

# EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER  
DEPARTMENT OF EMERGENCY MEDICINE

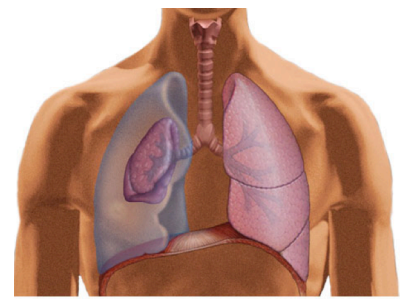


Care Warriors

## Spontaneous Pneumothorax

A 24-year-old male with Marfan's Syndrome presents to the Emergency Department with sudden onset of shortness of breath and right sided chest pain which began 1 hour prior to arrival. Patient describes the pain as "sharp", 7/10, and radiating to the upper back and right shoulder. He denies any recent trauma, nausea, vomiting, diaphoresis, fever, recent illness, travel, or immobilization. He reports no significant family history. Admits to a 6-pack year smoking history, heavy alcohol use and denies any drug use. On physical exam, patient is a slender 24-year-old male who appears to be in mild respiratory distress. He is AAOx3, vital signs are stable with mild hypoxemia. Trachea is midline. On the lung exam patient has decreased breath sounds on the right lung fields and percussion reveals hyper resonance to the apex of the right lung. Heart exam shows positive S1 and S2 heart sounds, no murmurs are appreciated, there is no reproducible chest tenderness, and patient has no jugular venous distension. Otherwise abdominal and neurological exams are intact. Which risk factor(s) does this patient have that predispose him to his current medical condition?

- A. Smoking History
- B. Marfan's Syndrome
- C. Alcohol abuse
- D. A, B and C
- E. Both A and B



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Complete right-sided pneumothorax

A pneumothorax is a collapsed lung. It occurs when air leaks into the space between the lung and the chest wall and the pressure from the air pushes on your lungs causing it to collapse. Some differentials to consider include asthma, aspiration, diaphragm injuries, foreign bodies, mediastinitis, myocardial ischemia, myocarditis, pulmonary empyema and tuberculosis.

*EM Case of the Week is a weekly "pop quiz" for ED staff.*

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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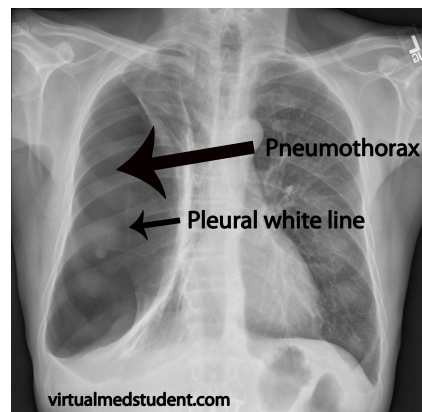
# Warriors

**The correct answer is E.** This patient has a primary spontaneous pneumothorax (PSP). Some risk factors that have been proposed or linked to having a PSP include smoking history, Marfans syndrome, family history of PSP and being a male.

A pneumothorax is a collapsed lung. It occurs when air leaks into the space between your lung and chest wall. The pressure then pushes on your lung causing it to collapse. It can be caused by blunt chest trauma, underlying lung disease, mechanical ventilation, or it can be iatrogenic. Spontaneous pneumothorax is divided into primary and secondary. A primary spontaneous pneumothorax (PSP) is a pneumothorax that occurs without an inciting event in a person without lung disease. The incidence of PSP in the united states is about 7/100,000 yearly with a higher rate of occurrence in men than women. A secondary spontaneous pneumothorax (SSP) results as a complication of underlying lung disease, most commonly COPD cystic fibrosis, lung malignancy and necrotizing pneumonia.

## Discussion

Primary spontaneous pneumothorax occurs in people without any underlying lung disease. The typical presentation is a young patient in their 20's who develops sudden onset dyspnea and pleuritic chest pain which begins at rest. Although PSP is considered to occur in people without previously recorded lung pathology, it has been found that many of these people do in fact have some underlying lung disease which has gone undiagnosed. The incidence is higher in males, smokers, and patients with a family history of primary spontaneous pneumothorax. Once a person has had a PSP, the recurrence is estimated to be somewhere between 24-54%. A tension pneumothorax is a complication which can occur in 1-2% of patients with PSP and patients usually present with tachycardia, tachypnea, hypotension and hypoxemia. There will be a mediastinal/tracheal shift to the contralateral side and the ipsilateral lung will be collapsed. This is a medical emergency and requires immediate decompression.



Secondary spontaneous pneumothorax occurs as a complication of underlying lung disease, most commonly patients with COPD (most likely from rupture of apical blebs). Other lung pathology that can result in spontaneous pneumothorax includes cystic fibrosis, primary or metastatic lung malignancy, necrotizing pneumonia, tuberculosis. . The typical presentation of these patients is like those with PSP, except the symptoms tend to be more severe; dyspnea can range from mild to very severe likely due to the underlying lung disease causing a decrease in pulmonary reserve.

## Diagnosis

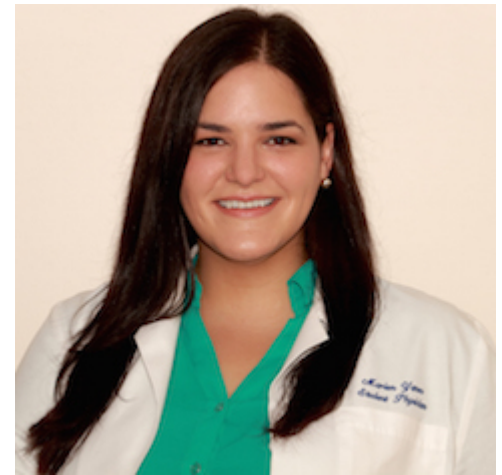
For both PSP and SSP the initial diagnosis consists of chest radiograph. Diagnosis is made with the presence of a white visceral pleural line on the CXR which indicates the border of the lung and pleural air. The size of the pneumothorax can be estimated using imaging by determining the distance between the visceral pleura and parietal pleura at the level of the hilum. If the distance is greater than 2 cm then it is a "large" pneumothorax. If the diagnosis of pneumothorax is unclear from the chest radiograph, you can obtain a CT of the chest, or less commonly an ultrasound can be done.

## Treatment

Treatment for pneumothorax depends on the type and size of pneumothorax.

For a list of educational lectures, grand rounds, workshops, and didactics please visit [BrowardER.com](http://BrowardER.com) and **click** on the **"Conference"** link.

*All are welcome to attend!*



This month's case was written by Marien Yanes. Marien is a 4<sup>th</sup> year medical student from NSU-COM. She did her emergency medicine rotation at BHMC in September 2017. Marien plans on pursuing a career in Family Medicine after graduation.

PSP <3 cm in stable patient	-Supplemental oxygen -repeat CXR in 6 hours -if no changes in CXR and patient has access to emergent medical care can discharge home
PSP >3cm in stable patient	-Pleural aspiration -if above fails can insert chest tube
PSP in unstable patient	-Insert chest tube - if chest tube placement is delayed then do needle decompression (at the 2 <sup>nd</sup> or 3 <sup>rd</sup> intercostal space in the midclavicular line)
Recurrence of PSP in stable patient	-insert chest tube followed by video assisted thoracoscopic surgery
SSP <3cm in stable patients	-placement of small bore chest tube in pleural space and admission to hospital (chest tube preferred over needle aspiration)
SSP >3 cm in stable patient	-chest tube placement
SSP in clinically unstable patients	-Chest tube placement, consider needle decompression if delayed access
SSP <1cm, stable	-supplemental oxygen with close monitoring -repeat CXR 12-24 hours or sooner if deteriorating

## Take Home Points

- Spontaneous pneumothorax can be classified as primary or secondary depending on whether or not there is underlying lung disease.
- Typical presentation is sudden onset of dyspnea and pleuritic chest pain on the side which is affected.
- Diagnosis is made by chest radiograph but in patients with suspected tension pneumothorax, chest tube should be placed immediately.
- As a general rule, if the pneumothorax is >3 cm patient should have intervention either by chest tube, needle decompression or pleural aspiration.

## REFERENCES

Light, R. (2017). Primary spontaneous pneumothorax in adults. In G. Finlay (Ed.), *UpToDate*. Retrieved September 20, 2017, from <https://www.uptodate.com/contents/primary-spontaneous-pneumothorax-in-adults>

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