

FEATURES OF SURGICAL TACTICS IN CASE OF CLOTTED HEMOTHORAX

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Abstract: This study investigates the clinical features and optimal surgical approaches for managing traumatic clotted hemothorax (TCH). A total of 78 cases were analyzed, with clotted hemothorax resulting from penetrating chest injuries in 32.05% of cases and closed trauma in 67.95%. Diagnostic methods included radiography, ultrasound, and MSCT, revealing varying fluid and air levels in the pleural cavity. Treatment methods ranged from conservative therapy to invasive surgical interventions. Video-assisted thoracoscopic sanitation (VATS) proved to be the most effective and minimally invasive approach, enabling comprehensive removal of clots and minimizing complications. Early diagnosis and appropriate choice of treatment play a critical role in improving patient outcomes in TCH cases.

Keywords: clotted hemothorax, chest trauma, thoracoscopy, video-assisted thoracic surgery (VATS), pleural drainage, thoracotomy, surgical tactics

ОСОБЕННОСТИ ХИРУРГИЧЕСКОЙ ТАКТИКИ ПРИ СВЕРНУВШЕМСЯ ГЕМОТОРАКСЕ

Аннотация: В этом исследовании изучаются клинические особенности и оптимальные хирургические подходы к лечению травматического свернувшегося гемоторакса (ТГ). Всего было проанализировано 78 случаев, при этом свернувшийся гемоторакс возник в результате проникающих ранений грудной клетки в 32,05% случаев, а закрытая травма — в 67,95%. Диагностические методы включали рентгенографию, УЗИ и МСКТ, выявляющие различные уровни жидкости и воздуха в плевральной полости. Методы лечения варьировались от консервативной терапии до инвазивных хирургических вмешательств. Видеоассистированная торакоскопическая санация (ВАТС) оказалась наиболее эффективным и минимально инвазивным подходом, позволяющим полностью удалить сгустки и минимизировать осложнения. Ранняя диагностика и правильный выбор лечения играют решающую роль в улучшении результатов лечения пациентов в случаях ТГ.

Ключевые слова: свернувшийся гемоторакс, травма грудной клетки, торакоскопия, видеоассистированная торакальная хирургия (ВАТХ), плевральный дренаж, торакотомия, хирургическая тактика

INTRODUCTION

One of the most pressing problems of modern surgery and traumatology remains chest trauma, as the number of victims with wounds and closed chest trauma is steadily increasing. A significant portion of these victims experience severe complications, among which one of the most difficult to diagnose and treat is clotted hemothorax (Helling TS et al., 1989). 2002). Traumatic hemothorax occurs in 25-59.9% of victims and in 3.8-12% of them it ends with the formation of clotted hemothorax [1,2,3].

The problem of diagnostics and treatment of traumatic clotted hemothorax (TCH) is very difficult due to the fact that after hemothorax, dense blood clots are usually formed, which become a favorable environment for the development of microorganisms and fibrous layers, adhesions

remain, which complicate the respiratory function of the lungs, causing the formation of sclerotic processes in them [2,5]. The most well-known and widespread methods of diagnostics of clotted hemothorax (CH) are X-ray and puncture of the pleural cavity. However, these methods do not provide complete information on the localization, volume of CH, the ratio of liquid and dense fractions.

The traditional method of eliminating clotted hemothorax is thoracotomy. The use of punctures and drainage of the pleural cavity in combination with the introduction of proteolytic enzymes is often ineffective [1,6]. The rapid development of endovideosurgical technologies allows us to significantly expand the range of surgical interventions performed in a minimally invasive manner. Interest in the use of endovisual technology for clotted hemothorax is due to the fact that traditional interventions are accompanied by severe surgical trauma and long-term rehabilitation of patients. In this regard, it seems relevant to improve the effectiveness of treatment of post-traumatic hemothorax [3,4,7,8].

MATERIAL AND METHODS

We analyzed 78 cases of traumatic clotted hemothorax (TCH) (in 25 (32.05%) patients TCH arose as a result of penetrating chest wounds and in 53 (67.95%) - closed chest trauma). Analyzing the mechanism of injuries, TCH due to penetrating wounds was observed in young people, while in closed trauma TCH was observed mainly in mature, elderly and old people and was predominantly male - 64 (82.05%).

In the first 24 hours after the injury, 28 (35.90%) victims were admitted, up to 7 days - 23 (29.49%), up to two weeks - 12 (15.38%), up to a month - 10 (12.82%) and later - 5 victims (6.41%). In the first 24 hours, mainly after penetrating chest wounds and rib fractures were admitted. More than half of the victims - 42 (53.85%) were diagnosed with concomitant diseases, which led to a worsening of the condition of the victims.

All patients underwent X-ray examinations. In 36 (46.15%) patients, a horizontal fluid level was detected in the pleural cavity, and in 25 (32.05%) patients, the presence of air above the fluid level was detected. However, in 17 (21.79%) patients, only a darkening in the lower floor of the hemithorax was detected. In these cases, chest ultrasound and test puncture were used to clarify the nature and amount of fluid accumulation in the pleural cavity. In 15 patients who presented late, MSCT of the chest was used.

The following methods of treatment of SG were used : conservative treatment in 7 patients (8.97%); repeated punctures of the pleural cavity - in 12 (15.39%); drainage of the pleural cavity with the introduction of enzymes (streptase) - in 16 (20.51%); video-assisted thoracoscopic sanitation of the pleural cavity - 38 (48.72%); thoracotomy with lung decortication and pleurectomy - in 5 (6.41%).

RESULTS AND DISCUSSION

In chest injuries, the diagnosis of HS was initially established in 61 (78.20%) patients, although the radiographic picture was interpreted as hydrothorax without signs of organization. In closed chest trauma, the primary radiographic examination allowed establishing the diagnosis of HS only in 19 (35.85%) of 53 examined patients. As in penetrating wounds, hydrothorax or hydropneumothorax was most often diagnosed instead of HS - in 21 (84%) of 25 observations. This is often due to the difficulties in differential diagnosis of TSH and traumatic intrapulmonary changes (traumatic hemorrhages into the parenchyma).

X -ray examination is the most common screening method that allows suspecting hydrothorax, however, the impossibility of multipositional examination in severe passive patients

or with extensive soft tissue emphysema causes low sensitivity of this method. In such cases, the best and invaluable method is MSCT of the chest, which characterizes the exact determination of the volume and localization of pathological contents of the pleural cavity (sensitivity 98%) and objective data on the ratio and localization of liquid and dense fractions of TSG (sensitivity 96.5%). At the same time, interlobar and paramediastinal forms of TSG can be diagnosed only with MSCT and allows to outline the points of puncture or drainage of the pleural cavity, the places of insertion of ports during thoracoscopy, and also to establish the need for thoracotomy.

The choice of the method of treatment of TSH depended on the stage of the clotted hemothorax, its volume and the nature of concomitant diseases and associated injuries. Treatment began with a puncture or drainage of the pleural cavity with the introduction of enzymes. This manipulation was performed in 39 (45.3%) patients. These measures were successful in 21 (53.8%) patients with small clotted hemothorax. The criteria for recovery were considered to be normalization of the patient's condition, stabilization of functional indicators.

All treatment methods are conditionally divided into four types. In 7 cases, conservative treatment was used. These were patients with a TSG volume of less than 500 cm³, suffering from severe concomitant diseases, severe combined trauma, which forced us to avoid more aggressive treatment methods. There were no TSG suppurations or fatal outcomes in this group of patients.

The second group included those who were treated by repeated punctures of the pleural cavity - 12 (15.39%) and those who underwent drainage of the pleural cavity with the introduction of enzymes (streptase) - 16 (20.51%). This is the contingent whose treatment was aimed only at evacuating the liquid fraction of the pleural effusion, by repeated punctures of the pleural cavity or its drainage with subsequent washing and aspiration. These were patients with combined trauma or severe concomitant diseases. Conservative treatment and treatment by evacuating only the liquid fraction of the pleural effusion were used for local and fragmentary forms of pleural effusion, when the dense part was less than 500 cm³ and was localized in hard-to-reach places of the pleural cavity (paravertebrally, paramediastinally, in the interlobar fissure). Intrapleural administration of streptase was used in all forms of TSH, but in fragmentary TSH it was the least effective, which forced its use to be used twice or three times. Long-term hyperthermia associated with the absorption of fibrinolysis products limits the use of this treatment method in weakened elderly and senile patients. There were no fatal outcomes in this group of patients.

Videothoracoscopy sanitation was used in 38 patients. One of the most important advantages of videoendoscopic surgery is that the endoscope can enter the pleural cavity and conduct a detailed examination. Videothoracoscopy was performed within 3 to 10 days after the injury, with an established diagnosis of TSH with a volume of more than 500 cm³ and with a stable condition of patients. During this manipulation, we used the "trocar - extractor" developed by us, which allowed for the complete removal of formed clots, dense inclusions, which allowed for complete cleansing of the pleural cavity. There were no complications or fatal outcomes.

Open surgeries were performed in 5 patients (46.2%) in chronic cases with pleural empyema, when minimally invasive interventions did not lead to lung straightening. Thoracotomy with evacuation of the dense fraction ...

CONCLUSIONS

Early treatment of victims and early diagnosis of TSCH and adequate drainage of the pleural cavity make it possible to prevent serious surgical complications. Video-assisted thoracoscopic sanitation of the pleural cavity is the most rational and minimally invasive surgical tactic for TSCH.

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