

Spontaneous pneumothorax, pneumomediastinum, and pneumopericardium in a 16-year-old drug-abusing motorcyclist surrounded by a pack of coyotes

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Preview

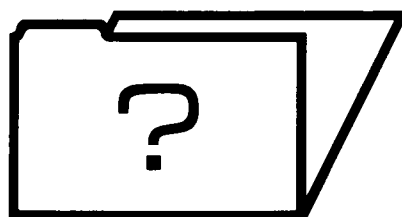
Numerous causes of pneumothorax, pneumomediastinum, and pneumopericardium have been described in the literature. The authors report a unique case in which one or more causes may have contributed to the patient's condition.

A 16-year-old boy presented to Skiatook Family Medicine Center, Skiatook, Oklahoma, complaining that his "chest and heart felt swollen." He described in detail a bizarre episode that had occurred on the previous day as he returned from a camping trip. As he attempted to restart his motorcycle, the engine exploded and caught fire. He was wearing a helmet with a face mask and was uninjured in the explosion. However, he did inhale smoke and fumes while putting out the fire, and he had mild dyspnea after the explosion.

A short time later, the patient was surrounded by a pack of 10 coyotes that forced him onto a bridge. He then experienced a panic attack accompanied by tachycardia, palpitations, pleuritic central chest pain, and increased dyspnea. He eventually warded off the coyote pack by throwing rocks, and he returned home, where his symptoms abated.

At presentation, the patient complained of pleuritic chest pain, palpitations, and the sensation that his chest and heart were

swollen. He admitted to smoking a half-pack of cigarettes per day but denied use of marijuana and other drugs. (One month later, however, the patient was admitted to a chemical dependency unit for 34 days, where it was learned that he had been a frequent abuser of phencyclidine [PCP], cocaine, and "crack.") His past



A PERPLEXING CASE

medical history was generally unremarkable and did not include emphysema or other pulmonary disorders.

Physical examination revealed normal vital signs and no respiratory distress. Subcutaneous crepitus was present in the left base of the neck. The lungs were clear, and heart rate and rhythm were regular. Auscultation of the

heart revealed Hamman's sign with systole.

Roentgenograms of the neck and chest demonstrated subcutaneous emphysema, left apical pneumothorax, pneumomediastinum, and pneumopericardium. An electrocardiogram was normal.

The patient was admitted to St John Medical Center, Tulsa, Oklahoma, for observation and was treated conservatively with oxygen. Chest films showed improvement, and he was discharged from the hospital on the following day. Follow-up examination 1 week later showed complete resolution of signs and symptoms.

Discussion

Spontaneous pneumothorax occurs commonly in healthy males and is most often secondary to rupture of an apical bleb.¹ Air from a ruptured bleb can disperse into the mediastinum and lead to pneumomediastinum. Mediastinal air may then spread further along the pulmonary vessels or aortic border and enter the pericardium.² The concurrent presence of pneumothorax, pneumomediastinum, and pneumopericardium is rare.

Spontaneous pneumomediastinum can occur with asthma, defecation, exercise, parturition, and violent coughing. Pain in the

continued

chest, back, and neck is a common symptom. Patients may complain of dyspnea and sore throat. Pneumomediastinum can also result from a ruptured esophagus or large airway. Physical examination usually reveals subcutaneous emphysema, wheezing, and Hamman's sign on auscultation over the precordium. This sound is produced by cardiac action moving air bubbles between planes of mediastinal tissue. Hamman's sign is loudest during systole and, when heard through the stethoscope, sounds like the unfastening of Velcro.²

Spontaneous pneumomediastinum has been reported to occur with smoking of both marijuana and cocaine.³ Inhalation of free-base cocaine causes increased intraalveolar pressure when the abuser attempts to inhale deeply for a prolonged time.³ This inhalation technique is often accompanied by Valsalva's maneuver, which also can generate considerable intraalveolar pressure.

Pneumopericardium may not be clinically evident initially and

is often discovered on chest films. It may occur following thoracic trauma, prolonged positive pressure ventilation, tracheal rupture, or a sudden increase in intrathoracic pressure, such as that resulting from a severe blow to the chest.² In one reported case,² pneumopericardium was caused by a sudden high-velocity influx of air into the respiratory tract of a motorcyclist riding at high speed with his mouth open. Pneumopericardium can become extensive enough to result in cardiac tamponade.

The case described here offers numerous possible causes for pneumothorax, pneumomediastinum, and pneumopericardium. The patient had been riding a motorcycle, and thus high-velocity air could have been introduced into the respiratory tract, leading to pneumomediastinum. He had also been coughing, perhaps violently, from inhalation of smoke and fumes during the engine fire. In addition, the panic attack brought on by the coyotes could have induced hyperventilation leading to rupture of a bleb that produced pneumothorax, which then progressed to pneumomediastinum and pneumopericardium. Alternatively, since the patient was a drug user, his condition may have developed after he used a Valsalva-like inhalation technique, but he may have con-

cealed this information from the examining physician.

Conclusion

Treatment of pneumomediastinum and pneumopericardium is usually conservative; serial chest films, administration of oxygen, and observation are adequate for most patients. It is important to rule out cardiac tamponade in patients with pneumopericardium and to identify pneumomediastinum secondary to rupture of the esophagus or large airway, which requires emergency surgical repair. Extensive pneumothorax may necessitate tube thoracostomy. RGM

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References

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