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## A minor fault may lead to a major complication

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### ARTICLE INFO

**Article Type:**  
Case Report**Article History:**

Received: 19 April 2017

Accepted: 15 August 2017

Published online: 30 August 2017

**Keywords:**

Acute renal failure

Urinary output

Ureteral ligation

Acute tubular necrosis

### ABSTRACT

Control of intake and urinary output is an important measure in the management of patients with acute renal failure (ARF) and non-correct recordation of urinary output by nurses may cause a severe problem in the management of these patients. The reported case was a 34-year-old woman who developed ARF and anuria after hysterectomy during emergency cesarean section. Computed tomography and serial ultrasonography of kidneys and urinary tract revealed mild hydronephrosis. Although, our patient had anuria, but recorded urinary output by nurses was 300-350 mL/d because urinary bag has not been emptied at the end of each day. Therefore, we thought that ARF is due to acute tubular necrosis because of severe bleeding during cesarean section. We also interpreted that hydronephrosis is secondary to recent pregnancy. After 10 days, it was detected that the patient has not been any urinary output during this period. Therefore the diagnosis was changed to urinary obstruction because of bilateral ureteral ligation during hysterectomy.

### Implication for health policy/practice/research/medical education:

In an approach to a patient with anuria after pelvic operations, urinary tract obstruction must be reminded. Early diagnosing and resolving obstruction may lead to completely return of renal function. However, if neglected, it can lead to non-compensative complications.

*Please cite this paper as:* Mousavi Movahhed SM, Sabetnia L, Alemzadeh-Ansari MJ, Ahmadi Halili S, Beladi Mousavi SS. A minor fault may lead to a major complication J Renal Inj Prev. 2018;7(3):116-118. doi: 10.15171/jrip.2018.27.

### Introduction

Acute renal failure (ARF) is a syndrome characterized by deterioration of renal function over a period of hours to days, resulting in the failure of the kidney to excrete nitrogenous waste products and to maintain fluid and electrolyte homeostasis (1). This disease has a high mortality, approximately 50% in developed countries. Causes of ARF are classified to three groups; pre-renal (results from decreased renal perfusion, which leads to a reduction in glomerular filtration rate), Intrinsic renal (caused by ischemic or nephrotoxic injury to the kidney), and post-renal (due to obstruction of the urinary collection system by either intrinsic or extrinsic masses) (2,3).

In an approach to a patient with ARF, urinary tract obstruction must be reminded, although around 5% of all causes of ARF are urinary tract obstruction. Early diagnosing and resolving obstruction can cause to

completely return of renal function. However if neglected, it can cause to non-compensative complications.

### Case Presentation

A 34-year-old woman, gravida 3, para 2 presented with a severe pre-eclampsia (blood pressure of 175/105 mm Hg and proteinuria of 2.5 g/d), at 31 weeks of gestation. She had a history of cesarean section. Ultrasonography revealed placenta previa. Patient scheduled for cesarean section, however, it accompanied by severe bleeding due to penetration of placenta into the bladder. Hysterectomy and repair of bladder was conducted. In cesarean section, patients received five units of RBC pack cell and four units of fresh frozen plasma.

After surgery, urinary output reduced and blood urea nitrogen (BUN) and plasma creatinine (Cr) reached to 40 mg/dL and 2 mg/dL respectively. Primary diagnosis was acute tubular necrosis (ATN). In next days, plasma BUN

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and Cr raised to 115 mg/dL and 10 mg/dL respectively. At this time, hemodialysis was started. Computed tomography and serial ultrasonography of kidneys and urinary tract in 2, 4, 8, and 12 days after cesarean section revealed only mild hydronephrosis. Recoded urinary output was 300-350 mL/d. Therefore, it seems that ARF is due to ATN causing severe bleeding during cesarean section. Additionally, hydronephrosis was interpreted to be secondary to recent pregnancy.

After 10 days, it was found that urinary bag has not been emptied at the end of each day by nurses, while during this period, patient has not any urinary output. Accordingly, the diagnosis was changed to urinary obstruction because of bilateral ureteral injury during hysterectomy. Cystoscopy preformed and revealed severe wall bladder edema. While urologist could not insert double J catheter, nephrostomy was conducted and approximately 2.5 L urine was emptied. In the next days, urinary output increased and plasma BUN and Cr decreased. A week after nephrostomy, open surgery for repair of ureters was conducted and double J catheter was installed in both ureters.

### Discussion

Ureter and bladder injury rates varied according to the complexity of the surgery, ranging from less than 1 injury per 1000 to as many as 13 injuries per 1000 gynecologic and urogynecologic surgeries (4). In a study, Vakili et al reported a 1.7% rate of ureteral injury during benign gynecologic procedures (5). A study of 62379 hysterectomies in Finland showed a ureteric injury rate of 13.9 injuries per 1000 laparoscopic hysterectomy and 0.4 per 1000 abdominal hysterectomy (6). Another study in 2009 indicated that the rate of ureteral injury during hysterectomy is 1.8% (7). However, bilateral ureteric obstruction following operations is unusual. Ustunsoz et al reported only two patients with bilateral ureteral injuries among 22 cases with ureteral injuries that were diagnosed late after cesarean sections. The average time for making the diagnosis in this study was  $21 \pm 50.1$  days (range; 1 day to 8 months). In this investigation, all 22 cases were initially confirmed with antegrade pyelography and afterwards they underwent percutaneous nephrostomy (8).

Ureter injury during surgery is an important cause of ARF after surgery, which must be reminded as a differential diagnosis of ARF after abdominal and pelvic surgeries. Overall, the most common cause of ARF related and non-related surgery is ischemic and nephrotoxic ATN (90%). Ischemic ATN is secondary to decrease in renal perfusion, and nephrogenic ATN is secondary to exogenous (such as drugs) and endogenous (such as hemolysis) toxins (9, 10). Urinary output in ATN usually is either more than 400 mL/d (non-oliguric ATN) or less than 400 mL/d (oliguric ATN). Therefore, when both ARF and anuria presented in a patient, interpretation should be toward to other causes of ARF, especially urinary tract obstruction (11-13).

Ultrasonography of kidneys and urinary tract for rule-out of urinary obstruction should be performed in all patients with ARF. In three conditions, urinary tract obstruction can occur without hydronephrosis within the first one to three days initiation. 1) when collecting system is incompliant and less likely to dilate. 2) when the patient is dehydrate, and finally 3) when the collecting systems are encased by retroperitoneal tumors or fibrosis. Then, if ultrasonography in first day was normal, it should be repeated in next days (14). Additionally, normal ultrasonography and CT scan cannot definitely exclude urinary tract obstruction, because sensitivity of these para-clinical studies for excluding urinary obstruction is only 90% (15).

Cause of neglecting in our patient was the presentation mid hydronephrosis in both of kidneys in ultrasonography and also non-correct recordation of urinary output by nurses (16). Therefore, it is necessary that such patients should be admitted in a ward with experience nurses.

### Conclusion

In an approach to a patient with anuria after pelvic operations, urinary tract obstruction must be reminded. Early diagnosing and resolving obstruction may lead to completely return of renal function. However, if neglected, it can lead to non-compensative complications.

### Authors' contribution

All authors passed all criteria for authorship contribution based on recommendations of the International Committee of Medical Journal Editors. SMMM and MJAA handled and managed the case. SSBM supervised the treatment. MJAA prepared the primary draft. SSBM edited and finalized the manuscript. All authors read and signed the final paper.

### Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors. The patient has given informed consent to publication of this case.

### Conflicts of interest

The authors declared no potential conflicts of interest with respect to the case, authorship, and/or publication of this article.

### Funding/Support

None.

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