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REVIEW

Treatment of haemothorax

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Summary
Haemothorax is a problem commonly encountered in medical practice and is most frequently related to open or closed chest trauma or to invasive procedures of the chest. Spontaneous haemothorax is less common and can have various causes, such as the use of anticoagulants, neoplasia, and rupture of pleural adhesions. Identification by radiography and thoracentesis is indicated and treatment of the underlying trauma should start immediately. After insertion of a large chest tube, antibiotic prophylaxis in trauma patients should be administered for 24 h.

Further treatment depends on the haemodynamic stability of the patient, the volume of evacuated blood and the occurrence of persistent blood loss. Surgical exploration by VATS or thoracotomy is necessary if >1.500 ml of blood has accumulated and/or an ongoing production of >200 ml of blood per hour is observed. If the haemorrhage is less severe, careful investigation into the underlying cause must be performed and blood should be evacuated by tube thoracostomy. If clotted blood retained in spite of tube thoracostomy, intrapleural fibrinolytic therapy can be applied to breakdown clots and adhesions. If conservative treatment is insufficient, a surgical approach with VATS or thoracotomy is indicated to prevent subsequent complications.

Contents

Abbreviations: CT, Computer Tomography; IPFT, Intrapleural Fibrinolytic Therapy; IU, International Units; VATS, Video-Assisted Thoracoscopic Surgery.

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Introduction

The exact incidence of haemothorax is not known. Chest injuries occur in approximately 60% of all polytrauma cases and haemothorax is most frequently caused by chest trauma. A rough estimate of the occurrence of haemothorax related to trauma in the United States approaches 300,000 cases per year.[1] Generally, haemothorax can be divided into two categories, based on aetiology: spontaneous and traumatic haemothorax.

This document represents the present knowledge about treatment of haemothorax looking at the published literature. We performed a systemic search of the literature, using the term "haemothorax" in PubMed. Articles published between 1975 and September 2009 were included.

Definition

Haemothorax refers to a collection of blood within the pleural cavity. By definition this bloody pleural effusion should contain a haematocrit value of at least 50% of the haematocrit of peripheral blood.

Aetiology

The primary cause of haemothorax is sharp or blunt trauma to the chest. Iatrogenous and spontaneous haemothoraces occur less frequently.

Iatrogenous haemothoraces are known to occur as a complication of cardiopulmonary surgery, placement of subclavian- or jugular-catheters or lung- and pleural-biopsies. Reported causes in the literature are, for example, sclerotherapy of oesophageal varices, rupture of pulmonary arteries after placement of Schwann—Ganz catheters, thoracic sympathectomy and translumbar aortography.[2]

Spontaneous haemothoraces are generally caused by rupture of pleural adhesions (3—7% of all cases), neoplasma (schwanommas, soft tissue tumours, and hepatocellular carcinoma), pleural metastasis, and as a complication of anticoagulant therapy for pulmonary embolism.[3] Less frequent causes reported in the literature are rupture of aneurysmatic thoracic arteries such as the aorta, mammarian arteries and intercostal arteries (e.g. Ehlers Danlos syndrome, and neurofibromatosis), rupture of pulmonary vascular malformations (Rendu-Osler-Weber syndrome), endometriosis, and exostoses.[2,3]

Pathogenesis

Bleeding into the pleural space can occur with virtually any disruption of the tissues of the chest wall and pleura or the intrathoracic structures. Blood that enters the pleural cavity is exposed to the motion of the diaphragm, lungs, and other intrathoracic structures. This results in some degree of defibrination of the blood so that incomplete clotting occurs. Within several hours of cessation of bleeding, lysis of existing clots by pleural enzymes begins. However, when this lysis is incomplete or bleeding is relatively large, clot formation is inevitably.

Once the clot has been allowed to organize, it will adhere to the lung and pleura, making it difficult to remove. The agitation of cardiac and respiratory movement rapidly defibrinates the blood, and a fibrin clot thus formed is deposited on the visceral and parietal pleura, setting the stage for a trapped lung. In its early development, this thin membrane has little substance and is attached very loosely to the underlying pleural surface. By the seventh day, there is an angioblastic and fibroblastic proliferation. The membrane continues to thicken by progressive deposition and organization of the coagulum within the cavity. An understanding of the pathologic features of a clotted haemothorax makes it clear that, if possible, the clotted haemothorax should be evacuated within a reasonable time after onset of bleeding.

Initial treatment

Chest tube drainage

In most cases, chest tube drainage by means of a large calibre ($\geq$28 French) tube is an adequate initial approach unless an aortic dissection or rupture is suspected.[2,3] After the tube thoracostomy is performed, a chest radiograph should always be repeated in order to identify the position