World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-19, February 2023
ISSN: 2749-3644

SURGICAL MANAGEMENT OF INJURIES TO THE SMALL AND LARGE INTESTINE

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Article history:

Received: December 8th 2022
Accepted: January 8th 2023
Published: February 4th 2023

Abstract:

The article presents the experience of surgical treatment of 50 patients with isolated injuries of the small and large intestine. The diagnostic algorithms used in the clinic in patients with injuries of the small and large intestine were studied. The diagnostic program included history taking, clinical and objective data, results of ultrasonic and roentgenologic methods of investigation, videolaparoscopy. Depending on the nature of the injury, indications for surgical treatment of patients with this pathology were specified. The developed diagnostic program and the choice of an optimal variant of the operative intervention allowed to reduce the number of unfavorable outcomes among the injured with small and large intestine injuries.

Keywords: trauma, small intestine, large intestine, diagnosis, surgical treatment.

INTRODUCTION. In the peacetime structure of traumatism, abdominal and retroperitoneal injuries occur in 2-4% of cases, with closed abdominal injuries predominating at 82.4%. In patients with hollow organ injuries, the incidence of injuries to the small intestine is 30-38%, to the large intestine, 3-13%, to the stomach, 2-3%, and to the duodenum, 1.2-10%. The small intestine sustains such a large number of injuries due to its anatomical characteristics of being long and poorly protected. Damages to the large intestine are observed 2.4 times less frequently because of its more favorable anatomical location. Victims with closed injuries of hollow organs are distinguished:

- tearing of the serous or mucous membranes;
- organ rupture;
- Tearing of an organ;
- crushing of the organ.

Factors affecting injury to the hollow organ:

- force and direction of impact (direct, oblique, tangential impact, crushing);
- fixation of the hollow organ (physiological, pathological);
- Occupancy of the hollow organ at the time of injury;
- The degree of relaxation of the anterior abdominal wall.

Blunt force trauma to the small and large intestine can be reduced to three types: crushing, tearing and bursting. Crushing is caused by compression of the intestine between the injuring instrument and the spine, ribs or iliac bone due to perpendicular impact or compression of the anterior abdominal wall, resulting in instant rupture of the intestine or necrosis of the injured organ. Organ rupture in trauma victims occurs when there is a closed loop filled with gas and intestinal contents, or due to anatomical features or pathological changes. Organ detachment occurs with an oblique or tangential blow, when the intestinal loops are pressed against a solid base, displaced horizontally or vertically, causing detachment of the mesentery and intestinal wall at the physiological or pathological fixation. In this case the contents of the hollow organ do not have time to move within the enclosed space and tear it from the inside, away from the site of force application. The variability of the clinical picture at different times after injury, the different nature of the injuries, the state of shock and often acute blood loss make diagnosis difficult. The deceptive appearance of the ease of diagnosis of small intestinal trauma sometimes leads to delayed surgery and diagnostic errors. According to a number of authors, in 16% of cases the indication for emergency surgery in patients with closed abdominal injuries is late, and errors at the diagnostic stage reach 33%.
Lethality in isolated small and large intestine injuries varies from 5.1 to 20.4%. Based on the above, the development of a diagnostic algorithm and the improvement of surgical tactics for isolated small and large intestine injuries is an urgent problem in emergency surgery.

MATERIAL AND RESEARCH METHODS. Between 2018 and 2023, 36 patients with isolated injuries to the small intestine and 14 with injuries to the colon were

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operated on in the Department of Abdominal Surgery. At the same time, injuries to the ileum were observed in 26 victims, while 10 had injuries to the jejunum. Injuries to the colon were distributed as follows: 7 cases revealed damage to the transverse colon, 4 to the sigmoid colon, 2 to the ascending colon, 1 to the descending colon. In the first 6 hours from the time of injury, 27 patients were admitted, from 6 to 12 hours - 17, after 12 hours - 6.

RESULTS AND DISCUSSION. The diagnostic programme began with an examination of clinical and objective findings. The clinical picture in victims with small intestine injuries is characterized by considerable polymorphism. It depends on the nature, localization and extent of intestinal injury, combination with injuries to other organs of the abdominal cavity, thorax, musculoskeletal system, and skull, as well as on the time elapsed since the injury. In the first hours after rupture of the intestine, symptoms of acute abdomen, peritonitis, diffuse pain, limitation of abdominal wall mobility, abdominal muscle tension, disappearance of hepatic tautness, blunting of percussion sound in the indented areas of the abdomen are identified. Thus, 24 patients were treated for widespread peritonitis, 7 of them had pain syndrome and other pathological symptoms only at the moment of admission to the admission ward, but later the pain subsided and there was a light period of a few hours. Thereafter, the pain resumed and the clinical picture of widespread peritonitis developed. In 5 cases, the lucid interval lasted 5-7 days from the time of injury, with a gradual development of a clinic of flaccid peritonitis due to progression of necrosis of the intestinal wall, due to detachment of the intestine from the mesentery.

The clinical picture of intra-abdominal colon injury is characterised by the rapid development of severe widespread fecal peritonitis. At the same time, extraperitoneal ruptures of the colon are characterized by symptom neutrality, especially in the first hours after injury, and a developed clinical picture appears on the 5th-7th day due to the development of retroperitoneal phlegmon. Intraperitoneal damages of large intestine were revealed in 10 patients, extraperitoneal - in 4 patients. Review X-ray of the abdominal cavity organs has been performed in all the admitted patients. This examination provides revealing of free gas and free liquid in abdominal cavity, indirect signs of inflammation and injury. The information rate of this method was 33%.

Abdominal and retroperitoneal ultrasound detects the presence of even small amounts of fluid in the abdominal cavity. Abdominal puncture under ultrasound to take fluid for visual, biochemical and bacteriological examination is of particular diagnostic value. An ultrasound scan can also be used to suspect retroperitoneal damage to the colon. It was done in all 50 (100%) of the victims. The informative value was 86%.

Computed tomography (CT) is the most sensitive method for detecting retroperitoneal colon injuries. Abdominal CT was performed in 6 cases with suspected retroperitoneal colon rupture in 3 victims. The method had an informative value of 92%.

Videolaparoscopy is the most informative method of diagnosis in isolated small and large intestine injuries. It is particularly valuable for detachments of the intestine from the mesentery, haematomas of the intestinal wall or mesentery, and retroperitoneal haemorrhages. By performing dynamic video laparoscopy it is possible to monitor the progression of necrosis of the devascu- lated part of the intestine. In a number of cases this method of diagnostics is of low informative value, in particular in case of retroperitoneal damage of the large intestine in the first hours after the injury. Videolaparoscopy was performed in 35 patients with a diagnostic value of 96%.

The extent of surgical intervention in small and large intestine injuries depends on a number of factors: the time of patients' admission to the hospital since the injury, the presence of widespread peritonitis, the size of the intestinal wall defect, the level of injury, and the presence of fecal matter in the lumen of the injured organ. Small bowel resection with ileostomy. Multiple short-stem defects+peritonitis 4 (11.1%). Small bowel resection + ileotransversostomy Terminal ileum with a defect of more than 2/3 of the colon circumference 4 (11.1%). Maidl jejunostomy multiple damages of proximal jejunum 3 (8,3%), resection of small intestine with side-to-side anastomosis, extraperitoneal anastomosis for doubtful anastomoses 3 (8,3%). We believe that small intestine wall defects less than 1/2 of the circumference should be sutured with two-row sutures with obligatory nasointestinal intubation. If the damage is 2/3 or more of the intestine circumference or if the intestine is torn from the mesentery by more than 3 cm, small intestine resection with side-to-side anastomosis and nasointestinal intubation should be performed. Resection of the damaged segment of the small intestine with an ileostomy is performed in patients with multiple defects of the intestinal wall at a short distance from each other, in the presence of widespread peritonitis. At defects more than 2/3 of the terminal ileum circumference a small intestine resection with ileotransverse anastomosis was performed. At multiple damages of the proximal jejunum the operation of choice was resection of the damaged segment of the intestine with the Maidl-type jejunostomy. If there is a risk of the development of the formed interintestinal junction failure and widespread peritonitis, high

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resection of the jejunum is performed with "extraperitonealization" in order to prevent intraperitoneal complications. When performing surgical intervention in patients with colon wounds, we strictly follow the algorithm we have developed. Thus, in 4 cases of closed injuries of the large intestine at early admission of victims to the hospital, with defects of the intestinal wall less than 1/2 of the circumference, its suturing by 2 rows with transanal intestinal intubation was performed. At multiple defects of the right flank of the colon in a short extent, concomitant peritonitis right-sided hemicolectomy with the ileostomy was performed. In 2 patients during the operation the mesentery was detached from the wall of the descending colon over 3 cm in length and the left-side hemicolectomy with trans-versostomy was performed. In 1 case, multiple injuries of the transverse colon were complicated by widespread fecal peritonitis, therefore, transverse colon resection with transversostomy, thorough sanation and drainage of the abdominal cavity were performed. In 3 cases of extensive damage to the sigmoid colon, surgery was terminated by Hartmann's operation. In closed small intestine injuries, 3 patients died. The fatality rate was 8.3%. The causes of lethal outcomes were widespread peritonitis with the development of multiple organ failure syndrome, pulmonary embolism, and massive myocardial infarction. Right-sided hemicolectomy + ileostomy Multiple short defects, extensive defects + peritonitis 2 (14.3%), Left-sided hemicolectomy + transversostomy Extensive intestinal defects, Tearing of the intestine from the mesentery over 3 cm 2 (14,3%), Resection of the transverse colon with side-to-side anastomosis + retrograde intubation of the colon 2/3 and more intestinal defects 2 (14,3%), Transverse colon resection with transvesostomy Multiple short defects, extensive defects+peritonitis 1 (7,1%), Hartmann's operation Extensive sigmoid defects 3 (21,4%).

CONCLUSIONS: The diagnosis of closed injuries of the small and large intestine must be comprehensive, including evaluation of clinical and objective data, and the results of instrumental methods of examination. Ultrasound and CT of the abdomen and retroperitoneal space with contrast are the most informative methods of diagnosing extraperitoneal colon injuries. Videolaparoscopy is the method of choice in diagnostics of closed abdominal cavity injuries. Dynamic videolaparoscopy is a valuable diagnostic method to assess the viability of the devascu- lated portion of the intestine. The choice of optimal surgical aid for isolated closed injuries of the small and large intestine is determined by the severity of injury, volume of blood loss, localization of the injury, time of admission since injury, and the presence or absence of purulent-septic complications. When defects are less than 1/2 the circumference of the small intestine, suturing with 2 rows of sutures is performed with obligatory nasointestinal intubation. When more than 1/2 of the circumference of the intestine is damaged, the intestine is detached from the mesentery by more than 3 cm, and multiple intestinal injuries are sustained by resection of the damaged segment. A Maidl jejunostomy is the procedure of choice if there are multiple or extensive injuries to the jejunum. If there is a risk of anastomosis failure, extraperitoneal surgery is performed.

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Volume-19, February 2023
ISSN: 2749-3644

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