Ewa Kopyto[1], Marcin Czeczelewski[2], Łukasz Światłowski[2], Hanna Szmygin[3], Krzysztof Pyra[2]

[1]Students' Scientific Society at the Department of Interventional Radiology and Neuroradiology, Medical University of Lublin, Lublin, Poland
[2]Department of Interventional Radiology and Neuroradiology, Medical University of Lublin, Lublin, Poland
[3]Center of Oncology of the Lublin Region St. Jana z Dukli, Lublin, Poland

Complication upon complication — minimally invasive management of fragmented percutaneous nephrostomy

Corresponding author:

Marcin Czeczelewski, MD
Department of Interventional Radiology and Neuroradiology, Medical University of Lublin
Al. Racławickie 1, 20-059 Lublin, Poland
e-mail: Marcin.czeczelewski@gmail.com

Medical Research Journal 2024;
DOI: 10.5603/mrj.101574

ISSN 2451-2591
e-ISSN 2451-4101

ABSTRACT

Ureteral obstruction, a complex clinical condition, often necessitates decompression, commonly achieved through nephrostomy tube placement. This minimally invasive procedure connects the renal collecting system to the skin via a draining catheter, frequently performed to relieve obstructions caused by stones, malignancies, and strictures. Despite a high technical success rate of 99%, unexpected complications such as tube fragmentation can occur.

This case study highlights a rare instance of polyurethane nephrostomy tube fragmentation in a 45-year-old woman following a hysterectomy for endometrial adenocarcinoma. Initial imaging revealed uterine injury, leading to the placement of a nephrostomy tube and a double-J stent. Two weeks later, the patient experienced a tube fracture, necessitating minimally invasive retrieval of the fragment and subsequent laparoscopic ureter repair. The postoperative period was complication-free, emphasizing the need for nephrostomy care and prompt management of complications. This case underscores the importance of proper insertion techniques, regular replacements, and careful monitoring to prevent and address such issues effectively.

Keywords: ureteral injury, nephrostomy tube, minimally invasive procedures

Med Res J 2024

Ureteral obstruction presents as a heterogeneous clinical condition, posing challenges in determining optimal decompression techniques. One way is nephrostomy tube placement, a minimally invasive and well-tolerated procedure, that involves connecting the renal collecting system to the skin via a draining catheter [1]. Urologists or interventional radiologists perform this procedure primarily to relieve urinary obstructions, which constitute 90% of cases, commonly caused by stones, malignancies, and strictures [2]. Additionally, nephrostomy tubes facilitate urinary diversion, preparation for endourologic interventions, diagnostic testing, and administration of chemotherapy for upper urothelial carcinomas [3]. The procedure boasts a high technical success rate, nearing 99%. Although percutaneous nephrostomy placement is safe and effective, it can still lead to certain complications [4]. This clinical image demonstrates an extremely rare case of a polyurethane nephrostomy tube fragmentation, retention of its fragment in the renal collecting system and a minimally invasive method of its removal.

A 45-year-old woman underwent a total hysterectomy with appendages and pelvic lymphadenectomy due to endometrial adenocarcinoma. A control computed tomography scan in the excretory phase performed 10 minutes after intravenous administration of intravenous contrast agent revealed contrast-enhanced urine accumulation between the vagina and rectum. The supravesical segment of the left ureter, approx. 4 cm from the vesicoureteric junction, was dilated and connected to the pathologically contrasted area in the retrovesical space. The patient was referred to the interventional radiology department where, under local anaesthesia, percutaneous access to the renal collecting system

Figure 1. Abdomen AP supine view presenting pigtail fragment of broken nephrostomy in the left renal collecting system

Figure 2. Fluoroscopy presenting the moment of grasping the nephrostomy fragment with the endovascular snare. Then the fragment was gently pulled through the ureter towards the bladder along with the entire system of catheters

was obtained, and a guidewire was passed through the site of the ureteral injury. Subsequently, a double-J stent and a nephrostomy were placed to facilitate the healing of the ureter. The patient was discharged home after the procedure.

Two weeks later, the patient presented to the emergency department due to a fractured nephrostomy catheter. The breakage of the nephrostomy likely occurred due to the type of material from which the nephrostomy was made — polyurethane, and the method of fixation to the skin with sutures, which, under repeated bending, led to the tube's detachment. An attempt to externally remove the remaining portion of the was unsuccessful, resulting in a complete displacement of the fragment into the renal pelvis (Fig. 1). The removal procedure was performed at the interventional radiology department. The retrograde catheterization of the left ureter through the urethra and urinary bladder was performed. Kumpe catheter in the bladder is used to find the vesicoureteric junction. After selective catheterization of the left ureter, a 7Fr vascular sheath was introduced to provide support for the extraction of the foreign body. Using an endovascular snare, the nephrostomy fragment was successfully removed (Fig. 2). The ureter was secured by placing a DJ catheter to expose the left ureter for subsequent laparoscopic ureter repair. Three days later a laparoscopic left ureteroneocystostomy was performed. The postoperative period was without complications and the patient was discharged home. A follow-up cystoscopy after one month did not reveal any complications; the DJ catheter was removed.

A prolonged waiting period, rigid fixation to the skin, urinary infections, and metabolic diseases associated with stone disease are significant factors contributing to the fragmentation of nephrostomy [5]. To prevent this complication, proper insertion techniques, regular timely replacements, and appropriate care of the nephrostomy catheter are necessary. This case demonstrates that such complications can be effectively managed using minimally invasive radiology techniques.

Article information

Acknowledgements: *Not applicable.*

Ethics statement: *The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the Helsinki Declaration. Written informed consent was obtained from the patient for the publication of this case report and accompanying images.*

Author contributions: *Ewa Kopyto — research and conceptualisation, drafting of the text; Marcin Czeczelewski — involved in the clinical care of the patient, drafting of the text, sourcing and editing of clinical images; Łukasz Światłowski — involved in the clinical care of the patient, sourcing and editing of clinical images; Hanna Szmygin — critical revision of the manuscript; Krzysztof Pyra — involved in the clinical care of the patient, sourcing and editing of clinical images, critical revision of manuscript, give final approval of the manuscript.*

Funding: *Not applicable.*

Conflict of interest: *The authors declare that they have no conflict of interest.*

Supplementary material: *Not applicable.*

References

1. Dagli M, Ramchandani P. Percutaneous nephrostomy: technical aspects and indications. Semin Intervent Radiol. 2011; 28(4): 424–437, doi: 10.1055/s-0031-1296085, indexed in Pubmed: 23204641.
2. Farrell TA, Hicks ME. A review of radiologically guided percutaneous nephrostomies in 303 patients. J Vasc Interv Radiol. 1997; 8(5): 769–774, doi: 10.1016/s1051-0443(97)70658-4, indexed in Pubmed: 9314366.
3. Balasubramanian A, Metcalfe MJ, Wagenheim G, et al. Salvage topical therapy for upper tract urothelial carcinoma. World J Urol. 2018; 36(12): 2027–2034, doi: 10.1007/s00345-018-2349-9, indexed in Pubmed: 29804202.
4. Yoo MJ, Bridwell RE, Inman BL, et al. Approach to nephrostomy tubes in the emergency department. Am J Emerg Med. 2021; 50: 592–596, doi: 10.1016/j.ajem.2021.09.034, indexed in Pubmed: 34592566.
5. Kumar S, Ganesamoni R, Nanjappa B, et al. Fragmented pigtail percutaneous nephrostomy tubes: etiology and management. Korean J Urol. 2012; 53(7): 492–496, doi: 10.4111/kju.2012.53.7.492, indexed in Pubmed: 22866222.