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## A PRIMARY SPONTANEOUS PNEUMOTHORAX IN YOUNG WOMAN

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### ABSTRACT

Primary spontaneous pneumothorax (PSP) occurs in patients without preexisting lung disease and no precipitating event. Risk factors include smoking, age under 40 years, ectomorph body type and family history of PSP. Acute chest pain and shortness of breath are the most frequent symptoms. Pulmonary examination is the most important to clinical diagnosis. We present the case of a patient who consulted in our internal medicine clinic. Complementary information was collected by researching databases on this matter. We describe the case of a 22-year-old javanese woman with no relevant medical history. The patient presented with sudden onset chest pain and dyspnea since 5 days ago, getting worse with exercise and kneeling position. The past two days, she can only sleep with sitting position. No fever or cough or PSP in family history previously. She had recovered from parotitis 3 months ago. She looked tired, tachypnea and tachicardia, and had a 86% peripheral oxygen saturation. The hemithorax dextra is miss motion, hyperresonant, diminished breath sounds. The patient was referred to the emergency department, where additional imaging studies showed an extensive pneumothorax with collapsed right lung. She was admitted for tube thoracostomy and water seal drainage immediately. After 5 days, she had a complete pulmonary expansion. The case described a young woman with PSP without any risk factor beside history of parotitis. It emphasized the importance of physical examination which can not be replaced by additional and laboratory.

### Introduction

Primary spontaneous pneumothorax (PSP) occurs when air enters the intrapleural space in a

patient without a previous trauma or a history of lung disease. A common cause of PSP is the existence of pleural bullae due to subclinical lung disease. Tall, thin, male

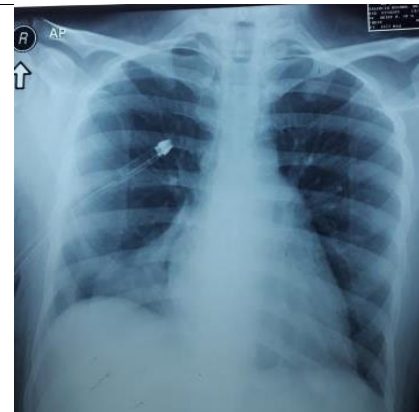
patients who smoke and are between the ages of 10 and 30 are at higher risk for developing PSP. In this case, since the patient was a young woman, no previously lung disease, no other risk factor, make this case interesting.

### **Case presentation**

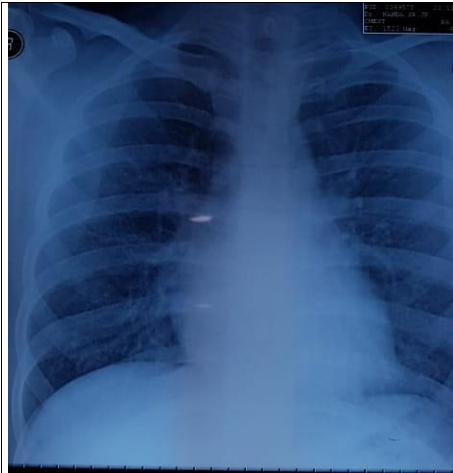
Our patients, a 22-year-old javanese woman with no relevant medical history. The patient presented with sudden onset chest pain and dyspneu since 5 days ago, getting worse with exercise and kneeling potion. The past two days, she can only sleep with sitting position. No fever or cough or PSP in family history previously. She had recovered from parotitis 3 month s ago. She looked tired, tachypnea and tachicardia, and had a 86% peripheral oxygen saturation. The hemithorax dextra is miss motion, hypersonor, deminished breath sounds, and reduced tactile fremitus on palpation of the chest. The patient was referred to the emergency department, where additional imaging studies showed an extensive pneumothorax with collapsed of right lung. She was admitted for tube thoracostomy and water shield drainage immediately. After 5 days, she had a complete pulmonary expansion, and discharged from the hospital.



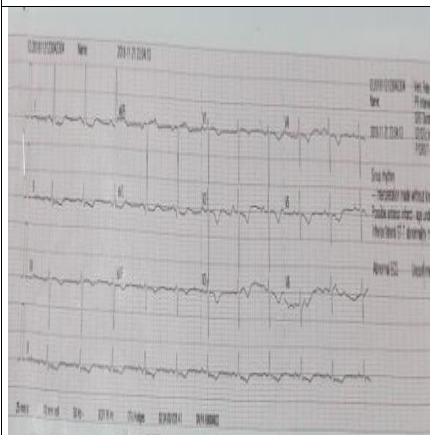
Picture 1. Pneumothorax dextra, with colaps of the right lung



Picture 2. After insertion of chest tube, the right lung begin to expand



Picture 3. Her right pulmo was fully expand



Picture 4. EKG at admission : show sinus rythm with signed of ischemic because of hypoxia

### Discussion

Pneumothorax is defined as air or gas accumulated in the pleural cavity. A pneumothorax can occur spontaneously or after trauma to the lung or chest wall. Pneumothorax

can also be divided into tension and non-tension. A tension pneumothorax can be a medical emergency due to rising intrathoracic pressure from progressive air accumulation in the pleural space. Circulatory or respiratory failure might be developed from subsequent lung or mediastinal compression. A non-tension pneumothorax can be divided into open or close (partial) type. It is not as critical as tension pneumothorax because there is no ongoing air accumulation and hence no compression of intrathoracic organs from rising pressures<sup>1,2</sup>

Spontaneous pneumothorax can be classified as either primary or secondary. Primary spontaneous pneumothorax (PSP), which is defined as a pneumothorax without underlying lung disease, predominantly occurs in young, thin males. It is usually caused by ruptured pleural blebs or bullae . Secondary spontaneous pneumothorax (SSP) usually occurs in older people with underlying pulmonary disease, such as emphysema or asthma, acute or chronic infections, lung cancer, and congenital diseases including cystic fibrosis, catamenial pneumothorax, or lymphangioliomyomatosis<sup>1</sup>.[Go to:](#)

The age-adjusted incidence of PSP is from 7.4 to 18 per 100 000

population per year in males, and from 1.2 to 6 per 100 000 population per year in females. It usually occurs in tall, thin males of 10 to 30 years old. Rarely does it occur in people at the age of more than 40 years. PSP might be associated with some congenital disorders such as Marfan's syndrome, or some environmental factors such as smoking. PSP usually occurs at rest. There are some precipitating factors, such as change in atmospheric pressure or emotional change. In our experience, in the treatment of more than 700 patients with PSP, occurrences are more common during weather changes, and midterm or final exam seasons for students. This may be related to Valsalva maneuver, which has been regarded as a mechanism of pneumothorax or pneumomediastinum in other reported series. Hearing loud music has also being reported as a risk factor of PSP, which may be due to acute changes in transpulmonary pressure by exposure to sound energy<sup>3</sup>.

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### **Pathogenesis**

Most authors believe that PSP results from spontaneous rupture of a subpleural bleb or bulla. However, only a portion of patients with PSP

could be found with blebs or bullae in imaging or at the time of surgery. Other mechanisms may be considered, such as increase in pleural porosity secondary to inflammation. The development of bullae, blebs, or pleural porosity might be related to many factors, such as distal airway inflammation, distal bronchial tree anomaly, disorders of connective tissue formation, local ischemia, and malnutrition<sup>1,3</sup>.

### **Clinical presentation**

PSP usually occurs at rest, and presents with acute onset of local pleuritic chest pain accompanied by shortness of breath. This pain may be mild or severe, sharp and steady ache in character, and usually resolves within 24 h even though pneumothorax still exists. On physical examination, decreased breath sounds on auscultation, decreased chest wall movement on inspection, hyperresonance (tympanic) on percussion, and reduced tactile fremitus on palpation of the chest are most often detected in patients with large pneumothorax (free air occupies more than 15% to 20% area of hemithorax) . Reflex tachycardia can be found in most patients in response to discomfort or circulating or respiratory compromise. Tension pneumothorax should be suspected if severe tachycardia, cold sweating,

hypotension, or cyanosis has developed. Blood gas analysis in patients with large pneumothoraces may reveal increased alveolar-arterial difference in oxygen partial pressure (PA-aO<sub>2</sub>) due to increased intrapulmonary shunt from the collapsed lung<sup>3,4</sup>.

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Most PSP cases are confirmed by upright posteroanterior chest radiograph, which can be used to assess the pneumothorax size with good accuracy. Computed tomography (CT) of the chest can be used to detect patients with small pneumothoraces (less than 15% area of hemithorax). More than 50% of patients with PSP have contralateral blebs/bullae, and about a quarter of them will develop a contralateral pneumothorax<sup>4</sup>.

### **Non-surgical management**

Therapeutic options include bed rest, oxygen supplementation, manual aspiration, chest tube drainage, and thoroscopic and surgical interventions. A small (<15%) pneumothorax in an otherwise healthy patient can be observed and supplied with oxygen inhalation, which can facilitate the reabsorption of air in the pleural cavity up to four-fold faster. The risk of recurrence is estimated to be

20%–50%. The effectiveness of simple aspiration for patients with PSP can be assessed by taking chest radiograph 6 h later. Larger (>15%) pneumothoraces can be treated by simple aspiration with an intravenous or thoracentesis catheter, or drainage with pigtail catheter or chest tube. Simple aspiration is more effective (in about two thirds) for patients with small or moderate pneumothoraces<sup>4,5</sup>. For patients with larger pneumothoraces, recurrent attacks, or larger volumes of aspirated pleural air (>30%), more aggressive therapies such as chest tube drainage or surgery should be considered<sup>5</sup>.

Chest tube drainage can be effective in about 85% to 90% of patients on the first episode of PSPs. However, probabilities of recurrent PSPs can be increased up to 50% after the first recurrence, and 85% after the second recurrence. A recent evidence-based medicine (EBM) review found no significant difference between simple aspiration and intercostal tube drainage with regard to immediate success rate, early failure rate, duration of hospitalization, one-year success rate, and number of patients requiring pleurodesis at one year. Simple aspiration does not require hospitalization, compared with intercostal tube drainage<sup>3,5</sup>.

A chest tube can be connected into the Heimlich one way valve or water-seal system. Chest tubes can be removed successfully at either end expiration or end inspiration, and potentially as soon as less than 200 ml/fluid output per day is achieved or lung is fully expand. Talc pleurodesis through a chest tube or medical thoracoscopy under local anesthesia is superior to conservative treatment by chest tube drainage only in cases of PSP that fail after simple aspiration. However, recurrences may still occur in over half of these patients undergoing talc pleurodesis only<sup>4</sup>. Hence, we use talc pleurodesis in combination with bullae/blebs resection for selective patients with PSP. Surgical management of PSP is usually indicated in patients with recurrent ipsilateral pneumothorax, first episode with occupational risk or persistent air-leakage (more than 5 to 7 d), or prior contralateral pneumothorax<sup>3</sup>.

This case can be classified as PSP, because we hadn't found any risk factor. She is female, proportional Body Mass Index (BMI), not thin, no pulmonary

disease, not smoking, no family history of PSP, and no congenital disorder. Some common precipitating factors were tiredness the past week because of examination and had just recovered from parotitis, in weather change period of time. She was not in her menstrual cycle. Her clinical presentation is pathognomonic for large pneumothorax confirmed by upright postero-anterior chest radiography. Chest tube connected to closed water seal drainage was conducted immediately by surgeon. Presence of bullae and bleb were undetectable, no open thoracotomy needed because in five days her right lung was fully expand and she was returning home. She still have to undergo observation to avoid incidence of recurrence.

**Conclusions:** The case described a young woman with PSP without any risk factor beside history of parotitis. The diagnosis was made by anamnesis and physical examination and confirmed by chest radiology. It emphasized the importance of physical examination which can not be replaced by additional and laboratory.

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