

Iatrogenic Ureteral Catheterization Leading to Urosepsis: A Rare Case Report

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Abstract

Urethral catheterization is a common procedure, but rare complications such as inadvertent ureteral catheterization can lead to severe outcomes, including hydronephrosis and urosepsis. We present a case of a 92-year-old bedbound male who developed urosepsis due to iatrogenic ureteral catheterization, which significantly contributed to his clinical deterioration. We are going to report as first case in Sultanate of Oman. We believe and review a literature with no similar case report has been published before. A 92-year-old bedbound male with a history of left hip replacement presented with a two-day history of fever, shortness of breath, and cloudy urine. On examination, he was hypotensive (BP 60/40 mmHg), tachycardic (HR 95 bpm), febrile (38°C), and tachypneic (RR 30/min), with left-sided abdominal tenderness. Laboratory investigations revealed elevated CRP (185 mg/L), serum lactate (11 mmol/L), anemia (Hb 8.1 g/dL), acute kidney injury (creatinine 158 μ mol/L), and leukocytosis (6.9×10^9 /L). These findings confirmed the severity of urosepsis. A CT scan showed left-sided hydronephrosis with the Foley catheter tip misdirected into the left ureter, while the balloon remained inflated within the bladder. (Fig 1). Blood cultures grew *Escherichia coli*, confirming urosepsis. A diagnosis of ureteral injury secondary to improper catheterization was made. The catheter was removed, antibiotics initiated, and supportive measures provided, including fluid resuscitation and organ support. Emergency intervention included deflation and removal of the catheter, which was successfully repositioned into the bladder. However, ultrasound revealed pus-like urine draining from the catheter, suggesting an ongoing infectious process. Despite medical management, including broad-spectrum antibiotics and hemodynamic support, the patient remained critically ill and showed progressive deterioration over the following days, ultimately leading to mortality. This case highlights the potentially serious complications of improper urethral catheterization, particularly in fragile elderly patients. Awareness of all potential complications, careful technique, and imaging confirmation in suspicious cases are critical for preventing such occurrences. Guidelines should emphasize training on Foley catheter placement, defining who is permitted to perform it, and ensuring sufficient training courses to minimize the risk of ureteral misplacement. Despite timely intervention, the patient succumbed to septic shock, emphasizing the need for multidisciplinary ICU management in critically ill patients.

Keywords: Iatrogenic ureteral injury; Urosepsis; Foley catheter misplacement;

Introduction

Urethral catheterization, although routine, carries risks of complications beyond infections and urethral trauma. These include rare but serious events like inadvertent ureteral catheterization, which should always be considered. Urethral catheterization is a routine procedure performed for urinary drainage in hospitalized and home-care patients.¹ While typically safe, rare complications such as inadvertent ureteral catheterization can lead to hydronephrosis, urinary tract infections, and ultimately, sepsis. The misplacement of a Foley catheter into the ureter is uncommon but underreported, making its early recognition crucial.² We present a rare case of a bedbound elderly male who developed urosepsis due to undetected iatrogenic ureteral catheterization. This case underscores the importance of clinical suspicion and proper catheter placement techniques to prevent serious complications.

Case Report

A 92-year-old bedbound male with a history of left hip replacement and prolonged immobility secondary to advanced age and frailty was brought to the emergency department with a two-day history of fever, shortness of breath, and cloudy urine. No other significant comorbidities were reported. Due to his condition, history was obtained from his caregiver, who reported that his indwelling Foley catheter had been changed at home by a staff nurse one week prior. On initial assessment, the patient was critically ill, presenting with: [Table 1]. CT chest and abdomen findings revealed: Left-sided hydronephrosis, Foley catheter tip mispositioned into the left ureter, Bladder collapsed with the catheter balloon correctly inflated in the bladder, No right-sided hydronephrosis. [Figure 1]. The diagnosis of ureteral injury with subsequent urosepsis was confirmed after careful review with the radiologist.

Table 1: showing the clinical and laboratory parameters of the patient.

Category	Finding	Interpretation
Vital Signs	Blood Pressure: 60/40 mmHg	Hypotension (shock)
	Heart Rate: 95 bpm	Relative tachycardia
	Temperature: 38°C	Fever
	Respiratory Rate: 30/min	Tachypnea
Clinical Examination	Cold peripheries	Peripheral hypoperfusion
	Altered mental status	Likely secondary to sepsis and hypotension
	Abdominal tenderness (left-sided)	Suggestive of upper urinary tract involvement
	Turbid urine from Foley catheter	Suggestive of urinary tract infection
Laboratory Results	C-reactive protein (CRP): 185 mg/L	Elevated; marker of severe inflammation
	Serum lactate: 11 mmol/L	Elevated; indicates tissue hypoperfusion/sepsis
	Total leukocyte count: $6.9 \times 10^9/L$	Mildly elevated
	Hemoglobin: 8.1 g/dL	Anemia
	Creatinine: 158 $\mu\text{mol/L}$	Acute kidney injury
	Blood cultures: Escherichia coli (E. coli)	Confirmed urosepsis



Figure 1: Coronal view CT Scan showing the indwelling catheter approaching the lower left ureter.

Intervention and clinical course: Immediate corrective action included:

- Deflation of the catheter balloon (~25 mL) and careful withdrawal of the catheter from the ureter.
- Successful repositioning of the catheter into the bladder.
- Bedside ultrasound confirmed the correct bladder positioning.
- Pus-like urine drainage was observed post-repositioning, indicating severe infection.

Despite aggressive intravenous fluid resuscitation, broad-spectrum intravenous antibiotics (including meropenem 1 g every 8 hours and vancomycin 15 mg/kg every 12 hours), and supportive care, the patient remained hemodynamically unstable. Over the next 48 hours, his condition worsened, with progressive cyanosis and worsening shock, ultimately leading to his demise.

Discussion

Iatrogenic ureteral catheterization is an extremely rare but serious complication of Foley catheter placement. The ureter is not intended to accommodate a catheter, and its inadvertent cannulation may result in hydronephrosis, upper tract obstruction, urinary tract infection, and ultimately, sepsis.²

Pathophysiology of Ureteral Catheterization Leading to Sepsis.³

1. **Mechanical Obstruction:** The catheter impedes normal urine drainage, leading to hydronephrosis and increased intrarenal pressure, impairing kidney function.³

2. **Infection Risk:** Stagnant urine serves as a medium for bacterial growth, increasing the risk of urosepsis.
3. **Sepsis Progression:** Persistent obstruction and infection may lead to multisystem organ dysfunction, as seen in this case.³

Proper training for nursing staff on Foley catheter placement, with clear institutional policies on who may perform it, and regular competency-based courses, are essential to minimize risk. Preventive measures include gentle technique, confirming free urine flow before balloon inflation, and early imaging in suspicious cases. In elderly patients with anatomical changes, ultrasound guidance or urological consultation may be warranted.

- Proper training for nursing staff on Foley catheter placement to prevent ureteral misplacement.
- Use of a gentle technique and confirmation of proper catheter placement (e.g., urine flow, lack of resistance).
- Early imaging in patients with unexplained hydronephrosis or urosepsis.
- Consider cystoscopy in difficult catheterization cases to avoid complications.

Conclusion

This case underscores the importance of vigilance during Foley catheter placement. Iatrogenic ureteral catheterization is rare but can lead to significant complications such as hydronephrosis and urosepsis. Proper training, early suspicion, and imaging confirmation are crucial in preventing such occurrences. Despite timely intervention, the patient succumbed to septic shock, emphasizing the need for heightened awareness and preventive strategies in elderly, bedbound patients.

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