

## Urinothorax: A Less Common Cause: Case Report

Mamoutou Keita<sup>1\*</sup>, Taha Jalil<sup>1</sup>, Mohamed Taouhid<sup>1</sup>, Mohamed Cheqboub<sup>1</sup>, Mohamed Amine Lakmichi<sup>1</sup>, Zakaria Dahami<sup>1</sup>, Ismail Sarf<sup>1</sup>

Urology Department, Arrazi Hospital; Mohammed VI University Hospital, Marrakech, Morocco

DOI: <https://doi.org/10.36347/sasjs.2024.v10i09.016>

| Received: 12.08.2024 | Accepted: 19.09.2024 | Published: 23.09.2024

\*Corresponding author: Mamoutou Keita

Urology Department, Arrazi Hospital; Mohammed VI University Hospital, Marrakech, Morocco

### Abstract

### Case Report

Urinothorax, an uncommon condition characterized by urine accumulation in the pleural space, poses a diagnostic and therapeutic challenge due to its rarity and potentially life-threatening consequences if not promptly addressed. We present a case of a 79-year-old female with a history of chronic kidney disease, hypertensive cardiopathy, arrhythmia, and type 2 diabetes, who presented with hemi-thoracic pain and dyspnea. Initial evaluation revealed a large left pleural effusion, later confirmed as urinothorax secondary to emphysematous pyelonephritis. The diagnostic process involved thoracic drain placement, laboratory tests, and imaging studies, including chest and abdominal CT scans. The underlying mechanism of urinothorax in this case was attributed to obstructive renal dilation causing perirenal inflammation, leading to weakened diaphragmatic barriers facilitating urine transmigration into the pleural space. Management strategies focused on treating the obstructive uropathy and relieving the underlying genitourinary tract pathology. Despite these efforts, the patient succumbed to severe sepsis. Our case underscores the importance of early diagnosis and management of urinothorax, especially in patients with urotract disorders or recent abdominal surgeries. While urinothorax is a rare entity, clinicians should maintain a high index of suspicion to prevent delays in treatment, recognizing that timely intervention is crucial for favorable outcomes. Further research is warranted to elucidate optimal management strategies and improve prognosis in such cases.

**Keywords:** Urinothorax, emphysematous pyelonephritis, obstructive uropathy, case report.

Copyright © 2024 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

## INTRODUCTION

Urinothorax or urine collection in the pleural space is a rare and unusual cause of pleural effusion. The phenomenon was first described by Corriere *et al.*, in 1968 [1]. The situation is described as an accumulation of urine in the pleural space that can be life-threatening in the absence of prompt treatment.

It is a rare cause of pleural effusion secondary to an obstructive uropathy, trauma or ureteral injury during an abdominal surgery [2-4]. Other etiologies are also cited in the literature as malignant extra-urinary tumours, extracorporeal lithotripsy by shock waves, complication after percutaneous nephrolithotomy [5-7] or following percutaneous renal cryoablation.

We present here an unusual case of urinothorax following emphysematous pyelonephritis.

### Patient and Observation

**Patient information:** This is the case of a 79-years-old female patient presenting to the emergency department for hemi-thoracic pain and dyspnea. Patient is known to

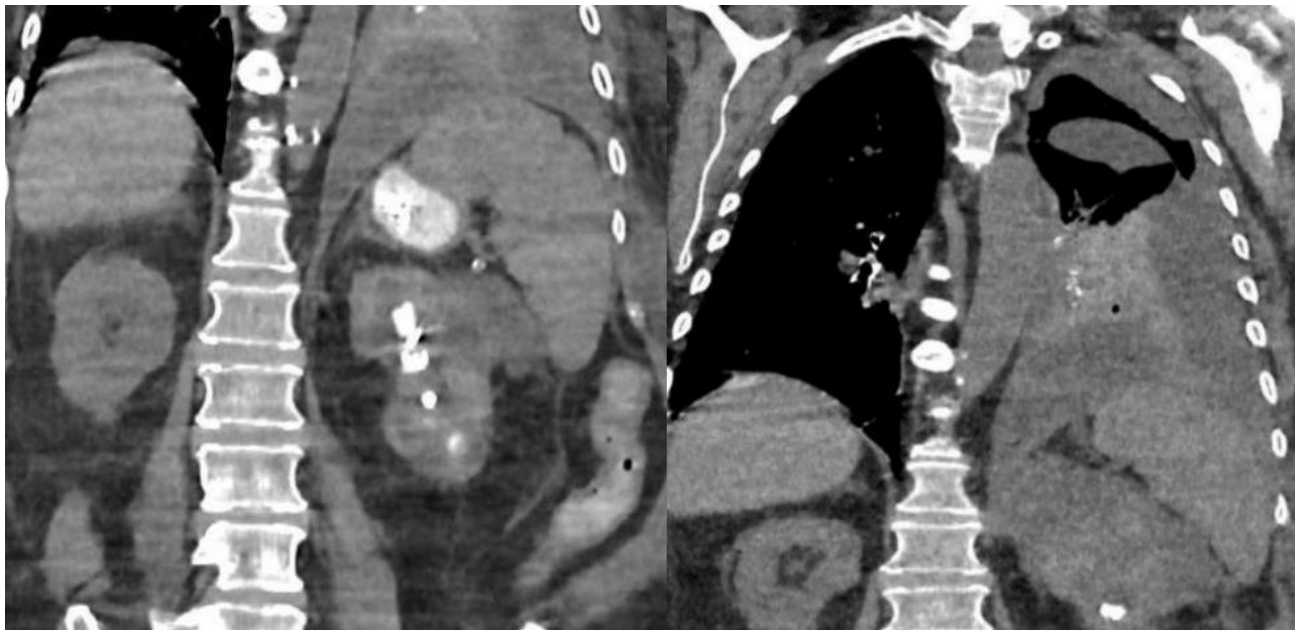
have chronic kidney disease, hypertensive cardiopathy, arrhythmia, and type 2 diabetes.

**Clinical finding:** On admission, the patient was conscious and well oriented. However, she was tachypneic with a respiratory rate of 24 per minute. Her blood pressure was 114/79 mmHg, pulse 148 bpm, and temperature 36°C. Oxygen saturation was 98% on room air. On physical examination, attenuated breath sounds and dullness to percussion were noted primarily on the left side of the chest. The chest X-ray showed a large left pleural effusion.

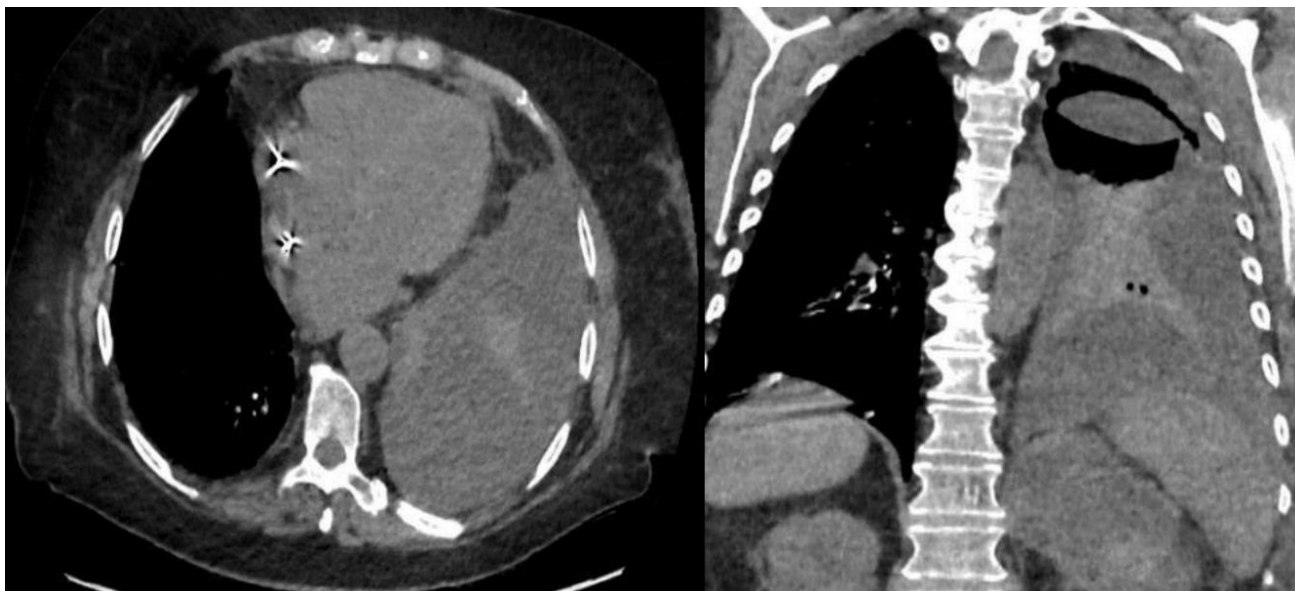
**Diagnostic assessment:** Placement of a thoracic drain through the left axillary route under ultrasound guidance and local anesthesia was performed. The nature of the sample was sero-haematic, exudative. Her laboratory tests revealed an LDH of 1136 IU/l in addition to a pleural fluid protein level of 40 g/l compared to a serum protein level of 62 g/l. *Proteus mirabilis* was found in both pleural fluid and urine cultures.

A chest CT scan was therefore performed. It confirmed the presence of a left pleural effusion of moderate to high abundance, with partial atelectasis of the left lower and upper lobes. No mediastinal lymph nodes were seen (Figure 1). Abdominal CT scan revealed heterogeneity of the upper pole of the left kidney with

perirenal infiltration in continuity with the diaphragm. Calcium deposits and few air bubbles were seen within the pyelocaliceal cavities evoking pyelonephritis (Figure2).



**Figure 1: chest CT scan shows left pleural effusion of moderate to high abundance with partial atelectasis of left upper and lower lobes**



**Figure 2: Abdominal CT reveals heterogeneity of the upper pole of the left kidney with perirenal infiltration in continuity with the diaphragm.**

**Therapeutic interventions:** Placement of a thoracic drain through the left axillary route under ultrasound guidance and local anesthesia was performed.

**Diagnosis:** In this context, we have a diagnosis of an exudative pleural effusion following CT scan findings, biochemical factors, and the lack of a specific cause

explaining a transudative pleural effusion (heart failure, cirrhosis, nephrotic syndrome, peritoneal dialysis, etc.).

**Patient Perspective:** the patient notes a clear improvement in his respiratory function and his dyspnea directly after chest drainage.

**Informed Consent:** each step of the diagnostic and therapeutic process has been well explained to the patient with verbal consent obtained before any diagnostic and therapeutic action.

## DISCUSSION

Urinothorax is a pleural effusion caused by the accumulation of urine in the pleural space. This rare condition is due to the leakage of urine collection from the peritoneum and retroperitoneal space into the pleural cavity. The most commonly reported causes of urinothorax are complications of surgical procedures involving the kidney or ureter (perforation, PCNL, ESWL), retroperitoneal inflammation, trauma, urinary obstruction, and malignant disease [8, 9]. In our situation, we have a case of exudative pleurisy of obstructive origin, favored by emphysematous pyelonephritis with involvement of the diaphragm by contiguity (see [Figure 2](#)).

Obstructive uropathy and damage to the genitourinary tract can lead to the development of collections of perirenal and retroperitoneal fluid, called urinomas. The translocation of urine from the genitourinary tract into the pleural space can be explained by the following two mechanisms [10]. The first one is direct: transmigration takes place through the diaphragmatic pores, following a pressure gradient between the abdomen and the pleural space or can be caused by a urinoma rupturing directly into the pleural space.

The second mechanism is indirect: a retroperitoneal urinoma drains into the pleural space through the communication between the retroperitoneal and pleural lymphatics. Citron and Higgins [13] in 1929 demonstrated for the first time that particules can enter the pleural space from the peritoneal space via lymphatic communications between the pleural and retroperitoneal lymphatics. Urine from the retroperitoneal space can also pass through the pleural space via these communications.

In our study, we consider a direct transmigration mechanism. Because of the proximity of the kidney to the diaphragm, the perirenal inflammation reached the diaphragm, leading to the weakening of this barrier, favoring the crossing of urine from the renal compartment to the pleural one. In addition, this mechanism, is also favored by the direct movement of abdominal fluid into the pleural space through the phrenic defects. A pleural effusion usually develops when the rate of fluid accumulation in the pleural space exceeds the rate of pleural fluid elimination by the pleuroparietal lymphatics.

In the literature, in most cases, the diagnosis is based on the identification of a pleural effusion associated with an obstructive or traumatic uropathy which resolves after treatment of the obstruction. It is not uncommon for the diagnosis of urinothorax to be made

without determining biochemical parameters such as pleural fluid to plasma creatinine ratio, pH, or glucose levels, which was our case. It is a reversible disease when management is aimed at treating the cause, in a way that early disease and etiology diagnoses are crucial. In our patient, we demonstrated the presence of a urinothorax following an obstructive renal dilation in the context of an emphysematous pyelonephritis, affecting the diaphragm by contiguity. In addition *Proteus mirabilis* was found in both pleural and urine cultures.

The management of urinothorax is not well defined to date. It involves identifying and treating the underlying genitourinary tract pathology (relieving obstruction or repairing an upper GU tract lesion) to prevent its recurrence and persistence. Drainage of the pleural space is performed both for diagnostic and therapeutic purposes. The results of a systematic review done in Spain, suggest that the management should be based on the treatment of the underlying uropathy, either alone or in combination with thoracentesis/thoracic drainage. Relief of the obstruction of the urinary system and repair of the underlying disease of the genitourinary tract is the mainstay of treatment. When the obstruction is relieved, rapid resolution of the urinothorax occurs. Thoracic surgery is usually not necessary and none of the patients in previously reported cases, including our case, required surgery, such as thoracotomy or video-assisted thoracoscopic surgery procedure.

Unfortunately, our patient died following severe sepsis with general status alteration despite renal and pleural drainage. Despite adequate management, this disease could be fatal, especially in elderly patients with several comorbidities.

## CONCLUSION

Although urinothorax is one of the rare diseases, physicians should be vigilant in diagnosing this disease and to consider it in the presence of any pleural effusion, particularly in patients with urinary tract disorders and those who underwent recent abdominal surgical interventions.

## REFERENCES

1. Corriere Jr, J. N., Miller, W. T., & Murphy, J. J. (1968). Hydronephrosis as a cause of pleural effusion. *Radiology*, *90*(1), 79-84.
2. Brown, B., Trotter, C., Cox, P., & Hanlon, C. (2011). Urinothorax: a rare cause of pleural effusion. *West Virginia Medical Journal*, *107*(6), 16-18.
3. Ameer, K. A., Thomas, R., Sureshkumar, V. K., Deepak, V., Srikanth, P., Arjun, P., ... & Thomas, M. (2013). An unusual complication of a common gynaecological procedure. *J Assoc Physicians India*, *61*(7), 490-492.
4. Ansari, T., & Idell, S. (1998). Management of undiagnosed persistent pleural effusions. *Clinics in*

- chest medicine*, 19(2), 407-417. Doi: 10.1016/S0272-5231(05)70087-3
5. Karkoulas, K., Sampsonas, F., Kaparianos, A., Tsiamita, M., Tsoukalas, G., & Spiropoulos, K. (2007). Urinothorax: an unexpected cause of pleural effusion in a patient with non-Hodgkin lymphoma. *European Review for Medical & Pharmacological Sciences*, 11(6), 373-374.
  6. Oguzulgen, İ. K., Oguzulgen, A. İ., Sınık, Z., Köktürk, O., Ekim, N., & Karaoglan, Ü. (2002). An unusual cause of urinothorax. *Respiration*, 69(3), 273-274. doi: 10.1159/000063633.
  7. Handa, A., Agarwal, R., & Aggarwal, A. N. (2007). Urinothorax: an unusual cause of pleural effusion. *Singapore Med J*, 48(11), e289-e292.
  8. O'Donnell, A., Schoenberger, C., Weiner, J., & Tsou, E. (1988). Pulmonary complications of percutaneous nephrostomy and kidney stone extraction. *Southern Medical Journal*, 81(8), 1002-1005.
  9. Bhattacharya, A., Venkataramarao, S. H., Kumar, S., & Mittal, B. R. (2007). Urinothorax demonstrated on 99m Tc Ethylene dicysteine renal scintigraphy. *Nephrology Dialysis Transplantation*, 22(6), 1782-1783.
  10. Tortora, A., Casciani, E., Kharrub, Z., & Gualdi, G. (2006). Urinothorax: an unexpected cause of severe dyspnea. *Emergency radiology*, 12, 189-191.