Title

Spontaneous Pneumomediastinum (Hamman's Syndrome): A Rare Cause of Chest Pain During Labor and Delivery

Journal

Proceedings of UCLA Health, 26(1)

Authors

Goh, Mark
Khandabi, David

Publication Date

2022-08-25

CLINICAL VIGNETTE

Spontaneous Pneumomediastinum (Hamman's Syndrome): A Rare Cause of Chest Pain During Labor and Delivery

Mark Goh, MD and David Khandabi, MD

Introduction

Spontaneous pneumomediastinum (SPM) or Hamman's syndrome is an uncommon clinical condition that is not typically considered in the differential diagnosis of acute chest pain. Its occurrence in the general population has been reported as less than 1:44,000, and it is likely even more rare during pregnancy or labor where its incidence approaches 1:100,000.[1] Here we present a case of SPM in a 34 week parturient that developed during vaginal delivery of twins. Clinicians should be mindful of this rare complication, especially in patients who are engaged in vigorous Valsalva maneuvers or who carry certain comorbid conditions which may predispose to the development of SPM.

Case Description

A 24-year-old, 80 kg, G1P0 female with a monochorionic/ diamniotic twin pregnancy presented at 34 weeks and 2 days with painful contractions. She was admitted to the labor and delivery service in pre-term labor with prolonged premature rupture of membranes. Twin A measured 1842g cephalic (17th percentile) and twin B measured 2073g (46th percentile). Both were confirmed to be in the cephalic position and both exhibited a Category I tracing on fetal HR monitoring. Her CBC was normal and she was covid negative. The patient expressed a strong desire for a vaginal delivery and was counseled that any attempted vaginal delivery may ultimately require a breech extraction vs an urgent cesarean section. She was given IV morphine for pain and IV oxytocin was started to augment labor. A continuous epidural was placed for labor analgesia. She eventually progressed to complete dilation and complete effacement approximately 10 hours after admission.

She was taken to the obstetric operating room for vaginal delivery of twins. With a standard trial of coaching and pushing, Twin A was delivered 1 hour later with an Apgar score of 6 and 7. Immediately after delivery, the patient began complaining of right sided chest pain worse with deep inspiration. All vital signs remained stable except for sinus tachycardia during pushing. Oxygen saturation remained 100% on room air. EKG showed no ischemic changes and breath sounds were equal and symmetric. Twin B remained in the cephalic position but high in the birth canal, so IV oxytocin was continued.

The patient continued to complain of right sided chest pain, increasing in intensity and limiting her ability to push. Her vital signs remained stable. With significant coaxing and persuasion, she was able to push with sufficient force to deliver Twin B 1.5 hour later. Apgar scores were 6/7. The placenta was manually extracted and all postpartum bleeding was controlled.

In the recovery room, her vital signs were stable but the chest pain persisted, so a stat portable CXR was ordered (Figure 1) which showed soft tissue emphysema in the lower neck/upper chest, and a lucency around the cardiac silhouette, suspicious for pneumomediastinum. Crepitus was also observed on palpation of the upper chest and neck.

Her chest pain improved slightly over next 24 hours but did not resolve. Chest CT (Figures 2 and 3) demonstrated persistent subcutaneous emphysema and mediastinal air encasing the great vessels, airway and heart but with no identifiable etiology.

A barium esophagram was ordered to definitively rule out esophageal perforation. However, by POD 2, the chest pain was improved and the patient decided to sign out to be with her newborn twins. Vital signs were entirely normal at the time of discharge.

Discussion

Spontaneous pneumomediastinum (SPM) is a rare clinical entity defined by the presence of mediastinal air which has developed without any inciting trauma, pulmonary pathology, or iatrogenesis.[2] It is thought to occur from rupture of marginally located, terminal alveoli with subsequent dissection of air along the bronchovascular tree, tracking back into the mediastinum.[3] Subcutaneous emphysema from air tracking further in the chest wall and neck is a common, coexisting finding.

Unlike spontaneous pneumothorax, which often presents in young, tall, and thin males, SPM is not associated with any particular demographic group or body habitus. SPM typically presents with acute onset chest pain and occasionally with cough and dyspnea. Preexisting lung disease is often identified in affected patients, including interstitial lung disease, asthma, bronchiectasis, and cystic lung lesions. SPM is also associated with smoking and inhalational cocaine use, which may contribute to alveolar damage and subsequent rupture.[4] In the absence of predisposing factors, repeated Valsalva maneuvers as may

occur during the second stage of labor or during vigorous exertion often precede the development of SPM. Such maneuvers are thought to substantially increase intrathoracic pressures, which may expand certain marginally located alveoli unevenly, leading to rupture and air leak.

Fortunately, SPM is usually a benign, self-limited condition that only requires supportive therapy such as rest, oxygen and analgesics. Serious complications including septic mediastinitis, tension pneumothorax, and cardiac tamponade are rare. Most authors also stress that diagnostic testing to identify a specific cause such as esophageal tear, rarely yield clinically relevant information and should not be ordered routinely.[5] Dietary restriction and prophylactic antibiotics are often prescribed but are usually unnecessary.[6]

If SPM is suspected during labor, other serious causes of chest pain should be investigated and ruled out, including coronary spasm, myocardial infarction, pulmonary embolus, amniotic fluid embolus, and aortic dissection. Chest x-ray is diagnostic in most patients with SPM. If equivocal, chest CT will provide more definitive evidence of mediastinal air.[7] If diagnosed or suspected during labor, management should be aimed at minimizing further pushing and Valsalva maneuvers, typically by assisting the second stage of labor with either forceps or vacuum. If unsuccessful, strong consideration should be given to moving immediately to operative Cesarean delivery.

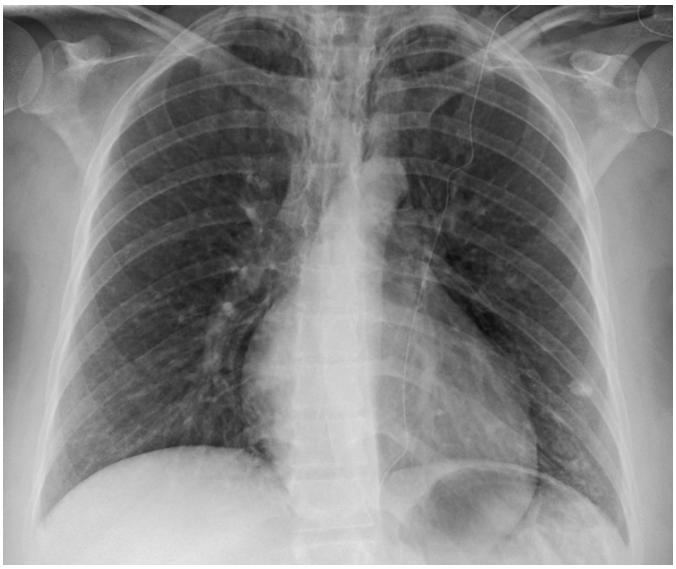

Figure 1: Chest X-ray with subcutaneous emphysema in the upper chest and mediastinal air outlining the cardiac silhouette.

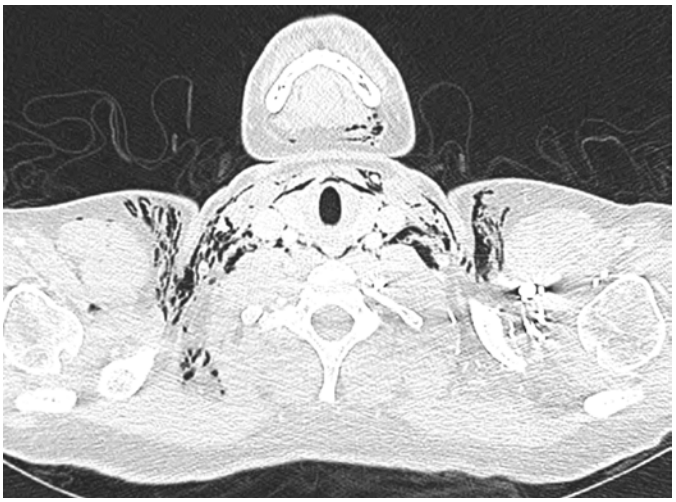

Figure 2: Chest CT with subcutaneous air tracking throughout the upper chest and neck

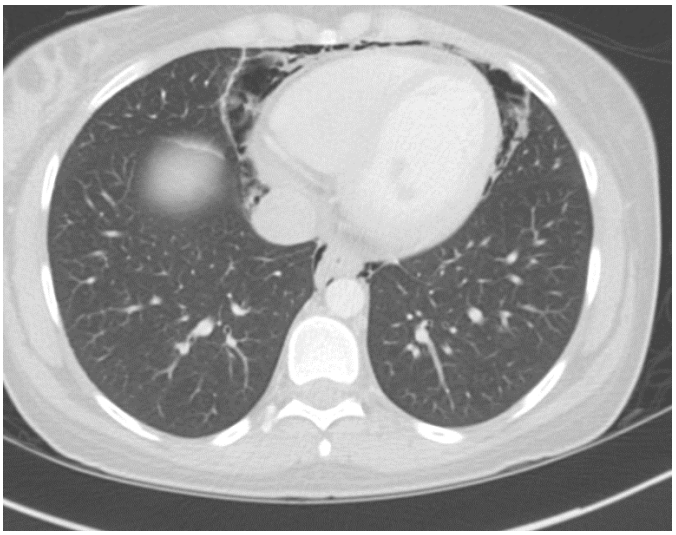

Figure 3: Chest CT with mediastinal air encasing the heart and tracking posteriorly to the aorta and esophagus.

REFERENCES

1. **Amine NO, Lomiguen CM, Iftikhar A, Sahni S**. Pregnancy-associated Spontaneous Pneumomediastinum: A Contemporary Review. *Cureus*. 2018 Oct 15;10(10): e3452. doi: 10.7759/cureus.3452. PMID: 30564531; PMCID: PMC6298626.
2. **Mondello B, Pavia R, Ruggeri P, Barone M, Barresi P, Monaco M**. Spontaneous pneumomediastinum: experience in 18 adult patients. *Lung*. 2007 Jan-Feb; 185(1):9-14. doi: 10.1007/s00408-006-0002-7. Epub 2007 Feb 15. PMID: 17310299.
3. **Caceres M, Ali SZ, Braud R, Weiman D, Garrett HE Jr**. Spontaneous pneumomediastinum: a comparative study and review of the literature. *Ann Thorac Surg*. 2008 Sep;86(3):962-6. doi: 10.1016/j.athoracsur.2008.04.067. PMID: 18721592.

4. **Perna V, Vilà E, Guelbenzu JJ, Amat I**. Pneumomediastinum: is this really a benign entity? When it can be considered as spontaneous? Our experience in 47 adult patients. *Eur J Cardiothorac Surg*. 2010 Mar; 37(3):573-5. doi: 10.1016/j.ejcts.2009.08.002. Epub 2009 Sep 12. PMID: 19748792.
5. **Bakhos CT, Pupovac SS, Ata A, Fantauzzi JP, Fabian T**. Spontaneous pneumomediastinum: an extensive workup is not required. *J Am Coll Surg*. 2014 Oct;219(4): 713-7. doi: 10.1016/j.jamcollsurg.2014.06.001. Epub 2014 Jun 6. PMID: 25053221.
6. **Al-Mufarrej F, Badar J, Gharagozloo F, Tempesta B, Strother E, Margolis M**. Spontaneous pneumomediastinum: diagnostic and therapeutic interventions. *J Cardiothorac Surg*. 2008 Nov 3;3:59. doi: 10.1186/1749-8090-3-59. PMID: 18980688; PMCID: PMC2596119.
7. **Iyer VN, Joshi AY, Ryu JH**. Spontaneous pneumomediastinum: analysis of 62 consecutive adult patients. *Mayo Clin Proc*. 2009 May;84(5):417-21. doi: 10.1016/S0025-6196(11)60560-0. PMID: 19411438; PMCID: PMC2676124.