

Pneumomediastinum as a complication of athletic competition

EDWIN J MORGAN AND DAVID A HENDERSON

From West Virginia University School of Medicine, Morgantown, West Virginia, USA

Pneumomediastinum in the absence of pneumothorax is frequently omitted in the differential diagnosis of retrosternal chest pain. Although a relatively uncommon entity, it occurs principally in healthy young men and parturient women and often without apparent cause.^{1,2} We report two patients with radiographically evident free air in the mediastinal space related to athletic competition. To our knowledge, the only other account of sports related pneumomediastinum occurred in two students climbing Mount Rainier.³ Pneumomediastinum has also been associated with diabetic ketoacidosis,⁴ marijuana smoking,⁵ anorexia nervosa,⁶ bronchial asthma,⁷ and pulmonary function testing.⁸

Case reports

CASE 1

This 20-year-old male student (CW) was seen on 14 November 1977 with a one-day history of right shoulder and pleuritic chest pain. He first noticed this after inadvertently tackling the ball carrier during a flag football game played the day before. He finished the game and the chest pain subsided but the shoulder pain persisted associated with mild dyspnoea. He had no previous history of cardiac or respiratory disease.

Physical examination revealed a healthy student with tenderness over his right acromio-clavicular joint and a crackling sound over the anterior precordium synchronous with the heart beat. Chest and shoulder radiographs showed right supraclavicular subcutaneous emphysema (fig 1).

The sound heard over the precordium was interpreted as Hamman's sign. The patient recovered uneventfully and continues to lift weights and play football without recurrence.

CASE 2

This 19-year-old soccer player (FS) came to the emergency room with dull, pleuritic anterior chest pain. He was mildly dyspnoeic. The day before he had competed in an intramural soccer match. He remembered being hit in the midsternal area with a ball kicked from about 10 feet away. He had only mild chest discomfort during the game which subsided. However, after the game he noted some pleuritic chest discomfort when walking up the hill from the stadium. During his evaluation in the emergency room, pneumomediastinum was suspected on the chest radiograph (fig 2). The patient reported to the University Health Service the next morning where the diagnosis was confirmed by the presence of subcutaneous emphysema of the neck. By this time, he had no symptoms and had recovered uneventfully. He continues to play soccer and has had no recurrence.

Discussion

Pneumomediastinum is a condition in which free air is found within the mediastinum in the absence of obvious extrathoracic sources, the air enters from some adjacent air-containing organ—that is, lung, oesophagus, and so on. Subcutaneous emphysema, an associated finding which results from thoracic decompression of the free air, may be the only clinical manifestation. It is caused by air dissecting upwards between



Fig 1 Posteroanterior radiograph showing subcutaneous emphysema above the right clavicle which led to the diagnosis of pneumomediastinum.

Address for reprint requests: Dr EJ Morgan, School of Medicine, West Virginia University, Morgantown, West Virginia 26506, USA.

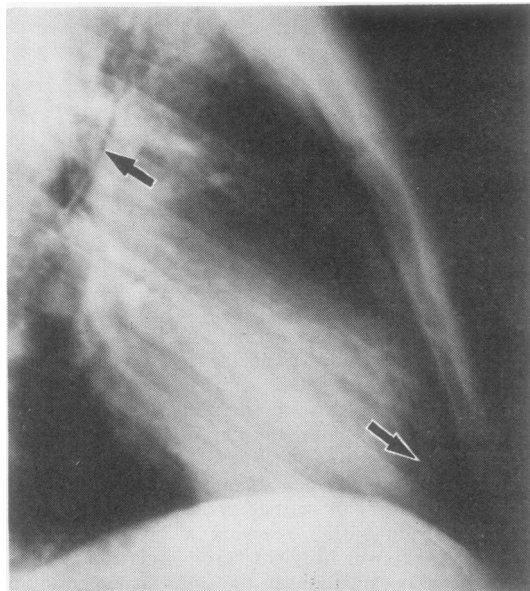


Fig 2 Lateral chest radiograph shows a rim of air along the edge of the pericardium consistent with pneumomediastinum.

the fascial layers of the neck.¹

It may occur from rupture of alveoli into pulmonary interstitial tissue dissecting along vascular sheaths to the hilum, from perforation of the trachea, bronchus, or oesophagus, from trauma to the chest wall, from decompression in diving, from perforation of stomach or intestine via the retroperitoneal space or spontaneously after coughing, vomiting, sudden exertion. The method by which chest wall trauma causes it is uncertain but it has been speculated that air escapes from ruptured alveoli caused by increased intra-alveolar pressure from compression of the chest. Chest wall trauma most likely caused the pneumomediastinum in our two patients.

The most commonly reported symptom is pain.² The pain is usually acute, stabbing and substernal with radiation to the back, neck, and shoulders and gradually subsiding. It is often lessened by sitting upright and leaning forward. Dyspnoea occurs in about half of the reported cases. An important physical sign is the loud crunching sounds over the precordium (synchronous with the heart beat), described as the mediastinal crepitation of Hamman.⁴ Subcutaneous emphysema, and pneumothorax are commonly present. The most important procedure to confirm the diagnosis of pneumomediastinum is chest radiography. A rim of free air commonly outlines the pericardium, heart and other mediastinal structures. The lateral film often shows a substernal collection of air.

Pneumomediastinum is generally a benign condition which is self-limiting and subsides without treatment.⁷ These two cases indicate the importance of considering pneumomediastinum in the differential diagnosis of chest pain in the student athlete.

References

- 1 Gray JM, Hanson GC. Mediastinal emphysema: aetiology, diagnosis and treatment. *Thorax* 1966; **21**:325-31.
- 2 Munsell WP. Pneumomediastinum. *JAMA* 1967; **202**:689-93.
- 3 Vosk A, Houston CS. Mediastinal emphysema in mountain climbers. *Heart Lung* 1977; **6**/5:700-805.
- 4 Hamman L. Spontaneous interstitial emphysema of the lungs. *Trans Assoc Am Phys* 1937; **52**:311-5.
- 5 Miller WE, Spiekerman RE. Pneumomediastinum resulting from performing Valsalva maneuvers during marijuana smoking. *Chest* 1972; **62**:233-4.
- 6 Donley AJ, Kemple TJ. Spontaneous pneumomediastinum complicating anorexia nervosa. *Br Med J* 1978; **67**:1604-5.
- 7 Zegel HG. Subcutaneous emphysema in a young man. *JAMA* 1979; **241**:1273-4.
- 8 Varkey B, Kory RC. Mediastinal and subcutaneous emphysema following pulmonary function tests. *Am Rev Respir Dis* 1973; **108**:1393-6.