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*Article*

# Effectiveness of Minimally Invasive Technologies in The Treatment of Urgent Abdominal Diseases in Infants

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**Abstract:** The article presents the results of emergency treatment of abdominal diseases in 344 children. Diagnostic criteria and therapeutic tactics for various acute surgical diseases occurring in the abdominal cavity are presented. 287 patients underwent surgical interventions. Most operations were performed using minimally invasive laparoscopic methods. There were no complications during or after surgery.

**Keywords:** laparoscopy; emergency abdominal pathology; young children

## 1. Introduction

Emergency surgical diseases of the abdominal cavity among infants account for an average of 30-40% . In this category of sick children, the diagnosis and treatment of diseases are the most difficult. This is due to the similarity of the clinical picture of the disease in children of this age, the children's negative reaction to examination, and the difficulty of using instrumental examination methods[1] . Currently, worldwide, methods of diagnosis and treatment of pediatric abdominal surgical pathology using minimally invasive and endovideolaparoscopic technologies are considered preferred. Currently, despite the development of minimally invasive and endoscopic technologies in our country, only a few surgical centers have practical and scientific experience in performing endovideolaparoscopic surgical operations in young children [2].

The purpose of the work is to improve the results of diagnosis and treatment of urgent surgical diseases of the abdominal cavity in young children using modern minimally invasive endovideolaparoscopic technologies[3].

## 2. Materials and Methods

This study was conducted using a retrospective and analytical research design. The clinical material included 344 children aged from 1 month to 7 years who were treated for urgent surgical diseases of the abdominal cavity at the Republican Scientific and Practical Center of Pediatric Minimally Invasive and Endoscopic Surgery between 2016 and 2025. Patients were selected based on confirmed diagnoses of acute abdominal pathology requiring emergency surgical intervention.

Clinical examination methods included detailed assessment of complaints, physical examination, laboratory investigations (complete blood count, biochemical analysis, acid–

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base balance), and instrumental diagnostic techniques. Ultrasound examination of the abdominal cavity was the primary imaging method used to establish diagnosis and determine surgical tactics. In selected cases, diagnostic videolaparoscopy was applied to уточнить diagnosis and simultaneously perform therapeutic interventions.

Patients were divided into groups according to nosological forms and age categories. Surgical treatment methods were analyzed comparatively, with particular attention paid to minimally invasive endovideolaparoscopic techniques. The effectiveness of treatment was evaluated based on intraoperative findings, duration of surgery, postoperative recovery period, presence of complications, and length of hospital stay.

Statistical analysis was performed using descriptive methods to summarize clinical outcomes. The study adhered to ethical principles of pediatric surgical practice, and all interventions were carried out in accordance with accepted clinical standards.

## 3. Results

From 2016 to 2025, 344 children aged 1 month to 7 years with urgent surgical diseases of the abdominal cavity were treated at the Republican Children's Scientific and Practical Center for Minimally Invasive and Endovisual Diseases[4].

**Table 1.** Division of patients by nosology

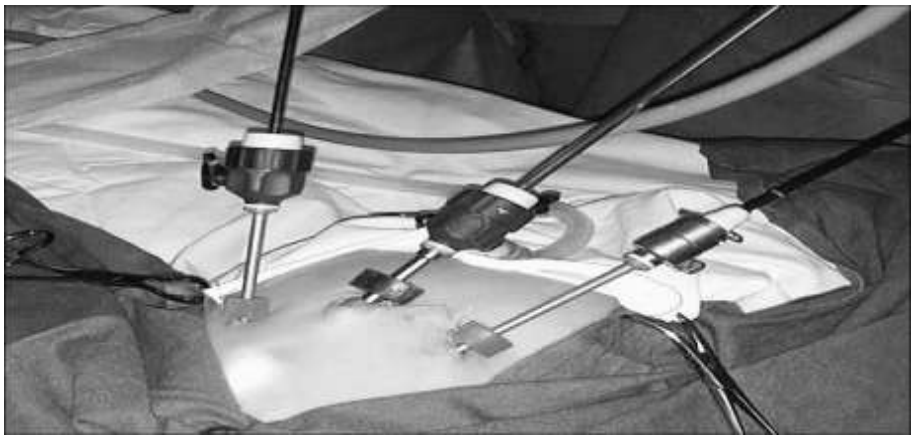
| **Nasology** | **Patient age** | | | | **Total** |
|---|---|---|---|---|---|
| | **1-6 months** | **6-12 months old** | **1-3 years old** | **3-7 years old** | |
| Congenital hypertrophic pylorostenosis | 8. | 17. | 14. | | 39. |
| Intestinal invagination | 8. | 18. | 9. | 12. | 47. |
| Phlegmonous appendicitis | | 2. | 29. | 33. | 64. |
| Gangrenous appendicitis | | 3. | 43. | 25. | 71. |
| Meckel's diverticulum | | | 3. | 5. | 8. |
| Compressed inguinal hernia | 6. | 76. | 21. | 12. | 115. |
| Total | 22. | 116. | 119. | 87. | 344. |

39 children were treated for congenital hypertrophic pyloric stenosis, of which 30 were boys and 9 were girls. (Their age is from 3 weeks to 5 weeks). The body weight of the operated children was in the range of 3600-5200 g[5]. Diagnosis and clinical symptoms of the disease were carried out based on ultrasound data: thickening of the muscular layer of

the pyloric stomach was more than 4 mm and the length of the stenosed area was more than 15 mm, the diameter of the pyloric canal was also assessed[6].

***Figure. 1.*** *Echocartrin of the pyloric region of the stomach during ultrasound examinatio*

***Figure. 2. Laparoscopic pyloromyotomy (intraoperative and external examination of the child).***



All children admitted with the diagnosis of congenital hypertrophic pyloric stenosis underwent surgery. Video laparoscopic pyloromyotomy was performed under endotracheal anesthesia. In all cases, 3-millimeter trocars and instruments from KARL STORZ were used, and a pylorotomy was used to separate the serous membrane[7]. Then, with the help of endoscopic instruments, the pyloric muscle layer was dissected into the mucous membrane. The integrity of the mucous membrane was monitored by injecting air into the stomach and duodenum through a nasogastric tube. The duration of the surgical intervention was 15-25 minutes. Intraoperative perforation of the pyloric mucosa was observed in 1 (1.6%) case, which was restored by videolaparoscopic methods. In the postoperative period, the sick children were treated in the intensive care unit for 2 days[8]. With complete restoration of gastrointestinal tract passage in the postoperative period, it occurred on the 2nd and 6th days, and the days of hospitalization were from the 6th to the 10th day. In all patients who underwent videolaparoscopic pylorotomy, no complications were observed in the postoperative period[9].

47 children aged 3 months to 7 years with intestinal invagination were treated at the center. The duration of the disease ranged from 2 to 48 hours from the moment of admission to the hospital, of which 29 (86%) patients were admitted within 12 hours.

Diagnosis of the disease was carried out based on ultrasound data, depending on its clinical symptoms. Of these, 29 (86%) patients underwent conservative treatment, namely disinvagination (pneumoirrigoscopy)[10].

**Figure. 3.** Pneumography in intestinal invagination


Pneumoirrigoscopy was unsuccessful in 8 (10%) children. These patients underwent diagnostic laparoscopy and laparoscopic disinvagination after pneumoirrigoscopy[11]. Only in 1 (1.2%) child with intestinal invagination, necrosis of the ileum occurred against the background of gangrenously altered Meckel's diverticulum, in which diagnostic laparoscopy was performed, the altered part of the ileum was resected with a minilaparotomy incision, and an end-to-end anastomosis was applied. No complications were observed in the postoperative period in the operated patients[12].

**Figure. 4. The process of performing disinvagination by laparoscopic and conventional methods.**

The center has 135 patients aged 1-7 years with acute appendicitis. Due to the difficulty in diagnosing acute appendicitis in young children, ultrasound examination of the abdominal organs became of great importance. Attention was paid to the presence of voluminous formations in the abdominal cavity, free fluid, the condition of the mesenteric lymph nodes, and the diameter of the appendix[13].

After preoperative examination and preparation, all children underwent general clinical examination (general blood count, blood type and Rh factor, biochemical blood analysis, assessment of the acid-base status of the blood), correction of metabolic disorders.

Among children operated on for acute appendicitis, destructive forms of appendicitis prevailed. In particular, phlegmonous changes of the appendix were detected in 64 (19.5%) children. All patients underwent appendectomy by endovideolaparoscopic method[14].

**Figure. 5.** The procedure for performing appendectomy by laparoscopic method

Out of 71 (19.5%) children, gangrenous-perforative appendicitis and local purulent peritonitis were detected in 24 (70.5%) children. All patients underwent appendectomy, sanitation and drainage of the abdominal cavity using endovideolaparoscopic methods. For 3-5 days after the operation, the children received treatment in the intensive care unit. The length of stay in the hospital is from 5 to 15 days. No complications or deaths were observed in this group of patients.

41 children, aged from 1 month to 3 years, were admitted to the center with a diagnosis of compressed inguinal hernias. The duration of hernia compression was within 1-5 hours, and in most children it was 2-3 hours. All patients underwent emergency surgery[15].

Of these, 34 (83%) children underwent surgery to eliminate compressed inguinal hernias using traditional methods, and 7 (17%) children aged 1-3 years underwent surgery to eliminate hernias using the endovideolaparoscopic method.

**Figure 6.** Compressed inguinal-scrotal hernias

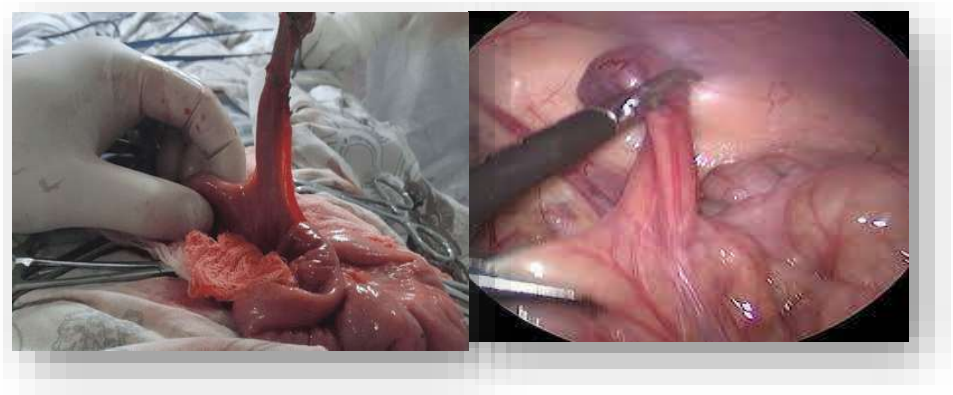
Necrobiotic irreversible changes in the compressed areas of the intestine and mesentery were not detected in any of the cases. Surgical interventions for hernia removal by endovideolaroscopic method took an average of 20 to 60 minutes[16]. Indications for antibacterial therapy were recommended in the postoperative period if the duration of the disease was more than 3 hours and there was a slight deseritization of the intestinal wall. After surgical operations, no complications were observed. After surgical intervention, the patient's general condition and blood tests were assessed, and they were discharged from the hospital for outpatient treatment on days 3-5[17].

**Meckel's diverticulum**

Two children aged 2 and one child aged 7 were admitted to the center with abdominal pain. According to urgent indications, after ultrasound examination, patients

underwent diagnostic videolaparoscopy, and in 2 children, a phlegmonously altered Meckel's diverticulum, located in the mesenteric part of the ileum, was detected[18]. Meckel's diverticulum was detected in the ileum at a distance of 25 and 30 cm from the ileocecal angle. In these patients, signs of secondary altered catarrhal appendicitis were detected, and diverticulectomy and appendectomy were performed[19].

**Figure 7. Laparoscopic and conventional diverticulectomy**



The remaining patients were hospitalized with the clinic of acute intestinal obstruction, diagnostic videolaparoscopy was performed, symptoms of strangulation intestinal obstruction were detected, and intestinal obstruction was eliminated. In this case, diverticulectomy of the base of Meckel's diverticulum was performed using the wedge-shaped method[20]. No complications were observed during surgical interventions.

## 4. Conclusion

Today, the experience accumulated by clinics operating in our republic and foreign clinics shows that endovideolaparoscopic surgical interventions in urgent cases of abdominal organs in young children are an effective method, and the prevention of adhesive diseases of the peritoneum, one of the most severe pathologies in the postoperative period, is one of the least traumatic and effective treatments. Early restoration of gastrointestinal tract function after minimally invasive surgical interventions and reduces the rehabilitation time of patients. Complications after video laparoscopic surgical interventions are practically not observed.

## REFERENCES

[1] R. Amirbekova and R. Bogdanov, “Endovideosurgery in emergency abdominal surgery in children,” in Proceedings of the Symposium on Emergency Abdominal Surgery, Ufa, Russia, 2002, pp. 13–14.

[2] C. M. Gorsler and F. Schier, “Laparoscopic herniorrhaphy in children,” Surgical Endoscopy, vol. 17, no. 4, pp. 571–573, 2003.

[3] S. Duca, N. Al Haijar, F. Graur, et al., “Laparoscopic management of Meckel’s diverticulum,” Chirurgia (Bucharest), vol. 99, no. 4, pp. 233–236, 2004.

[4] G. A. Bairov, Urgent Surgery in Children. St. Petersburg, Russia: Medicine, 1997.

[5] I. V. Poddubnyy, “Laparoscopic operations in pediatric surgery,” Ph.D. dissertation, Moscow, Russia, 1998.

[6] B. K. Aggarwal, S. Raian, A. Aggarwal, R. Gothi, et al., “CT diagnosis of Meckel’s diverticulum in paracolic internal hernia,” Abdominal Imaging, vol. 30, no. 1, pp. 56–59, 2005.

[7] A. J. Bufo, M. K. Chen, R. Shah, et al., “Laparoscopic pyloromyotomy: A safer technique,” Clinical Pediatrics, vol. 38, no. 10, pp. 593–596, 1999.

[8] M. V. Shchebenkov, “Endovideosurgery in children with pathology of the processus vaginalis of the peritoneum,” Pediatric Surgery, no. 4, pp. 24–27, 2002.

[9] F. Agachan, J. S. Joo, and S. D. Wexner, "Intraoperative laparoscopic complications: Are we getting better?" Diseases of the Colon & Rectum, vol. 39, no. 10, pp. 1149–1154, 1996.
[10] N. M. Bax, "Ten years of maturation of endoscopic surgery in children: Is the wine good?" Journal of Pediatric Surgery, vol. 39, no. 2, pp. 146–151, 2004.
[11] J. J. Park, B. G. Wolff, M. K. Tollefson, E. E. Walsh, and D. R. Larson, "Meckel's diverticulum: The Mayo Clinic experience with 1476 patients (1950–2002)," Annals of Surgery, vol. 241, no. 3, pp. 529–533, 2005.
[12] A. Yagmurlu, D. C. Barnhart, A. Vernon, et al., "Comparison of the incidence of complications in open and laparoscopic pyloromyotomy: A concurrent single-institution series," Journal of Pediatric Surgery, vol. 39, no. 3, pp. 292–296, 2004.
[13] Y. F. Isakov, Z. A. Stepanov, and T. V. Krasovskaya, Abdominal Surgery in Children. Moscow, Russia: Meditsina, 1988.
[14] A. F. Dronov, I. V. Poddubnyy, A. N. Smirnov, et al., "Laparoscopic operations in infants," Endoscopic Surgery, no. 1, p. 53, 2004.
[15] V. V. Kholostova, "Urgent laparoscopy in infants," Ph.D. dissertation, Moscow, Russia, 2008.
[16] A. V. Geraskin, A. N. Smirnov, A. F. Dronov, and P. M. Jarustovskiy, "Pathology of Meckel's diverticulum: Modern approaches to diagnosis and treatment (literature review)," Annual Surgery, no. 2, pp. 21–29, 2007
[17] A. Akcakaya, O. Alimoglu, O. V. Ozkan, and M. Sahin, "Complicated Meckel's diverticulum," Ulusal Travma ve Acil Cerrahi Dergisi, vol. 9, no. 4, pp. 246–249, 2003
[18] R. V. Plakhov, "Video laparoscopic interventions in the treatment of widespread peritonitis," Ph.D. dissertation, Moscow, Russia, 2003
[19] F. Schier, Laparoscopy in Children. Berlin, Germany: Springer, 2003.
[20] P. M. Jarustovskiy, "Laparoscopy in the diagnosis and treatment of Meckel's diverticulum in children," Ph.D. dissertation, Moscow, Russia, 2007.