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Case Report

Spontaneous pneumomediastinum

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coronary syndrome and pulmonary embolism. Here we present the case of a young male who developed SPM after a bout of cough.

Case Report

A 24 year old male patient presented to the emergency department at around 4:00 am with complaints of sudden onset chest pain and difficulty in breathing for 30 min duration. He woke up with a severe bout of cough that lasted for 1 min followed by chest pain. Chest pain was moderate to severe in intensity, piercing type, retrosternal and was radiating to the neck. This chest pain was increasing on deep inspiration. Patient also experienced breathlessness at rest immediately following chest pain. He was having rhinorrhoea and dry cough for 2 days. There was no history of fever, vomiting, profuse sweating, previous episodes of angina on exertion or dyspnoea on exertion, hypertension, diabetes mellitus, wheezing, palpitations or swelling over body. Patient denied any history of smoking or drug abuse.

On examination patient was anxious with PR = 110/min, BP = 124/82 mmHg, RR = 22/min, temperature 98.4 °F, there was no cyanosis, clubbing, pallor, icterus, jugular venous pressure was not raised and there was no pedal oedema. There was swelling at base of neck along with fullness of

Introduction

Spontaneous pneumomediastinum (SPM) is defined as presence of free air in the mediastinum in the absence of any surgical or medical procedure, chest trauma or mechanical ventilation.¹ SPM is an uncommon entity seen usually in young males and presents with chest pain, dyspnoea and subcutaneous emphysema. Although SPM is a benign and self-limiting illness it must be differentiated from acute life threatening conditions like Boerhaave syndrome, acute

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bilateral supraclavicular fossa. Crepitations were palpable around neck and shoulders suggestive of subcutaneous emphysema. Systemic examination did not reveal any positive finding. Weight of the patient was 66 kg, his height was 183 cm and Body Mass Index (BMI) was 19.71 kg/m².

Routine haematological and biochemical profile was normal. Electrocardiogram (ECG) was normal, chest X-ray posterior–anterior view showed air as thin translucent streaks of lucency between the parietal pleura and mediastinum at the levels of bilateral hila and lower paratracheal location. Air was also seen between diaphragm and base of heart on left side and in bilateral supraclavicular location as subcutaneous emphysema (Fig. 1). CT scan of chest revealed thin areas of hypodensity with CT values suggestive of air, tracking between the soft tissues of mediastinum and between parietal pleura and mediastinum (Figs. 2 and 3). On the basis of these findings a diagnosis of spontaneous pneumomediastinum with subcutaneous emphysema was made. Patient was managed conservatively with bed rest, oral analgesics and oxygen inhalation.

Patient's symptoms resolved in 3 days, repeat chest X-ray & CT scan done after ten days was completely normal (Fig. 4) and he was discharged. Patient is receiving regular follow up for last one and a half year and has not experienced similar episode.

Discussion

Pneumomediastinum (presence of free air in the mediastinum) can be divided in two groups, if there is no obvious primary

Fig. 1 – Chest radiograph (PA view): demonstrates thin linear/curvilinear translucent streaks at the mediastinal pleural interface (arrow heads). Similar radiolucent streaks are also noted between the diaphragm and base of heart (black arrow) and in bilateral supraclavicular location (white arrows) suggestive of pneumomediastinum and subcutaneous emphysema.

source of the air in mediastinum it is known as spontaneous pneumomediastinum, if specific pathological condition like trauma, intrathoracic infection or disruption of aero-digestive track can be identified then it is referred to as secondary pneumomediastinum.² Spontaneous pneumomediastinum is defined as presence of free air in the mediastinum in the absence of any surgical or medical procedure, chest trauma or mechanical ventilation.¹ The common triggering events for occurrence of SPM are Valsalva manoeuvre, attack of bronchial asthma, many kind of sports events, straining at stools, labour, vomiting, coughing, while performing pulmonary function test and inhalation of illicit drugs like cocaine or amphetamines.³ The patient presented above developed SPM after a bout of coughing. SPM has also been reported as a rare complication in patients with dermatomyositis.⁴ The cause of SPM in these patients is often attributable to interstitial pneumonitis.⁴ Our patient however did not have any features suggestive of interstitial pneumonitis on CT scan of chest, neither was there any evidence of skin manifestations like heliotrope rash or Gottron's papules, also there was no history of muscle weakness and muscle power was normal on examination.

SPM occurs most commonly in young males, with chest pain and shortness of breath being the most common symptoms. The chest pain typically radiates to the back or neck and is aggravated by swallowing, sitting or inspiration. Dysphagia, dysphonia and neck swelling are the other reported symptoms.⁵ The most commonly noted physical sign is presence of subcutaneous emphysema around neck and shoulders.⁶ Hamman's sign refers to crackles or bubbling sound heard with each heart beat on auscultation, may be present.

Signs suggestive of pneumomediastinum on chest X-ray are, air streaks in the superior mediastinum, prominent silhouette of the heart, subcutaneous emphysema of shoulder and neck, double-bronchial-wall sign (the tracheal or main bronchial wall is visualized between inner air and leaked air) and the continuous diaphragm sign (the diaphragm of both sides appearing connected by leaked air between the inferior surface of heart and diaphragm).⁵ The lateral view of chest X-ray is more sensitive in making a diagnosis of SPM.⁷ On lateral view the air can be seen between sternum and anterior pericardium (the pneumopericardium sign), or air can be seen surrounding the pulmonary artery (the ring-around-artery sign).⁵ CT scan of the chest is another useful investigation in cases of suspected SPM, as chest CT can detect even small amount of air that is not detected by chest X-ray. Iyer et al found that 5% patients had pneumomediastinum that was too small to be detected by chest X-ray but was detected by CT scan.⁸ CT scan of the chest can sometimes reveal underlying disease leading to pneumomediastinum.⁹

The differential diagnosis of SPM must include Boerhaave syndrome. Boerhaave syndrome involves the rupture of oesophageal wall after severe vomiting and is characterized by severe chest pain, subcutaneous emphysema, mediastinitis leading to fever and hypotension. Boerhaave syndrome is associated with high morbidity and mortality. The diagnosis of oesophageal perforation is confirmed by water-soluble contrast oesophagram (Gastrograffin), which reveals the location and extent of extravasation of contrast material. Although barium is superior in demonstrating small perforations, the spillage of barium sulphate into the mediastinal and pleural

Fig. 2 – [a–d]: Axial plain CT images (lung window) of the neck and thorax at mid cervical (a), thoracic inlet (b), subcarinal (c) and through mid cardiac levels (d) respectively. Note presence of extensive surgical emphysema involving superficial as well as deep layers of the neck and pneumomediastinum.

cavities can cause an inflammatory response and subsequent fibrosis and is therefore not used as the primary diagnostic study. If, however, the water-soluble study is negative, a barium study should be performed for better definition. However conducting additional invasive investigations are not recommended if there are no features suggestive of Boerhaave

syndrome. Other differential diagnoses for SPM acute coronary syndrome and pulmonary embolism. These were ruled out in our patient as his ECG was normal and also there were no risk factors for coronary artery disease or pulmonary embolism.

Only rest and adjunctive treatment like analgesics are recommended for the treatment of SPM.⁵ Some authors report

Fig. 3 – Coronal and sagittal reformatted images clearly delineate the craniocaudal extent of involvement.

Fig. 4 – Chest radiograph (PA view) taken after symptomatic recovery shows resolution of findings.

that administration of 100% oxygen leads to rapid absorption of leaked air.² Routine use of antibiotics in all patients is not recommended.⁵ Clinical course of SPM is usually benign and the mean duration of onset of symptoms to improvement of symptoms is 1.8–2.2 days.⁵ Our patient also improved symptomatically in 3 days.

Conflicts of interest

All authors have none to declare.

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