Tension pneumopericardium in an infant

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A 6-MONTH-OLD GIRL presented with respiratory failure due to respiratory infection requiring intubation. Her pre-intubation chest x-ray is shown in Figure, A. Thirty minutes subsequently, the patient developed an acute syndrome characterized by difficulty to ventilate, hypotension, and bradycardia. A repeat chest x-ray revealed pneumopericardium without associated pneumothorax (Fig, B). Emergent pericardiocentesis and placement of a pericardial drain resulted in immediate return of normal sinus rhythm, and improvement in blood pressure and oxygenation. A repeat chest x-ray demonstrated resolution of the pneumopericardium (Fig, C). Bronchoscopy was performed during the hospital course with no evidence of tracheobronchial injury and the pericardial drain was removed.

The patient recovered well after this event without requiring further intervention. She was extubated on hospital day 4 and treated for her respiratory infection, with eventual discharge to her home.

Tension pneumopericardium is a rare condition that has been infrequently reported. It is most commonly associated with positive pressure ventilation, but it has been reported as a complication of fistula formation between the respiratory or gastrointestinal tracts and the pericardium, frequently owing to chest trauma. When associated with ventilation, the mechanism is likely dissection of air back along perivascular and peribronchial sheaths to the pericardium after alveolar rupture, known as the Macklin effect. It has been reported both from high-pressure mechanical ventilation as well as hand-assisted bag ventilation. The condition has a very high mortality rate, up to 80% in some reports. Pneumopericardium seems to be more common in neonates; it is hypothesized that adults have more dense adhesions between pericardial layers, which prevents dissection of air from the mediastinum. It has been infrequently

Figure. Three serial chest radiographs (CXR) are presented to document the patient’s clinical course. (A) Patient’s admission CXR to the emergency department, which shows a right sided pulmonary infiltrate as the probable cause of the infants presenting respiratory distress. (B) The development of pneumopericardium (black arrows) after endotracheal intubation. (C) CXR taken after pericardiocentesis and insertion of a pericardial drain (arrows).
reported in the pediatric population outside of the neonatal period. Although pneumopericardium has been reported after endotracheal intubation, the development of tamponade physiology and tension pneumopericardium is very rare.

In this case, the short duration of time between intubation and the development of tamponade physiology, as well as the absence of associated pneumothorax, suggests that an airway injury may have occurred during intubation, although alveolar injury with retrograde dissection of air cannot be excluded. Regardless of the etiology, the condition required prompt recognition and intervention to avoid cardiac arrest. As this case reveals, tension pneumopericardium is a potentially lethal complication of endotracheal intubation and mechanical ventilation.

REFERENCES