

Positive video-assisted thoracoscopic pericardial window management of a right ventricle stab wound with minimally invasive technique

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Abstract: This is a case report of a successful right ventricle stab wound suture through a video-assisted pericardial thoracoscopic window, avoiding the need of a thoracotomy diminishing its associated risks, morbidity and costs. A 22-year-old patient was admitted to the emergency room with a stab wound on the left side of his chest, the patient showed symptoms of dyspnea and signs of pulmonary hypoventilation on his left lung, a chest tube were placed on the affected side with an improvement on his symptoms. A video-assisted thoracoscopic pericardial window (VATPW) was performed within the next 24 hours to rule out underlying heart wound. A VATPW shows a 1 cm right ventricle wound which was treated through the same portals avoiding a thoracotomy. The left chest tube was removed 48 hours after de procedure and the patient underwent a control echocardiogram, with no abnormalities reported and no symptoms of dyspnea, respiratory distress or palpitation the patient was subsequently discharged. The VATPW is a feasible and safe procedure to rule out underlying heart injury in individualized cases and it provides a minimally invasive treatment option in selected patients avoiding major surgery like thoracotomy or sternotomy and the added morbidity that carry with them.

Keywords: Thoracoscopic pericardial window; ventricle wound; thoracotomy; stab wound

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Introduction

It is described that 20% of hemodynamically stable patients with precordial wounds have hidden heart wounds, forcing the surgeon to rule them out (1). Performing a video-assisted thoracoscopic pericardial window (VATPW) is a safe and effective method to determine the presence of cardiac lesions, in the following we present the case as seen in the video of a positive VATPW with a right ventricle wound and its management through this surgical approach with excellent results.

Patient Information

A 22-year-old male, who works as a merchant, was admitted to the emergency room with a stab wound

in his left precordial region (located on his second intercostal space with midclavicular line). The patient had symptoms of respiratory distress with signs of pulmonary hypoventilation in his left pulmonary field, but no signs of cardiac tamponade. According to the patient status the on call surgeon decided to place a chest tube without prior radiographs, which drained air and 400 cc of blood. Control chest X-rays showed a well-placed chest tube, free costophrenic angles and the blood work showed no significant drop in hemoglobin and hematocrit.

Based on physical examination, imaging and location of the wound, the on call surgeon decided to perform a VATPW within 24 hours of admission. The patient is transported to the operating room (OR) and placed on supine position on the operating table, the on call anesthesiologist performs an endotracheal intubation with a



Figure 1 Positive video-assisted thoracoscopic pericardial window, management of a right ventricle stab wound with minimally invasive technique (2).

Available online: <http://www.asvide.com/articles/1013>

bi-lumen 7.5 tube; the collapse of the left lung is achieved. The chest tube placed in the emergency room is extracted and the residual surgical wound is used as an entry point for a 10 mm trocar, the cavity is insufflated with CO₂ at a pressure of 10 mmHg, through this trocar the 30-degree optical lens is forward and the pericardium is evaluated on its full extent, a 2 cm pericardial wound presents itself with a layer bleeding draining to the left thorax which explains the lack of tamponade signs and the clinical improvement once the chest tube was placed in the emergency room. A systematic panoramic view of the cavity is performed, no signs of injury to the mediastinum or large vessels were found. A suction cannula is placed through a second 5 mm trocar that was inserted under direct vision in the 7th intercostal space with anterior axillary line, the residual haemothorax was drained and a grade 1 lung injury of the upper lobe of about 2 cm in length was observed.

A third 5 mm trocar is placed in the 7th intercostal space with middle clavicular line, through it, a grasper is inserted, using surgical scissors the pericardial wound is extended cephalic and caudally, which exposes a 1 cm straight wound to the right ventricle with a layer bleeding. The patient vital signs continue stable, so a thoracoscopic management is attempted, with the option for a thoracotomy if necessary.

The ventricle stitching is performed with a simple mattress stitch using a needle holder and a 3-0 non absorbable monofilament suture. A fibrin sealant is placed to cover the wound and the pericardium is left as it is. The trocars are removed under direct vision; a new chest tube is replaced and connected to a vacuum system (*Figure 1*). At the

end of the procedure the patient was extubated successfully. He's transferred to a general ward and 48 hours after surgery, undergoes a follow up echocardiogram reported as normal. The chest tube is removed and the patient is discharged. The patient is seen 2 weeks after surgery for the post-operative follow up and is allowed to reincorporate to his daily activities.

Monthly clinical follow-up is scheduled, with no signs of dyspnea or respiratory distress.

Discussion

Penetrating chest trauma has been debated in all scenarios, from centuries before Christ to the present day. It is clear that the patient with penetrating chest injury and signs of tamponade or in extremis is a candidate for thoracotomy surgery (1,3).

It is also known that up to 20% of hemodynamically stable patients with precordial wounds have a hidden heart wound (1). The study of patients with stable chest trauma is what has led to controversies determining which is the best intervention to rule out the presence of a heart wound, a subxyphoid ultrasound knowing that it can generate a false negative or, a pericardial window either subxyphoid or minimally invasive that could diminish the risk of a missed heart wound (4-6).

So far the best evidence available in chest trauma and hemodynamically stable patient is the prospective study made by a South African group composed by Nicol *et al.*, who have shown that pericardial window is definitely superior to ultrasound when it comes to identifying hidden cardiac wounds in stable patients (5). However, even though video-assisted thoracoscopy is a minimally invasive method that allows to perform a pericardial window in a safe manner, with an excellent visualization of the mediastinum, the greater vessels, the lungs and in our case, achieve the drainage of a traumatic haemothorax, not to mentioned the successful management of a right ventricle wound, it has its drawbacks, this technique is only possible if the patient remains stable during surgery, it still needs further studies to weight its potential benefits in terms of patient outcomes, costs and applicability, but in selected patients and with the right surgical team it could prove to be an alternative to diminish the risk of a missed heart wound (7).

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None.

Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

Informed Consent: Written informed consent was obtained from the patient for publication of this manuscript and any accompanying images.

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