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Case report

Postoperative subcutaneous emphysema following percutaneous nephrolithotomy: A rare complication

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ABSTRACT

Percutaneous Nephrolithotomy (PCNL) is a common urological procedure performed for complicated upper urinary tract stones. The advantages of PCNL include lower morbidity and mortality rates and quicker recovery compared to traditional open surgery. A number of complications have been reported which can be life threatening. Here we present a case of 71 years old lady, who developed subcutaneous emphysema following PCNL.

1. Introduction

Percutaneous Nephrolithotomy (PCNL) is considered gold standard for the management of large renal stones [1]. It provides maximal stone free rates and is considered to have a great influence in reducing morbidity and mortality rates [2,3]. Nevertheless, few complications have also been reported in literature. The commonly reported complications include; significant bleeding, fever, thoracic complications including hydrothorax and pneumothorax, sepsis, bowel injury, urinoma and most notably death [4]. Subcutaneous emphysema involving the chest wall along with pneumothorax or pneumomediastinum following PCNL is a rare complication but has been reported in a few case reports [5–7]. In this case report we describe a case of significant air in the retroperitoneal space and abdominal wall, following PCNL without related bowel injury.

2. Case report

A 71 years old obese female, known case of hypertension, well controlled on medications, presented to the outpatient clinic with history of on and off left flank pain for 6 months. Her condition was associated with on and off fever, occasional dark stained urine with increased frequency. Her preoperative investigations were unremarkable but her urine culture was positive for gram negative rods sensitive to ciprofloxacin, which was treated with oral ciprofloxacin according to the sensitivity pattern. Her Computed Tomography (CT) scan showed

bilateral partialstag horn stones, measuring 3.4 × 1.8 mm on right side and 2.6 × 2.1 cm on left side (Fig. 1a & b).

She was planned for elective PCNL on the left side. The procedure was performed in prone position by a specialist Urologist. A lower pole puncture was done under fluoroscopic guidance and the tract was dilated using serial metallic dilators up to 28 Fr. The puncture site was below the 12th rib and posterior to posterior axillary line. The stone was fragmented using pneumatic lithoclast and fragments were retrieved. A nephrostomy tube was placed at the end of procedure. Postoperatively the patient was vitally stable. The next day patient remained stable and was mobilized. Her urine output and nephrostomy output were clear, so both Foley's catheter and nephrostomy were eventually removed. Her postoperative laboratory work up that included a complete blood picture and renal function were within normal limits and was eventually discharged home.

On follow up, 4th Postoperative day as an outpatient she reported abdominal pain, more on left flank associated with anorexia, constipation, nausea, non-projectile vomiting and low grade fever. On examination she was noted to be febrile (37.8 °C) and tachycardic (110b/min), there was mild erythema around the puncture site as well as significant subcutaneous emphysema on the left flank extending anteriorly towards epigastrium and left iliac fossa was noted. On expression, foul smelling purulent discharge was seen from the puncture site. Auscultation of the bowel had decreased bowel sounds Abdominal X-ray was done which showed air in the left iliac fossa (Fig. 2a & b).

She was admitted and her septic work up was done and a CT scan was

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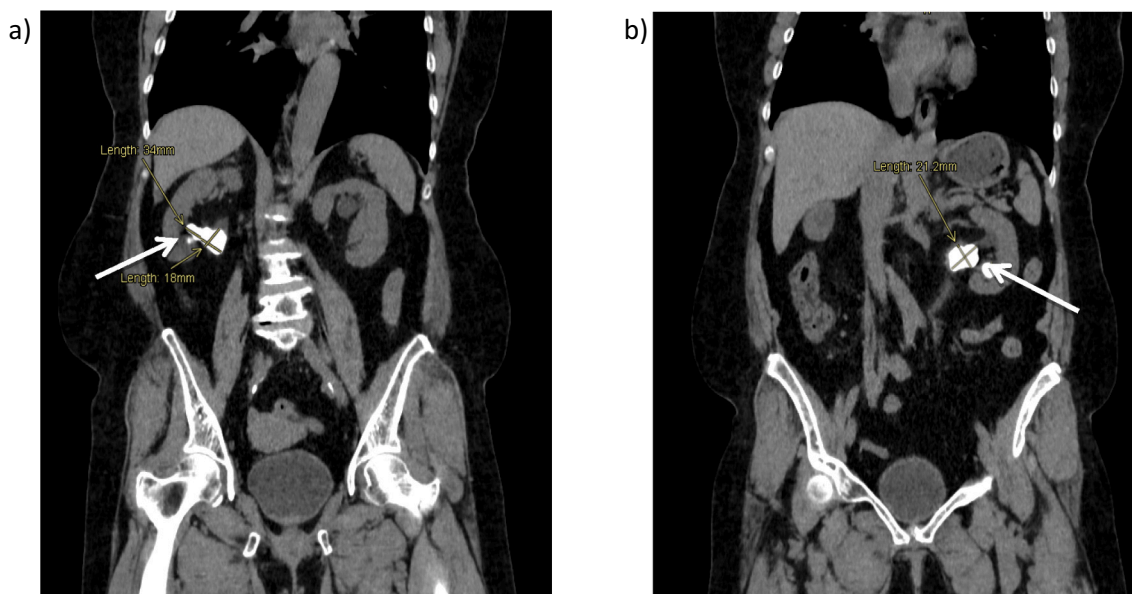


Fig. 1. a & b; showing bilateral renal staghorn calculi (white arrows).

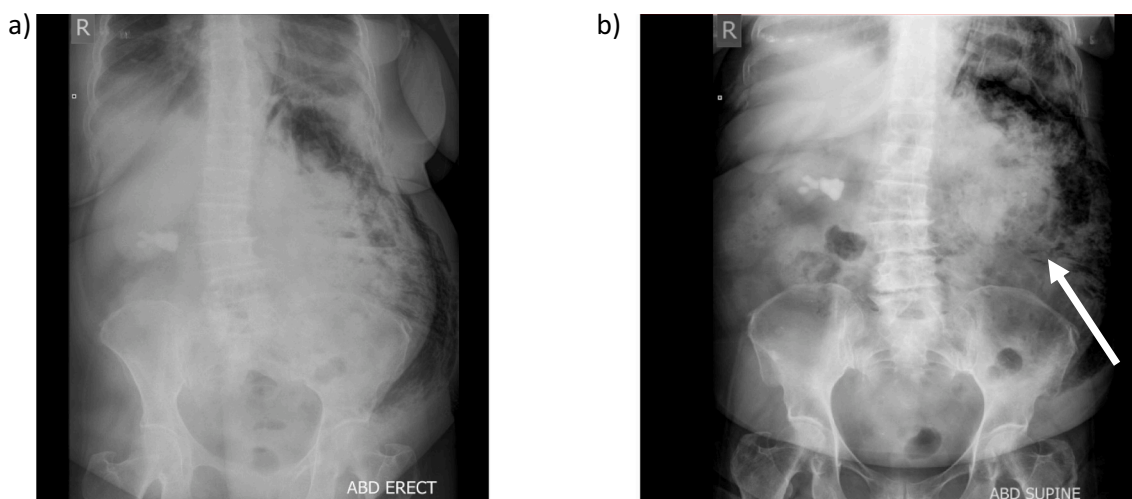


Fig. 2. a & b; Abdominal X-ray erect and supine, depicting subcutaneous emphysema (air in the left iliac fossa).

ordered which showed significant air in left retroperitoneal space (Fig. 3a & b). There was no evidence of any bowel perforation, lung or pleural injury. She underwent daily dressing and was started empirically on Intravenous antibiotics. Her Repeat Urine culture showed *Klebsiella oxytoca* and Pus Culture showed *E. coli*, which were treated with Injection Meropenem. She improved clinically after initiation of antibiotics and inflammatory markers subsequently settled. Subcutaneous emphysema reduced spontaneously with time and was discharged home with daily dressing. She was followed up 4 weeks post operatively, her wound had completely healed and subcutaneous emphysema resolved completely.

3. Discussion

Subcutaneous emphysema is characterized by swelling of the tissues due to accumulation and spreading of air along tissue planes. More often it suggests a communication between the subcutaneous tissue and an organ containing air (such as airway or viscera). However, it can be due to infection of subcutaneous tissue. Although it is usually benign and self-limited, it may be associated with a life-threatening situation [8].

Subcutaneous emphysema is a rare but known manifestation of intra-abdominal pathology. There are several reports of abdominal and thoracic subcutaneous emphysema following iatrogenic perforation of the colon (by colonoscopy) or due to perforated diverticulitis [9,10]. Among urological procedures, subcutaneous emphysema has been reported following retroperitoneoscopic surgery for renal problems, iatrogenic bowel injury following retroperitoneal surgery or percutaneous nephrolithotomy. Wang et al. reported a case of pneumomediastinum caused by the collection of retroperitoneal air, produced by bacteria in a case of emphysematous pyelonephritis [11]. Chang et al., reported an unusual case of pneumomediastinum following PCNL, who suggested iatrogenic introduction of air into the collecting system and retroperitoneal space through the irrigation system as a possible cause [5]. Chubak et al., reported an unusual presentation of colon perforation after PCNL, characterized by sore throat, pneumomediastinum, and neck and shoulder crepitus [6]. Dwivedi et al., reported a case of pneumomediastinum and bilateral pneumothorax following PCNL [7]. They also suggested iatrogenic introduction of air into the retroperitoneum via the irrigating system. In our case, we found significant emphysema along with septic presentation of the patient

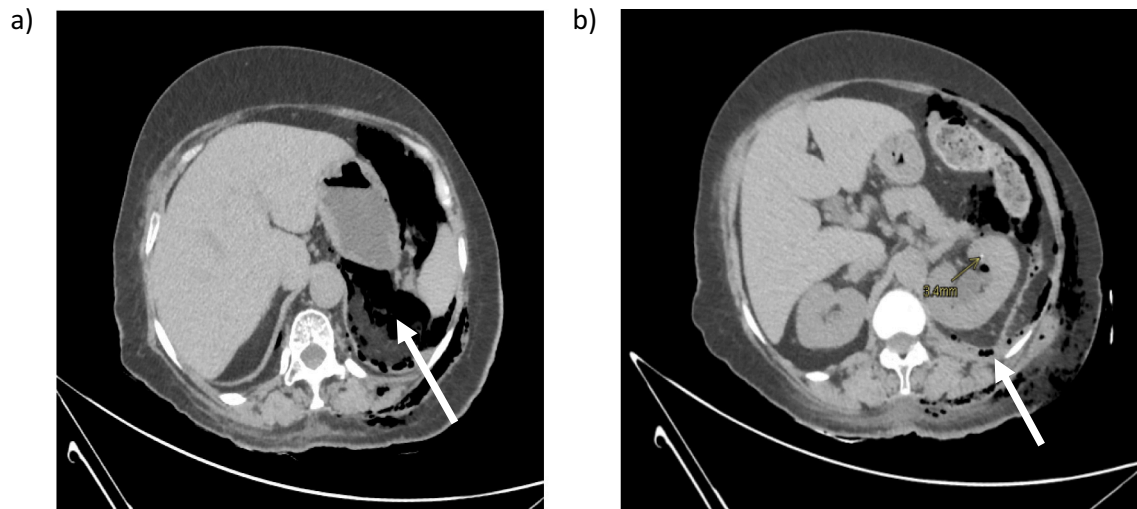


Fig. 3. a & b; white arrows, showing free air in the retroperitoneal space.

postoperatively. As the preoperative culture performed was positive and the stone itself may be a possible source of infection. We could attribute the emphysema to be caused by two possible reasons, one being infection caused by air producing organisms and also to erroneously introduced air via irrigating system. In light of these findings we propose that, an air tight irrigation tubes should be used, air removed before connecting the tubing to the nephrostomy sheath and irrigation fluid replaced timely before air enters the tubing. We also looked for development of pneumomediastinum or pneumothorax which was not seen in our case and the patient was managed conservatively with intravenous antibiotics after which she responded well and recovered completely.

The case report has been formulated as per SCARE guidelines [12].

4. Conclusion

PCNL is a commonly performed procedure for complex renal stones with lower morbidity and mortality. Still it can be associated with significant postoperative complications. Special vigilance is required to recognize rare and potentially life threatening complications. Preoperative planning of puncture for access, perioperative antimicrobial coverage and an air free irrigation system are obligatory to avoid such complications.

Declaration of patient consent

Written informed consent was obtained from the patient for publication of this report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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None.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

The Case report was approved by the institutional research committee, patient gave her consent for publication.

Consent

No details of the patient were given.

Author contribution

All authors contributed equally, drafted the manual script, looked for appropriate literature and sent for publication.

Registration of research studies

Not applicable.

Guarantor

Dr. Athar Ali (head of the General Surgery).

Declaration of competing interest

There are no conflicts of interest.

References

- [1] G.M. Preminger, D.G. Assimos, J.E. Lingeman, S.Y. Nakada, M.S. Pearle, J.S. Wolf, Chapter 1: AUA guideline on management of staghorn calculi: diagnosis and treatment recommendations, *J. Urol.* 173 (6) (2005) 1991–2000.
- [2] A. Skolarikos, Alivizatos G. de la Rosette JJMCH, Percutaneous nephrolithotomy and its legacy, in: 47, *Eur. Urol.*, 2005, 22-8.
- [3] P. Alken, G. Hutschenreiter, R. Günther, Percutaneous kidney stone removal, *Eur. Urol.* 8 (1982), 304-11.
- [4] Jdl Rosette, D. Assimos, M. Desai, J. Gutierrez, J. Lingeman, R. Scarpa, The clinical research office of the endourological society percutaneous nephrolithotomy global study: indications, complications, and outcomes in 5803 patients, *J. Endourol.* 25 (1) (2011), 11-7.
- [5] C.-H. Chang, Y.-C. Jou, C.-H. Wu, C.-W. Hsieh, Pneumomediastinum: an unusual complication after percutaneous nephrolithotomy, *Tzu-Chi Med. J.* 29 (2) (2017) 118.
- [6] B. Chubak, J.M. Stern, An unusual presentation of colon perforation following percutaneous nephrolithotomy, *Can. Urol. Assoc. J.* 8 (11–12) (2014), E862.
- [7] D. Dwivedi, S. Sud, S. Singh, M. Kumar, Postoperative pneumomediastinum with bilateral pneumothorax following percutaneous nephrolithotomy, *Indian J. Respir. Care* 9 (1) (2020) 113.
- [8] A.F. Carvalho, C. Branco, P. Leão, C. Antunes, Extensive Subcutaneous emphysema as a presentation of ischemic colitis, *Case Rep. Surg.* 2015 (2015), 587508 (2 pages).
- [9] S. Fosi, V. Giuricin, V. Girardi, E. Di Caprera, E. Costanzo, R. Di Trapano, Subcutaneous emphysema, pneumomediastinum, pneumoretroperitoneum, and pneumoscrotum: unusual complications of acute perforated diverticulitis, *Case Rep. Radiol.* 2014 (2014), 431563 (5 pages).

- [10] 1190-2 R. Kassir, K. Abboud, J. Dubois, S. Baccot, T. Debs, J.-P. Favre, et al., Perforated diverticulitis of the sigmoid colon causing a subcutaneous emphysema, *Int. J. Surg. Case Rep.* 5 (12) (2014).
- [11] 909-11 Y.C. Wang, J.M. Wang, Y.C. Chow, A.W. Chiu, S. Yang, Pneumomediastinum and subcutaneous emphysema as the manifestation of emphysematous pyelonephritis, *Int. J. Urol.* 11 (10) (2004).
- [12] for the SCARE Group, R.A. Agha, Franchi, C. Sohrabi, G. Mathew, The SCARE 2020 guidelines: updating consensus Surgical Case Report (SCARE) guidelines, *Int. J. Surg.* 84 (2020) 226–230.