

Iatrogenic Urinary Catheter Migration into the Left Lumbar Ureter in an Active Gynecologic Oncology Patient: The 6th Worldwide Case Report and Comprehensive Literature Review

M. Bouchareb^{1*}, M. El Idrissi El Jouhari¹, Irzi Mohamed¹¹CHR Metz-Thionville- FRANCEDOI: <https://doi.org/10.36347/sjmcr.2026.v14i05.069>

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*Corresponding author: M. Bouchareb
CHR Metz-Thionville- FRANCE

Abstract

Case Report

Introduction: Migration of a transurethral urinary catheter into the upper urinary tract is one of the rarest and least recognized iatrogenic complications in urology. To date, fewer than fifty cases have been reported in the world literature, occurring almost exclusively in female patients with conditions reducing bladder capacity. We report here the 6th case involving a urethral catheter that migrated into the left lumbar ureter in a patient with metastatic endometrial adenocarcinoma undergoing chemo-immunotherapy (Paclitaxel–Carboplatin–Dostarlimab), an oncological context never previously described in this type of complication. **Case Report:** A 65-year-old woman with metastatic endometrial adenocarcinoma on active systemic treatment, complicated by proximal pulmonary embolism. During routine replacement of her indwelling urinary catheter, the patient developed acute left-sided flank pain associated with paradoxical urinary urgency despite a catheter in place. Physical examination revealed a hard, painful hypogastric mass corresponding to the pelvic tumor. Laboratory workup showed a major inflammatory syndrome (CRP 290 mg/L, leukocytosis at 15,500/mm³), anemia (Hb 8.1 g/dL), acute renal failure (creatinine 17 mg/L), and a urinary tract infection with *Escherichia coli*. Bladder scan showed 487 mL post-void residual despite the catheter in place. The non-contrast CT of the abdomen and pelvis was pathognomonic: a large pelvic mass measuring 147 × 123 × 141 mm with the catheter tip positioned high and the balloon inflated at the level of the left lumbar ureter. Emergency surgical management allowed retrieval of the misplaced catheter under hydrophilic guidewire after renal opacification, and bilateral double-J stent placement under general anesthesia. The postoperative course was initially marked by persistent inflammatory syndrome (creatinine 30 mg/L) requiring placement of a 16 Fr silicone catheter. The patient was discharged with a GFR of 35 mL/min, reflecting satisfactory partial renal recovery. **Discussion:** This case illustrates the convergence of several rarely combined risk factors: female sex, extrinsic bladder compression by a large pelvic tumor mass, Paclitaxel-induced peripheral neuropathy attenuating pain perception, and long-term catheterization. The systematic literature review identifies 48 patients in total, 67% female, 63% with neurogenic or low-capacity bladder, with predominant complications including acute pyelonephritis (35%), acute renal failure (27%), urosepsis (21%), and ureteral rupture (17%). This case is the first to report this complication in the context of an active pelvic gynecological cancer undergoing immuno-chemotherapy. **Conclusion:** Transurethral urinary catheterization must not be trivialized, even by experienced healthcare professionals. In the presence of conditions reducing bladder volume, active pelvic neoplasia, or chemo-induced neuropathy, heightened vigilance is required during any catheter manipulation. Systematic verification of balloon positioning by ultrasound when in doubt, and immediate urology consultation when difficulty arises, constitute the two pillars of effective prevention of this potentially life-threatening complication.

Keywords: Urinary catheter, Ureteral migration, Endometrial adenocarcinoma, Chemotherapy, Peripheral neuropathy, Iatrogenic complication, Double-J stent, Acute flank pain.

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INTRODUCTION

Transurethral urinary catheterization is one of the most frequently performed procedures in hospital settings, across all specialties. Its reputation for simplicity and apparent harmlessness makes it a task

often delegated to non-specialized personnel, sometimes performed under emergency conditions or with reduced vigilance. This trivialization of the procedure constitutes, paradoxically, one of its primary sources of complications.

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The first description of a urinary catheter misplaced into the ureter dates back to 1996, reported by Singh and Eardley [8], in a 26-year-old paraplegic woman with spina bifida. Since then, only about fifty cases have been published in the international literature, conferring upon this entity the status of an ultra-rare but clinically severe complication.

We report here a singular case, the 6th specifically involving a trans-meatal urethral catheter in a woman with reduced bladder capacity, and the first described in the context of active metastatic endometrial adenocarcinoma treated with chemo-immunotherapy combining Paclitaxel, Carboplatin, and Dostarlimab.

II. MEDICAL CASE REPORT

2.1. Patient Presentation and Medical History

Mrs. D.M., 65 years old, former steel industry worker, no children, referred for urgent urological management. She has been followed for several months for grade 3 endometrial adenocarcinoma, stage IVB (TNM: T4N1M1), with multiple visceral metastases (pulmonary, hepatic), currently treated with Paclitaxel 175 mg/m² – Carboplatin AUC 5 – Dostarlimab 500 mg every 3 weeks for 5 cycles. The last chemotherapy cycle was administered 10 days before admission. The disease is complicated by proximal pulmonary embolism treated with therapeutic anticoagulation (weight-adjusted LMWH).

Her family history is particularly significant: breast, liver, colon, and lung cancers in several first-degree relatives, suggestive of a genetic predisposition to neoplasia. Medically, she presents with treated essential hypertension, substituted hypothyroidism, statin-treated

dyslipidemia, and active smoking cessation for 15 years. Regarding surgical history, the patient underwent appendectomy in childhood and total hysterectomy with bilateral salpingo-oophorectomy for initial cancer treatment. Concurrent chemo-radiotherapy was also administered as part of the initial management.

From a urological standpoint, the patient has had an indwelling urinary catheter for several weeks due to voiding difficulties secondary to the invasive pelvic tumor mass.

2.2. Circumstances of Occurrence

During routine urinary catheter replacement, the patient reported sudden onset of intense left-sided flank pain, associated with paradoxical urinary urgency despite the catheter being in place. The caregiver performing the change noted mild resistance during balloon inflation, without prior verification of urine return.

2.3. Clinical Examination

The patient's general condition is impaired in the context of progressive malignant disease. Abdominal palpation reveals a large, hard, and tender hypogastric mass corresponding to the known pelvic tumor. There is no frank abdominal guarding. The left lumbar fossa is tender on deep palpation, without a palpable lumbar contact. The hernial orifices are free. The lower extremities show no edema. Neurologically, hypoesthesia of the lower extremities is noted, consistent with the known chemo-induced peripheral neuropathy. The urinary catheter in place is patent but drainage flow is markedly insufficient.

2.4. Diagnostic Workup

Table 1: Laboratory Results on Admission

Parameter	Value	Interpretation
Hemoglobin	8,1 g/dL	↓Anemia (N: 12–16 g/dL)
White blood cells	15 500/mm ³	↑ Leukocytosis (N: 4,000–10,000)
Creatinine	17 mg/L	↑ Acute renal failure (N: 6–12)
CRP	290 mg/L	↑ Major inflammatory syndrome (N < 5)
Urinalysis/Culture (ECBU)	Pan-sensitive Escherichia coli	Positive documented urinary tract infection

Bladder scan: 487 mL post-void residual despite the catheter in place first critical warning sign of aberrant catheter positioning.

Non-contrast abdominopelvic CT scan (diagnostic gold standard): pathognomonic findings revealing:

- A large pelvic mass measuring 147 × 123 × 141 mm, invading and compressing the bladder, drastically reducing its functional capacity.

- A urinary catheter with a very high tip position, with the balloon inflated at the level of the left lumbar ureter pathognomonic image of the complication.
- Dilation of the left pyelocaliceal system, indicative of ureteral obstruction.

(See image 1)

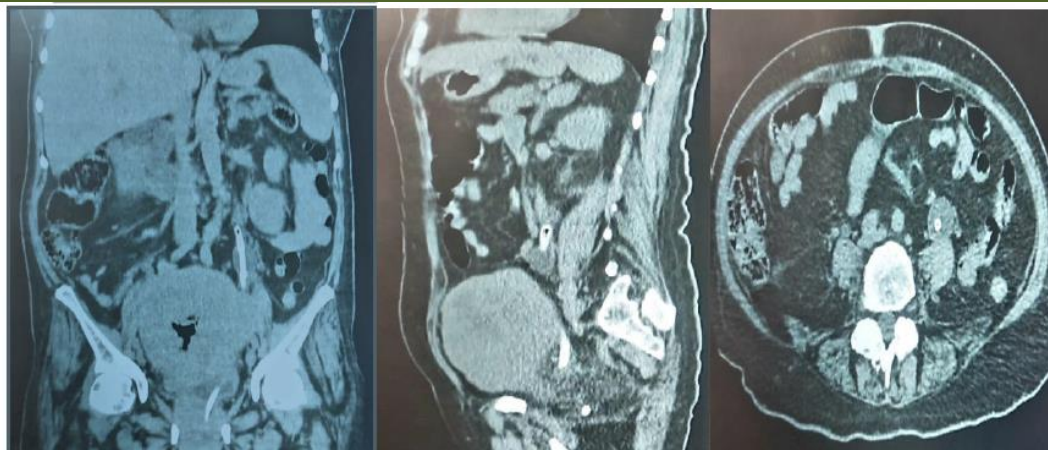


Figure 1: Abdominopelvic CT scan (coronal, sagittal, and axial reconstructions) demonstrating the iatrogenic migration of the urinary catheter balloon into the left lumbar ureter, adjacent to a large pelvic tumor mass

2.5. Therapeutic Management

In response to this presentation, the patient was urgently taken to the operating room. Under general anesthesia, the surgical strategy comprised three successive steps:

- **Step 1:** Left retrograde renal opacification: complete visualization of the left urinary tract before any extraction maneuver.
- **Step 2:** Retrieval of the misplaced catheter under hydrophilic guidewire: careful balloon

deflation under endoscopic visual control, allowing avoidance of any mechanical ureteral injury during extraction.

- **Step 3:** Bilateral double-J stent placement under endoscopic control: relief of left ureteral obstruction caused by the impacted balloon and prevention of contralateral obstruction due to tumor compression.

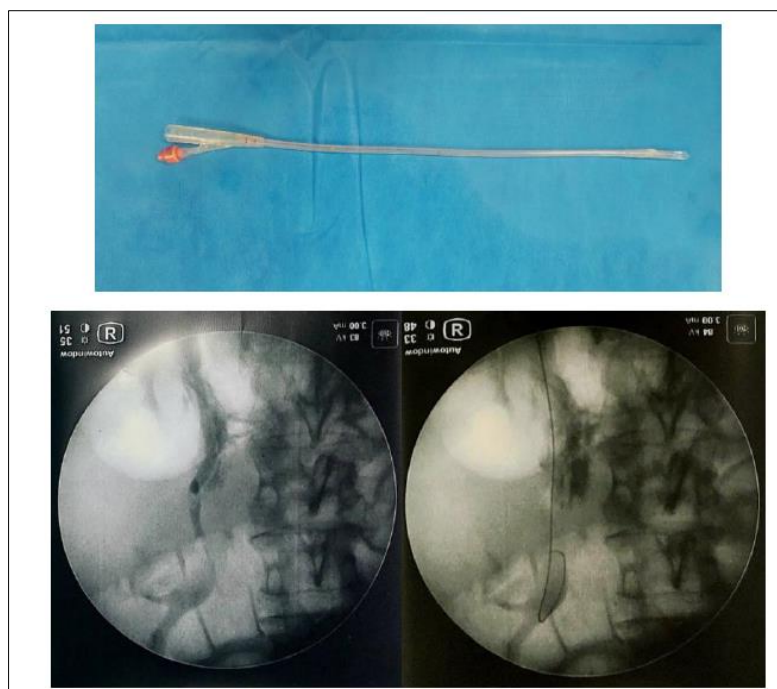


Figure 2: Macroscopic appearance of the catheter after extraction and intraoperative fluoroscopy images illustrating double-J stent placement under hydrophilic guidewire guidance

2.6. Postoperative Course and Outcome

The immediate postoperative course was marked by persistence of the inflammatory syndrome and transient worsening of renal function (creatinine 30 mg/L immediately postoperatively), reflecting the prolonged ureteral obstruction.

A 16 French silicone urinary catheter was subsequently placed to address extrinsic bladder obstruction caused by persistent pelvic tumor compression. Antibiotic therapy adapted to the antibiogram (pan-sensitive *Escherichia coli*) was initiated.

The subsequent course was progressively favorable: at discharge, the glomerular filtration rate (GFR) was 35 mL/min, reflecting satisfactory partial renal recovery, compatible with resumption of systemic anticancer treatment. General condition improved progressively under adapted oncological treatment.

III. DISCUSSION

3.1. An Ultra-Rare Iatrogenic Complication: Epidemiological Overview

Migration of a urinary catheter into the ureter represents one of the rarest complications in urology. The systematic review by Li & Au (2024), the most comprehensive to date, identifies 48 published cases in the world literature since 1996, with 67% occurring in women and 63% associated with low-capacity or neurogenic bladder. The true incidence is likely underestimated due to the lack of recognition of this complication.

Our case constitutes the 6th specifically reported case in a woman with a condition reducing bladder volume and involving a urethral catheter. Its uniqueness lies in the active oncological context, never previously described: metastatic endometrial adenocarcinoma under chemo-immunotherapy accumulates several rarely combined risk factors.

3.2. Pathophysiology and Risk Factors: Why Does the Catheter Migrate into the Ureter?

Several converging mechanisms have been proposed to explain this phenomenon [1, 2, 4]:

- Female urethral anatomy: The brevity of the female urethra (3-4 cm versus 20 cm in males) constitutes the primary biomechanical factor. It permits catheter advancement beyond the bladder neck without notable resistance, particularly during insertion with a single 'wrist flick' to the catheter hub.
- Reduced bladder capacity: A low-capacity bladder reduces the anatomical distance between the internal urethral meatus and the ureteral orifices. Any excessive catheter advancement risks directly engaging its tip into a ureteral ostium.

- Chemo-induced peripheral neuropathy: A risk factor specific to our case deserves particular attention: Paclitaxel-induced peripheral neuropathy. Taxol® is an anti-microtubule agent with dose-dependent neurotoxicity, causing distal axonal sensory neuropathy. In our observation, this adverse effect likely played a dual role: on the one hand, attenuating the patient's pain perception during ureteral penetration (thereby delaying the clinical warning diagnosis); on the other hand, reducing the reflex bladder contractions that might have signaled the abnormal catheter positioning.
- Long-term catheterization: Chronic catheterization induces progressive atrophy of the bladder mucosa and reduction of detrusor tone, promoting bladder contraction around the catheter and progressive reduction of functional bladder volume.
- Vesicoureteral reflux: In some cases, distension or vesicoureteral reflux secondary to chronic obstruction dilates the ureteral meati, facilitating catheter engagement [1, 13].

3.3. Clinical Presentation and Diagnosis

The clinical presentation of this complication is deceptive and polymorphic. In the Li & Au review, flank pain is the most frequent sign (46% of cases), followed by fever (31%), urinary retention (23%), and voiding disorders (15%). Complete absence of symptoms was reported in 8% of cases.

The most characteristic and most underestimated semiological finding remains inadequate urinary drainage despite an apparently in-place catheter: in our case, 487 mL residual was documented by bladder scan. This sign often attributed to a 'mucus plug' or urethral malpositioning should systematically raise suspicion of ureteral or extra-vesical catheter positioning.

Abdominopelvic CT scan constitutes the diagnostic gold standard, used in 69% of reported cases [1]. Its performance must be urgent whenever the clinical picture suggests aberrant catheter positioning.

3.4. Complications and Prognosis

The complications of this iatrogenic event are not trivial [1]:

Complication	Frequency (n=48)	Severity
Acute obstructive pyelonephritis	35 %	Potentially septic
Acute renal failure	27 %	Ureteral obstruction
Urosepsis	21 %	Life-threatening
Ureteral rupture	17 %	Surgical repair required

In our observation, two of these complications are documented: acute renal failure (initial creatinine 17 mg/L, worsening to 30 mg/L postoperatively) and obstructive pyelonephritis with documented urinary sepsis (*E. coli*, CRP 290 mg/L, leukocytosis at 15,500).

3.5. Therapeutic Strategy

Management must be surgical and urgent upon diagnosis confirmation. Therapeutic options are organized in escalating complexity [1]:

- Simple removal by catheter exchange (58% of cases): sufficient when the balloon can be deflated without difficulty and no ureteral injury is identified.
- Cysto-ureteroscopy with or without balloon puncture (27% of cases): indicated when the balloon cannot be deflated or simple extraction is impossible.
- Interventional radiology percutaneous nephrostomy or antegrade double-J stent (10% of cases): reserved for severe obstruction or ureteral injury.
- Open surgical repair (6.25% of cases): for complete ureteral rupture.

In our case, the endoscopic strategy with retrieval under hydrophilic guidewire and bilateral double-J stent placement allowed combining obstruction relief and bilateral ureteral protection — a choice justified by pelvic tumor invasion and immunosuppression secondary to chemo-immunotherapy.

3.6. Prevention: Cardinal Principles

Prevention of this complication relies on simple but strictly followed rules [1, 2, 10]:

1. Never advance the catheter 'to the hub' in women: 5 to 7 cm of insertion beyond the urethral meatus is sufficient; insertion of 15 cm (to the hub) greatly exceeds the trigone and may reach the ureteral orifices.
2. Systematically verify urine return before any balloon inflation: absence of return must mandate a saline verification flush.
3. Immediate ultrasound when in doubt: balloon localization by ultrasound is rapid, non-irradiating, and accessible in any department.
4. Never force in the event of resistance: any resistance to balloon inflation must raise suspicion of ureteral positioning.
5. Immediate urology consultation in case of difficulty: particularly in at-risk patients — female sex, pelvic mass, neurotoxic treatment, long-term catheterization. Kashefi *et al.*, demonstrated that targeted training of non-specialized personnel significantly reduces the incidence of catheterization complications [10].

IV. CONCLUSION

We report the 6th worldwide case of transurethral urinary catheter migration into the ureter, and the first occurring in the context of active metastatic endometrial adenocarcinoma under chemo-immunotherapy. This case exemplarily illustrates the convergence of rarely combined risk factors — female anatomy, tumor-induced bladder compression, chemo-induced neuropathy, and prolonged catheterization and underscores the paramount importance of heightened

vigilance during urinary catheterization in any patient with reduced bladder capacity.

Transurethral urinary catheterization must not be trivialized. Far from being an innocuous procedure, it engages medical and paramedical responsibility in its fullest extent. In the presence of active pelvic cancer or chemo-induced neuropathy, the procedure must be performed with particular care: verification of urine return before any balloon inflation, vigilance during resistance, and systematic resort to imaging when in doubt. This publication aims to sensitize all practitioners' urologists, oncologists, anesthesiologists, nurses to this underrecognized complication, in order to reduce its morbidity and mortality and promote a culture of safe catheterization.

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