
CASE REPORT

Anorexia Nervosa Presenting with Spontaneous Pneumomediastinum

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ABSTRACT

Spontaneous pneumomediastinum (SP) is uncommon in children and adolescents. It can be associated with anorexia nervosa (AN), particularly in cases having a preceding history of vomiting. We highlight the case of a 15-year-old girl with SP as the presenting symptom of AN. She lost 10 kilograms (kg) over six months but denied vomiting. She complained of neck swelling and dysphagia. Physical examination revealed subcutaneous crepitations over the neck. X-rays confirmed subcutaneous emphysema and also revealed pneumomediastinum. The patient was managed with oxygen therapy as well as slow re-feeding. A subsequent chest X-ray showed complete resolution in 16 days.

Keywords: Anorexia nervosa, Children, Medical complications, Spontaneous pneumomediastinum, Subcutaneous emphysema

INTRODUCTION

Eating disorders are increasingly being seen in Singapore and the rest of Asia. The number of new cases of AN presented to an eating disorders clinic in Singapore rose dramatically from six in 1994 to 24 in 2002¹. There are many complications of AN, including bradycardia, hypotension, electrolyte derangements, osteoporosis, hair loss, amenorrhoea in girls and psychiatric comorbidities. SP is a rare, but increasingly recognised complication of AN. A literature review published in 2010 established 12 cases of SP in young anorexics below the age of 18 years². We report the case of a 15-year-old Chinese girl who had SP as the presenting problem which subsequently led to the diagnosis of AN. While vomiting or oesophageal tears can cause pneumomediastinum in patients with eating disorders, our patient did not have such triggers.

CASE REPORT

A 15-year-old Chinese girl presented to the Emergency Department with a one week history of neck swelling. This was preceded two weeks prior by dysphagia, odynophagia, dyspnoea and chest tightness, which resolved after several days. She

was also noted to have nasal-sounding speech. There was no preceding trauma, injury, vomiting or coughing. There was no significant past medical history or history of asthma. Of significance was a weight loss of 10kg over the past six months. The girl had been restricting her food intake during that same time period, but denied any vomiting or purging behaviours. The patient had been amenorrhoeic for the past four months and reported having body image issues.

Physical examination revealed a cachectic girl, whose weight of 28.3kg was less than 85% of the expected body weight for her age. Her body mass index was 11.8 kg/m², which was below the third percentile. Her resting heart rate was 46 beats per minute (min), blood pressure of 97/67mmHg, temperature of 36 degrees Celsius and respiratory rate of 15 breaths per min. There was no postural hypotension or postural increase in heart rate. There was diffuse swelling and subcutaneous crepitations over her neck and anterior chest wall. Heart sounds were muffled. Lungs were clear on auscultation with good air entry bilaterally. There was no dyspnoea.

Table 1. Laboratory Results.

Investigation (serum)	Result	Range of normal values
Potassium	3.2 mmol/L	(3.5–5.1 mmol/L)
Sodium	140 mmol/L	(135–145 mmol/L)
Calcium	2.37 mmol/L	(2.15–2.72 mmol/L)
Magnesium	0.90 mmol/L	(0.70–0.95 mmol/L)
Phosphate	1.0 mmol/L	(0.8–1.6 mmol/L)
Follicle stimulating hormone	1.0 IU/L	(1.35–17.06 IU/L)
Luteinizing hormone	0.07 IU/L	(0.38–60.33 IU/L)
Estradiol	37 pmol/L	(77–2382 pmol/L)
Thyroxine (free T4)	11.9 pmol/L	(10.3–25.7 pmol/L)
Thyroid stimulating hormone	3.208 mIU/L	(0.500–4.500 mIU/L)



Fig. 1. Lateral neck X-ray showing subcutaneous emphysema (white arrow).

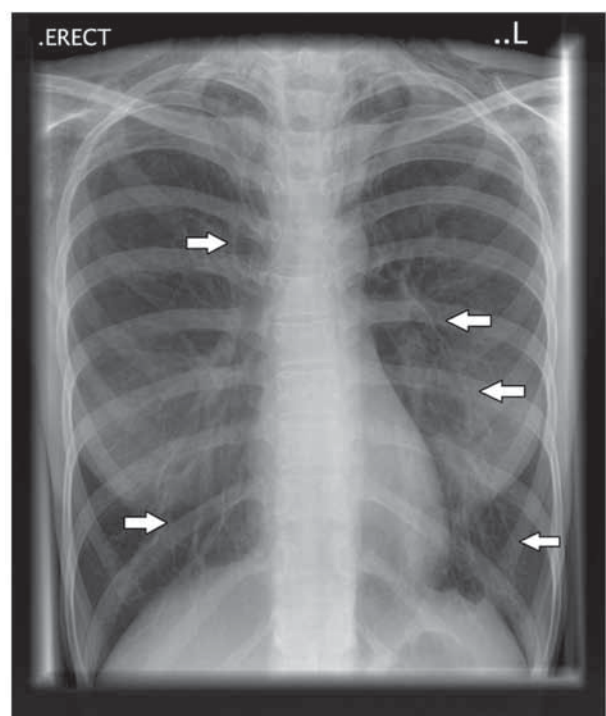


Fig. 2. Pneumomediastinum seen on chest X-ray on the day of admission (white arrows).

Initial laboratory tests are shown in Table 1. Of note was the low potassium, follicle stimulating hormone, luteinizing hormone and estradiol levels.

A lateral neck X-ray showed extensive subcutaneous emphysema in the anterior aspect of her neck (Fig. 1). Pneumomediastinum was seen on the chest X-ray (Fig. 2). There was no pneumothorax. Water-soluble contrast swallow study was normal with no sign of leakage to suggest oesophageal perforation. Electrocardiogram showed sinus bradycardia.

She was given high FiO₂ delivered at a high flow rate of 10 L/min via a non-rebreather mask. Repeat

chest X-ray on day four and day 11 of her hospital admission showed significant improvement of the pneumomediastinum and subcutaneous emphysema. There was complete resolution by day 16.

The patient was also diagnosed with AN, which required re-feeding during her hospitalisation. This was accomplished successfully without complications, with corresponding improvement in her weight to 32.1kg and resting heart rate to more than 60 beats per min. She was subsequently managed in the eating disorders clinic, and recovered from her AN after 16 months.

DISCUSSION

The term “spontaneous pneumomediastinum”, by definition, refers to cases of pneumomediastinum that occur without a preceding history of trauma (such as chest trauma, endotracheobronchial or esophageal procedures, mechanical ventilation, vascular catheterisation or thoracic surgery). However, a trigger may be found in 70-90% of cases, with the most commonly cited being asthma and vomiting³. Oesophageal rupture, usually due to vomiting, may also cause pneumomediastinum.

SP in children is rare, with reported incidences between one in 800 to one in 42,000 patients presenting to hospital emergency units³. However, SP is known to be associated with AN, with over 20 cases reported in the literature^{2,4}. Most patients were already known to have AN before developing SP. However for our patient, SP was the precipitating event that brought her to the attention of medical professionals and the subsequent diagnosis of AN.

The cause of SP has been commonly thought to be due to self-induced vomiting in patients with eating disorders. The increase in intra-thoracic pressure and intra-alveolar pressure during vomiting leads to alveolar rupture and escape of air into the mediastinal compartment. In addition, Boerhaave's syndrome needs to be considered as a cause of pneumomediastinum, as oesophageal rupture may have resulted from vigorous vomiting⁵. This can be excluded by contrast radiography.

However, many of the cases reported in patients with eating disorders were not associated with vomiting^{2,4,6}. Our patient also denied vomiting prior to the onset of her symptoms. Animal studies have shown that starvation causes a significant decrease in lung interstitium with thinning of alveolar walls. Emphysematous lung changes have also been documented in chronically malnourished patients with AN⁷. It is postulated that during starvation, oxygen consumption falls and lung tissue is sacrificed in the process of gluconeogenesis to provide glucose for the “more essential” functions of the brain⁸. It is thus possible that anorexic patients are at higher risk of alveolar wall rupture due to their severe malnutrition, even in the absence of vomiting as a trigger.

SP has a good prognosis, if not associated with other complications such as oesophageal perforation. Most cases resolve within two weeks

with supportive management (bed rest, analgesia, 100% oxygen). None of the reported patients with SP associated with AN required surgical drainage.

AN in Asia is on the rise, and eating disorders are increasingly being seen in Singapore. While SP is a rare condition with a good prognosis, it is important to be mindful of this complication as we expect to see an increasing number of patients with eating disorders.

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