



Spontaneous pneumomediastinum: Experience in 13 patients

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ABSTRACT

Spontaneous pneumomediastinum (SPM) is a rare clinical entity that concerns mainly young adults. We report 13 cases (11 males/2 females) of SPM. The average age was 31 ± 0.85 years. The most common precipitating factor was asthma attack. The onset symptoms were mainly chest pain (11 cases). Synchronous pneumothorax was found in 5 cases and it was bilateral in 2 patients. The evolution was marked by the spontaneous resorption. SMP is an underrecognized cause of chest pain in young adults. Chest radiography is usually sufficient for the diagnosis, and further diagnostic procedures are generally not necessary. The prognosis is often favorable.

1. Introduction

Spontaneous pneumomediastinum (SPM) is defined as the presence of interstitial free air in the mediastinal cavity. It was described for the first time by Louis Hamman in 1939 [1]. It is an uncommon condition that occurs primarily in males with an average age of 18–25 [2–5]. SPM is typically benign but, it should be distinguish from secondary pneumomediastinum caused by trauma, gas producing infection and esophageal rupture which are all potentially fatal and require emergency management [6] (see Table 1)

We report 13 patients who presented between 1990 and 2018 to the Pneumology Department of the University hospital of Monastir with SPM. Medical history, symptoms, clinical and paraclinical finding at presentation, treatment and length of hospital stay were reviewed.

2. Cases reports

13 cases were identified with the diagnosis of SPM. The mean age was 31 ± 0.85 years with a range of 15–80 years. There were 11 males and 2 females. Two patients were known asthmatics. One of them had a history of pneumothorax secondary to an acute asthma attack. Another patient had idiopathic pulmonary fibrosis in the stage of chronic respiratory failure.

The precipitating factor was asthma attack in three patients, Cough

attacks in four patients and vomiting effort in one case. SPM had immediately followed a dive in one patient. PMS appeared 7 days after spontaneously resolving intestinal intussusception in a patient with Henoch-Schonlein purpura.

The onset symptoms were mainly chest pain which was described in 11 cases (84.62%), followed by dyspnea (8 cases, 61.54%) and cough (7 cases, 53.85%). Cervical pain was reported by one patient (tab 1).

Hemodynamic and respiratory constants were stable in 12 patients. Only one case presented a respiratory failure in relation with an inaugural asthma attack.

On lungs auscultation, sibilants and abolition of vesicular murmurs were found in three cases each one.

Subcutaneous emphysema was palpated in 8 cases (61.54%), associated with an extension to thoracic soft tissues in 7 cases.

Diagnosis was established by chest radiograph in all cases (Figs. 1–3). Synchronous pneumothorax was found in 5 cases and it was bilateral in 2 patients (Figs. 1 and 2). Cervico-thoracic subcutaneous emphysema was found in 11 cases.

Thoracic CT scan, performed in 12 patients, showed pneumomediastinum in all cases, associated with unilateral pneumothorax in 2 cases and bilateral pneumothorax in three cases. Subcutaneous emphysema was found in 11 cases. It was cervical in one case, cervico-thoracic in 9 cases and cervico-thoraco-retroperitoneal associated with epidural emphysema in an asthmatic patient (Fig. 1). The treatment was based on intra-hospital rest in all cases with oxygen therapy in 7 cases,

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Table 1
Detailed data of the 13 patients.

Case	Age (years)	Sexe	Causes of pneumomediastinum	pneumothorax	symptoms	Intervention	outcomes
Case 1	15	male	A dive	absent	Chest pain	AD	SR
Case 2	29	male	Asthma attack	bilateral	Chest pain Dyspnea Cervical pain	AD, O2	SR
Case 3	80	female	Cough attack	bilateral	Cough, dyspnea and chest pain	AD	SR
Case 4	17	male	Following intestinal intussusception	absent	Chest pain	AD	SR
Case 5	30	female	Asthma attack	absent	Chest pain and dyspnea	AD, O2	SR
Case 6	22	Male	Cough attack	unilateral	Chest pain dyspnea and cough	TD, O2 and AD	SR
Case 7	47	Male	No precipitating factor found	absent	Dyspnea cough	O2	SR
Case 8	25	Male	vomiting	unilateral	Chest pain dyspnea	TD, O2 and AD	SR
Case 9	32	Male	No precipitating factor found	absent	Dyspnea cough	O2	SR
Case 10	19	Male	Cough attack	absent	Chest pain cough	AD	SR
Case 11	28	Male	Cough attack	absent	Chest pain cough	No intervention	SR
Case 12	45	Male	No precipitating factor found	absent	Chest pain	AD	SR
Case 13	25	Male	Inaugural asthma attack	unilateral	Chest pain dyspnea cough	TD, O2 and AD	SR

AD: analgesic drug, TD: thoracic drainage, O2: oxygen therapy, SR: spontaneous resorption.

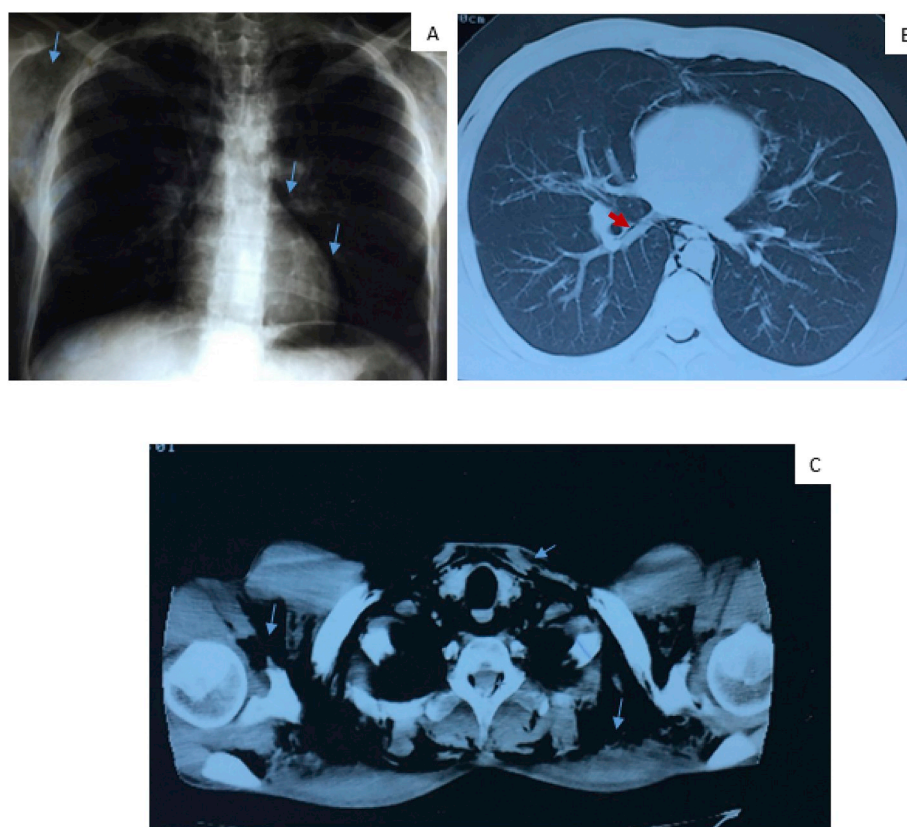


Fig. 1. Cross section Chest CT showing pneumomediastinum, partial bilateral pneumothorax, important anteroposterior subcutaneous emphysema and epidural emphysema in a 29-year-old asthmatic patient (vascular sheath's linear air collections: red arrow). (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

thoracic drainage for total pneumothorax in 3 cases and analgesia in 10 cases. The mean length of hospitalization was 6.54 days with a range of 3–11 days. All patients had spontaneous resorption of the SPM without recurrence.

3. Comment

Spontaneous pneumomediastinum (SPM) was first described by

Louis Hamman in 1939, therefore, the condition is called Hamman syndrome. It is characterized by free air in the mediastinum not preceded by thoracic trauma, surgery, or any other medical procedure or gas producing infection [6]. It is more common in young men [2–5].

SPM is a rare condition. But its true incidence is unknown. It is probably underestimated because few practitioners are aware of this condition [7].

Macklin and Macklin in 1944 provided a sound explanation for

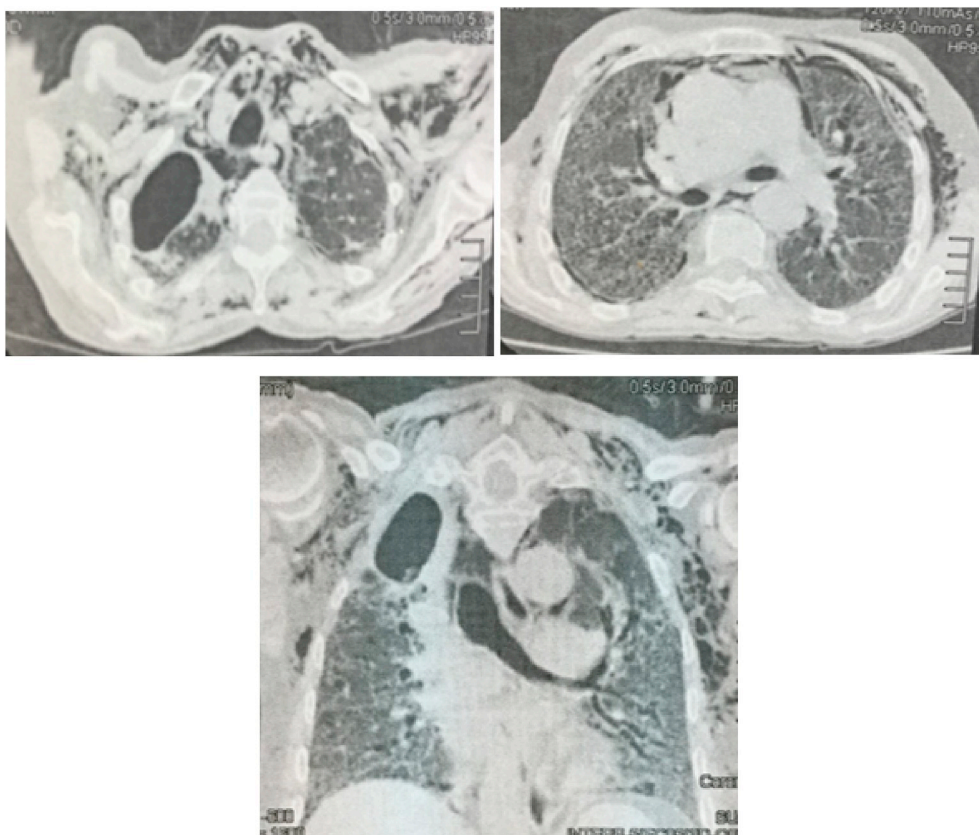


Fig. 2. Chest CT showing the presence of interstitial air surrounding the mediastinal structures, important subcutaneous emphysema and bilateral pneumothorax in a patient with idiopathic pulmonary fibrosis and apical sequelae cavity.

pneumomediastinum, based on experiments conducted on cats: The increase of alveolar pressure causes them to rupture, therefore releasing air centripetally dissects the pulmonary interstitium and migrates through the peribronchial and perivascular sheaths to the mediastinum [7]. The diffusion of air through the visceral pleura may explain the occurrence of concomitant pneumothorax. The Macklin effect appears on thoracic computed tomography (CT) as linear collections of air contiguous to the bronchovascular sheaths (Fig. 1, red arrow).

SPM has been associated with many conditions and triggers, such as asthma exacerbation, severe cough or vomiting and other activities associated with the Valsalva maneuver [2–4]. Few case reports have shown that SPM has also occurred in patients with idiopathic pulmonary fibrosis and can be considered as a predictor of mortality [8]. No case of SPM associated with Henoch-Schonlein purpura has been published so far.

The most common symptom described in the literature is chest pain, it's typically acute, retrosternal, pleuritic and may radiate to neck or shoulders [2,3].

Patients presenting with SPM usually have a good general state with no vital distress. Subcutaneous emphysema is the most commonly

reported clinical sign [2,3]. Hamman's sign - characterized by a dry crackling noise detected during the auscultation of precordial space, especially during cardiac systole but also during diastole - is present in about half of the cases and it is a pathognomonic sign of mediastinal emphysema [1].

Chest radiography generally confirms the diagnosis. Chest CT is needed in the presence of clinical suspicion with a negative chest X-ray or to rule out a secondary pneumomediastinum.

The treatment is generally conservative and consists of bedrest and analgesics [3]. If the patient is stable, he can be immediately discharged after being educated about the possible presenting symptoms that require immediate hospitalization [4].

Spontaneous pneumomediastinum is a rare condition in young men which should be considered in the differential diagnosis of acute chest pain. Chest radiography with both posteroanterior and lateral views is usually sufficient for the diagnosis, and further diagnostic procedures are generally not necessary.

Declaration of competing interest

The authors declare that they have no competing interests.

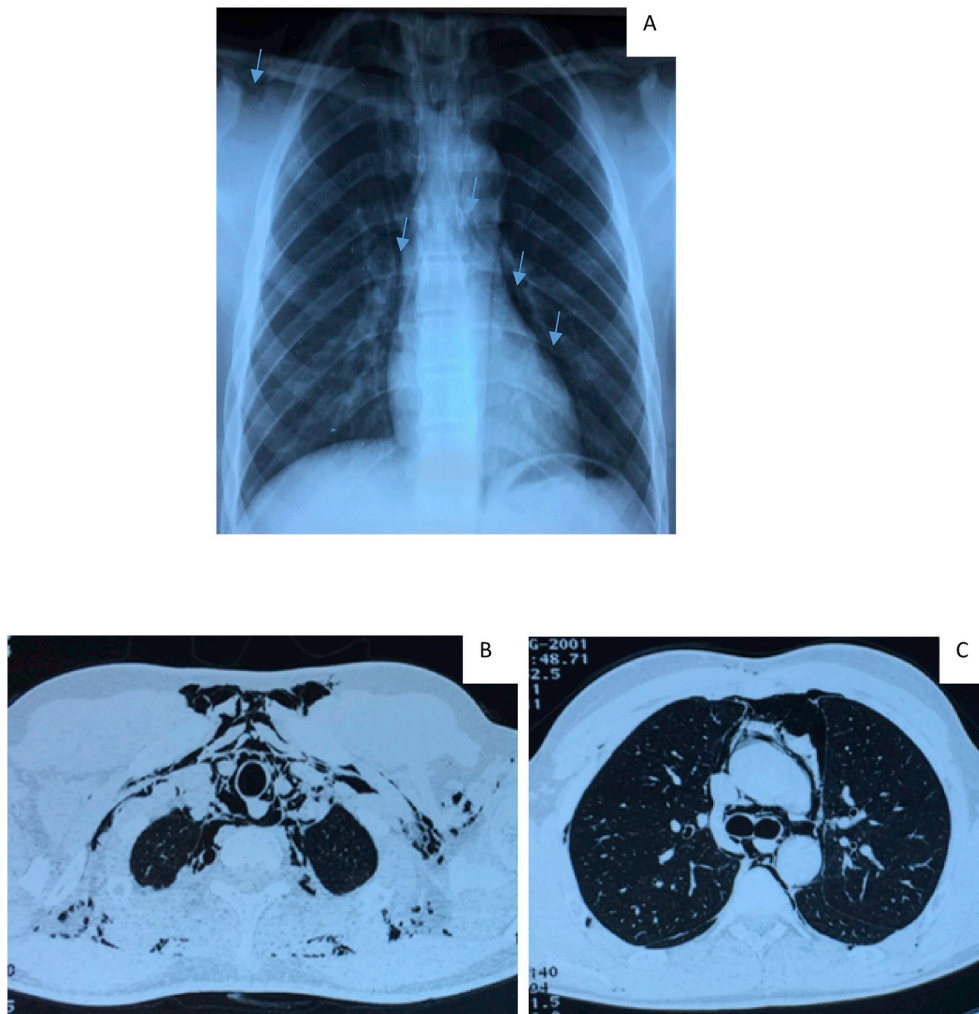


Fig. 3. Chest radiograph showing signs of pneumomediastinum and subcutaneous emphysema in soft tissues following a dive in a 15-year-old-patient.

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