



Urinothorax: Really Worth to Fear it?

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Abstract

Pleural Effusions (PE) due to pleural injury following supracostal Percutaneous Nephrolithotomy (PCNL) occur in upwards of 15% of patients; however, these effusions are invariably diagnosed immediately postoperative or during the hospital stay. We report a 33-years-old female underwent an uneventful supracostal left PCNL staghorn stone procedure. She developed a Nephropleural Fistula (NPF). It's a rare but serious thoracic complication of PCNL. She was treated with left chest tube drainage and an indwelling ureteral catheter placement. Early recognition and management of a pleural injury is critical to avoid life-threatening situations. But, despite all interventions on time development of persistent NPF rate is 0.87%. We presented management of NPF which treated by open surgery.

Keywords: Complications; Nephrolithotomy; Nephropleural fistula; PCNL; Urinothorax

Introduction

PCNL is the gold standard treatment for staghorn kidney stones and generally associated with low morbidity. Supracostal access can be associated with a significantly greater rate of intrathoracic complications compared with subcostal access [1]. The most common intrathoracic complications; include pneumothorax, hemothorax and hydrothorax. Another associated complication of supracostal access that is not often seen is the development of NPF. Reported incidence of NPF in PCNL was 0.87% [2]. The incidence increases especially when using a supracostal approach above 12th rib or in patients who are young and with low body mass index [3]. NPF describes an abnormal, direct and persistent communication between the intrathoracic cavity and intrarenal collecting system. It is a rare but life-threatening complication and more likely to occur during right sided procedures [3].

Case Presentation

A 33 years old woman presented with complaining left flank pain. CT scan revealed a staghorn calculi measuring 3.0 cm × 3.6 cm × 2.2 cm with moderate HU (427-876) (Figure 1a,1b). Physical examination was unremarkable. Prone PCNL planned. A 6 F ureteral catheter advanced retrograde over the initial guidewire to left ureter at lithotomy position. Stone allocation confirmed by retrograde pyelography at prone position. An access provided to kidney through above 11th rib. Stone fragmented and stone fragments removed from kidney. A 5 mm stone fragment seen in middle-upper calyx at fluoroscopy could not be reached. 16 F re-entry catheters inserted to collecting system and operation was ended. Overall, operative time was 2 h with no intraoperative complications.

Minimally PE was seen on chest radiography on post operative day one and reentry catheter removed thought of a minimal pleural injury. Patient developed shortness of breath on postoperative day two (Figure 1c). Thorax surgeon consulted and chest tube drainage had been applied. Sequentially an indwelling 6F ureteral stent placed to collecting system (Figure 1d). There was drainage close to 1500 cc daily from chest tube. On post operative day 10 there was a till drainage. So after clamping the chest tube PE increased again. Therefore, a NPF was thought and an open surgery was performed for excision of fistula tract (Figure 2). After open surgery day two chest tube drainage was removed and patient discharged. Ureteral stent removed two weeks after surgery.

Discussion

Optimal percutaneous access is essential in achieving a stone free status and for success of the surgery. The complication rates of supracostal percutaneous nephrostomy tracts have been noted to be as great as 10% to 30% with a supracostal 12th rib approach and 25% to 35% with a supracostal 11th rib approach [1,4]. NPF is a direct and persistent communication between the intrarenal collecting system and the intrathoracic cavity [2]. Routine postoperative chest radiography should be used for

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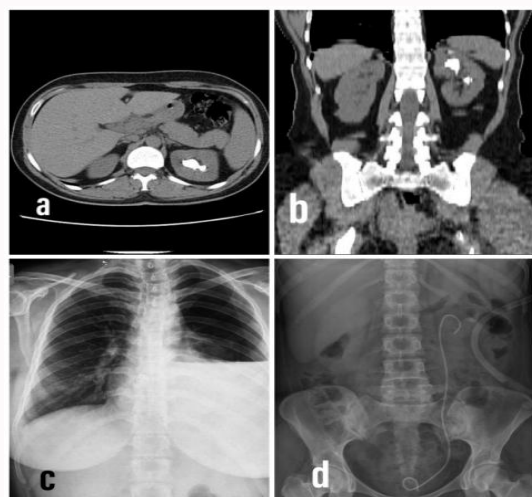


Figure 1: a) Sagittal section of abdomen CT, b) I section of abdomen CT shows upper caliceal stone, c) Increase of pleural effusion after re-entry catheter removed on post operative day 2, d) Diversion of both systems by chest tube and ureteral catheter.

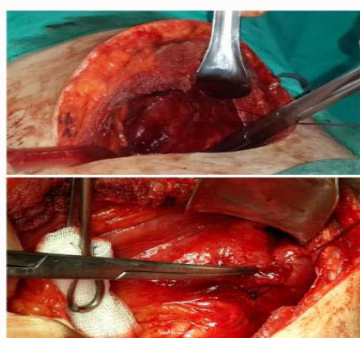


Figure 2: Excision of NPF by open surgery.

all patients undergoing percutaneous nephrolithotomy. A subclinical pneumothorax or effusion can be safely observed with serial chest radiographs and patient monitoring for signs of worsening respiratory status or evidence of increased size of the pneumothorax, obviating the need for an obligatory thoracostomy tube. However, observation is not always successful, and deterioration in the patient's condition may require emergent chest tube placement as in our patient. We stayed conservative at first day due to possibility of spontaneous regression of effusion with thought of minimally pleural injury. A chest tube placement is exactly mandatory and definitive

treatment in massive PE. But it can be an over treatment patients whose conditions may improve at close follow up. In some selected cases serial thoracentesis and a diversion from the urinary tract can be a choice as Baugh et al. did [5]. They highlighted that the method is safe, less invasive and a less painful alternative to tube thoracostomy.

Despite placement of a chest tube for PE and an indwelling 6 F ureteral catheter for decompressing intrarenal pressure our patient developed NPF. There are many major risk factors for NPF include younger age, low Body Mass Index (BMI) because of lack of perirenal fat, and intercostal approaches above the 11th rib [3]. Our patient met all these risk factors. But, the numbers of punctures to the kidney for successful access are most essential risk factor. Every trial leads to an injury in the pleura and enlarges the defect. Therefore, it can be a good option to use an ultrasound guided access for avoiding complications.

Conclusion

Intercostal puncture above the 12th rib *via* the supracostal approach provides relatively safe access when subcostal angulation is not feasible. But any patient who presents with shortness of breath and PE, post-PCNL, should raise suspicion of NPF. Currently, immediate postoperative X-rays are recommended to screen for urinothorax and immediate postoperative intrathoracic complications. Ensuring the drainage of the pleural space and urinary system with catheters as soon as possible is essential.

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