

An Unusual Presentation in Urinothorax

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Abstract

Urinothorax is defined as the presence of urine in the pleural cavity. Leakage from the urinary tract can cause urinoma with retroperitoneal urine collection, and secondarily, urinothorax. We report the case of a 35-year-old female who presented with dyspnoea and right-sided chest pain. Chest radiograph revealed a right-sided pleural effusion. The patient had undergone left-sided ovarian cystectomy three months ago, had sustained a left-sided ureteric injury that required ureteric stent placement. Urinothorax was suspected as a consequence of ureteric injury; pleural fluid to serum creatinine ratio was found to be greater than one, confirming the diagnosis.

[Indian J Chest Dis Allied Sci 2016;58:195-197]

Key words: Urinothorax, Urinoma, Pleural effusion, Creatinine.

Introduction

Urinothorax is a rare and often undiagnosed condition.¹ It was first described by Corriere *et al*² in 1968, in their studies of ureteral obstruction in dogs. The most common causes of urinoma include obstructive uropathy, abdominal trauma with urinary tract involvement, retroperitoneal inflammatory or malignant processes, lithotripsy, failed nephrostomy or renal biopsy.^{1,3,4} Leakage of urine into retroperitoneal space results in the formation of urinoma and the urine then passes through the diaphragmatic lymphatics or defects in diaphragm into ipsilateral pleural space. Nevertheless, the condition may occasionally be bilateral⁵ or contra-lateral.^{6,7} The pleural fluid has a colour and odour similar to urine and has low pH and glucose, similar to the pH and glucose of urine. It is traditionally defined as pleural transudate,¹ but can also be pleural exudates,⁸ as in the patient we describe. The pleural fluid-to-serum creatinine ratio higher than one is a hallmark of this condition and there are some other features that can assist in this diagnosis.⁹

Case Report

A 35-year-old female presented to us with chief complaints of right-sided chest pain and progressive dyspnoea since one month. She had undergone left-sided ovarian cystectomy three months back. Her medical records revealed a left ureteric injury at the time of surgery, followed by ureteric stent placement. She was afebrile, resting oxygen saturation while breathing room air was 98%, pulse 94 beats per minute, blood pressure 110/70mmHg. General examination was unremarkable. Respiratory system

examination showed findings consistent with right-sided moderate pleural effusion. Rest of the physical examination was unremarkable. Chest radiograph (Figure 1) and thoracic ultrasonography confirmed the presence of right-sided pleural effusion. Haematological and biochemical investigations were normal. Kidney, ureter and bladder (KUB) radiograph showed the presence of left-sided double J (DJ) stent (Figure 2). Abdominal ultrasonography showed ascites and DJ stent *in situ* on left side. Thoracocentesis revealed pleural fluid cell count 900cells/mm³ with 95% lymphocytes; pH 7.30, glucose 40mg/dL, proteins 3.9mg/dL, lactate dehydrogenase (LDH) 173 U/L and adenosine deamine (ADA) 30U/L. Serum protein level was 5.6g/dL, the pleural-fluid to serum protein ratio was greater than 0.5 suggesting that the pleural fluid was an exudates as per Light's criteria.¹ Pleural fluid Gram's and Ziehl-Neelsen's staining, cytopathology were negative.

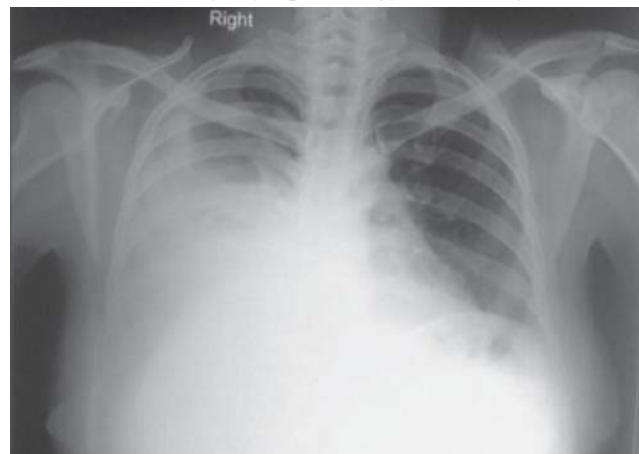


Figure 1. Chest radiograph (postero-anterior view) showing right-sided pleural effusion.

[Received: September 24, 2014; accepted after revision: September 18, 2015]

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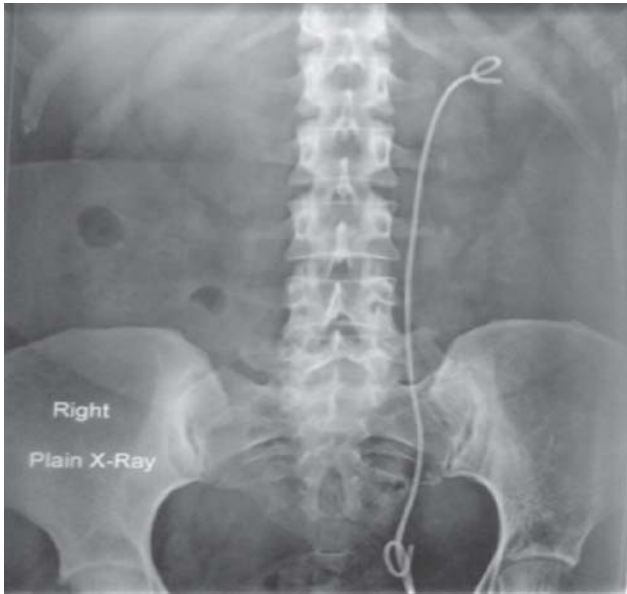


Figure 2. Kidney, ureter and bladder (KUB) radiograph showing the presence of left-sided double J (DJ) stent.

In view of pleural effusion and ascites occurring following ureteric injury during ovarian cystectomy, urinothorax was suspected; pleural fluid and serum creatinine were tested. The pleural fluid creatinine level was 3mg/dL, serum creatinine level was 1mg/dL; the pleural-fluid to serum creatinine ratio was greater than one, suggestive of the presence of urine in the pleural space. The patient was referred to urologist for repair of ureter. The urologist found upward migration of DJ stent and leakage of urine at laparotomy. Ureteric repair was done with Boaris flap. There was complete resolution of the pleural effusion after surgery (Figure 3).

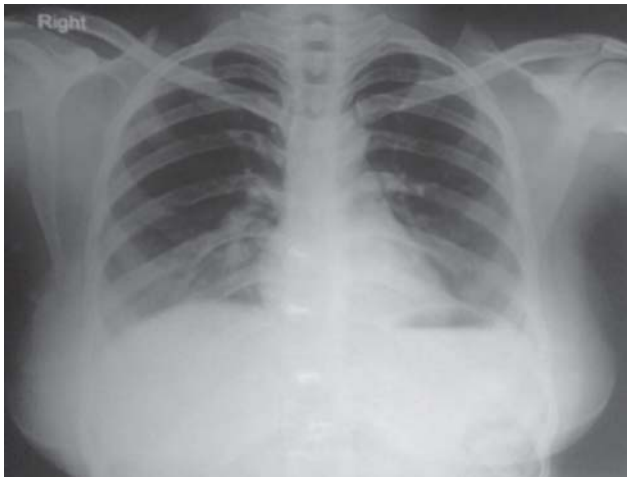


Figure 3. Chest radiograph (postero-anterior view) after surgical repair showing clearance of right-sided pleural effusion.

Discussion

Presence of urine in pleural cavity is termed as

urinothorax.¹ There are three possible routes by which urine reaches the pleural space: by lymphatic drainage, through defects in diaphragm or by direct passage into pleural cavity by way of mediastinum.¹⁰ Urinothorax has been classified as obstructive and traumatic. Obstructive lesions of the urinary tract, such as prostatic hypertrophy and carcinoma, renal cysts, urethral valves, renal calculi and renal transplantation,¹⁰ are known to cause urinothorax. Traumatic causes like percutaneous nephrolithotomy,¹¹ nephrostomy,¹² extra-corporeal shock wave lithotripsy,¹⁰ ileal conduit surgery,¹² laparoscopic radical nephroureterectomy¹³ and renal biopsy¹⁰ causing urinothorax are also described. Usually the pleural effusion is ipsilateral to the side of the obstructive urinary lesion, but contralateral pleural effusion has also been reported,^{6,7} as also observed in our case. Effusion may be asymptomatic and discovered on routine evaluation or may cause dyspnoea and respiratory failure if pleural effusion is massive.¹⁴

The fluid is straw-coloured, with an odour of urine and in majority of cases the pleural fluid is transudative.¹⁹ In our case fluid was exudative, as in some cases of urinothorax, where there is bleeding in the urinary tract and plasma passes into pleural fluid.^{6,13,14} The pleural fluid pH in urinothorax is usually acidic but can be alkaline.¹⁴ However, the diagnostic criteria is a pleural fluid to serum creatinine ratio of more than one.¹⁰ Early aspiration of pleural fluid increases the sensitivity of this parameter as later equilibration between pleural fluid and serum is likely.

Renal scintigraphy with technetium may show the route taken by fluid between retroperitoneum and pleura.^{6,11,15} The diagnosis of urinothorax requires a high degree of suspicion and this entity is probably under-diagnosed in routine clinical practice.⁶ At the present time, increased awareness of this entity coupled with the availability of advanced imaging and scintigraphic techniques have resulted in the increase of cases of urinothorax being diagnosed.

In conclusion, patients presenting with pleural effusion with a history of abdominal injury or surgery should be suspected for urinothorax. Surgical repair of the primary cause results in resolution of pleural effusion.

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