THE ABILITIES OF VIDEOTHORACOSCOPY AT BLUNT THORACIC TRAUMAS

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Abstract. Overall 292 patients with the blunt trauma of the chest were at the in-patient treatment from 2006 to 2011 years at the 2nd clinic of the Tashkent Medical Academy. All the patients were separated by us to 2 groups: the first (control) group are 145 (49.7%) patients, who were diagnosed and treated without using of the videothoracoscopy; the second (basic) group are 147 patients, at whom the videothoracoscopy was used at the stages of diagnostic and treatment. As a result of performed research was confirmed that using of the videothoracoscopy at the patients with the blunt thoracic trauma helps to reduce the number of the postoperative complications from 23.4% to 14.3% of the cases, allows to reduce the frequency of the wide thoracotomy from 11.7% to 0.6% of the cases, reduce the terms of being of the patients at the stationer.

Keywords: videothoracoscopy, blunt thoracic trauma, hemopneumothorax.

Introduction

Today the problem of closed chest trauma remains one of the most important in modern surgery and traumatology, and often is one of the main causes of mortality, reaching to 30% according to different authors (Vagner, 1981; Wanek and Mayberry, 2004).

It should be noted that the number of patients with chest injuries has been steadily increasing, and this is due, primarily, to the richness of technology in modern life and high tempo. So, nowadays in the structure of peacetime injuries closed chest trauma reaches 35-50%, while in the 70-80-ies of the last century according to the statistics it was only 8-12% (Vagner, 1981; Akilov et al., 2002). It makes doctors around the world to develop new methods of diagnosis and treatment of patients with blunt thoracic traumas.

In this regard, according to some authors, the use of video endoscopic technique is very promising for qualitatively new way to solve the problem of treatment of patients in this category (Jestkov et al., 2002; Ahmed and Jones, 2004; Korotkov, Kutirev and Kukushkin, 2006; Krotov et al., 2009; Moore et al., 2011).

At the same time, many surgeons still begin treatment of chest injuries with drainage of pleural cavity, especially in penetrating wounds, and the indications for surgical treatment are determined by the amount and intensity of the discharged by drainage blood without character of intrathoracic lesions (Jestkov, Barskiy and Voskresenskiy, 2006; Wilson et al., 2009).

Clinical Material and Methods

During the period from 2006 to 2011 year 292 patients were hospitalized in the 2nd Clinic of Tashkent Medical Academy with the diagnosis of Blunt Thoracic Trauma (BTT).

BTT was often occurred at male – 203 (69.5%). The age of patients ranged from 16 to 82 years (mean age 37.8 ± 1.5 years).

The most common injury was autotrauma, noted in 136 (46.6%) patients, and then – household injury – in 115 (39.3%).

To evaluate the effectiveness of videothoracoscopy patients were divided into 2 groups: the first group (control) consisted of 145 (49.7%) patients, who had the examination and treatment without videothoracoscopy; the second group (main) amounted to 147 patients who had videothoracoscopy at stages of diagnosis and treatment.

These groups were comparable by sex, age and severity of the injury.

As a rule, the patients were brought to the clinic through ambulance (68% of patients). 32% of patients went to the doctor themselves.

Mainly patients were delivered during the first six hours of injury, although there were cases of late admission. So in 9.7% cases, patients were admitted one day after the injury.
Examination of patients was complex and included general clinical examination, laboratory, as well as non-invasive (ultrasound and X-ray examination of the chest, pulse oximetry) and invasive (puncture and drainage of the pleural cavity), research methods, and also videothoracoscopy at patients from the 2nd group. Traumatic injuries of the chest were met equally from the right and left side (respectively 48% and 52% of cases), while in 12% of cases there was two-sided nature of the damage.

Closed thoracic trauma combined with traumatic brain injury was in 58% of cases, with fractures of the long bones – in 26%, pelvis – 13%, injuries of the abdominal cavity – in 19% and retroperitoneal space – 16%.

114 (39%) patients were received in a state close to satisfactory, moderate – 130 (44.5%), in heavy – 48 (16, 5%).

Because of the unreasonableness of videothoracoscopy in patients with extreme severity of the condition, the patients of this category are not included in the analysis.

Results

On the basis of X-ray hemothorax was detected in 13.1% of all patients, pneumothorax – in 10.2%, and hemopneumotorax – at 39.3%.

Minor hemothorax had every fifth patient, moderate – each of the eighth, large and total – one in seven. The distribution of patients in main and control groups according to frequency of the presence of these types of hemothorax was almost identical. At the same time, clotted hemothorax was formed in only 1 (1.2%) patients of the main group and in 8 (6.9%) of the control.

Rib fractures were observed in 121 (41.4%) patients. In this case, a single rib fracture was observed – in 42 (14.4%) patients, multiple – in 79 (27%), of which the formation of the rib valve was observed in 13 (4.5%).

Ultrasound of the chest and abdomen was performed in all patients. The main aim of ultrasound at the blunt chest trauma was to identify hemothorax, which was found in 204 (69.8%) cases. I.e. ultrasound was more specific method than radiography for diagnosing of hemothorax, considering also the fact, that in 35 (11.9%) cases, it was possible to detect changes in the abdominal cavity in patients with combined trauma. At the same time, chest ultrasound was uninformative at 33 (11.3%) patients due to subcutaneous emphysema. The abovementioned list of instrumental examination of patients in 2 group was supplemented by videothoracoscopy, indications to which were hemopneumothorax in 88 (59.9%), hemothorax – in 31 (21.1%), pneumothorax – in 28 (19%).

Videothoracoscopy allowed finding almost all the most probable variants of injuries of the chest wall, pleural sheets, mediastinum and lungs in patients with blunt thoracic trauma.

Revealed that the closed chest trauma is inevitably accompanied by subpleural hematoma in the area of rib fractures (121 patients), where almost always, especially in the presence of hemothorax, takes place rupture of parietal pleura. At hemopneumothorax or pneumothorax in almost all cases there was detected a region of damage to the visceral pleural tissue of the lung. It should be noted that in 8 patients with isolated pneumothorax has already been identified hemothorax during videothoracoscopy.

Another important advantage of the diagnostic videothoracoscopy at blunt chest trauma was the possibility of a full inspection of the entire surface of the diaphragm. Another important advantage of the diagnostic videothoracoscopy at blunt chest trauma was the possibility of a full inspection of the entire surface of the diaphragm. So, in 3 (2%) cases, rupture of the left dome of the diaphragm was an accidental discovery at endoscopic examination of the pleural cavity, and therefore Video-assisted Thoracic Surgery (VATS) suturing of this damage was performed and complemented with laparoscopy.

At patients with pneumothorax in the control group treatment interventions consisted of the installation of thoracocentesis in II intercostal space. In this situation, from 27 cases of pneumothorax in 2 cases due to the unresolved pneumothorax on 2-3 days was performed thoracotomy with suturing of lung injuries.

At hemothorax tactics depended on the intensity of bleeding and volume of simultaneous blood loss. So in case of simultaneous aspiration of 1500 ml of blood (1 patient), discharging of more than 500 ml of blood for 1 hour (2 patients), and discharging of more than 200 ml per hour for 3 hours (4 patients) was made emergency thoracotomy. So in 7 cases of thoracotomy were revealed lung injuries or continuous bleeding from the pleura, which in our opinion in 5 cases were eliminated by videothoracoscopy.
In case of hemopneumothorax there was made thoracostomy with two drainages. Tactics was the same as in isolated pneumo or hemothorax. So one patient was operated because of the ongoing pneumorrhea, but because of the bleeding – 8 patients.

After the use of pleural cavity drainage and conducted conservative measures 128 patients from 145 of 1 group succeeded in straightening of lung and stoppage of bleeding. Recovery was observed in 114 patients. In 8 patients developed clotted hemothorax, and at 7 – empyema.

17 (11.7%) patients were undergone wide thoracotomy. In these patients, the postoperative period was hard, with the development of complications in all cases and death in 6 (4.1%).

The average stay of patients in the control group in the hospital was 12.5 ± 2.1 bed-days.

In the second group of patients treatment manipulation was started with diagnostic videotoracoscopy. Identified damages were simultaneously eliminated either endoscopically or by performing of video-assisted surgery.

Thus, during the videotoracoscopy were done: VATS stop bleeding from the intermuscular vessels in 48 cases, from intercostal artery - in 18, bone fragments of ribs – 34, lung wound – 23; VATS closure of lung wound – in 32 cases; VATS suturing of bullae rupture – in 2 cases; VATS dissection of mediastinal pleura – in 5 cases; VATS suturing of diaphragmal wounds – 2 cases; video-assisted closure of wounds of the lung – in 6 cases.

In addition, at 12 patients with fractures of the ribs during videotoracoscopy was carried fixing of them. In this case, the indications for VATS ribs fixing were SPO2 decrease below 90 after anesthesia.

In this case, in none of the cases we have conversion to the open method of operating. Only in one case because of established coagulated hemothorax in the postoperative period, we had to make a wide thoracotomy.

Thus, in addition to a high diagnostic efficiency of VATS, this method has also sufficiently broad therapeutic abilities, reducing the frequency of thoracotomy 11.7% to 0.6%.

The average stay in the hospital in the main group was 9.4 ± 2.3 bed-days.

The accumulated clinical experience, skills and confidence in the use of diagnostic and treatment capabilities of videotoracoscopy prompted us to implement endoscopic technique more widely in combined injuries and wounds of the abdomen. Suchlike patients in the second group were 37 (17.5%). Usually, laparoscopy was performed at the second stage after videotoracoscopy.

Thus, videotoracoscopy allowed us to eliminate the intrapleural complications of injuries in 78 (37.0%) patients, apart from routine aspiration of discharged blood. Post-operative complications occurred in 21 (14.3%) patients of the second group, while with the traditional tactics – at 34 (23.4%) patients (Table 1).

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<th>Types of complications</th>
<th>I Group, n = 145</th>
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<td>Non-specific complications</td>
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<tr>
<td>– Postoperative pneumonia</td>
<td>10</td>
<td>6.9</td>
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<tr>
<td>Specific complications</td>
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<tr>
<td>– Suppuration of wound</td>
<td>2</td>
<td>1.4</td>
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<tr>
<td>– Clotted hemothorax</td>
<td>8</td>
<td>5.6</td>
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<tr>
<td>– Pleural effusion</td>
<td>6</td>
<td>4.2</td>
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<tr>
<td>– Pulmonary atelectasis</td>
<td>2</td>
<td>1.4</td>
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<tr>
<td>– Empyema</td>
<td>7</td>
<td>4.8</td>
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<tr>
<td><strong>Total</strong></td>
<td>34</td>
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**Discussion**

Comparative analysis of the results of treatment of patients with BTT with the use of traditional methods and videotoracoscopy shows a number of advantages in the application of the latter. So, videotoracoscopy substantially exceeds the remaining non-invasive and less-invasive methods of diagnosis of BTT. Unlike them, it allows you not only to establish the exact topical diagnosis, but also quickly and reliably eliminate the
injuries, which does not require opened intervention, with minimal trauma to the patient, thereby reducing the average hospital stay, complications and deaths.

It should be noted that the majority of post-operative complications were eliminated by conservative or minor surgery (pleural puncture and drainage of the pleural cavity). Repeated surgery as thoracotomy was performed in 15 (10.4%) patients of the first ("conventional") group and 1 (0.6%) patient of the second group. Thus, the foregoing treatment strategy of thoracic injuries contributed on the one hand to the early detection of injuries requiring emergency surgery, and on the other hand – avoiding undue wide thoracotomy, and reduce the trauma of the operations in this difficult group of patients.

Conclusion

1. Videothoracoscopy unlike other methods of BTT diagnosis allows you to set the topical diagnosis accurately. Furthermore, it allows simultaneously treat these injuries minimum trauma to the patient.

2. Application of videothoracoscopy at patients with closed chest trauma promotes reduction of postoperative complications from 23.4% to 14.3%, allows reducing frequency of wide thoracotomy from 11.7% to 0.6%, to reduce time of staying in hospital.

References


