Review Article

Damage Control the Liver and Spleen in Case of Concomitant Injury (Literature Review)

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Abstract

Until now, the issues of diagnosis and treatment tactics for abdominal injuries remain relevant and far from resolved. The complexity of their diagnosis is often due to the erasure of clinical manifestations, simultaneous damage to various organs of the abdominal cavity and the presence of combined injuries. Thus, concomitant traumatic brain injury with impaired consciousness leads to an increase in the probability of неundiagnosed injuries to internal organs. The state of shock distorts the clinical picture of the "acute abdomen", and the more severe it is, the less pronounced the symptoms of intra-abdominal catastrophe become.

Keywords: Injury, Surgery, Liver, Spleen, Abdomen.

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Introduction

Meanwhile, shock is registered in the majority of patients with concomitant injuries: 72-90% and its presence becomes the rule rather than the exception.[1,2] Another adverse factor associated with abdominal injuries - is alcohol intoxication, which occurs with increasing frequency. According to,[3] it was detected in 30% of post- victims, and according to it was already detected in 80-85% of victims.[4]

All this affects the accuracy and timing of diagnosis. Thus, according to the percentage of unrecognized при abdominal injuries in combination with cranial trauma during life was 25.2%.[5] In the report it was noted that in 16% of patients with a closed abdominal injury, indications for surgery were delivered with a significant delay, which led to a sharp increase in the frequency of deaths in this part of patients (65%).[6] Due to the serious condition of the victims, diagnostic measures during their examination should be minimal, sparing and maximally informative, they should be carried out simultaneously with anti-shock therapy.[7,8] According to the number of exploratory laparotomies for combined abdominal trauma reaches an average of 25%.[8]

Recognition of abdominal injuries is associated with objective difficulties. Often, the picture of an "acute abdomen" is simulated by a skull injury, a fracture of the spine, pelvis, lower ribs, etc., or the picture of damage to the abdominal organs can be masked by a deep comatose state, alcohol intoxication.[9] Conventional diagnostic methods with the focus on complaints and anamnesis in relation to multiple trauma are untenable. Physical examination is also not very informative. Such important symptoms as pain during palpation of the abdomen, the absence of intestinal motility noises, muscle tension of the anterior abdominal wall, dullness in sloping areas of the abdomen, the disappearance of "hepatic dullness", a positive Shchetkin's symptom-Blumberg patients with a closed abdominal injury do not have 100% informative value.[10–12]

Laboratory confirmation of intra-abdominal bleeding is based on the determination of the hematocrit number. But at the same time, with serial determination of hematocrit, its noticeable decrease occurs only when the volume of blood loss reaches 20% of the BCC. An increase in the number of leukocytes after an injury is observed in the next few hours, but this indicator

does not play a big role in the diagnosis of a closed abdominal injury, leukocytosis occurs in any other injuries, and its value is not adjusted with the severity of the injury.[13]

The bloodless method that has significantly improved the diagnosis is currently ultrasound (ultrasound).[14] For the first time, systematized echographic signs of damage to the parenchymal organs of the abdominal cavity (spleen) were presented in.[15] As diagnostic criteria, the author identified six signs, including acoustic heterogeneity, an increase in the size of the organ'(including и in dynamics), its deformation, a change in position, a violation of the contour and the presence of free fluid in the abdominal cavity.

The use of ultrasound along with clinical, radiological, laboratory and instrumental diagnostic methods significantly expands the possibilities for detecting intra-abdominal bleeding.[16]

Abakumov M. M. etal., (2009) note that using echolocation during dynamic observation, it is possible to detect even 200.0 ml of free fluid in the abdominal cavity in 94.3% of cases.

Salomone DD.S..et al., (2012) used ultrasound for an emergency examination of 291 patients with closed abdominal trauma in order to exclude or confirm intra-abdominal bleeding. The authors highly appreciate ultrasound for emergency diagnosis and dynamic monitoring in patients with abdominal trauma.

A number of surgeons believe that sonography will not be able to "replace" instrumental methods in the diagnosis of abdominal injuries.[17] Thus, after conducting a comparative study of the diagnostic capabilities of ultrasound and laparocentesis with obtained the following results: the diagnostic accuracy of instrumental methods reached 100%, and echography - only 84%.

Analyzing the literature data, both domestic and foreign authors, we can note a clear trend towards an increasingly widespread introduction of ultrasound of the abdominal cavity in the diagnostic arsenal of closed abdominal trauma. The для method's non-invasiveness, speed, and the possibility of repeated use, regardless of the patient's condition, determine the prospects for using echography in the diagnostic support of patients with closed abdominal injuries, especially multiple and combined ones.

Currently, in the diagnosis of traumatic injuries of the abdominal organs, preference is given to instrumental research methods that make it possible to establish a final diagnosis at an early stage.[3–5]

In recent years, laparoscopy has become increasingly widespread in the diagnosis of abdominal injuries caused by abdominal trauma.[6] Despite its more than 90—year history, laparoscopy was not widely used for a long time due to the lack of good equipment and imperfect methods, which led to numerous errors, complications and дикредитациидiscrediting of the method itself. Initially, laparoscopy was used only for suspected diseases of the abdominal cavity. In 1992, N. Pietra reported on the successful use of laparoscopy for suspected rupture of the spleen.[12] Offer Ergashev O. N. etal., (2011) on the use of laparoscopy in all diagnostically unclear cases did not find supporters for a long time,[17] laparoscopy was used in 150 patients with blunt abdominal trauma and only in one case an exploratory laparotomy was performed. The authors did not note false-negative results and serious complications associated with the use of this method. Many authors report 100% diagnostic reliability of this method for abdominal trauma.

Galperin I. I. et al, (2009) laparoscopy was used not only for diagnostics, but also for sanitizing the abdominal cavity and stopping bleeding in small liver ruptures. The authors called this method "radical conservative".

Currently, the development of endo-videoscopic technology expands the capabilities of laparoscopicAI and, in the figurative expression of Badea R.. et al . (2013) begins to gradually "bring the diagnosis closer to the treatment". By this term, the authors mean the possibility of treating some of the victims using a laparoscopic technique. So, using the endo-video laparoscopic technique for closed abdominal trauma in six victims,[18] revealed a ruptured spleen in five cases, and ruptured liver in one caseраз. Splenectomy was required only in one case, and in all other cases it was possible to aspirate blood from the abdominal cavity, accurately identify the damage and achieve stable hemostasis using biological glue.

A number of surgeons limit indications for laparoscopy for certain types of injuries. So, по according to the phrase laparoscopy is not acceptable if a liver injury is suspected, since pneumopritoneum can cause gas embolism in the event of damage to the hepatic veins.[5,6] Applying a pneumoperitoneum can also, worsen the patient's condition. These authors prefer laparoscopy to laparocentesis.

Indications for laparoscopy are the same as for laparocentesis in those doubtful cases when there is still a suspicion of damage to the abdominal organs, subcapsular damage to the liver, spleen.[19]

Contraindications to laparoscopy include multiple scars on the anterior abdominal wall after surgery, the presence of intestinal fistulas, and bloating.[20]

Duchesne J.C. et al (2010) for multiple scars on the anterior abdominal wall, the method of "open" laparoscopy is used, considering that the adhesive process is a relative contraindication to the study.Mm. Abakumov etal., (2010) consider unstable hemodynamics and multiple rib fractures with severe respiratory failure as contraindications to laparoscopy.

Complications during laparoscopy are rare. In 594 laparoscopic studies, only damage to the omentum, subcutaneous

emphysema, and bleeding from the vessels of the anterior abdominal wall were complicated. Hollow organ injuries occurred in 3 patients, with no adverse outcomes. Performed laparoscopy on 182 patients and described only two complications - strained pneumothorax and small bowel injury, which were immediately diagnosed. With the improvement of laparoscopes and techniques, with the accumulation of experience in recent years, the number of complications and deaths has significantly decreased.

Analyzing the results of treatment of patients with abdominal injuries, it should be noted that the use of laparocentesis and laparoscopy can reduce the duration of preoperative examination, reduce overall mortality, reduce the number of diagnostic errors, and avoid exploratory laparotomies.[20]

Instrumental diagnostic methods are of paramount importance for the differential diagnosis of traumatic and hemorrhagic shock, which makes it possible to exclude or confirm internal bleeding in a minimum period of time, and therefore, to outline the tactics of further therapeutic measures. It is early diagnosis and early surgery that are the key to saving the lives of victims.[17] A number of authors believe that performing all types of instrumental examinations — laparocentesis and laparoscopy, as well as evaluating the results, should be performed by the surgeon himself, and not by an endoscopist.[4,9,12]

Instrumental methods of research should not be opposed to laparotomy. Their use does not exclude or replace trial laparotomy, but makes the indications for it stricter and objective by improving preoperative diagnostics. If the clinical picture is questionable in some patients, it is advisable to use dynamic laparoscopy, which, if the clinical picture remains unchanged, allows you to exclude peritonitis, secondary bleeding, and other complications, and thus avoid unnecessary laparotomy and relaparotomy in some patients, which negatively affect the general condition of the victims.[21] An analysis of the literature shows that currently the overwhelming majority of surgeons in emergency surgery prefer instrumental methods in the diagnosis of abdominal injuries.

And in our time, recommendations and recommendations continue to be relevant who believed that in relation to polytrauma, the thesis of maximum objectification of the diagnostic technique should be put forward, because classical physical methods are too unreliable. At that time, laparocentesis and laparoscopy were widely used, thanks to which it was possible to significantly reduce the number of diagnostic errors, exploratory laparotomies, reduce the time of preoperative examination and improve treatment results.

According to the literature, the incidence of liver damage among other abdominal injuries ranges по from 13.6% to 54%, while more than a third of the victims have combined and multiple injuries.[12,15]

The main types of injuries in which liver damage occurs are road accidents, cataract, squeezing abdominal compression.[13,14] The clinical symptoms of liver damage consist of symptoms of shock and intra-abdominal bleeding. Shock in liver injury occurs in 35.2 % - 75% of patients.[12,13]

There are no pathognomonic symptoms, so preoperative diagnosis is difficult. Diagnostic errors in liver injury occur in 17 % of cases. After the introduction of instrumental research methods, the situation improved: according to I. Z. Kozlov et al., the number of diagnostic errors decreased from 25% to 4.4%.

Radionuclide methods, angiography, and computed tomography are used to diagnose liver damage.[20,21] So far, they have found limited use in emergency surgery and are mainly used in specialized hepato-surgical departments in elective surgery. These are expensive, long-term invasive methods, and their use is not safe in unstable hemodynamics.[20]

More and more widely in recent years, ultrasound has been used to diagnose liver damage. A number of authors promote this method, considering that its capabilities are comparable to the accuracy of instrumental diagnostic methods.[18] Others, on the contrary, are more reserved about it and believe that echography will not be able to ”replace” instrumental methods.[12,15,17] The number of such publications, especially in the Russian literature, is relatively small, mostly they come out of the walls of specialized departments dealing with combined trauma.[1,5,9] In doubtful cases, as M. P. Korolev quite rightly emphasizes, ” it is necessary to make indications for laparotomy wider, since every hour of waiting increases the probability of an unfavorable outcome.”

Treatment of liver damage is mainly operative. The scope of surgical intervention depends on the nature of the injury, the duration of the injury, the age of the victim, the presence of combined injuries, and the qualification of the surgeon. With small ruptures, the wound was sutured to the full depth, sometimes with the fixation of a strand of the large omentum. With large injuries, atypical or segmental liver resection is performed, in some cases, with sufficient qualifications of the surgeon and appropriate conditions, hemihepatectomy is performed. In the presence of an extensive wound surface, various variants of hepatopexy are widely used for hemostasis.[1,5,9,11]

In recent years, thanks to the development of endovideo surgery, with minor liver damage, it is possible to sanitize the abdominal cavity and achieve thorough hemostasis using biological glue and other synthetic hemostatic drugs.[20,21] There are isolated reports of minor liver damage in hemodynamically stable patients and with excluded visceral organ damage (according to the results of the study). CT, ultrasound, peritoneal lavage) are treated conservatively, and the mortality rate

in this group of victims is 0%.[14–16]

According to the literature, the mortality rate in liver injuries remains quite high: 15-50%, and is due to the severity of the injury, significant blood loss, and the presence of combined injuries.[15,16]

According to the literature, the frequency of spleen injuries among injuries to other abdominal organs ranges from 15% to 30%.[3,5] At the same time, almost 80% of the victims have combined and multiple injuries.[5,7,8] The main types of injuries that cause damage to the spleen are road accidents, falling from a height (тсат - trauma), squeezing abdominal compression. The clinical symptoms of spleen injury are diverse and depend on the severity of the injury, the time elapsed after the injury, and the associated injuries. The frequency of so-called two-stage spleen ruptures ranges from 2% to 12.9%.[9,10] Due to the absence of pathognomonic symptoms of spleen injury, preoperative diagnosis is difficult.

In the last decade, both domestic and foreign authors have reported on the diagnostic capabilities of ultrasound for spleen injury, noting its advantages — speed, the possibility of repeated use regardless of the condition of the victim, the absence of complications and contraindications.[10,11] The main echographic signs of spleen damage are the presence of free fluid in the abdominal cavity, unevenness of the contour and an increase in the size of the organ. Ultrasound is of particular importance in the diagnosis of subcapsular hematomas and 2-moment rupture of the spleen.[21]

However, not all authors share the opinion about the sufficiently high diagnostic accuracy of echography in cases of spleen injury, which, according to their data, varies widely: from 53% to 98%, and they believe that ultrasound cannot replace instrumental diagnostic methods.[10]

Treatment of spleen injuries is operative. The main type of operation is splenectomy, although some authors use different types of organ-preserving operations, and in recent years there have been reports that using video laparoscopic techniques it is possible to sanitize the abdominal cavity and achieve thorough hemostasis using hemostatic drugs.[1,5,8]

The mortality rate for spleen injury remains quite high and reaches 10-25%. Of the immediate causes that contribute to death, the first place belongs to diagnostic difficulties in recognizing violations of the integrity of the organ, and as a result-leading to irreversible consequences of blood loss.[5,6]

Conclusion

Laparoscopic methods for the diagnosis and treatment of parenchymal injuries are now being widely introduced, and the advantages of these methods are indisputable.The Current state of endovideo surgery in the diagnosis and treatment of parenchymal injuries is generally characterized by a number of insufficiently resolved issues. Thus, the nature, scope and sequence of endovideo surgical interventions are not specified.

All these issues are insufficiently covered in the literature and require further study.

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