Severe heart laceration in penetrating chest trauma:
thoracoscopy as a key to diagnosis

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A patient had attempted suicide by firing a butcher’s gun into his left chest 3 cm caudal to the mammilla. Transthoracic echocardiography and CT-scan showed a discrete hematopneumothorax but no pericardial effusion, the cardio respiratory condition was stable. As the bolt had been aimed directly at the heart of the patient, thoracoscopy was performed to rule out cardiac trauma. Thoracoscopy showed a distinct severe contusion of the otherwise intact pericardium and a hemopericardium. Immediate thoracotomy and pericardiotomy revealed significant intrapericardial bleeding caused by an incomplete rupture of the left ventricle. The condition was successfully treated by direct reinforced suture.

1. Introduction

Suction drainage has often been advocated as the method of choice in the treatment of otherwise uncomplicated perforating chest trauma. Yet, though the presence of a life-threatening condition is unlikely if chest roentgenograms, CT-scan and sonography show inconspicuous findings, a residual risk, that depends on the respective trauma mechanism, remains.

In former years the side-effects of a potentially unnecessary explorative thoracotomy had to be weighed against the residual risk. Video-assisted thoracoscopy (VATS), however, is a method the inherent stress and negative effects of which are not significantly higher than those of suction drainage alone. This is, why we have been increasingly using VATS for the diagnosis and treatment of chest trauma during the last years [1,2,3].

We report the case of a patient, who had sustained a life-threatening incomplete rupture of the left ventricle, that in spite of CT-scan and sonography was not diagnosed prior to VATS.

2. Case report

A 47-year-old male patient had attempted suicide by firing a butcher’s gun into his left pleural cavity. The site of the perforation was 3 cm caudal to the left mammilla. After on-site endotracheal intubation and insertion of a chest tube by the emergency doctor, the patient was admitted to our department. Chest roentgenograms, transthoracic echocardiography and CT-scan showed a discrete hematopneumothorax but no pericardial effusion (Fig. 1), bronchoscopy revealed retained mucus and chronic bronchitis, electrocardiogram showed neither arrhythmia nor low voltage. Both blood pressure and heart rate were within normal range, the laboratory parameters as well were normal. Through the chest tube a total of 150 ml of blood had been drained since its insertion. Throughout the examination series in the emergency room the patient’s condition was stable.

Because anamnestic data as well as the local findings suggested that the bolt had been aimed directly at the heart of the patient, video-thoracoscopy was performed to rule out cardiac trauma. There was a minimal amount of blood in the pleural space, the lung surface was intact, the fractured rib segments were slightly protruding into the pleural cavity. The lower half of the left pericardial circumference, however, showed a livid discoloration and superficial
bleeding from small vessels of the epipericardial fat. Otherwise the pericardium was intact. Hemopericardium was visible. Due to the presumable severity of the trauma, the procedure was immediately converted to thoracotomy. At pericardiotomy about 300 ml of fresh blood drained under pressure. The source of bleeding was a 4 cm long severe laceration of the left ventricle localized laterofrontal. involving half its wall thickness. The condition was successfully treated by direct reinforced suture using Teflon pledgets (Fig. 2). The pericardium was loosely closed with the help of a polypropylene mesh. One intrapericardial and one intrapleural drainage were positioned.

Throughout the postoperative period, there was no pericardial effusion and no relevant myocardial dyskinesia as documented by repeated transesophageal echocardiography. The chest tubes were removed after 3 days. The patient was transferred to a psychiatric department on the 7th postoperative day.

3. Discussion

In some cases of penetrating chest trauma the injury will prove fatal at the very site of the incident, in others the severity of the situation will require emergency thoracotomy immediately after admission [4]. There is, however some controversy about the management of patients, the cardio respiratory situation of whom remains stable and in whom the overall check-up does not give evidence of severe injury. Trauma centres which have to deal with large amounts of penetrating chest injuries advocate chest tube drainage and ‘wait and see’ in such cases.

In Austria penetrating chest trauma is a very rare condition. This is, why in former years both patients and doctors would in case of a ‘stable situation’ which however leaves the slightest doubt rather accept the risk, the prolonged hospital stay and the costs connected with thoracotomy than the risk of leaving a life-threatening situation undetected [1,2,5]. In recent years thoracotomy for penetrating chest trauma has been replaced by thoracoscopy, which is now routinely performed in any cardiorespiratorily stable penetrating chest trauma in which the injury to the thoracic viscera cannot the precluded [1,2,3]. In addition to a clear-cut diagnosis it offers the possibility of thoracoscopic suturing of pulmonary lesions, removal of foreign bodies, control of minor bleeding or of immediate conversion to thoracotomy in case of need [6,7].

The present case of severe ventricular laceration, which might have had a fatal outcome if undetected, underlines the value of invasive diagnostic procedures in ‘stable’ penetrating chest trauma.

References


Appendix A. ICVTS on-line discussion

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Message: Although the blood was not clotted, TEE failed to reveal the pericardial tamponade, which was confirmed by thoracoscopy and 300 ml blood was evacuated during surgery. The findings here conform to our Scandinavian experience where TEE is inconclusive in cardiac trauma patients. In this case thoracoscopy was a useful tool in the diagnosis of an otherwise missed injury. In such a case, some issues are to be considered. Was thoracoscopy performed under local or general anesthesia? If so why was the patient subjected to general anesthesia while he was stable? Were there any clinical signs of tamponade? Have you seen the bullet during thoracoscopy or was there an exit wound?