

## Empyema Due to Thoracic Migrating Appendicolith

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**Background:** Retained appendicolith following appendicectomy, and can cause recurrent abscess in the abdomen and retroperitoneum. **Case characteristics:** 11-yr-old boy who presented with subpulmonic abscess and pneumonia following appendicectomy for perforated appendicitis. **Observations:** Thoracotomy revealed a thick walled subpulmonic abscess surrounding an appendicolith along with a rent in the posterolateral aspect of the diaphragm. **Message:** In children presenting with pus collections and a history of recent appendicectomy, the possibility of a migrating appendicolith should be considered.

**Keywords:** Appendicitis, Appendicectomy, Complications.

**D**ropped appendicolith can occur as a consequence of non-retrieval of stone from peritoneal cavity during open or laparoscopic appendicectomy. Such events are known to present with delayed abscess in abdominal locations [1]. We report a child who presented to us with subpulmonic abscess and pneumonia due to a dropped appendicolith, following perforated appendicitis.

### CASE REPORT

An 11-year-old boy, previously hospitalized elsewhere, had undergone emergency laparotomy and open appendicectomy for perforated appendicitis with peritonitis. He had been treated with broad spectrum antibiotics for ten days and discharged. During that period he had some cough, but a normal chest X-ray. Two weeks following surgery, he was brought to our hospital with intermittent high grade fever for 3 days. On examination, he was febrile and tachypneic, but not hypoxic. Air entry was decreased and there was stony dullness on percussion in left hemithorax. Laboratory work-up revealed neutrophilic leucocytosis, anemia (Hb 8.5 g/dL), and mild thrombocytosis (platelet count 4.57 lakh/mm<sup>3</sup>). He was treated with broad spectrum antibiotics – Piperacillin-Tazobactam and Vancomycin – in view of probable nosocomial infection. Chest X-ray showed homogenous opacity in left middle and lower zones. Ultrasonography (USG) of the chest showed thick multiloculated turbid fluid collection in posterolateral aspect of left pleural cavity. Hence, a diagnosis of complicated pneumonia with left empyema was considered. USG abdomen done to rule out

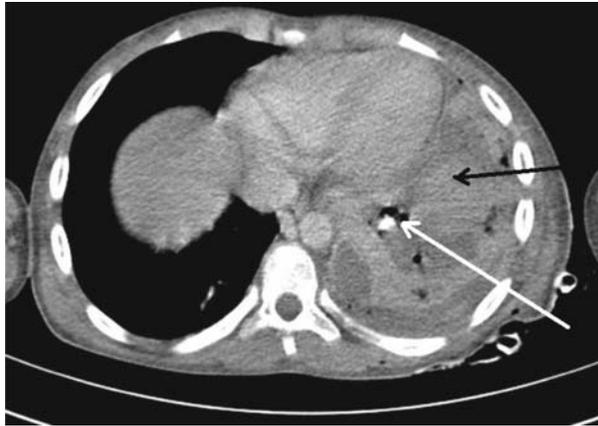
subdiaphragmatic abscess was normal. Diagnostic thoracentesis resulted in a dry tap.

The child underwent a Video-assisted thoracoscopic surgery (VATS), which showed loculated empyema, and thickened visceral and parietal pleura with interpleural adhesions. Decortication was done over upper lobe resulting in good lung expansion; however, we were unable to clear the peel around lower lobe. Contrast enhanced computed topography (CECT) of chest showed collapse of left lower lobe, mild to moderate pleural fluid with air pockets and a radio-opaque shadow measuring (7x5 mm) in basal segment of left lower lobe **Fig. 1**. Flexible bronchoscopy showed a normal trachea-bronchial tree with no foreign body.

At thoracotomy, a thick walled subpulmonic abscess surrounding an appendicolith (0.7x1.5 cm) was found. A rent in the posterolateral aspect of diaphragm was noted (**Web Fig. 1**). The rent in diaphragm was repaired and extensive decortication was done. Appendicolith analysis was positive for calcium oxalate and carbonate. Pus in the subpulmonic space and stone revealed growth of Extended-spectrum Beta Lactamase *Escherichia Coli*, sensitive to Piperacillin-Tazobactam. Post thoracotomy, fever settled and left lung expansion improved. Child was discharged on oral co-trimoxazole for two weeks after completion of two weeks of parenteral piperacillin-tazobactam. At six months follow-up, he had full lung expansion, and was doing well.

### DISCUSSION

An appendicolith is found in approximately 12-30% of



**FIG. 1** CECT chest showing collection (black arrow) and a hyper-intense shadow suggestive of foreign body (white arrow) in left hemithorax.

patients with appendicitis [2]. An appendicolith, also known as fecolith or stercolith, is an inspissated fecal mass with calcium phosphate and organic debris deposited around it. These are usually subcentimetric; those larger than 2 cm are termed giant appendicoliths [3]. Formation of abscess around such appendicolith occurs due to the bacteria within it acting as a nidus of infection [4]. The time interval between appendicectomy and the diagnosis of ectopic appendicolith may range from ten days to few years [4].

Retained appendicoliths are most commonly found in pelvis or Morrison's pouch [5]. Pneumoperitoneum and positioning used during laparoscopy can result in the appendicolith moving to unusual sites. Abscesses have been reported in the retroperitoneum, perihepatic region, and subhepatic, tubo-ovarian, psoas, pelvic and gluteal regions [1,6]. A single case report of a migrating appendicolith with diaphragmatic perforation resulting in empyema has been reported [7]. It is interesting that the appendicolith in our patient migrated from the abdomen, perforating the diaphragm without causing any significant subdiaphragmatic abscess.

X-rays can detect only 10-15% of appendicoliths. USG and CT scan are diagnostic modalities of choice. In USG, calcified appendicoliths are seen as hyperechoic foci. CT is more sensitive, detecting even noncalcified fecoliths. On CT, appendicoliths appear as areas of high attenuation, as laminated bodies with gas in centre or homogenous opacity [8]. CT procedures to localize retained appendicoliths preoperatively have been described [9]. In our patient, appendicolith was initially not identified on X-ray and USG. CT chest revealed a

radiopaque shadow that was later confirmed as appendicolith.

Retrieval of the appendicolith is important to prevent future recurrent abscesses [1,10]. This can be done as open surgery along with drainage of the abscess; percutaneous methods with radiological guidance have also been described [1]. Prevention is by meticulous attention during appendicectomy with retrieval of appendix as well as any appendicoliths during surgery. Retrieval bags at laparoscopy are useful as the lith may crumble during instrumentation [4].

We suggest that the possibility of a missed migrating appendicolith should be considered in children who present with empyema following appendicectomy.

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**WEB FIG. 1** *Operative picture at thoracotomy with defect in posterolateral part of diaphragm (arrow) and the appendicolith retrieved (inset).*