

# EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER  
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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## Primary Spontaneous Pneumothorax

A 38-year-old male with a past medical history of multiple primary spontaneous pneumothoraces presents to the ED with left-sided chest pain for the past 6 hours. He reports that his pain worsens with deep inspiration. He also admits to a sudden onset of mild shortness of breath but denies palpitations, cough, and anxiety. The patient has a 25 pack-year smoking history. Physical exam reveals a thin patient with multiple scars on the chest secondary to previous chest tube insertions, mild local tenderness in the left second intercostal space, and normal heart and lung sounds. Vital signs are stable. Remainder of physical exam is unremarkable. Chest x-ray and CT scan were ordered, and the patient was found to have small, left-sided spontaneous pneumothorax (<2cm). Which of the following is the most appropriate management?

- A. Simple aspiration with 16-18 gauge cannula
- B. Administer high flow O<sub>2</sub> and observe in ED for any worsening symptoms
- C. Intercostal chest tube drainage
- D. Admission to the hospital and observation for 24 hours

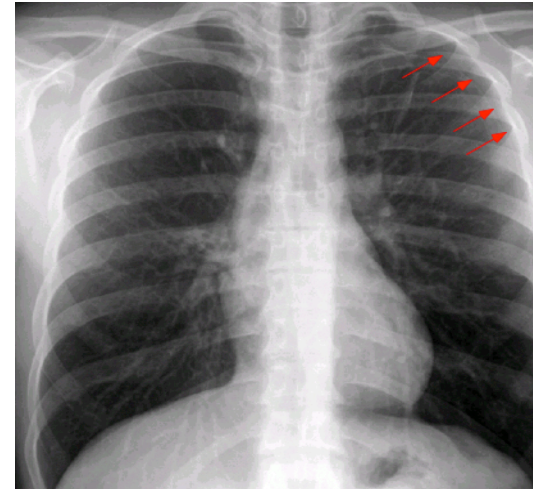


Figure 1: Chest X-ray demonstrating a small left apical pneumothorax. The visceral pleural line is marked by the arrows.



Figure 1: Left-sided chest tube insertion sites scars.

*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.

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**The correct answer is B.** Administer high flow O<sub>2</sub> and observe in ED for any worsening symptoms.

### Introduction:

Pneumothorax is defined as the presence of air in the pleural space. Initial patient presentation depends on the type and size of the pneumothorax and can range from asymptomatic to life-threatening respiratory distress.

Primary spontaneous pneumothorax (PSP) results from rupture of subpleural blebs or bullae, usually at the apices of the lungs. It commonly occurs at rest in otherwise healthy individuals without underlying lung disease. The incidence of PSP ranges between 8-28 per 100,000 cases per year for men and 1.2-6 per 100,000 per year for women.

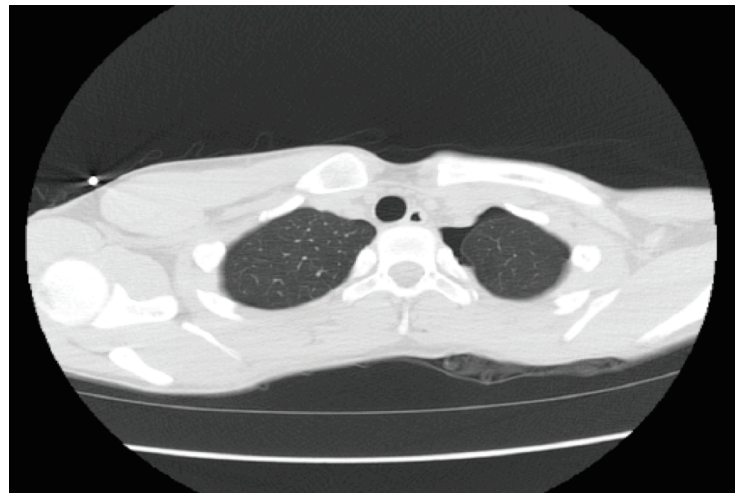
### Discussion:

**Risk Factors:** The most important risk factors for primary spontaneous pneumothorax include: low BMI, male gender, family history, congenital diseases such as Marfan syndrome, and a smoking history.

**Clinical Presentation:** PSP usually presents with a sudden onset of local chest pain with shortness of breath. The severity of the pain depends on the extent of the pneumothorax and usually resolves within 24 hours. Physical exams will reveal decreased or absent breath sounds, hyper-resonance, decreased tactile fremitus, and decreased chest wall movement on the affected side. Vital signs are usually stable although a possible tachycardia can occur secondary to respiratory distress.

**Diagnosis:** The initial approach for primary spontaneous pneumothorax includes the clinical history and physical exam. After PSP is suspected, a chest x-ray should be ordered. Pneumothorax of 2 cm or less of visible rim is considered "small". Larger than 2 cm width at the level of the hilum is considered a "large" pneumothorax.

When a pneumothorax is too small to be detected on standard chest radiograph, chest CT should be ordered. CT can detect very small pneumothoraces, blebs, and bullae, which are found in less than 20% of patients with PSP. In fact, 50% of patients who have blebs/bullae on one side develop them on the opposite side as well and about 25% of them will develop contralateral pneumothorax.



*Figure 3: Chest CT scan showing a small left-sided apical spontaneous pneumothorax.*

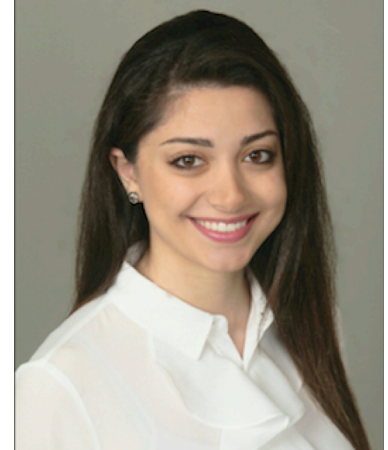
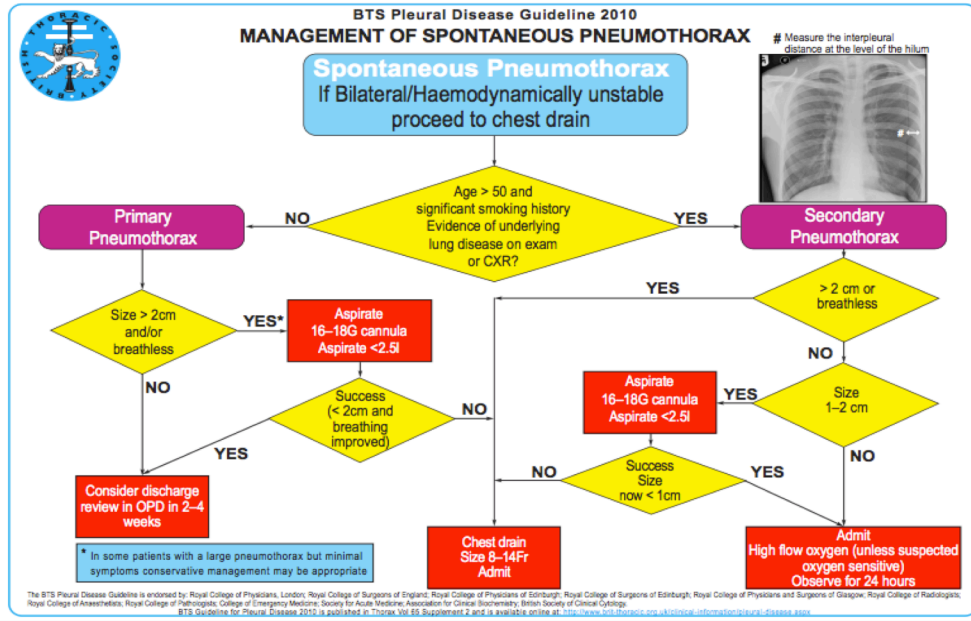
### Management:

The management of PSP depends on the size of the pneumothorax and on the patient presentation. Small pneumothoraces in otherwise healthy individuals are usually managed by observation and supplemental high flow oxygen. Simple aspiration or drainage with pigtail catheter and chest tube are the treatments for larger pneumothoraces. To measure the success of needle aspiration, the patient should be reassessed with a chest x-ray 6 hours later. Chest tube drainage is effective in 85-90% of initial PSP episodes. Hospitalization (4.56-7.60 days) is required with chest tube drainage as compared to simple aspiration. Re-expansion lung edema is a possible complication of chest tube drainage; therefore, caution should be taken with negative pressure suction.

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!*

# Warriors



## ABOUT THE AUTHOR

This month's case was written by Reem Ichoa. Reem is a 4<sup>th</sup> year medical student from NSU-COM. She did her Emergency Medicine rotation at Broward Health North in July 2017. Reem plans on pursuing a career in Pediatrics after graduation.

### Recurrence:

Recurrence is common in PSP and can be unilateral or contralateral. About 25-50% of recurrences are within the first year with 50% increased risk after the first recurrence and 85% after the second. The risk of recurrence increases if a second or third pneumothorax were managed without surgery being done. The presence of blebs and bullae is significantly associated with the development of a recurrence; however, studies have shown that the severity of the dystrophic lesions is not associated with the risk of recurrence.

Surgical options are indicated in cases of recurrent pneumothorax including thoracotomy and video-assisted thoracoscopic surgery (VATS) where blebs/bullae are resected, stapled, or sutured. There is near zero mortality rate and post-operative complications are low making these surgical treatments widely accepted.

### Take Home Points

- Primary spontaneous pneumothorax occurs in patients with no underlying lung disease with a typical presentation of tall and thin adolescent males.
- Patient presentation can range from asymptomatic to severe respiratory distress.
- The diagnosis PSP is based upon the patient's history, physical exam, and imaging studies including chest x-ray and CT scan.
- Treatment options vary according to the size of the pneumothorax and patient presentation.
- Unilateral or contralateral recurrence is common mostly within the first year of the first PSP.
- Surgery is indicated for recurrent spontaneous pneumothoraces and includes thoracotomy and VATS.

### REFERENCES

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