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Case report

Voice training induced spontaneous pneumothorax

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ABSTRACT

Background: Voice training induced spontaneous pneumothorax is seldom reported in the literature. This study reports a case of middle-aged man without comorbidities who presented with spontaneous pneumothorax following voice training and made a complete recovery after CT guided needle thoracostomy.

Case report: This is a case of a middle-aged male non-smoker with ectomorphic build who presented with chest pain of sudden onset and difficulty in breathing following voice training. The chest pain was central, radiated to the left shoulder and aggravated by lying supine. Chest auscultation revealed reduced breath sounds on the left middle and lower lung zones posteriorly.

An initial diagnosis of chest pain of unknown origin was made. Chest radiograph done revealed a left sided pneumothorax, with no background lung pathology seen. Chest CT was done to rule out any underlying pathology, to quantify the pneumothorax and to plan for CT guided needle thoracostomy at our institution.

Complete resolution of the left sided pneumothorax was seen after the procedure.

Conclusion: Voice training is a rare cause of primary spontaneous pneumothorax. In the absence of any other lung pathology, it can be effectively managed by CT guided needle thoracostomy as seen in the index patient.

It is essential for emergency physicians to include voice training as a potential cause for primary spontaneous pneumothorax.

1. Introduction

Primary spontaneous pneumothorax (PSP) occurs when there is atraumatic leakage of air into the pleural spaces in the absence of an underlying clinically apparent lung disease [1]. This abnormal collection of air may be precipitated by sudden changes in atmospheric pressure or other forms of barotrauma [2,3]. Though clinically apparent lung disease is thought to be absent in PSP, subpleural bullae are found in 76–100% of patients during video-assisted thoracoscopic surgery [4].

Voice training basically involves the intricacies of changes in melody, notes and pitches by manipulating vocal cords as well as thoracic and abdominal muscles. Significant alterations in intra-thoracic pressure may be produced, capable of rupturing the blebs in the lungs causing a pneumothorax [3].

We report a case of a middle aged man without comorbidities who presented with a spontaneous pneumothorax following a voice training rehearsal and made a complete recovery after an image guided needle thoracostomy.

2. Case presentation

The patient was a 41 year old male non-smoker with ectomorphic build who presented with chest pain of sudden onset and difficulty in breathing which had been on for 6 hours. He was engaged in voice training rehearsals the previous evening and symptoms developed overnight. The chest pain was initially described as sharp, and then became a steady ache. The chest pain was central, radiated to the left shoulder and aggravated by lying supine.

He denied a previous history of trauma, fever, cough or palpitations and any significant past medical or family history. He however had mild dyspnoea.

On initial presentation, vital signs were normal except for tachypnoea of 22 cycles/min. Oxygen saturation was 97% on room air. The patient was 173cm tall and weighed 59kg with a BMI of 19.71 kg/m². Physical examination revealed an ill-appearing male of asthenic build in painful distress. On chest examination, percussion notes were hyper-resonant on the left hemithorax and auscultation revealed reduced

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breath sound intensity on the left middle and lower lung zones posteriorly. Routine blood work was essentially normal. A chest CT was obtained which clearly delineated a left-sided pneumothorax with a collapsed segment of the lung as seen in Fig. 1.

The air was then aspirated gradually using a 16G cannula under aseptic conditions (Fig. 2a) and image guidance with a resultant effect of expansion of the left lung (Fig. 2b).

Patient's symptoms resolved immediately after procedure and he was discharged home the same day. Follow up visit carried out at six weeks revealed complete resolution of the left sided pneumothorax, with the lung tissue fully re-expanded. Fig. 3. There was no recurrence of symptoms.

3. Discussion

Primary spontaneous pneumothorax (PSP) is a relatively uncommon condition with a yearly incidence of 7.4–18 cases per one hundred thousand men and 1.2–6 cases per one hundred thousand women [5,6]. The occurrence of PSP following voice training is rarely reported in researched literature even though pneumomediastinum, which may occur following similar mechanisms, has been shown to follow episodes of shouting [7,8].

The exact cause of a primary spontaneous pneumothorax is not known but authors like Inderbitsi et al. have postulated that the rupture of a sub-pleural bleb or bulla found in 76–100% of patients who had video-assisted thoracoscopic surgery [3,9]. Known risk factors include: smoking, male sex, ectomorphic physique and a family history of pneumothorax [10]. PSP is also more common among adolescents and young adults as demonstrated in a study by Abolnik et al. [11] who identified 286 cases with an average age of 25.3 years. The index patient however, was 41 years of age which is older than the usual for PSP and as such makes voice training more distinct as the aetiology in this case.

Most episodes of primary spontaneous pneumothorax occur while the patient is at rest. Virtually all patients have ipsilateral pleuritic chest pain or acute dyspnea [12]. Onset of symptoms in this case was gradual with sharp chest pain being the most prominent symptom. With progressive increase in the volume of air within the pleural space however, symptoms became exacerbated.

A P.A, erect chest radiographics usually sufficient to confirm the diagnosis of a pneumothorax, however a CT scan which provides more detail will be required when the physical examination and chest x-rays are equivocal [10]. Consideration should also be given for a CT in patients older than the expected age for PSP e.g. patients over 40 years of age. A high level of suspicion is also required when dealing with a pneumothorax as it can swiftly progress to a tension pneumothorax,

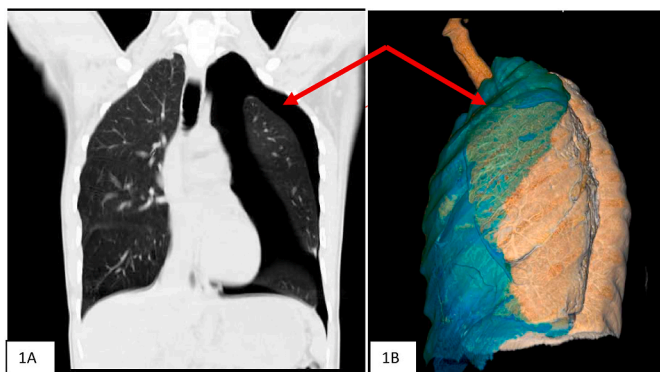


Fig. 1. A: CT scan of the chest, sagittal reformatted, lung window. The pneumothorax is more evident (black arrow), with a collapsed segment of the lung noted (red arrow). Fig. 1B shows the volume rendered image (lateral view), with the area of pneumothorax, depicted in green. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

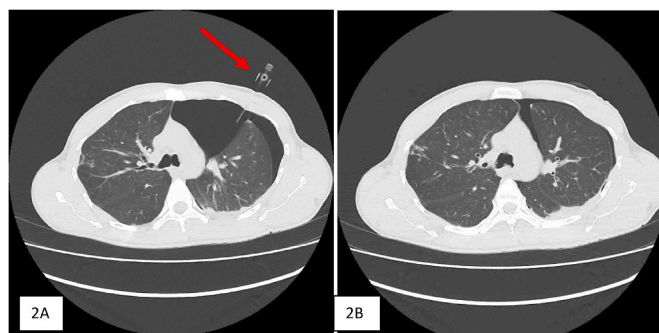


Fig. 2. a: Image guided needle aspiration with 16G needle (arrow) in situ. Fig. 2b: Post intervention axial scan, showing almost complete resolution of the left sided pneumothorax.

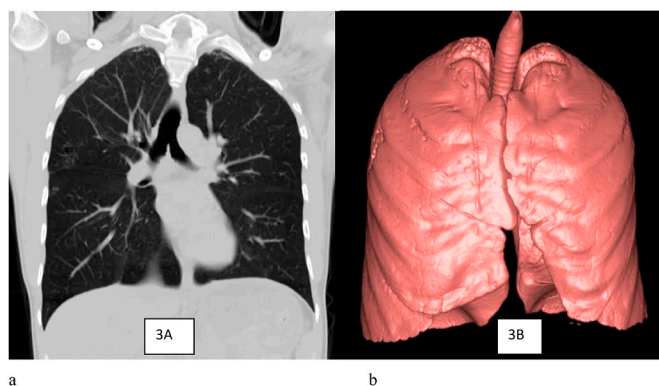


Fig. 3. a: Follow up scan done 6 weeks later shows complete resolution of the left sided pneumothorax, with the lung tissue fully re-expanded. Fig. 3b shows the volume rendered image (frontal view) depicting fully re-expanded lungs.

however, the probability of this occurring in primary spontaneous pneumothorax has been found to be low [5].

Small spontaneous pneumothoraces do not always require any form of intervention, as they are unlikely to proceed to respiratory failure or tension pneumothorax, and usually resolve spontaneously. Large PSPs with air leak into >50% of the pleural cavity will require treatment which may be in form of needle aspiration, chest tube insertion, pleurodesis, surgery or any combination of the aforementioned [10]. The index patient had needle aspiration with complete resolution of symptoms and no recurrence at 6 weeks follow up visit. Noppen et al. demonstrated no significant difference in initial success rates and recurrence rates for needle aspiration versus chest tube drainage especially in patients with their first episode of PSP [13].

Recovery may take anywhere from one week to four weeks depending on the size of the pneumothorax and treatment approach used. However, for first time occurrences as in this patient, manual aspiration led to a complete resolution and no short term recurrence. A study by Harvey et al. showed that needle aspiration is a simple and safe procedure and should be the initial treatment of choice for patients with normal lungs who present with a spontaneous pneumothorax, irrespective of its size. It is less painful than intercostal drainage, leads to a shorter admission, and reduces the need for pleurectomy with no increase in recurrence rate at one year [14].

4. Conclusion

The occurrence of PSP following voice training is rarely reported in researched literature. The study concludes that intense voice training is a cause of spontaneous pneumothorax as demonstrated in this case. Possible mechanisms for this observation are suggested and treatment in

large air collections can be by simple needle aspiration with no recurrence.

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Declaration of competing interest

None to declare.

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