

Case report

Encysted secondary spontaneous pneumothorax successfully managed by simple needle aspiration

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Abstract

Introduction : We reported a case of encysted secondary spontaneous pneumothorax (SSP) in a 80-years old male with post TB fibrosis with emphysema managed with simple needle aspiration. **Case presentation:** The patient presented with increased shortness of breath with right sided chest pain for 6 hours, on examination of chest, absent breath sound with hyper resonance was found right mid and lower chest. Others area was vesicular breath sound with prolonged expiration as well as expiratory wheeze. Chest x ray shows hyper translucent lung field with devoid of bronchovascular marking with collapse lung margin on the Right side. Inhomogenous opacity with fibrotic band in the Right apical zone & trachea is shifted to right and others features of Emphysema/COPD also present (Fig -1) suggestive of right sided encysted pneumothorax with Post TB fibrosis with emphysema. We aspirate 1100ml of air by simple needle aspiration & give conservative treatment of COPD and patient SOB reduce, other clinical parameter was improved. Chest x ray shows pneumothorax was resolved and lung was expanded. **Conclusion:** simple needle aspiration in the management of secondary spontaneous encysted pneumothorax successfully expands the lung. Recent guideline says with secondary pneumothorax require intercostal tube drainage (ICTD). simple needle aspiration is a cheap, can be easily constructed, suitable for resource-limited settings, can be easily inserted without supervision and higher skills, less risk of chest tube related-complications and shorter length of hospital stay.

Key words: encysted secondary spontaneous pneumothorax, primary spontaneous pneumothorax, traumatic pneumothorax

Introduction

A pneumothorax (PTX) is an accumulation of air in the pleural space which compromises cardiopulmonary function.¹ There are two types of pneumothorax, traumatic and atraumatic/spontaneous. An atraumatic or spontaneous pneumothorax can be of further two types- primary spontaneous pneumothorax (PSP) in the absence of known lung disease and secondary spontaneous pneumothorax (SSP) with underlying lung disease.² Most of the PSP are managed by observation and/or needle aspiration. And usually, SSP requires a Chest tube drain.³ Pneumothorax requiring intervention is traditionally treated by large-bore chest tube drainage (CTD). Simple pneumothoraces, however, could also be treated successfully with the less invasive catheter aspiration as was shown by Delius et al. in 1989: for needle-induced PTX the success rate was 75%.⁴ Similarly, needle aspiration (NA) has been found to be effective for primary and secondary spontaneous pneumothoraces in recent randomized trials.^{5,6} Compared with chest tube thoracostomy, needle aspiration is less traumatic and may help to shorten hospital stay thereby reducing costs.

Though there is still no general consensus regarding this therapeutic modality, the British Thoracic Society recommended needle aspiration as a firstline therapy for primary spontaneous pneumothorax and as an option for small secondary spontaneous PTX as early as 2010.⁷

Case report: A 80-years-male with known case of right sided post TB fibrosis (H/O of PTB 40 years back) with emphysema and ex-smoker for 25 pack years brought to the cardiology OPD(ED) with increased shortness of breath with right sided chest pain for 6 hours. After cardiac evaluation specially ECG, Echocardiogram was normal and referred to our respiratory medicine consultant.

On general examination, he was anxious and dyspnoic but alert, oriented to time, place, and person. His pulse rate was 94 beats/minute, blood pressure was 130/85 mm Hg, respiratory rate was 30 breaths/min, the temperature was 98.8 F, and SpO₂ was 95%. On cardiovascular examination, there were no murmurs. In room air, on

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respiratory examination, he was using his accessory muscles for respiration. The trachea was shifted to right & chest wall depressed on right upper zone. absent breath sound with hyper resonancy was found right mid and lower chest. Others area was vesicular breath sound with prolonged expiration as well as expiratory wheeze. With a provisional diagnosis of acute exacerbation of COPD with Right sided pneumothorax, Chest x ray shows hyper translucent lung field with devoid of bronchovascular marking with collapse lung margin on the Right side. Inhomogenous opacity with fibrotic band in the Right apical zone & trachea is shifted to right and others features of Emphysema/COPD also present (Fig -1) suggestive of right sided encysted pneumothorax with Post TB fibrosis with emohysema

Procedure

With all aseptic precaution we insert 18G I/V cannula at



Fig-1

the right 5th intercostal space in the mid-axillary line in the triangle of safety. The intrapleural about 1100ml air was drained by 50cc syringe freely after that we stop the procedure due to feeling of resistance was felt & lung was expanded evidence by coughing and an IV cannula was taken out. A tight surgical bandage was applied for the next 24 hours. The patient felt immediate relief after the procedure. He could talk in complete sentences and his oxygen saturation improved to 97%. He was admitted and treated for COPD with oxygen delivery via nasal cannula, and antibiotics after 1 day chest x ray done, x ray shows size was pneumothorax reduce, lung expanded almost fully discharged on the 2nd day on inhaler drugs (rotacapsule indicaterol(110)+Glycopyrronium(50) single dose a day via revolizer device). The patient was asked to follow up after ten days but came up after 1 month. He was clinically well, able to walk without shortness of breath and talk in full sentences.



Fig-2

Discussion

secondary spontaneous Pneumothorax is an urgent situation that has to be treated immediately upon diagnosis. There are two types of pneumothorax, traumatic and atraumatic/spontaneous. An atraumatic or spontaneous pneumothorax can be further divided into two types: primary spontaneous pneumothorax (PSP) in the absence of known lung disease and secondary spontaneous pneumothorax (SSP) with underlying lung disease.² Occasionally, The communication between the air way and the pleural space acts as an one way valve, allowing air to enter the pleural space during inspiration but not to escape on expiration leading to tension pneumothorax.⁸ Secondary spontaneous pneumothorax is typically detected on an erect posterior-anterior chest X-ray image

through visual inspection by experienced radiologists.^{3,10} Loculated or encysted pneumothorax is a form of pneumothorax where a pocket of pleural air is trapped within a localized area. The posterior-anterior chest radiograph shows absent broncho-vascular markings extending from the edge of the visceral pleura to the chest wall & a pocket of pleural air is trapped within a localized area. However, it is possible to confuse a pneumothorax with a lung bulla. The mediastinal shift is usually evident in individuals with a tension pneumothorax. Computed tomography (CT) imaging of the chest is occasionally performed when diagnostic uncertainty exists, for example, to distinguish a pneumothorax from a large bulla or when the lung field is

obscured by surgical emphysema. It is also often carried out before a contemplated surgical procedure or when an underlying lung abnormality—such as interstitial lung disease, lymphangioleiomyomatosis, or histiocytosis—is considered a possibility [9]. Ultrasound of the pleura is best utilized when bedside rapid imaging is needed to diagnose pneumothorax (e.g., unstable patients with trauma or patients with suspected tension).¹¹ Encysted pneumothorax more commonly occurs in SSP which is more difficult to diagnose and treatment, our case was encysted SSP with large size (2/3 of right hemithorax) and we managed with needle aspiration successfully all through most of the guideline advice chest drain tube

The management of pneumothorax depends on the severity of symptoms, its size, and the presence of underlying lung disease. According to British Society Guidelines 2010, the size between the lung edge and chest wall is used to estimate the size of pneumothorax, i.e., <2 cm for small pneumothorax and ≥2 cm for large pneumothorax. The treatment of PSP includes initially needle aspiration (NA) with subsequent chest radiography and observation.³ This contrasts with US guidelines where chest drain is considered more appropriate.¹² The treatment of SSP includes catheter or chest tube insertion and simultaneous treatment of underlying lung disease.⁹ Our patient had encysted secondary spontaneous pneumothorax and was managed with needle aspiration, although existing guidelines recommend catheter insertion or tube thoracostomy.^{3,12} There is a role of needle thoracostomy in tension pneumothorax and early stage of secondary pneumothorax. There is limited data on needle aspiration as the primary modality of treatment in secondary spontaneous pneumothorax. A study by Ganaie et al. showed that there was no particular advantage in using NA as the first intervention over intercostal tube (ICT) in secondary spontaneous pneumothorax. It should not be included in the secondary spontaneous pneumothorax treatment algorithm in view of poor, successful lung re-inflation rate, longer hospital stays, and all eventually requiring ICT.¹³ Our patient with secondary spontaneous encysted pneumothorax was managed with a needle aspiration and treatment of co-existing lung disease. The COPD was in control and stable with bronchodilator inhalers over few months with no recurrence of pneumothorax.

The needle aspiration using IV cannula, IV set and 50cc syringe is an alternative to chest tube. This procedure has some pros and cons. This needle aspiration is cheap, can be easily constructed, suitable for resource-limited settings, can be easily inserted without supervision and higher skills, less risk of chest tube related-complications and shorter length of hospital stay. The disadvantage of using this needle aspiration is that there is high chance of disconnection of IV set and IV cannula and sucking of air back into interpleural space and some case need recurrent needle aspiration and some case need to chest tube drainage. This is not suitable for tension

pneumothorax and open pneumothorax

Conclusion

So far we know our case is the successful needle aspiration of encysted SSP, as a case report may be the first. As needle aspiration cost effective, can be easily constructed, suitable for resource-limited settings, can be easily inserted without supervision and higher skills, less risk of chest tube related-complications and shorter length of hospital stay. We may prefer firstly by needle aspiration if not contraindicated all through recent guideline does not support.

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