All Stiff Necks Are Not Created Equal

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A previously well 25-year-old male presents with a complaint of a stiff neck after staying up all night working on a term paper. As you are about to admonish him for coming to the emergeny department (ED) with such a trivial complaint, he says, "When I touched the side of my neck, I feel popping under the skin."

On exam, he looks well. He is in no respiratory distress, however, his voice is of a similar timber to that of a person who has just inhaled helium. The patient's vital signs are listed in Table 1.

His chest X-ray (Figure 1) shows a thin line of radiolucency, best seen along the left heart border and highlighting the aortic knob. He is also found to have a "continuous diaphragm sign"—an unbroken radiolucent line extending along both diaphragms, including beneath the heart. Retrosternal air or vertical lucent streaks outlining the mediastinal structures may be seen laterally. In this X-ray, subcutaneous air is also quite evident.

Table 1
Patient's vital signs

• Temperature: 36.8 C
• Heart rate: 100 beats per minute
• Respiratory rate: 24 breaths per minute
• Blood pressure: 112/82 mmHg
• Oxygen saturation: 98%
• Neck looks slightly broadened
• On palpitation, there is subcutaneous emphysema from mid-chest to jaw
• Trachea is midline
• Lungs have good air entry bilaterally
• Auscultation of heart sounds reveal a high-pitched "click" with each systole

Figure 1. Chest X-ray showing a large amount of pneumomediastinum, with considerable subcutaneous emphysema.

Questions:

1. What is this clinical picture?
2. What causes it?
3. What are the typical signs and symptoms?
4. What management is indicated?
5. What complications should I (and the patient) be weary of?

Answers:

1. What is this clinical picture?

Spontaneous pneumomediastinum, with air tracking along tissue planes to cause subcutaneous emphysema in the neck. The squeaky voice is due to laryngeal involvement.

2. What causes it?

In this case, the patient probably ruptured an alveolus into interstitial bronchial tissue, allowing air to dissect back along a bronchus. This mechanism is similar to the one that causes spontaneous pneumothorax, in which

case, the rupture extends into the pleural space. Although often idiopathic, as in this case, pneumomediastinum is often associated with asthma, barotrauma, freebasing cocaine, and in childbirth.

Other causes of spontaneous pneumomediastinum are listed in Table 2.

3. What are the typical signs and symptoms?

Pneumomediastinum usually presents with chest pain, dyspnea, and/or subcutaneous air. Clinical signs include:

- Hamman's sign, or "crunch," a crunching or clicking sound synchronous with the contraction of the ventricles; it is best heard over the precordium and increases in intensity during inspiration. Hamman's crunch sounds like two balloons being rubbed together and may also be heard with a pneumothorax.
- Mill-wheel murmur, a metallic splashing sound produced by the presence of air and fluid in the pericardium.

Low-grade fever in the absence of infection is not uncommon and, although blood tests are not routinely indicated, a mild leukocytosis may occur, likely secondary to inflammation following mediastinal air dissection. Electrocardiogram findings include diffuse low voltages, non-specific axis shifts, ST-T wave changes, and ST elevation in the lateral precordial leads.

Table 2

Causes of spontaneous pneumomediastinum

• Air escaping from the gasrointestinal tract (*e.g.*, Boerhaave's syndrome)
• Air escaping from the upper respiratory tract (*e.g.*, injury to the paranasal sinuses)
• Air from intrathoracic airway (*e.g.*, Barotrauma)
• Gas generated by bacterial infections
• Iatrogenic causes (scopes, dental extractions, endotracheal intubations)

4. What management is indicated?

Subcutaneous air is rarely dangerous in itself. Surgical relief is unnecessary, as subcutaneous air will resolve spontaneously. Most patients with spontaneous mediastinum can be discharged from the ED with clear instructions and outpatient followup. Specific treatment for pneumomediastinum is rarely needed. Clinicians should concentrate on identifying the cause, and prescribing symptomatic treatment where necessary. Invasive procedures are reserved for cases of increasing airway compromise or cardiovascular collapse. Repeat X-rays are not necessary if symptoms resolve.

5. What complications should I (and the patient) be wary of?

Life-threatening cardiovascular collapse as a result of pneumomediastinum is exceedingly rare. Causes include:

- Tension pneumomediastinum,
- Pneumothorax,
- Pericardial tamponade, and
- Airway compromise (very rare). Dx

Suggested Reading
1. Pneumomediastinum. In: Murray, Nadel: *Textbook of Respiratory Medicine*. Third Edition. W.B. Saunders Co., 2000.

This department covers selected points to avoid pitfalls and improve patient care by family physicians in the ED. Submissions and feedback can be sent to diagnosis@sta.ca.

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