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A RARE PRESENTATION OF SPONTANEOUS HEMOPNEUMOTHORAX IN A YOUNG MALE

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A 21-year-old previously healthy male presented to the emergency treatment unit with left-sided chest pain radiating to the left shoulder, which had worsened since the morning. The patient also experienced diarrhea (three episodes), vomiting (two episodes), and intermittent dyspnea. His history was largely unremarkable except for a significant smoking history—10-15 cigarettes per day for the past six years. On examination, the patient was in severe pain and appeared pale, with notable tachypnea (respiratory rate of 30 breaths per minute) and a rapid, regular pulse of 130 beats per minute. Physical findings were concerning: tracheal deviation to the right, hyperresonance on the left side of the chest, and reduced air entry on the left side. Despite these findings, the patient maintained a high oxygen saturation (SpO2 of 100% on room air). However, his blood pressure was dangerously low at 85/60 mmHg, raising the suspicion of a secondary spontaneous pneumothorax, likely complicated by a pleural effusion.

Emergency Management and Initial Complications

Given the severity of the patient's condition, immediate interventions were undertaken. Intravenous fluid resuscitation with 1 liter of normal saline was initiated, and needle decompression was performed on the left precordium using a 14-gauge cannula. A pigtail

catheter was inserted into the left pleural space, after which bubbling was noted, indicative of air evacuation. Despite these measures, the patient's condition deteriorated rapidly. Within 20 minutes, 1050 ml of blood drained from the pigtail catheter, signaling a hemothorax. The patient's blood pressure further dropped to 75/60 mmHg, and his heart rate increased to 136 beats per minute, necessitating further resuscitation.

Advanced Resuscitation and Stabilization

The resuscitation process was escalated, including the administration of two units of packed red blood cells (PRBC), an additional 1 liter of normal saline, and 1 gram of tranexamic acid to control bleeding. Antibiotic coverage was provided with 2 grams of intravenous cefazolin, and calcium gluconate was administered to address potential hypocalcemia from blood transfusion. Fentanyl was given for pain management. These interventions helped stabilize the patient's blood pressure to around 90 mmHg, with ongoing invasive blood pressure monitoring.

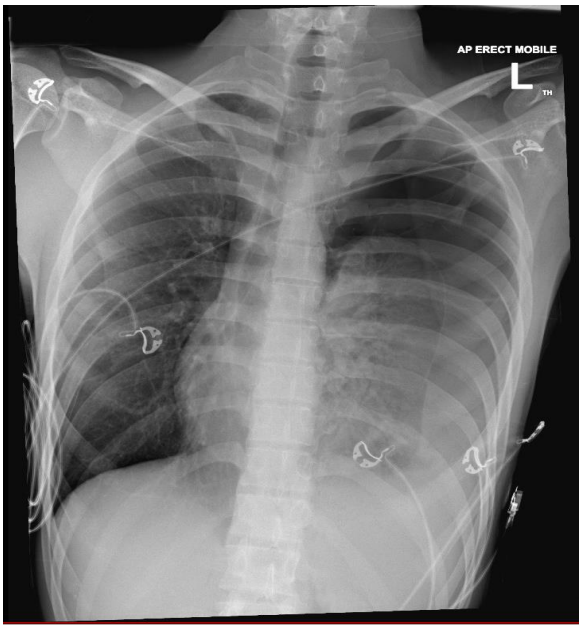

Figure 1: Preoperative Chest X-ray

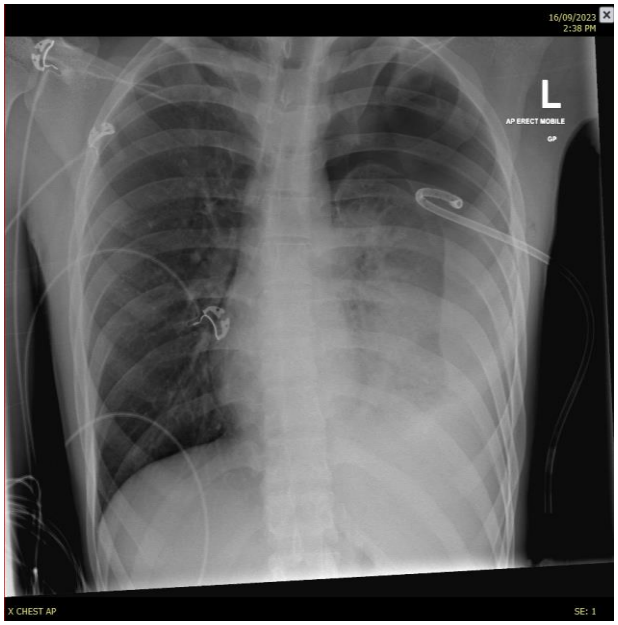

Figure 2: Post Operative Chest X -ray

Surgical Intervention and Post-Operative Course

Given the persistent hemodynamic instability and the significant output of blood from the pigtail catheter, the patient was reviewed by the cardiothoracic team. The pigtail catheter was replaced with a more robust 32G intercostal (IC) tube, which initially yielded 300 ml of blood, followed by minimal output. As the patient's condition stabilized, with a blood

pressure of 110/50 mmHg and a heart rate of 104 beats per minute, he was transferred to the intensive care unit (ICU) for close observation.

Despite initial stabilization, the patient experienced another episode of hypotension in the ICU, prompting an urgent surgical intervention. A limited left lateral thoracotomy was performed, during which the thoracic cavity was thoroughly explored. A hematoma was evacuated, and apical bullae in the upper lobe was stapled. Apical adhesion tears were diathermized, and no air leaks were noted on underwater testing. Apical and basal chest drains were inserted to ensure adequate drainage.

Post-Operative Recovery

The patient was extubated immediately after surgery and returned to the ICU for observation. Over the next 24 hours, minimal drainage was noted through the IC tube, and the patient maintained stable heart rate and blood pressure. The IC tube was removed on post-operative day 2, and the patient began physiotherapy to aid in his recovery. By post-operative day 5, the patient had recovered sufficiently to be discharged home, having successfully navigated a potentially life-threatening event.

Reflection on Management and Outcomes

This case underscores the complexity of managing a secondary spontaneous pneumothorax, particularly when complicated by a significant hemothorax. The initial emergency management, while appropriate in rapidly decompressing the pneumothorax, also highlighted the need for vigilance regarding potential complications, such as bleeding. The timely involvement of the cardiothoracic team and the decision to proceed with surgical intervention were critical in addressing the underlying pathology and stabilizing the patient. The patient's recovery trajectory, including his swift post-operative stabilization and discharge, reflects the effectiveness of the multidisciplinary approach employed in this case. However, the initial diagnostic and therapeutic decisions could be critically analyzed to optimize care pathways for similar future cases.

DISCUSSION

The initial response from the Australian Capital Territory Ambulance Service (ACTAS) seemed to overlook the possibility of a pneumothorax. This omission likely stems from cognitive bias, influenced by the observation of ST depression on the patient's electrocardiogram (ECG). The medical team's focus on the ST depression, a common indicator of myocardial ischemia, may have led them to prioritize cardiac issues, such as a suspected myocardial infarction, over other potential diagnoses. Consequently, the patient

was administered 300 mg of aspirin, a standard treatment for suspected acute coronary syndromes. However, this may have diverted attention away from other critical differential diagnoses, such as a pneumothorax, which could have been equally or more pressing given the patient's clinical presentation.

The patient was assessed in the emergency department 15 minutes after arrival, a delay that warrants scrutiny, especially in light of the patient's clinical status. Given the blood pressure reading of 88/60 mmHg—indicative of hypotension—more prompt assessment would have been ideal. Hypotension, particularly when coupled with potential signs of shock or other life-threatening conditions, typically demands immediate evaluation and intervention. The 15-minute delay in assessment might have contributed to a missed or delayed diagnosis, potentially exacerbating the patient's condition.

A key procedure-related issue was the choice between inserting a pigtail catheter versus an intercostal (IC) tube or performing a finger thoracostomy. The pigtail catheter, though less invasive and often preferred for its ease of insertion, became blocked after insertion. This blockage could have hindered effective decompression of the pneumothorax, if present, and might have delayed the resolution of the patient's symptoms. The decision to use a pigtail catheter over an IC tube or a finger thoracostomy could be seen as a procedural oversight, especially in emergency situations where rapid and reliable decompression is critical. Finger thoracostomy or IC tube insertion might have provided a more robust solution in this scenario, given their reliability in ensuring adequate drainage.

The case also highlights issues related to team leadership during the patient's care. Effective team leading in emergency situations is crucial for ensuring timely, accurate decision-making and coordinated patient care. In this case, the potential for cognitive bias, delayed assessment, and procedural complications suggests that there may have been a lack of clear communication and decisive action among the team members. Strong leadership could have mitigated these issues by guiding the team through a systematic approach to differential diagnosis, ensuring that critical conditions like pneumothorax were not overlooked, and facilitating prompt and appropriate procedural interventions. The effectiveness of the team leader is often reflected in the cohesion of the team's actions and the thoroughness of patient care, both of which appear to have been suboptimal in this scenario.

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