



A RARE CAUSE OF HEMORRHAGIC PLEURAL EFFUSION: URINOTHORAX

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ABSTRACT

A 64 year old male presented with right renal calculus. Per-cutaneous Nephrolithotomy and Double-J Stenting was done. On second post operative day, patient developed dyspnoea and was started on oxygen. CT chest and abdomen showed contrast filled continuous tract (postero- superiorly directed) which extended from the right renal upper pole calyx to right pleural cavity. Pleural aspiration revealed hemorrhagic pleural fluid and lab investigation showed pleural fluid- to-serum creatinine ratio >1, which is one of the biochemical diagnostic criteria of urinothorax. Urinothorax as a cause of hemorrhagic pleural effusion was diagnosed, which is quite rare as per literature.

KEYWORDS: Urinothorax, Pleural effusion, Per-cutaneous Nephrolithotomy.

INTRODUCTION

The presence of urine inside the pleural space is called urinothorax. It is a rare cause of pleural effusion secondary to (i) traumatic or (ii) obstructive causes.^[1] It is usually ipsilateral to the side of lesion.^[2,3] Diagnosis can be done with renal scintigraphy with a radioactive tracer,^[4,5] or measuring creatinine levels in pleural fluids.^[6] Hemorrhagic effusion due to urine in pleural cavity is reported in very few cases.^[12] Quite infrequently reported in adults; we present the case of a 64 year old male and a comprehensive review of the literature.

CASE REPORT

A 64 year old male presented with complaints of flank pain and dysuria. He was diagnosed as Right renal calculus and planned for Per-cutaneous Nephrolithotomy and Double-J Stenting under general anaesthesia (Figure 1).



Figure 1: Pre- operative Chest X-ray.

Right upper calyceal puncture (Supracostal assess) was made. Stone was fragmented completely. Right Double-J stent kept. On second post operative day, patient developed chest discomfort and right sided flank pain. Arterial blood gas showed that PO₂- 73mmHg and PCO₂- 27mmHg.

Patient was started on oxygen. On the following day, since the complaints persisted, CT scan of chest and abdomen was done and chest physiotherapy and incentive spirometry was initiated.

HRCT THORAX

HRCT Thorax showed moderate right side pleural effusion with non-enhancing soft tissue component (clots/ debris) in dependent portion of pleural cavity (Figure 2). In the delayed excretory phase, there was contrast filled continuous tract (postero- superiorly directed) seen extending from the right renal upper pole

calyx to right pleural cavity transversing peri-nephric space to posterior costophrenic sulcus and the contrast was seen layering in dependent portion of the pleural space. The tract measured 5mm in thickness (Figure 3). Minimal pneumothorax was also there on right side. These features were consistent with right nephro- pleural fistula.



Figure 2: Right side pleural effusion with soft tissue component (clots/ debris) in dependent portion of pleural cavity.



Figure 3: Contrast filled tract extending from the right renal upper pole calyx to right pleural cavity.

Ultrasound guided pleural aspiration was done on right side and 470ml hemorrhagic fluid aspirated. Pleural fluid cytology showed blood with inflammatory cells composed of predominantly neutrophils. No atypical

cells seen in the smear studied. Pleural fluid Gene Xpert for *Mycobacterium tuberculosis* was negative (Table 1).

Table 1: Pleural fluid aspiration values.

TEST	LAB VALUES	NORMAL VALUES
Pleural fluid total count	8436	0-0
Fluid creatinine	2.69	0-0
Pleural fluid total protein	1	6.4-8.2
Pleural fluid sugar	225	40-70
Pleural fluid LDH	370	

Following aspiration, patient improved symptomatically and oxygen was tapered and stopped. Foley's catheter

was removed and patient discharged on ninth post-operative day. Double J stent was removed on nineteenth

post-operative day (Figure 4).

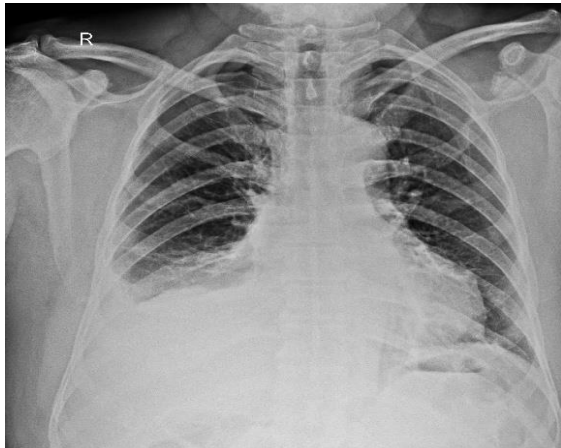


Figure 4: Post operative Chest X-ray.

DISCUSSION

The usual etiologies of urinothorax include percutaneous nephrolithotomy, percutaneous nephrostomy, extracorporeal shock wave lithotripsy, renal biopsy, renal transplantation, blunt trauma to kidney, bladder laceration and retroperitoneal inflammatory fibrosis.^[7] Pleural fluid-to-serum creatinine ratio >1 is the biochemical diagnostic criterion of urinothorax. The average pleural fluid-to-serum creatinine ratio in urinothorax is in the range of 1.09–19.8.

Other diagnostic criteria of urinothorax include transudative pleural fluid and low pleural fluid pH (usually less than 7.3), low protein and glucose ratios although in some cases, high levels of LDH lead it to be classified as false exudates.^[8] Diagnostic imaging, X-ray, contrast-enhanced computed tomography or pyelogram are required to establish the anatomical location of the defect causing urine leakage. In the present study, pleural fluid creatinine to serum creatinine ratio was >1 , high pleural fluid sugar and low protein suggestive of transudate. CT scan showed moderate pleural effusion. There was contrast filled continuous tract (postero- superiorly directed) seen extending from the right renal upper pole calyx to right pleural cavity transverse peri-nephric space to posterior costophrenic sulcus. Also, the contrast was seen layering in dependent portion of the pleural space.

Urinothorax often has an amber color and urine-like smell. As per, María E. Toubes *et al.*, the color of the PE was documented in 33 cases (37.5%); it was straw-colored in 24 (72.7%) and hematic in 9 cases (27.3%).^[9] In the present study, 470ml hemorrhagic fluid aspirated. Pleural fluid cytology showed blood with inflammatory cells composed of predominantly neutrophils.

The complications following percutaneous nephrolithotomy are infection, hemorrhage, adjacent organ injury, retained stone, loss of kidney function, and death. The Clinical Research Office of the Endourological Society (CROES) conducted two

multicenter global studies on the complications following percutaneous nephrolithotomy.

As per Rajiv Yadav *et al.*, in his study of 762 cases, noted the incidence of hydrothorax to be around 3.3%.^[10] According to Sekar H *et al.*, the overall incidence was only 2.17%.^[11]

Initial management of urinothorax is with thoracocentesis or thoracostomy, but detecting the origin of the leakage and performing surgical repair is essential. In the present study, thoracocentesis was performed.

As per Alexander Casallas *et al.*, the following surgical procedures were associated with Urinothorax: Nephrectomy (n = 2), Lithotripsy (n = 4), Transplantation (n = 4), Urethral obstruction (n = 10), Nephrostomy (n = 15), Prostatectomy, Ureterscopy, Combined hysterectomy and Salpingo-oophorectomy, trauma and other surgery (n = 6).^[12]

CONCLUSION

Urinothorax as a cause of hemorrhagic pleural effusion is quite rare. An early diagnosis of this condition definitely improves the patient's clinical outcome.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

ABBREVIATIONS

CT- Computed Tomography.

HRCT- High resolution computed tomography, PO₂- Partial pressure of oxygen.

PCO₂- Partial pressure of carbon dioxide and LDH- Lactate dehydrogenase.

REFERENCES

1. Garcia-Pachon E, Padilla-Navas I. Urinothorax: case report and review of the literature with emphasis on biochemical diagnosis. *Respiration*, 2004; 71(5): 533-6.
2. Dimitriadis G, Tahmatzopoulos A, Kampantais S, Ioannidis S, Radopoulos D, Katsikas V. Unilateral urinothorax can occur contralateral to the affected kidney. *Scandinavian Journal of Urology*, 2013 Jun 1; 47(3): 242-3.
3. Laskaridis L, Kampantais S, Toutziaris C, Chachopoulos B, Perdakis I, Tahmatzopoulos A, Dimitriadis G. Urinothorax—an underdiagnosed cause of acute dyspnea: report of a bilateral and of an ipsilateral urinothorax case. *Case Reports in Emergency Medicine*, 2012 Oct 16.
4. Jelic S, Sampogna RV. Detection of unrecognized urinothorax with renal scintigraphy. *Kidney international*, 2009 Aug 1; 76(3): 353.
5. Agranovich S, Cherniavsky E, Tiktinsky E, Horne T, Lantsberg S. Unilateral urinothorax due to nephropleural fistula detected on Tc-99m diethylenetriamine pentaacetic acid renal scintigraphy. *Clinical nuclear medicine*, 2008 Dec 1;

- 33(12): 889-91.
6. Mora RB, Silvente CM, Nieto JM, Cuervo MA. Urinothorax: presentation of a new case as pleural exudate. *Southern Medical Journal*, 2010 Sep 1; 103(9): 931-3.
 7. Handa A, Agarwal R, Aggarwal AN. Urinothorax: an unusual cause of pleural effusion. *Singapore Med J.*, 2007 Nov 1; 48(11): e289-92.
 8. Karkoulas K, Sampsonas F, Kaparianos A, Tsiamita M, Tsoukalas G, Spiropoulos K. Urinothorax: an unexpected cause of pleural effusion in a patient with non-Hodgkin lymphoma. *European Review for Medical and Pharmacological Sciences*, 2007 Nov 1; 11(6): 373.
 9. Toubes ME, Lama A, Ferreiro L, Golpe A, Álvarez-Dobaño JM, González-Barcala FJ, San José E, Rodríguez-Núñez N, Rábade C, Lourido T, Valdés L. Urinothorax: a systematic review. *Journal of Thoracic Disease*, 2017 May; 9(5): 1209.
 10. Yadav R, Aron M, Gupta NP, Hemal AK, Seth A, Kolla SB. Safety of supracostal punctures for percutaneous renal surgery. *International journal of urology*, 2006 Oct; 13(10): 1267-70.
 11. Sekar H, Krishnamoorthy S, Kumaresan N, Ramanan V. Supracostal punctures for PCNL: Factors that predict safety, success and stone free rate in stag horn and non-stag horn stones: A single centre experience and review of literature. *Journal of clinical and diagnostic research: JCDR*, 2016 Sep; 10(9): PC17.
 12. Alexander casallas, Camilo Castaneda- Cardona, Urinothorax- Case report and systematic review of the literature.