse (POP) is not rare, but it does not usually cause severe pyelonephritis or acute renal failure. Pyelonephritis in patients with POP has been rarely reported [1]. In such patients, however, it is critical to manage ureteral obstruction appropriately, including ureteral stenting and/or nephrostomy. Additionally, POP management is also important. Here, we encountered a case of recurrent bilateral hydronephrosis and pyelonephritis caused by POP and explored the management of such case.

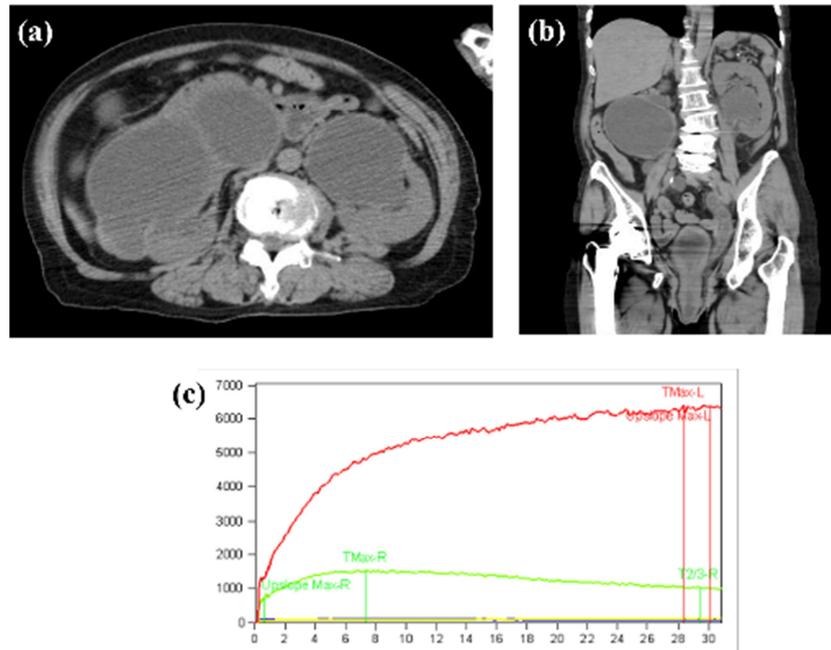
## 2. Case Presentation

A 79-year-old woman presented to our emergency room

with anorexia and difficulty moving. She had a history of appendicitis and right hip replacement arthroplasty. She exhibited preshock status: i.e., Glasgow Coma Scale of 11; body temperature of 36.5°C; blood pressure of 90/50 mmHg; heart rate of 96 beats/min; oxygen saturation of 92% (room air). A physical examination revealed tachypnea, knocking pain in the right back, and uterine prolapse. Blood tests revealed leukocytosis with severe inflammation and impaired renal function as the followings: white blood cell, 14,950 / $\mu$ L (neutrophils, 93.0%); C-reactive protein, 37 mg/dl; creatinine, 2.62mg/dl; blood urea nitrogen, 155 mg/dl. Urinary test showed pyuria, hematuria, and proteinuria. Computed tomography revealed uterine prolapse and cystocele with bilateral hydroureteronephrosis (Figure 1a and b). Urine and blood cultures grew *Escherichia coli*. She was diagnosed with right-side pyelonephritis with bilateral hydronephrosis

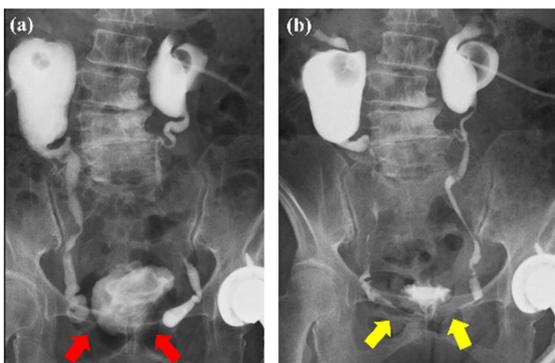
probably associated with POP. We tried reposition of the prolapsed uterus followed by ureteral stenting, however, which failed because ureteral orifices were not detected due to severe inflammation in the bladder. We underwent right nephrostomy and started antibiotics. Meropenem was administered and then deescalated to sulbactam

sodium/ampicillin sodium. She gradually recovered; the leukocytosis and renal function improved. She was discharged after 25 days of hospitalization. A Tc-99m mercaptoacetyltriglycine (MAG3) renal scan performed after discharge showed reduced uptake in the right kidney and obstruction of the left kidney (Figure 1c).



**Figure 1.** CT at her initial visit and renal scan after right nephrostomy.

CT at her initial visit shows uterine prolapse and cystocele with bilateral hydronephrosis (a, b). The Tc-99m mercaptoacetyltriglycine renal scan after right nephrostomy shows reduced uptake in the right kidney and obstruction in the left kidney (c). The red and green lines show the uptake of the left and right kidney, respectively.



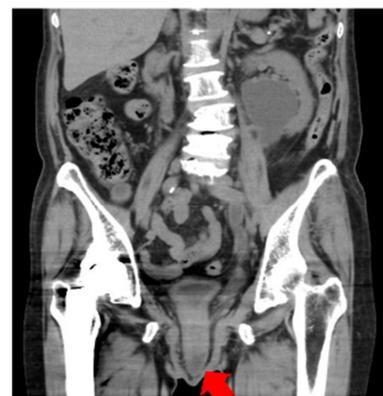
**Figure 2.** Antegrade pyeloureterography before (a) and after surgery (b) for pelvic organ prolapse.

Red arrows show the initial ureteral obstructions and the yellow arrows show the reduced obstructions after surgery.

Two months later, she revisited us with a fever. She exhibited leukocytosis and impaired renal function, and was diagnosed with left hydronephrosis and pyelonephritis. We performed left nephrostomy and prescribed antibiotics for two weeks. The POP appeared to be the cause of the ureteral obstructions; we thus consulted a gynecologist, who diagnosed stage 4 POP using the POP-Q system and a pessary was tried but it did not remain fixed

in place. The gynecologist then performed a laparoscopic hysterectomy and ovariectomy with uterosacral ligament suspension. Antegrade pyeloureterography performed at one month after surgery showed reduced ureteral obstructions in bilateral ureterovesical junctions (Figure 2a and b).

After confirming the ureteral obstructions being improved, we removed both nephrostomy catheters. However, two months later, she again visited us with recurrence of the cystocele and re-worsening of left pyelonephritis (Figure 3).



CT shows a recurrence of the cystocele (red arrow) and left hydronephrosis

**Figure 3.** CT showing recurrence of POP and hydronephrosis.

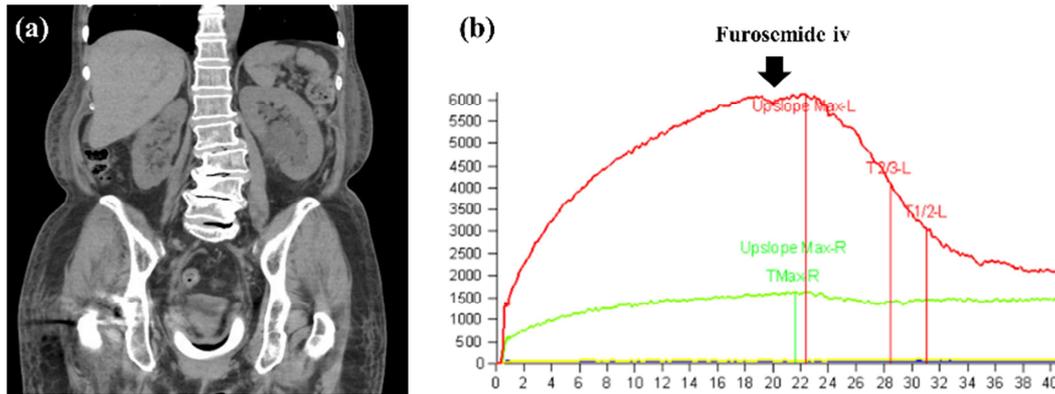


Figure 4. CT and renal scan following pessary placement.

CT following pessary placement shows improvement of the hydronephrosis (a). A diuretic Tc-99m mercaptoacetyl triglycine renal scan shows improved ureteral obstruction of the left kidney (b).

After the insertion of a pessary and antibiotic treatment, the cystocele, pyelonephritis, and hydronephrosis resolved (Figure 4a). A diuretic MAG3 renal scan revealed reduced ureteral obstruction of the left kidney (Figure 4b). We recommended resurgery for cystocele, but she rejected. Her POP and ureteral obstructions were managed well for one year due to pessary treatment.

### 3. Discussion

Hydronephrosis caused by POP is not rare. The prevalence ranges from 3.6 to 30.6% of all POP cases. Such hydronephrosis is sometimes asymptomatic; the patient may be unaware of renal function impairment [2]. Uterovaginal prolapse is more commonly associated with hydronephrosis (especially severe hydronephrosis) than vaginal vault prolapse [3]. The mechanism of obstruction is unclear; the possibilities include ureter compression by uterine vessels, the levator ani sling, or even the uterine fundus [4]. It has been suggested that the cardinal ligaments (that are laterally attached to the fascia above the pelvic sidewall and medially attached to the cervix and corpus uterus) from a loop over the ureter and force the ureter down as the uterus descends, thereby kinking the ureter [5]. The prevalence of hydronephrosis is 10.3 to 16.4% among patients of all POP-Q stages, but 13.7 to 20.6% in stage 4 patients [6]. Hydronephrosis with POP is usually managed via pessary placement or surgery such as uterosacral ligament suspension and sacrocolpopexy (with or without hysterectomy) depending on the type of prolapse and/or comorbidities [7]. Complete resolution of hydronephrosis has been reported in 56

to 83% of patients after pessary placement or surgery [6, 8–10].

Pyelonephritis in patients with POP is rare. We identified nine such cases in a PubMed search using pelvic organ prolapse, “uterine prolapse”, “cystocele”, or “genital prolapse” and “pyelonephritis”, “urinary tract infection”, or “renal abscess” [1, 2, 11–14]; our case appears to be the 10<sup>th</sup> (Table 1). Patient ages ranged from 70 to 94 years. All of the three patients undergoing nephrostomy or ureteral stent survived, whereas four of the seven patients not undergoing such interventions died. Five patients underwent POP management including surgery and manual replacement, and four of them survived while one patient who underwent hysterectomy with anterior and posterior repair died of renal failure (case #3 in Table 1) [1]. Five patients did not perform POP management and three of them died. These results suggest management of urinary tract obstruction and POP is critical to treat such patients appropriately.

We found a clear association between POP and ureteral obstruction in the present case. Such obstructions were exacerbated when the pelvic organs prolapsed (Figures 1, 2a, and 3) and resolved when POP was successfully managed via surgery and/or pessary placement (Figures 2b and 4). We performed a laparoscopic hysterectomy and ovariectomy with uterosacral ligament suspension as an initial surgical treatment for POP, but it relapsed thereafter. Laparoscopic or robot-assisted sacrocolpopexies were shown to be less recurrence rate than uterosacral ligament suspension [15]. It might be better to perform laparoscopic or robot-assisted sacrocolpopexy than uterosacral ligament suspension in terms of POP recurrence risk.

Table 1. Cases with POP and pyelonephritis, and their management and outcomes.

Case	Ref.	Age	N or S	POP management	Outcomes
1	[1]	85	(-)	(-)	Died
2	[1]	94	(-)	(-)	Died
3	[1]	71	(-)	Vaginal hysterectomy; anterior and posterior repair	Died
4	[2]	76	N	Vaginal hysterectomy; cystocele repair; uterosacral ligament suspension	Discharged
5	[11]	79	(-)	Manual replacement Ring pessary placement	Discharged
6	[12]	76	(-)	(-)	Discharged
7	[12]	70	(-)	(-)	Died

Case	Ref.	Age	N or S	POP management	Outcomes
8	[13]	73	S	Manual replacement	Discharged
9	[14]	74	(-)	(-)	Discharged
10	Our case	79	N	Laparoscopic hysterectomy; ovariectomy; uterosacral ligament suspension Ring pessary placement	Discharged

Ref, reference; N, nephrostomy; S, stenting to affected ureter

## 4. Conclusions

The present case exhibited severe bilateral hydronephrosis with asynchronous pyelonephritis due to POP, and required temporary bilateral nephrostomies. The POP recurred after the laparoscopic hysterectomy and uterosacral ligament suspension accompanied with exacerbation ureteral obstruction, which was successfully managed with pessary placement. There was a clear association between POP and ureteral obstruction, suggesting that managing POP appropriately is critical in such cases.

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