

Trauma of the Ascending Aorta by Barbed Wire: A Rare Mechanism

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ABSTRACT

We report a case of ascending aortic trauma, in a 60 years old patient by barbed wire. Primary exam revealed Beck's triad, generating the hypothesis of a cardiac tamponade, which was confirmed with FAST. It was quickly performed a laparotomy in order to discard abdominal injuries, including pericardial window, followed by sternotomy which confirmed the laceration of ascending aorta. Primary suture of the lesion was performed and the patient evolved well postoperatively. To our knowledge, this is the first reported case of penetrating trauma to the ascending aorta by barbed wire.

Keywords: Thoracic trauma, Ascending aorta, Trauma.

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RESUMEN

Reportamos un caso de trauma de aorta ascendente, en un paciente de 60 años por alambre de púas. El examen primario reveló una triada de Beck, generando la hipótesis de taponamiento cardíaco, la cual fue confirmada mediante FAST. Se realizó una laparotomía inmediatamente con la finalidad de descartar heridas abdominales, incluyendo ventana pericárdica, seguida de estereotomía la cual confirmó la laceración de aorta ascendente. Sutura primaria de la lesión fue realizada y el paciente evolucionó favorablemente en el post operatorio. Para nuestro conocimiento este es el primer caso de herida penetrante de aorta ascendente por alambre de púas.

Palabras claves: Trauma de tórax, Trauma torácico, Trauma de aorta ascendente.

INTRODUCTION

Chest trauma is classified as penetrating or blunt and represents 20 to 25% of deaths in polytrauma patients¹ Among penetrating injuries, involvement of large blood vessels occur in approximately 12.4% of the victims, and has a low survival rate, once most of patients die at the scene.^{2,3} To our knowledge, this is the first reported case of penetrating trauma to the ascending aorta by barbed wire.

CASE REPORT

Male patient, 60 years old, previously healthy arrives in the emergency with a history of trauma by barbed wire. Rescuers reported that while stretching the wire in wooden bases, a tip of the wire broke and reached the patient in the anterior chest,

causing a sudden high intensity dyspnea. After prehospital primary care, the patient was transported to the referral hospital. During transportation, 4 liters of lactated Ringer's solution was infused to maintain hemodynamic stability. On arrival, the patient was in poor general condition, obtunded, dyspneic with respiratory effort and cyanosis in facial and upper thoracic region. Physical examination revealed patent airway, symmetrically decreased thoracic amplitude, diminished breath sounds in the right hemithorax, presence of subcutaneous emphysema and two small perforations without active bleeding and located on the right of sternal edge. The respiratory rate was 30 with oximetry 84% on room air. Cardiac auscultation showed hypophonetic sounds without murmur or arrhythmia, frequency of 105 and blood pressure of 90/60 mmHg. Presence of bilateral jugular venous distention and peripherally had filiform pulses with pale and cold skin. Arriving Glasgow Coma Scale was 13 points (motor 6, eye opening 3, speech 4). In this scenario, physicians proceeded with cardiac monitoring, supplemental oxygen at 100% and a second peripheral venous access for saline infusion was obtained. The chest radiograph showed widening of the mediastinum. Medical research was complemented with ultrasound in the emergency room, which showed fluid in the peritoneal space and pericardial effusion, then a pericardial puncture guided by ultrasound was performed, and the liquid aspirated was blood. A laparotomy was indicated for rapid assessment of the abdominal cavity followed by pericardial window. During laparotomy, there was no signs of spleen or liver bleeding, neither perforation of hollow viscera. Pericardial window showed blood collection, with active and constant flow. Physicians proceeded to sternotomy and pericardiotomy, noting that the blood flow origin was in the ascending thoracic aorta, 1.5 cm above coronary eminence, and the lesion was sutured with 4-0 prolene with felt. The patient recovered well postoperatively and was hospital discharged in 7 days.

DISCUSSION

Because of the anatomical location, ascending aorta is the most affected large calibered vessel of the chest in penetrating stab wounds,⁴ and drilling is the most common mechanism.^{2,3} These patients usually present with massive hemorrhage, however, the absence of significant bleeding and hemodynamic stability in these injuries does not exclude

vascular injury, once there may be a partial or complete thrombosis of the affected vessel. Among patients with active bleeding, the intrathoracic hemorrhage drains into the pleural, mediastinal or pericardial space, leading respectively to a massive hemothorax or cardiac tamponade.

Cardiac tamponade is suggested by Beck's triad (muffled heartbeat, distended neck veins and hypotension) or the presence of a pericardial effusion in imaging test, such as FAST. Signs of mediastinal enlargement, down scrolling of the left bronchi, trachea dislocation, and opacification of the aortopulmonary window are common signs of traumatic aortic rupture on chest radiographs.⁴ CT should only be performed in hemodynamically stable patients with no indication of immediate surgery. Patients with penetrating chest trauma associated with thoracic aortic injury who present hemodynamically unstable are considered surgical emergencies.⁵ In our case, we chose laparotomy initially because the patient was hemodynamically unstable, the FAST have revealed free fluid in the abdomen and pericardial. Laparotomy in this case would allow surgeons to exclude intra-abdominal visceral hemorrhage and also perform a pericardial window. Regarding surgical access, lesions of the ascending aorta and proximal to the left common carotid artery are best addressed through a sternotomy or thoracosternotomy.^{1,2} Once accessed the site, the digital control of bleeding lesions facilitates hemodynamic resuscitation, providing stability. The approach of aortic lesion corresponds to the final repair using polypropylene with felt, followed by a thorough exploration of the mediastinum.^{2,3}

CONCLUSION

Penetrating chest wound with injury in large vessels have high mortality rates, however, through careful evaluation

and surgical experience, you can get good results, making their management challenging and rewarding.

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