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Spontaneous pneumomediastinum – diagnosis by exclusion?

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Abstract

Spontaneous pneumomediastinum can be a difficult condition to diagnose. A young woman with minimal risk factors presenting with features of pneumomediastinum is described. Diagnosis was made on radiological imaging but no etiological cause was found. Disease ran a benign course with good recovery. Several etiological factors for pneumomediastinum have to be considered before treatment and often SPM is a diagnosis by exclusion.

Keywords

spontaneous pneumomediastinum; atypical presentation; exclusion; macklin effect

Introduction

Pneumomediastinum is the abnormal presence of gas in the mediastinum and the most common etiology is rupture of the esophagus. We present below a case of pneumomediastinum with unclear etiology. Pneumomediastinum cases present with symptom triad of chest pain, dyspnoea and subcutaneous emphysema. Diagnosis is with the help of chest radiography and CT imaging. The incidence of spontaneous mediastinum is 1 in 44000 hospital admissions [1] and is more common among young male smokers. These cases should be managed in the high dependency unit and if an esophageal perforation is confirmed, surgical treatment should be considered. We present below a case of pneumomediasitnium with unclear etiology.

Case Presentation

26 year old female presented with acute onset of severe abdominal pain which radiated to the back. There was no history of trauma. She had been vomiting prior to admission but there were no coughing fits. She had not consumed excess alcohol and did not use recreational drugs. She was a smoker and used to smoke 20cigarettes per day. The patient was an asthmatic during her childhood but was currently symptom free and was on no medication. She was unemployed and fully engaged in taking care of her children. There was no significant premorbid history of any surgery or any major illness.

Clinical examination revealed a mildly febrile patient with a soft abdomen and palpable tenderness in the right iliac fossa. The patient was dehydrated with no evidence of respiratory distress or chest signs. Her white cell count was elevated at 14.9 and CRP was less than 1. Her blood gas levels were normal. Working diagnosis was appendicitis and she went on to have cross sectional imaging. Meanwhile her pain score was high and she was requiring opiate analgesia.

The ultrasound examination was reported to be normal. Her CT scan of abdomen with intravenous contrast noted pneumomediastinum (Figure 1) but no abdominal pathology, hence she had a CT chest as well (Figure 2). Boerhaaves was diagnosed on the strength of the radiology findings and symptoms of emesis preceding admission. The case was discussed with collegues at the tertiary cardiothoracic referral centre. Their recommendations included CT chest with oral contrast to identify esophageal damage to confirm Boerhaaves as diagnosis. CT chest the following morning showed no leak to indicate perforation (Figure 3). As the patient was symptomatically better and there was no cause identified for her pneumomediastinum she was managed conservatively with close observation initially in the high dependency unit. Treatment involved TPN, intravenous antibiotics, oxygen therapy, PPI medication, analgesia and nil oral regimen. She made good progress with the only notable finding being development of a degree of subcutaneous emphysema in the left side of the neck which regressed quickly. After full conservative management for a week the patient had further follow up CT imaging which confirmed almost complete resolution of the pneumomediastinum with no inflammation or perforation of the oesophagus.

Discussion

We presume this to be a case of spontaneous mediastinum with sudden increase in intrathoracic pressure due to emesis. Initially Boerhaaves was considered as a diagnosis as the most common cause for this presentation. However CT with oral contrast showed no leak effectively excluding Boerhaaves as diagnosis since Boerhaaves is a transmural perforation of the esophagus. Despite the vomiting prior to admission there was no evidence throughout her admission to suggest the esophagus was damaged in any manner. Unlike patients with Boerhaaves, our patient also had quick recovery from her symptoms without any intervention. From the history we were unable to identify any other causes for the pneumomediastinum.

Spontaneous mediastinum was first described by Hamman in 1939 [2]. Since then, although several rarer causes have been described, many such cases have no demonstrable etiology. History of acute/chronic respiratory conditions such as pneumonia or bronchial asthma has been linked to pneumomediastinum. More recently cases have been described linked to inhalation of excess nitrous oxide or repeated Valsalva manoeuvres. The theory behind this is that the terminal alveoli rupture and the air travels along the path of least resistance through the pulmonary vasculature and enters the mediastinum- known as the Macklin effect [3]. Apart from a 13 pack year history, our patient had no relevant recent respiratory history or breathing problems. Specialist opinion was obtained from the hospital respiratory team and they confirmed no respiratory pathology predisposing to pneumomediastinum. In a review of 6 case series involving 201 patients Sahni et al confirmed that the most common presenting symptom in SPM was chest pain [4]. In our patient the predominant symptom was abdominal pain.

Since the triggering factor was probably emesis, the diagnosis of bulimia was also queried but the patient denied this. Her presenting symptoms were mainly abdominal and mild pyrexia and investigations revealed a mildly raised white cell count. Since no cause could be found for her signs and a quick recovery with conservative management ensued, we presume this was a case of spontaneous mediastinum. Diagnostic dilemma occurred in this case due to atypical presentation, paucity of diagnostic signs and normal investigations, until the cross sectional imaging.

Conclusion

SPM is a condition with alarming symptoms necessitating urgent investigations to rule out conditions like Boerhaaves which could lead to mediastinitis with poor prognosis [5]. Vivek Iyer et al looked at 62 consecutive patients over a 11 year period and concluded diagnostic tests for a pathological cause was unfruitful [6]. SPM could lead to pneumothorax, pneumopericardium or pneumorachis and may necessitate emergency treatment with decompression. High index of suspicion is needed and often like in our case it is diagnosis by exclusion and runs a benign course with excellent results and an extremely low recurrence rate.

Figures

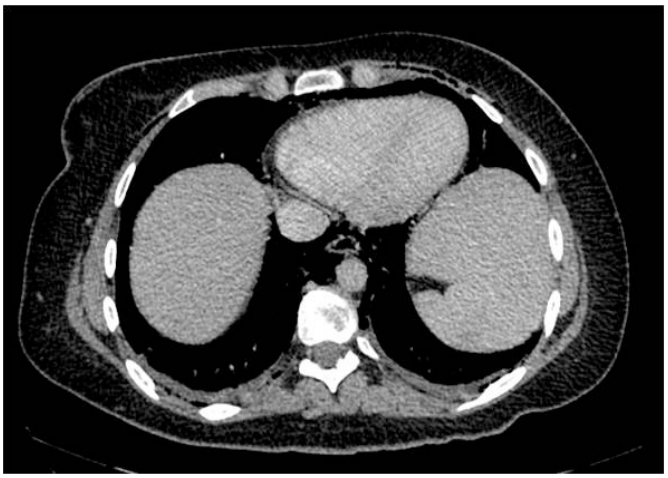

Figure 1: CT cross section of upper abdomen showing free air in the mediastinum

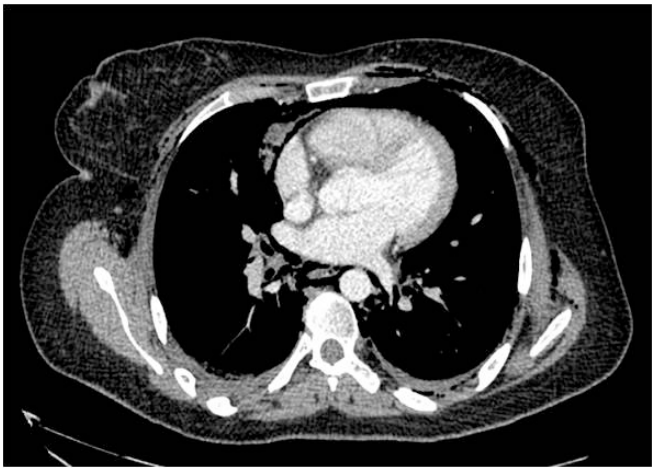

Figure 2: CT cross section of chest showing further air in the mediastinum

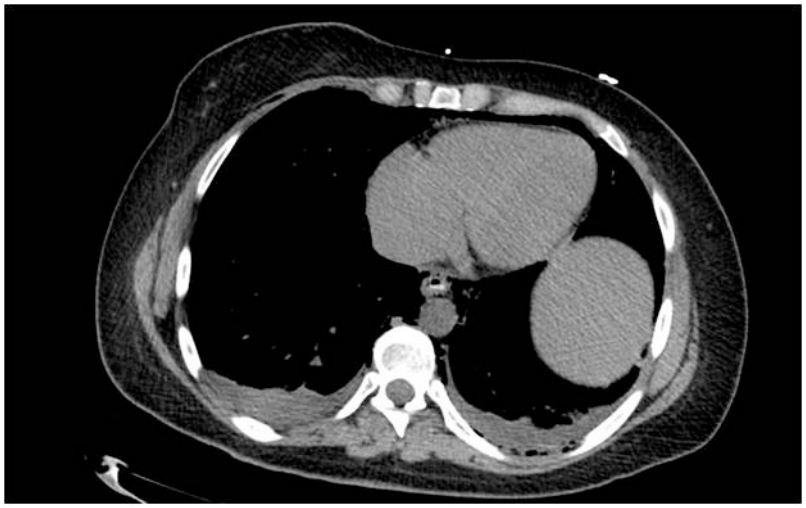

Figure 3: CT cross section showing no oesophageal perforation

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