

H98 Sudden Death After Bounce House Activities: A Late Complication of Congenital Diaphragmatic Hernia (CDH)

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Learning Overview: The goal of this presentation is to highlight the variability in presentation of a CDH, including age of onset and precipitating factors.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by demonstrating that late onset CDH is an important diagnosis to consider in children with acute gastrointestinal or respiratory symptoms that are not otherwise explained.

Hypothesis: It is hypothesized that the following patient died from late complications of a congenital diaphragmatic hernia that was provoked by increased intra-abdominal pressure associated with bouncing in a bounce house, an etiology that was not found elsewhere despite a thorough literature search.

A 3-year-old White female with no significant past medical history was found unresponsive and apneic after several hours of vomiting. The patient had reportedly not felt well since jumping in a bounce house at a festival earlier in the day. After one hour of attempted resuscitation by emergency medical services and hospital staff, the patient was pronounced deceased.

On autopsy, there was a three-centimeter opening in the left posterolateral hemidiaphragm with the spleen, stomach, and portions of small and large bowel displaced into the left chest cavity, resulting in compression of both lungs and the heart to the right side of the chest. The right lung weighed 295 grams and the left lung weighed 73 grams. Histologic examination revealed atelectasis in the left lung and congestion in the right lung, spleen, stomach, and bowel.

The cause of death in this patient was ultimately ruled to be respiratory compromise and associated gastrointestinal complications due to diaphragmatic herniation of abdominal contents into the chest cavity. It is believed that this sequence of events was triggered by jumping in a bounce house earlier in the day, which created a pressure gradient significant enough to allow the abdominal organs to herniate into the chest cavity.

CDH is a condition characterized by failure of the diaphragm to form completely *in utero*, resulting in an opening through which abdominal organs can invade.¹ Most commonly occurring posterolaterally, called a Bochdalek hernia, CDH is typically diagnosed prenatally or at birth, though in some cases it can be asymptomatic until later in life.^{2,3} Theories for why this may occur include occlusion of the opening by the liver or spleen, by a sac associated with the abdominal contents, or by the rim of the defect itself. Late onset of symptoms has been reported at times of increased intra-abdominal pressure, such as coughing, burping, or flying.⁴⁻⁷

CDH can be difficult to diagnose in children because of the rarity of presentation beyond infancy. It should be considered in patients who present with acute onset of gastrointestinal or respiratory symptoms without a known etiology or appearing out of proportion to possible etiology.⁸

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Congenital Diaphragmatic Hernia, Intra-Abdominal Pressure, Bounce House