

**DIAGNOSTIC AND THERAPEUTIC STRATEGIES IN THE
MANAGEMENT OF ACUTE ADHESIVE INTESTINAL OBSTRUCTION
IN PEDIATRIC PATIENTS**

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Abstract: Acute adhesive intestinal obstruction (AAIO) represents one of the most common and severe conditions in abdominal surgery. According to our data, its proportion among all types of intestinal obstruction in pediatric patients составляет 38.95%, which is consistent with findings reported by other authors. The management of patients with adhesive disease of the abdominal cavity remains a significant clinical challenge due to the severity of its clinical course, the high risk of serious complications, and the lack of standardized and effective strategies for preventing recurrence.

Keywords: acute adhesive intestinal obstruction, pediatric age, diagnosis, treatment.

Introduction

To date, acute adhesive intestinal obstruction remains an unresolved and clinically significant problem in abdominal surgery. The creation of optimal conditions aimed at reducing inflammatory responses and adhesion formation represents a key reserve for improving short-term surgical outcomes [2,4,8,]. Intra-abdominal adhesions and their associated complications occupy a leading position among the causes of morbidity and mortality in abdominal surgery [5,7,]. The pathogenesis of adhesion formation is multifactorial and remains insufficiently understood. Any surgical intervention involving the abdominal organs is

accompanied by fibrin deposition [1,3,5,7], which may subsequently lead to the development of intra-abdominal adhesions. These adhesions are recognized as one of the principal causes of intestinal obstruction.

Despite significant advances in the management of intra-abdominal adhesions, the incidence of complications and adhesive intestinal obstruction remains high. Notably, there is a paucity of studies investigating the role of angiogenesis in the development of intra-abdominal adhesive processes [4,6,8,]. At the same time, further investigation of this mechanism is of considerable importance for improving both the treatment and prevention of postoperative adhesions.

Aim of the Study The aim of this study was to optimize treatment strategies and improve clinical outcomes in patients with acute adhesive intestinal obstruction.

Materials and Methods

This study is based on a comprehensive analysis of the examination and treatment of 360 pediatric patients with acute adhesive intestinal obstruction, aged from 3 months to 15 years. All patients were admitted to the Republican Scientific Center for Emergency Medical Care, Fergana Branch during the period from 2020 to 2025.

Results

The use of laparoscopy in patients with suspected acute adhesive intestinal obstruction is associated with a certain degree of risk due to the potential for perforation of adherent and distended intestinal loops. Endoscopic examination in such cases revealed moderately выраженные inflammatory changes, including tissue hyperemia, edema, and contact bleeding during instrumental palpation. In most cases, the greater omentum was also involved in the pathological process. A characteristic feature of the endoscopic findings in late-stage acute adhesive intestinal obstruction was the presence of more organized membranous and cord-

like adhesions. Some of these adhesions, likely subjected to prolonged traction, demonstrated increased fibrous density.

Intestinal loops fixed by adhesions to the anterior abdominal wall, which was elevated due to pneumoperitoneum, appeared significantly deformed. In some cases, this created a misleading impression regarding the level of obstruction. This particular feature of laparoscopic visualization of bowel loops adherent to the parietal peritoneum under pneumoperitoneum conditions was taken into account. In diagnostically unclear cases, emphasis was placed on a key endoscopic sign of intestinal obstruction the redistribution of intestinal gas. In such situations, identification of the transition zone between dilated and collapsed bowel loops was essential. Diagnostic laparoscopy for suspected acute adhesive intestinal obstruction was performed in 90 children aged from 3 months to 14 years. Based on the nature of pathological findings observed during laparoscopy, all patients were divided into three groups.

The application of laparoscopy in cases with equivocal clinical presentation of acute adhesive intestinal obstruction enabled the identification of a range of other acute surgical conditions of the abdominal cavity. This approach allowed for early and accurate diagnosis, facilitated the selection of an optimal surgical approach, and, in some cases, made it possible to avoid surgical intervention altogether. Gynecological diseases were most frequently identified in girls, including primary ampullary salpingitis with pelvioperitonitis and ovarian cysts. Other commonly detected conditions included phlegmonous appendicitis, mesadenitis, and additional acute abdominal pathologies.

A small subgroup of patients ($n = 6$) had laparoscopic findings that excluded the diagnosis of acute adhesive intestinal obstruction. None of these patients required surgical intervention. In these cases, both endoscopic and radiological examinations confirmed the diagnosis of partial intestinal obstruction.

Based on the analysis of laparoscopic findings in 64 patients with AAIO, specific endoscopic diagnostic criteria were established, including both direct and

indirect signs. Indirect endoscopic signs included the presence of dilated small bowel loops, increased intra-abdominal fluid, reactive changes of the parietal and visceral peritoneum, microcirculatory disturbances in the intestinal wall, as well as fixation and rigidity of bowel loops. Although these features accompany acute intestinal obstruction, they are not specific and are insufficient for establishing a definitive diagnosis.

A reliable diagnostic sign of intestinal obstruction was identified as the redistribution of gas within the small intestine. The key direct endoscopic sign was the visualization of a bowel segment deformed by adhesions, with a proximally dilated segment and a distally collapsed segment. This sign was absent only in one case of small bowel volvulus. Among the 64 patients with AAIO, the site of obstruction could not be identified laparoscopically in only two cases. Overall, these findings confirm that laparoscopy is a highly effective method for the early diagnosis of acute adhesive intestinal obstruction. The diagnostic accuracy of laparoscopy reached 97.7%, while the accuracy of localization of the obstruction was 96.6%. The intraoperative management of AAIO in children was predominantly conservative, given the high risk of recurrent adhesion formation associated with repeated surgical interventions.

In patients with isolated adhesions and localized adhesive processes (n = 139), surgical management consisted of selective adhesiolysis limited to adhesions directly causing obstruction, with restoration of intestinal passage. In cases of extensive adhesive disease (n = 41), surgical tactics were also based on maximal tissue preservation. Only adhesions responsible for complete intestinal obstruction were divided, as extensive adhesiolysis may increase tissue trauma and promote further adhesion formation.

However, in patients with diffuse or total adhesive processes and a history of frequent hospital admissions (up to 4–5 times per year) for recurrent obstruction, adhesive horizontal intestinal plication was performed (n = 19). This approach included careful revision of all abdominal compartments, meticulous adhesiolysis,

and complete viscerolysis of the small intestine from the ligament of Treitz to the ileocecal region. The postoperative course in these patients was uneventful, and all were discharged in satisfactory condition.

All patients with AAIO exhibited varying degrees of small bowel paresis, ranging from mild dysfunction to complete gastrointestinal paralysis, accompanied by accumulation of intestinal contents and gas. These conditions resulted in significant microcirculatory disturbances in the affected bowel wall. Comparative analysis of different methods of small bowel decompression demonstrated significant advantages of the intestinal content evacuation (“milking”) technique. This method was associated with faster recovery of intestinal peristalsis, reduced postoperative complications, and shorter hospital stay.

Postoperative complications varied depending on the decompression technique used. Intestinal intubation via gastrostomy was associated with wound infection and peristomal skin maceration in 30% of patients, and in one case, with gastrostomy failure and subsequent peritonitis requiring relaparotomy. Rectal intubation resulted in colonic injury and bleeding in 12.5% of cases. Other decompression methods (ileostomy, cecostomy, intestinal puncture) were associated with local inflammatory complications in 50% of patients. Additionally, the duration of hospitalization was significantly shorter when using the intestinal content evacuation technique compared to other decompression methods.

This minimally invasive and tissue-sparing approach to the management of AAIO in children appears promising and warrants broader clinical application.

Particular attention in this study was paid to the role of laparoscopy not only in early and accurate diagnosis but also in the treatment of acute adhesive intestinal obstruction. The indications for laparoscopic adhesiolysis were based on the premise that endoscopic interventions are most effective in cases of localized adhesive processes, especially in the presence of single, cord-like adhesions.

If visualization was hindered by a small number of bowel loops or omental strands loosely adherent to the anterior abdominal wall, these were carefully

separated to facilitate inspection. In cases of extensive and dense adhesions, laparoscopic intervention was not performed.

Adhesiolysis was carried out using two manipulators inserted through additional trocars, while the laparoscope was maintained by an assistant. The use of dual-instrument technique allowed for more effective endoscopic dissection. Early-stage adhesions were separated bluntly using a rounded probe, whereas denser adhesions were divided using scissors. Highly vascular adhesions and omental structures were предварительно коагулированы.

A critical final stage of the procedure was endoscopic verification of intestinal patency. Successful restoration of bowel passage was confirmed by visualization of a non-deformed bowel segment between previously dilated and collapsed areas, with gradual expansion of the collapsed segment and free mobility upon manipulation. In cases of uncertainty, conversion to laparotomy was performed. The ability to identify the site of obstruction and perform effective adhesiolysis depended significantly on the degree of intestinal paresis. Therefore, laparoscopy demonstrated higher efficacy when performed at earlier stages of the disease.

Among 64 children with AAIO, laparoscopic adhesiolysis was performed in 43 cases, with successful resolution of obstruction achieved in 29 patients. In 21 cases, adhesiolysis was not performed due to contraindications, including severe circulatory disturbances of the bowel, extensive adhesions, intestinal fistulas, peritonitis, and inflammatory infiltrates. In 14 patients, laparoscopic treatment was unsuccessful, and conversion to laparotomy was required. Overall, laparoscopic management allowed avoidance of relaparotomy in 46.6% of patients with acute adhesive intestinal obstruction. Following successful laparoscopic treatment, patients were mobilized on postoperative days 2–3. The average hospital stay was 10.55 days, which was nearly half that observed in patients undergoing open surgery (18.73 days). In addition, the risk of complications associated with laparotomy wounds was eliminated.

The use of laparoscopy for both diagnosis and treatment of AAIO significantly improved therapeutic strategies, making them more active and effective. Laparoscopy is recommended in cases where conservative treatment fails within 2–3 hours. Prolonged ineffective conservative management leads to worsening intestinal paresis and reduces the effectiveness of endoscopic interventions. In cases of suspected strangulation obstruction, laparoscopy should be performed even earlier to allow timely diagnosis and attempt laparoscopic adhesiolysis.

Importantly, no postoperative complications or mortality were observed in patients who underwent successful laparoscopic adhesiolysis.

Conclusion

The present study demonstrated that the volume and duration of conservative therapy, as well as differential diagnostic measures in patients with suspected acute adhesive intestinal obstruction, depend on the stage and phase of the disease. Patients presenting with a hyperacute phase require immediate surgical intervention upon admission, following short-term preoperative preparation. In children with the acute phase, the duration of conservative and diagnostic measures should not exceed 3–4 hours. In cases of suspected subacute disease, a more prolonged course of conservative therapy may be justified for definitive confirmation or exclusion of the diagnosis. The widespread use of laparoscopy in the diagnosis of acute adhesive intestinal obstruction has established it as a highly informative method, with localization of the pathological process achieved in 95.5% of cases. Intraoperative management is determined by the extent of the adhesive process, the severity of intestinal paresis, and the degree of microcirculatory disturbances in the bowel. For gastrointestinal decompression, a gentle and effective technique involving the evacuation (“milking”) of small intestinal contents into the large intestine or stomach was successfully applied. The implementation of laparoscopic interventions allowed resolution of intestinal

obstruction and avoidance of laparotomy in nearly half of the patients with acute adhesive intestinal obstruction.

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