

THERAPEUTIC POTENTIALS OF LAPAROSCOPY FOR BLUNT LIVER INJURY

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Summary: Background of laparoscopic management of blunt liver injury in 13 patients (11 females and 2 males) from 2013 through 2023 is presented in the article. Laparoscopy was indicated in patients with stable hemodynamics and volume of hemoperitoneum less than 500 ml according to the ultrasound or with any volume of hemoperitoneum in case of injury more than 12h before admission. In 10 patients laparoscopic management of injuries was performed: coagulation of liver tears in 7 cases, abdominal sanitation and drainage in 3 patients. In 3 cases conversion to laparotomy took place. 2 patients (15.4%) developed postoperative complications. No missed injuries were observed. 1 patient (7.7%) has died. Average hospital stay comprised 8,5 (5—105) days.

Key words: closed abdominal trauma, liver injury, laparoscopy.

Trauma is the most common cause of death in the age group from 1 to 44 years; in the structure of mortality for all age categories, trauma is second only to oncological diseases and atherosclerosis. Among the causes of closed abdominal trauma in large cities, traffic accidents occupy the first place 45-50%, among other reasons are beating, falling from a height, industrial injury [1,2,4,6]. The most frequently damaged organs are the spleen (40-55%), liver (35-45%) and retroperitoneal organs (15%). Mortality in closed liver injury remains high. According to the leading clinics in the USA, Europe and Japan, it ranges from 31 to 46%. So high

The death rates are explained both by the severity of the liver injury itself and the prevalence of combined and multiple injuries among patients with closed trauma. Laparotomy is the standard access for surgical treatment of patients with liver damage [3,5]. However, numerous reports in recent years on the successful use of both diagnostic and therapeutic laparoscopy in this category of victims dictate the need for a careful revision of existing tactics. The aim of the work is to determine the therapeutic possibilities of video laparoscopy for closed liver injuries [7,8,9].

Material and methods

During the period from 2013 to 2023, we operated on 13 patients with closed liver injury using laparoscopy: 11 men and 2 women. The average age of patients are 30.7 (15-53) years. The causes of the injury were as follows: Traffic accident - 5, sports accident - 1, fall from height - 2, in 5 cases there was no data on the cause of injury. In the first 3 hours from the moment of injury, 6 victims were admitted, in 1 case the prescription of the injury was 3 days and in 6 cases there was no information about the timing of the injury due to the severity of the patients' condition. 7 victims had isolated closed abdominal trauma. In 3 cases, abdominal trauma was combined with closed craniocerebral injury (CRT) and bone injury, in 2 cases - with chest injury, and in 1 patient - with CRT and thoracic injury. The condition of the injured upon admission was assessed

as severe in 4 cases and as moderate in 9 cases. Upon admission, abdominal ultrasound was performed on a mandatory basis for all victims. In case of detection of a meager (no more than 50 ml) amount of fluid in the subhepatic space, the victims were hospitalized in the intensive care unit, where dynamic monitoring of the patient was carried out taking into account clinical, laboratory and echographic data. Ultrasound monitoring was carried out at intervals of 2 hours. An increase in the volume of hemoperitoneum, along with clinical and laboratory signs of ongoing bleeding, served as an indication for surgical treatment. Indications for the use of laparoscopy were the stability of hemodynamic parameters in combination with the volume of the hemoperitoneum, not exceeding 500 ml according to ultrasound data, or any volume of hemoperitoneum with a prescription injury of more than 12 hours. As a result of laparoscopic revision of the abdominal cavity, in 1 case, a rupture of both lobes of the liver was revealed, in 12 the damage was limited to 1 lobe, of which 1 victim had damage localized in the left lobe and 11 in the right. In 8 patients, abdominal injuries were limited to liver injury, in 2 cases liver ruptures were combined with retroperitoneal hematoma and in 3 more with rupture of the spleen. In 3 cases, we were forced to resort to access conversion. Indications for laparotomy were the inability to quickly stop bleeding laparoscopically in the presence of intense intra-abdominal bleeding from extensive ruptures of parenchymal organs (rupture of 5-7 segments of the liver of the 4th degree according to Moore, a combination of rupture of the liver and spleen with active bleeding), the presence of a paraduodenal hematoma, which we considered impractical to revise laparoscopically. There were 2 complications in the postoperative period. In 1 patient, after coagulation of a ruptured liver, a biloma of the right lobe of the liver was formed, drained by percutaneous access under ultrasound guidance, followed by recovery.

In the second case, due to the admission of hemorrhagic discharge through drains, we resorted to relaparoscopy, which revealed sweating of blood into the abdominal cavity from a previously diagnosed retroperitoneal hematoma without additional findings [10,11]. Not a single case of missed damage was noted. Fatal outcome occurred in 1 case in which a grade 4 liver rupture was detected and access conversion was performed. The duration of hospital stay was 8.5 (5-105) days (Table. 2), which was explained by the presence of severe combined injury. [14,15]

The well-known advantage of laparoscopic surgery, which consists in a less traumatic surgical aid, is not dominant in patients with internal organ injury [12,13]. The need to eliminate the immediate threat to the patient's life makes the remaining tasks secondary. However, as experience shows, the volume of hemoperitoneum and the degree of bleeding intensity do not always dictate the need for laparotomy. We conducted a retrospective analysis of our own results of treatment of victims with abdominal trauma over a three-year period preceding the use of therapeutic laparoscopy. [16,17] It was revealed that 31.6% of victims operated on for a closed abdominal injury had superficial ruptures of the liver, mesentery, ligamentous apparatus of the stomach; these patients could be operated laparoscopically [18,19]. In all cases of laparoscopy presented in this study, there were formal indications for laparotomy, taking into account tactical settings that have not lost their relevance to date. [20,21] Analyzing the results obtained, we came to the conclusion that laparoscopy in many cases can be an adequate and safe alternative

to open methods of surgical treatment of patients with abdominal trauma. As a screening method of examination, we consider ultrasound of the abdominal cavity. Based on echographic data on the volume of the hemoperitoneum, we choose a tactical option for further management of the patient [22]. In our opinion, the stability of hemodynamic and respiratory parameters and the absence of signs of peritonitis are a prerequisite for refusing laparotomy at the initial stage. In cases where the volume of hemoperitoneum, according to echographic data, does not exceed 50 ml, we consider it possible to conservatively manage the victim with dynamic monitoring of the patient's condition according to clinical, echographic and laboratory data in the intensive care unit [23,24]. When determining indications for laparoscopy, we adhered to the criteria on which most researchers agree:

- 1) detection by ultrasound of no more than 500 ml of free fluid in the abdominal cavity;
- 2) any amount of fluid in the abdominal cavity according to ultrasound data with an injury period of more than 12 hours in a patient with stable hemodynamics. The therapeutic and diagnostic algorithm we use can be graphically displayed using the following scheme. The further development of this area will be facilitated by the use of modern hemostatic materials and endovascular interventions for damage to parenchymal organs.

Conclusion

The initial results obtained allow us to conclude about the highest diagnostic value of laparoscopy in this category of victims, given the absence of diagnostic errors and missed injuries in the presented material. An analysis of the results of laparoscopic treatment of victims, depending on the severity of liver damage, shows that with Moore grade 1 and 2 trauma, conservative management of victims are possible, and if there are signs of ongoing bleeding, laparoscopic surgery may be an effective treatment method. Thus, the use of laparoscopy in patients with closed liver injuries has a sufficiently high informative value and, with the stability of hemodynamic parameters, can serve as an adequate and safe alternative to laparotomy, allowing to avoid unnecessary laparotomies, reducing surgical trauma and improving the results of treatment of patients in this severe category.

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