

Left pyopneumothorax with bronchopleural fistula and closure

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Abstract

A 75 year old elderly male came to our OPD with chief complaints of breathlessness, cough with expectoration for 1 month and fever for 1 week. Patient was a chronic smoker and used to smoke 10-20 beedis per day and he had no associated co-morbidities. On examination patient was tachypnoeic and had bilateral pitting pedal edema. Chest auscultation revealed bilateral extensive expiratory rhonchi with diminished breath sound in left hemithorax. Chest X-ray was taken which showed features of left hydro pneumothorax, following which ICD was inserted. CT thorax showed a large left hydro pneumothorax with BPF and bronchiectasis in left lower lobe with right lower lobe fibrosis. Bronchoscopy showed fistulous communication in superior segment of left lower lobe through which air and pleural fluid was draining. BPF closure was done by endobronchial injection of N-butyl cyanoacrylate glue into the superior segment of left lower lobe through the bronchoscopy following which wide swing in air column movement reduced with no air leaks.

Keywords: Bronchopleural fistula; Bronchus; Pleural Space.

Introduction

Bronchopleural fistula (BPF) is a sinus tract between the bronchus and the pleural space that may result from a necrotizing pneumonia/empyema, lung neoplasms, blunt and penetrating lung injuries or may occur as a complication of procedures, such as lung biopsy, chest tube drainage, or thoracentesis. More commonly, it arises as a complication of lung surgery, following failure of the bronchial stump to heal [1,2]. Non operative factors included diabetes mellitus, hypoalbuminemia, cirrhosis and steroid administration [3]. Bronchopleural fistula typically manifests seven to fifteen days following a lung resection, though more delayed presentations have been reported.

Fistulas can be classified according to the time of onset after the operation: early [1 to 7 days], intermediate [8 to 30 days], and late fistulas [more than 30 days]. The BPF can cause significant morbidity, prolonged hospitalization and even mortality. The most common cause of death is aspiration pneumonia and subsequent acute respiratory distress syndrome or development of tension pneumothorax [4,5]. The symptoms and signs of cough and changes in the air-fluid pattern on chest radiograph are warning signs of BPF. Other manifestations include fever with serosanguinous or purulent sputum. Acute respiratory distress may occur if a large fistula results in aspiration to the contralateral lung or if a tension pneumothorax develops. BPF closure is done by bronchoscopic placement of glues, gel foams, blood patches etc. [6-10].

Case Report

A 75-year-old elderly male came to OPD with chief complaints of breathlessness, cough with expectoration for 1 month and fever since 1 week. Breathlessness was for 1 month which was insidious in onset and progressive

in nature, aggravated since 1 week. Cough was associated with expectoration which was mucopurulent in nature and no hemoptysis. Fever was intermittent and not associated with chills and rigor. Patient was a chronic smoker and used to smoke 10-20 beedis per day. No associated co-morbidities were present.

On examination patient was tachypnoeic with respiratory rate of 30 breaths per minute, heart rate was 110/min, and blood pressure of 100/60mm/Hg.

On general examination patient had bilateral pitting pedal edema. Chest auscultation revealed bilateral extensive expiratory rhonchi with diminished breath sound in left hemithorax. Patient was evaluated with routine blood investigations and with chest X-ray which showed left hydropneumothorax (Fig. 1a). He was started on I.V. antibiotics and nebulization.

Under aseptic precautions ICD tube was inserted in the left 5th intercostal space along the mid-axillary line and was fixed to the skin at 8 cm (Fig. 1b). Around 750 ml of fluid was drained and was sent for fluid analysis. Wide swing in air column movement with air leak on forced expiration was noted following the insertion of ICD tube. CT thorax done which showed a large left hydropneumothorax with BPF and bronchiectasis in left lower lobe with right lower lobe fibrosis (Fig. 2a & 2b).

Patient was posted for bronchoscopy which showed fistulous communication in superior segment of left lower lobe through which air and pleural fluid was draining. Bronchial wash was taken from the above segments and sent for analysis. Patient was then planned for closure of bronchopleural fistula. BPF closure was done by endobronchial injection of N-butyl cyanoacrylate glue into the superior segment of left lower lobe through the bronchoscopy following which wide swing in air column movement reduced with no air leak and patient was asymptomatic and thus discharged.

There were no complications, as evident by the follow-up chest radiographs at one month (Fig. 3a & 3b). A written informed consent was obtained from the patient for the publication of this case details and accompanying images.



Fig. 1a: Chest radiograph showing left hydropneumothorax



Fig. 1b: Post ICD chest radiograph

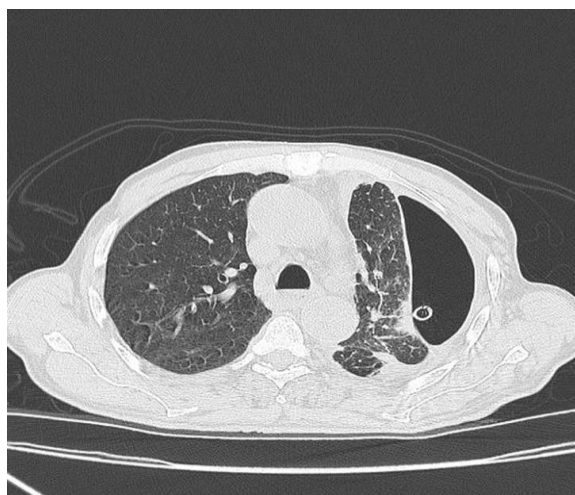


Fig. 2a: CT thorax showing BPF and left ICD in situ

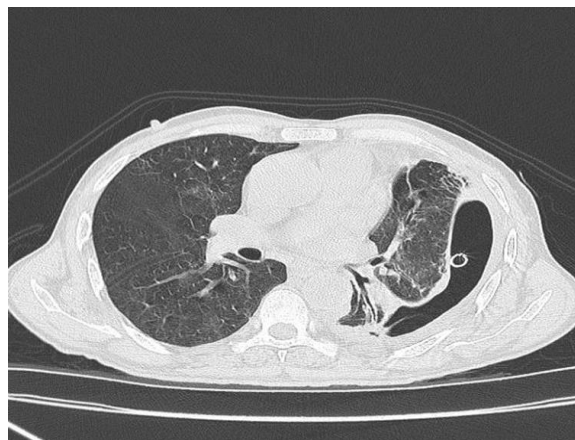


Fig. 2a: CT thorax showing BPF and left ICD in situ



Fig. 3a: Follow-up chest radiographs



Fig. 3b: Follow-up chest radiographs

Discussion

The incidence of BPF varies from 4.5% - 20% after pneumonectomy and 0.5% following lobectomy [2]. Asamura and his colleagues did a multivariate analysis

on the risk factors of BPF in lung cancer patients who underwent pulmonary resections. They found that right sided resection, pneumonectomy mediastinal lymph node resection and residual carcinoma at the bronchial stump as factors that predisposed to BPF [11].

There are various methods which was reported in the literature for BPF closure. This includes agents like glutaraldehyde-sterilized lead shot, autologous blood patch, gel foam and tetracycline, gelatin-resorcinol mixture, oxidized regenerated cellulose, albumin-glutaraldehyde tissue adhesive, N-butyl cyanoacrylate [9,10,12-14]. In our case we used N-butyl cyanoacrylate glue in two settings for the BPF closure. Other methods like use of intrabronchial valves, coils and stents were also reported [15-17].

A study on effect of N-butyl cyanoacrylate glue on the healing of skin wounds was studied by Galil and his colleagues. This glue was preferred over conventional suturing because of its effective and immediate hemostasis, bacteriostatic properties and rapid adhesion to hard and soft tissue [16,17]. 42 adult male hamsters were included in the study and found that initial healing was up to five days was faster in cyanoacrylate treated tissue. Moreover this provided immediate hemostasis and easy to use.

A case report presented by Javed et al., encountered with pulmonary embolism following endoscopic instillation of high dose of N-butyl cyanoacrylate glue (4ml) for treating gastric variceal bleeding [18]. Since the glue polymerizes and hardens instantaneously within 4 seconds on contact with blood, there will be tearing of vessels because of the needle stuck [19,20]. Dilution of the glue with lipoidal contrast agent used for prevention. Also larger volume delays polymerization and may increase the risk of embolization [21]. Mahmoudi and his colleagues in a study, reported 1ml instillation of glue at a time is ideal and essential to avoid embolization [22].

We used Endocryl glue (1ml N-butyl cyanoacrylate) for the closure of BPF. Endocryl glue instillation was injected through the bronchoscopy into the superior segment of left lower lobe bronchus. This was done in two sittings in which 1 ml each was injected. Patient didn't develop complications post-operatively and improved symptomatically. Follow up chest X ray after 1 month showed complete resolution hydropneumothorax.

Conflicts of interest: None declared

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