



Trauma and reconstruction

# A rare case of fatal rectal perforation and sepsis following traumatic urinary catheterization

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## ABSTRACT

This case report details a fatal rectal perforation and sepsis in a comorbid 96-year-old male after traumatic urinary catheterization, highlighting the risks of IDC management in elderly patients with complex health backgrounds. Despite maximal medical therapy, including escalated antibiotics and ICU care, the patient died from septic shock linked to improper catheter insertion by a non-specialist nurse in the community. This case emphasizes the urgent need for better catheterization practices, specialized nursing education, and clear guidelines to prevent such outcomes.

## 1. Introduction

Urinary catheterization, while a common medical procedure, carries the risk of significant complications. This case report delves into an instance of traumatic catheterization, highlighting the fatal repercussions for an elderly patient and the ensuing challenges faced by healthcare providers.

## 2. Case presentation

A 96-year-old male with a history prostatomegaly, chronic obstructive pulmonary disease (COPD), and previous small bowel resection, without a history of radiation or rectal surgeries, presented to the emergency department (ED) with hypoxia, tachypnoea, hypotension, and urethral bleeding. Additionally, the patient was experiencing urethral bleeding following two unsuccessful attempts by nursing home staff to re-insert his permanent indwelling urinary catheter (IDC), which had been crucial for managing his chronic urinary retention for the past five years.

The patient's complex medical background was further complicated by his urological history. Fourteen years prior, he underwent a transurethral resection of the prostate (TURP) in an attempt to alleviate lower urinary tract symptoms (LUTS) and urinary retention. However, the recurrence of his LUTS and subsequent urinary retention five years ago led to the decision to use a permanent IDC, as the patient expressed a desire to avoid further surgical interventions.

Upon ED admission, initial management included the administration of dobutamine, metaraminol, and broad-spectrum antibiotics. The patient reported suprapubic pain, and a bladder scan indicated a retained volume of 400ml. A senior ED clinician then proceeded to insert a 22Fr 3-way IDC and initiated continuous bladder irrigation (CBI). However, the procedure was quickly halted due to the patient's suprapubic pain, a significant negative fluid balance of 1L, and minimal urinary output. Urgent CT imaging revealed the IDC tip residing in the empty rectum, surrounded by surgical emphysema (Fig. 1).

Prompt multidisciplinary consultations with both general surgery and urology were then immediately pursued. Given that the surgical emphysema was primarily confined to the mesorectum and mesocolon, the general surgical team proposed a transanal surgical repair. However, the patient opted against this significant invasive procedure. Despite the patient's reluctance for surgery, the necessity to address his persistent symptomatic urinary retention led to the decision to perform a guide-wire IDC exchange. This exchange was conducted under direct cystoscopic visualization using local anesthesia, a safer approach in line with best practice guidelines for iatrogenic urological trauma.<sup>1</sup> The cystoscopic examination revealed a large false passage in the posterior membranous urethra, indicating the extent of the initial traumatic catheterization. Following this intervention, the patient was admitted to the intensive care unit (ICU) to provide comprehensive medical therapy and close monitoring.

As blood cultures grew *Providencia rettgeri* and *Enterococcus faecalis*, the patient's antibiotics were escalated to include anaerobic

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**Fig. 1.** CTAP Sagittal view demonstrating the malpositioned IDC with the tip of the catheter in the rectum and locally extensive surgical emphysema. An enlarged prostate and gas in the bladder are also noted.

coverage per specialist infectious disease recommendation. Despite this, the patient continued to deteriorate and passed away the following day due to worsening septic shock.

After consulting with the patient's nursing home, it was disclosed that the IDC had unintentionally become dislodged while the patient was sleeping. The attempts to reinsert the catheter were delayed for several hours and were carried out by a non-specialist nurse using the only available catheters, which were 18Fr 2-way normal tip IDCs. These attempts involved inserting the catheter fully to the hilt each time, yet failed to produce the anticipated urine outflow and instead resulted in urethral bleeding.

After conducting an extensive root cause analysis in response to this adverse event, we concluded that the initial traumatic attempts to insert the IDC at the nursing home were the primary contributors to the patient's intraabdominal bacteremia and subsequent death. This conclusion was drawn considering the patient's history of multiple traumatic catheter insertions and the timing of positive blood cultures obtained before the 3-way IDC insertion in the ED. Furthermore, the rectal

perforation was determined to be ultimately multifactorial in nature, encompassing the insertion attempts at both the nursing home and the ED, compounded by the patient's prostatomegaly and prior TURP. The interplay of these factors renders the exact cause of perforation indeterminate.

### 3. Discussion

Rectal perforation due to IDC insertion represents a significant yet rare clinical albeit rare, clinical challenge, underscoring the imperative for safe catheter insertion practices alongside prompt diagnosis and management.<sup>2</sup> While literature specifically addressing the mortality rate associated with traumatic IDC insertion is limited, a mortality rate of approximately 2.7% has been documented, highlighting the serious potential outcomes of such complications.<sup>3</sup> This case, further exacerbated by intraabdominal bacteremia and ensuing septic shock, accentuates the necessity for heightened vigilance and care in managing patients with predisposing risk factors.

The mechanical and anatomical intricacies involved in the IDC insertion process, particularly in a patient background replete with potential vulnerabilities, highlight the necessity of a nuanced and personalised approach to catheterization. In this case, the risk factors for rectal perforation were prostatomegaly with prior TURP, advanced age, permanent IDC and urethral trauma due to non-specialist IDC insertion. The lack of coude-tipped catheters in the nursing home, which are particularly beneficial in navigating the enlarged prostate in chronically catheterized older male patients, may have further complicated the catheterization process. Since the rectal perforation was discovered promptly, none of the previously documented typical symptoms, such as faecaluria, pneumaturia or leakage of urine into the rectum, were observed.<sup>4</sup>

In our case, the patient's advanced age and poor clinical condition largely precluded definitive surgical management. However, among the few cases reported in the literature, surgery has been the most successful approach.<sup>5</sup> Nonetheless, the best management strategy for IDC-induced rectal perforations is still under debate. While minor perforations may spontaneously heal after urinary or intestinal diversion, most require surgical repair.<sup>6</sup> Various surgical techniques have been explored, including transanal, trans sphincteric, perineal (posterior), and trans-abdominal (anterior) approaches. Despite this diversity, a definitive consensus on the best surgical method has yet to be established.<sup>4</sup>

Management of concurrent bacteraemia involves a multifaceted strategy, focusing on controlling infection and addressing mechanical injury. Tailored antibiotic therapy with appropriate gram-negative coverage is critical, given the exposure to gastrointestinal pathogens. Source control via surgical intervention depends on the perforation's extent and the patient's overall clinical disposition. This nuanced treatment landscape emphasizes the importance of a multidisciplinary approach, integrating expertise from general surgeons and infectious disease specialists to formulate and execute a comprehensive care plan.

To improve traumatic IDC insertion preventative measures, refining catheterization protocols and bolstering nursing catheter education is imperative. This includes comprehensive patient evaluations to discern risk factors and the refine insertion techniques to lower the risk of injury. Stressing the importance of gentle and correct insertion methods is vital, given the role of excessive force in causing initial perforations. Before any catheterization attempt, evaluating patient risk factors to determine if specialist consultation is necessary is recommended. In the event of an unsuccessful insertion, especially if no urine drainage is observed, reassessment and potential specialist involvement should be considered to avoid further complications. Despite recent evidence demonstrating a significant reduction in traumatic insertions through the implementation of specialist nursing education programs, these findings are predominantly from in-hospital settings.<sup>7</sup> This highlights the importance of specialized training programs and the need for comprehensive studies focused on catheterization practices in community settings.

In light of the findings from the root cause analysis, our ED has implemented revised protocols for suspected catheter-related urethral or bladder injuries that prioritise early urological consultation and IDC insertion under vision. Furthermore, recommendations were made to the nursing home to establish formal IDC education programs, a protocol for managing challenging IDC insertions and to consider the use of specialized catheters, such as coude-tipped ones, for patients with known prostatomegaly. This advice demonstrates a strong institutional dedication to improving patient safety and care quality, aiming to prevent similar adverse events in the future.

#### 4. Conclusion

Showcasing rectal perforation as a critical risk of IDC insertion, this case emphasizes the necessity of precision and individualized care in urinary catheterization, particularly for those with pre-existing urological risk factors. It brings to the forefront the challenges in diagnosis and management, advocating for comprehensive preventive measures, interdisciplinary cooperation, and heightened vigilance in clinical practice. Moreover, the report calls attention to the need to establish evidence-based guidelines and consensus on catheter-related injury management.

#### Consent

Informed consent was obtained from the patient for the publication of this case report.

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#### CRediT authorship contribution statement

**Darshan Sitharthan:** Writing – review & editing, Writing – original draft, Project administration, Investigation, Data curation, Conceptualization. **Paul Sved:** Writing – review & editing, Supervision.

#### Declaration of competing interest

The authors declare no conflict of interest.

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