Case Report

Pneumothorax Secondary to Acupuncture Therapy

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Abstract: A 27-year-old medical student seeking acupuncture therapy for a right levator scapular muscle spasm developed acute dyspnea, chest pain, and nonproductive cough within minutes following the treatment. The patient was later diagnosed with a 30% pneumothorax of the right lung. Pneumothorax is a well-known adverse effect of medical procedures such as central line placement, thoracocentesis and transbronchial lung biopsy. This case illustrates another iatrogenic cause of pneumothorax—acupuncture-induced pneumothorax. A review of the literature since 1985 reveals nine case reports of acupuncture-induced pneumothorax.

Key Words: Pneumothorax, acupuncture, iatrogenic, dyspnea, chest pain

The phenomenon of a pneumothorax occurs when a sufficient amount of air enters the pleural cavity to disrupt the surface tension adhering visceral to parietal pleura. The pleural cavity, normally a potential space, becomes a real space filled with air. Likewise, the inherent elastic recoil of the lung causes collapse. Pneumothoraces can be broadly classified by their etiology: spontaneous, traumatic, and iatrogenic.[1] The medical community is well versed in the diagnosis and management of this condition, as well as with an extensive list of etiologies, such as those found in the sixth edition of *General Thoracic Surgery* (Table).[2] However, acupuncture is an important cause of pneumothorax which is missing from the list. This report describes a case of a pneumothorax caused by acupuncture therapy.

Case Report

A 27-year-old female medical student presented to the clinic complaining of chest pain and dyspnea for the previous 24 hours. It was described as a sharp stabbing pain located over the right anterior chest with radiation to the posterior shoulder and mid back, which worsened with movement and improved with direct pressure applied to the anterior thorax. These symptoms, along with a nonproductive cough, began within minutes following acupuncture therapy for a right levator scapular muscle spasm. The acupuncture was performed along the medial border of the right scapula from the second to the eighth thoracic vertebrae. After resting five to six hours, the chest pain and dyspnea improved, while the nonproductive cough persisted. There were no palpitations or chest tightness/heaviness. Her past medical history was unremarkable, and she took oral contraceptives with a daily multivitamin. The patient never smoked and only drank alcohol occasionally.

Physical examination revealed decreased breath sounds over the right posterior scapular border in the area of the levator sacapulae and rhomboid muscles. There was no tracheal deviation, and her vitals were stable with oxygen saturation on room air at 96%. A chest x-ray was obtained and interpreted by the radiologist as a 30% pneumothorax of the right lung. It was then decided to allow the patient to go home, rest and wait for spontaneous resolution. This decision was based on the fact that the patient was a medical student who did not live alone and was only five minutes away from a hospital.

Over the next 36 hours, the patient's chest pain, dyspnea, and cough gradually worsened, prompting her to seek care at Broward General Medical Center's

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Key Points

- The increasing use of acupuncture therapy will lead to an inevitable rise in serious adverse events.
- Pneumothorax is a potential adverse outcome of acupuncture therapy.
- The medical community should have an elevated level of suspicion for serious adverse outcomes secondary to acupuncture therapy.

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emergency department. There, she was evaluated and another chest x-ray was obtained and interpreted as a 30% pneumothorax of the right lung. With no improvement of her symptoms, a 28F chest tube was inserted in the midaxillary line, fourth intercostal space and attached to water seal suction. A post tube placement chest x-ray indicated good tube placement with re-expansion of the right lung. Vital signs upon admission to the emergency department were stable and remained unchanged. The patient was subsequently admitted to the in-house cardiothoracic surgery service and remained in the hospital for two nights with no complications. Upon discharge, the water seal was replaced with a Heimlich valve and then removed two days later. A final chest x-ray following the tube removal revealed good lung expansion.

Discussion

This case provides the opportunity to review various therapeutic options in managing a pneumothorax. Options that may be utilized include observation with or without supplemental oxygen, pigtail catheter drainage, or tube thoracostomy. The decision of which modality to use largely depends upon the extent of injury, presence or absence of symptoms, and to a lesser degree, the etiology. If symptoms are at most minimal and the extent of injury is less than 15% on a chest x-ray, observation is typically appropriate. If a patient is admitted for short-term observation, supplemental oxygen may be employed to help increase the rate at which a pneumothorax is absorbed. If symptoms are more precarious or the extent of injury is greater than 15% on a chest x-ray, then a pigtail catheter or tube thoracostomy would be the procedures of choice. The importance of differentiating between iatrogenic versus primary spontaneous pneumothoraces lies in the fact that a primary spontaneous pneumothorax has an increased risk of recurrence, while iatrogenic-induced pneumothoraces generally do not. A few recent studies have shown that small pigtail catheters may be safer, more comfortable, cost-effective, and have fewer complications than tube thoracostomy for treating pneumothoraces and pleural effusions.[3,4]

The incidence of adverse sequelae in patients receiving acupuncture therapy is not well documented within the medical literature. Physicians must be aware of the complications associated with acupuncture as the number of physicians utilizing this therapy is growing. A search of the medical literature in English since 1985 found several articles pertaining to the indications for acupuncture therapy and the potential complications, but only 9 case reports of acupuncture-induced pneumothorax.[5–13]

Since the term "acupuncture" may indicate several different therapies, it is important to explicitly define the therapy undergone by this patient. The acupuncture treatment utilized in this patient's case is termed "needling." Needling is a therapeutic or preventive surgical procedure with the insertion of at least one thin, solid, metallic needle into the body.[14] When needling on the posterior thorax, one should avoid deep needling to spare the apices of the lungs, which are shallow at the base of the neck. The needle should be inserted superficially at an angle toward the midline. A needle of 25 mm in length is recommended for needling in this area.[15] The acupuncture needle used in this patient was a Seirin J-type 5 (0.25) 30 mm sterilized, disposable needle.

The most common serious adverse event from needling is pneumothorax. Care should be taken when needling long-

Table. Classification of pneumothorax

Spontaneous
Primary
Subpleural bleb rupture
Secondary
Bullous disease, including chronic obstructive pulmonary disease
Cystic fibrosis
Spontaneous rupture of the esophagus
Marfan syndrome
Eosinophilic granuloma
Pneumocystis carinii
Metastatic cancer, especially sarcoma
Pneumonia with lung abscess
Catamenial
Asthma, secondary to mucous plugging
Lung cancer
Lymphangioleiomyomatosis
Alpha 1-antitypsin deficiency
Neonatal
Acquired
Iatrogenic
Transthoracic needle biopsy
Subclavian catheterization
Central lines
Pacemaker insertion
Transbronchial lung biopsy
Chest tube malfunction
After laparascopic surgery
Barotrauma
Trauma
Blunt trauma
Motor vehicle accident
Fall
Sports-related
Penetrating trauma
Gunshot wound
Stab wound

Adapted from General Thoracic Surgery, volume 1, 6th edition.

time smokers, those with scoliosis or with a thin body habitus. Often, their lungs are weak or superficial, making them more susceptible to pneumothorax.[15] The estimated annual incidence of primary spontaneous pneumothorax is between 7.4 and 18.0 cases per 100,000 in men, and between 1.2 and 6.0 cases per 100,000 in women.[16] Secondary spontaneous pneumothorax has an annual incidence of approximately 6.3 cases per 100,000 in men and 2.0 cases per 100,000 in women.[16] Review of the English medical literature for the past 20 years found nine case reports of pneumothorax secondary to acupuncture therapy. The importance of this case cannot be overlooked due to the ever increasing use of acupuncture therapy in the U.S. The acceptance of this practice continues to expand within the "main stream" medical community, as evidenced by the National Institute of Health Consensus Development Panel on Acupuncture article in the Journal of the American Medical Association.[17] Likewise, the increasing use of acupuncture therapy will lead to an inevitable rise in serious adverse events.

Conclusion

This article describes an unusual case of pneumothorax induced by acupuncture therapy. Although serious adverse events due to acupuncture therapy are rare, the medical literature does not provide adequate data pertaining to the incidence of such complications. It is the intention of this case report to make the medical community aware of the increased use of acupuncture therapy and to elevate the level of suspicion for adverse outcomes.

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Virtue grows in adversity.

—motto of the Earls of Denbigh