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Congenital Diseases of the Abdominal Organs: Diagnosis and Surgical Tactics

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Abstract: Congenital diseases of the abdominal organs in children are one of the most pressing problems in pediatric surgery, resulting in high morbidity, mortality, and long-term complications. This review analyzes current data on the most clinically significant pathologies, including abdominal wall defects (gastroschisis, omphalocele), congenital forms of intestinal obstruction, and Hirschsprung's disease. The possibilities of prenatal and postnatal diagnosis are considered, including methods of ultrasound imaging, computed tomography, and contrast studies, as well as their role in early detection and risk stratification. Particular attention is paid to surgical tactics: from one-stage closure of defects to staged approaches and laparoscopic techniques, as well as the specifics of choosing an intervention for rare anomalies and Hirschsprung's disease. Factors determining an unfavorable prognosis are highlighted, including delayed surgery, severity of the initial condition, and concomitant pathologies. Modern prognostic models and their significance for individualized treatment are analyzed. The conclusion emphasizes the need for a multidisciplinary approach, adaptation of strategies to the conditions of specific healthcare systems, and the introduction of minimally invasive technologies, which opens up new prospects for increasing survival and improving the quality of life of patients.

Keywords: Congenital diseases of the abdominal organs, gastroschisis, omphalocele, intestinal obstruction, surgical tactics.

Purpose of the review

This review article was written with the aim of summarizing current data on congenital diseases of the abdominal organs in children, including abdominal wall defects, obstructive pathologies, and Hirschsprung's disease, with an emphasis on methods of prenatal and postnatal diagnosis, surgical tactics, and prognosis. In other words, to show how modern diagnostic methods and surgical tactics can improve the survival and quality of life of children with congenital abdominal pathologies.

Materials and methods

The review is based on an analysis of publications devoted to congenital diseases of the abdominal organs in children, with an emphasis on issues of diagnosis and surgical tactics. Sources were searched for and selected from peer-reviewed articles published in leading international scientific journals indexed in databases such as PubMed, SpringerLink, ScienceDirect, MDPI, BMJ Open, and SAGE. Priority was given to original clinical studies and reviews containing data on the results of surgical

treatment, risk factors for adverse outcomes, modern approaches to prenatal and postnatal diagnosis, and long-term prognosis in pediatric patients.

The selected publications were subjected to content analysis in order to systematize the available data and identify key areas in the surgical treatment of congenital anomalies of the abdominal organs.

Introduction

Congenital diseases of the abdominal organs in children remain one of the most significant problems in pediatric surgery. According to a global analysis of the burden of disease, congenital anomalies of the digestive system account for a significant proportion of childhood morbidity and mortality. The most clinically significant are abdominal wall defects (gastroschisis, omphalocele), congenital forms of intestinal obstruction, including segmental dilatation and pathological congenital adhesions, as well as Hirschsprung's disease. These conditions are characterized by a high risk of complications and require timely diagnosis and surgical correction [1–3].

Current research focuses on choosing the best treatment strategy and figuring out what makes the outlook better or worse. For example, waiting too long to do surgery and how bad the condition is to start with are linked to more bad outcomes, while using prediction models helps to better figure out the risk [4,5].

Analysis and discussion

Prenatal diagnosis of congenital diseases of the abdominal organs is based primarily on ultrasound examination, which allows the detection of abnormalities such as duodenal atresia, gastroschisis, and omphalocele in the early stages of pregnancy. In some cases, magnetic resonance imaging is of additional value, as it clarifies the location and extent of the lesion. Modern imaging methods make it possible not only to suspect pathology, but also to assess the prognosis for intrauterine development and the viability of the newborn [3,6]. Postnatal diagnosis includes a set of instrumental methods aimed at confirming the diagnosis and assessing the functional state of the abdominal organs. Contrast-enhanced overview radiography remains the key method when intestinal obstruction is suspected, allowing the level of the blockage and the nature of the pathological process to be determined. Computed tomography and ultrasound are used to clarify anatomical features and differentiate congenital anomalies from acquired diseases. Laboratory parameters, including electrolyte balance and signs of inflammation, play a supporting role in helping to assess the severity of the child's condition [4].

Certain diagnostic difficulties arise in rare forms of congenital pathologies. Segmental intestinal dilatation is characterized by a nonspecific clinical picture and is often only diagnosed during surgery. Similarly, congenital internal hernias and abnormal peritoneal bands can mimic other forms of acute intestinal obstruction and often require intraoperative verification. Thus, successful diagnosis of congenital diseases of the abdominal organs requires a comprehensive approach, including the use of prenatal and postnatal imaging methods, as well as high clinical vigilance on the part of the surgeon [2,7,8].

Surgical tactics for abdominal wall defects

Gastroschisis and omphalocele are the most common congenital pathologies of the anterior abdominal wall in newborns. Treatment tactics depend on the size of the defect, the condition of the intestinal loops, and the presence of concomitant anomalies. Modern approaches include both immediate closure of the defect and staged techniques using silos in cases of severe edema or intestinal shortening. Long-term observations show that such patients require increased attention due to the risk of repeat operations and complications in the form of adhesive obstruction [1].

Surgery for congenital forms of intestinal

In cases of duodenal atresia and other obstructive conditions, surgery remains the method of choice and should be performed early after the child's condition has stabilized. The most common technique for duodenal obstruction is duodenoduodenostomy, which shows good results when performed in a

timely manner. Laparoscopic access is actively used for small bowel obstruction, which is comparable in effectiveness to laparotomy but is less traumatic and allows for faster recovery. However, in severe cases with ischemia or necrosis of the intestine, laparotomy remains the preferred method [4,6].

Modern approaches to rare anomalies and Hirschsprung's disease

Conditions that are difficult to diagnose, such as segmental intestinal dilatation, congenital internal hernias, and pathological peritoneal bands, require an individual surgical approach and are most often detected intraoperatively. In these cases, the main task of the surgeon is to remove the obstruction to food passage and preserve the maximum volume of functional intestine. Hirschsprung's disease deserves special attention, as the choice of correction method remains a subject of debate. Modern surgical tactics — Swenson, Duhamel, and Yancey–Soave — demonstrate similar survival rates but differ in functional outcomes, which emphasizes the need to individualize tactics depending on the extent of aganglionosis and the patient's condition [2,7–9].

Prognostic models and modern approaches

The development of prediction methods has made it possible to introduce tools for assessing the risk of outcomes in children with congenital diseases of the abdominal organs. The use of machine learning algorithms, in particular random forest models, has shown high accuracy in predicting 30-day mortality in newborns with gastrointestinal anomalies. Such approaches take into account not only surgical parameters but also clinical and demographic factors, which makes them valuable for individualizing management tactics and timely risk stratification [5].

Factors contributing to an unfavorable outcome

The condition of the child at the time of admission and the timing of surgery are key factors in the prognosis. Studies show that delayed surgery, severe dehydration, sepsis, hypoalbuminemia, and low birth weight significantly increase the likelihood of adverse outcomes. Additional predictors of a complicated course are the presence of concomitant congenital anomalies and pronounced inflammatory changes in the intestinal wall [4].

Long-term consequences and repeat interventions

Even after successful primary surgery, children with congenital abdominal wall defects, such as gastroschisis and omphalocele, remain at risk for developing adhesive obstruction and require repeat surgical interventions. Population studies demonstrate an increased frequency of hospitalizations and surgical procedures during childhood in this category of patients. These data emphasize the need for long-term monitoring, early detection of complications, and the development of rehabilitation programs aimed at improving quality of life and reducing the surgical burden [1].

Global trends

Over the past decades, there has been a steady decline in the prevalence and mortality associated with congenital abdominal disorders. According to the Global Burden of Disease Study (GBD 2021), between 1990 and 2021, there was a 35.3% reduction in mortality and a 34.9% reduction in DALYs, indicating significant progress in diagnosis and surgical treatment. The greatest reduction in mortality was observed in high-income countries, where the introduction of prenatal screening and the development of neonatal surgery have improved survival rates [3].

Regional differences

Despite the overall positive trend, differences between regions remain significant. In countries with limited resources, mortality rates for gastroschisis and other obstructive intestinal pathologies remain significantly higher than in highly developed countries . This is due to late diagnosis, a shortage of qualified personnel, a lack of specialized centers, and limited access to intensive care for newborns. At the same time, in developed countries, the problems of long-term complications, including repeated hospitalizations and operations, come to the fore, which requires the improvement of rehabilitation programs [1,5].

The need to adapt strategies

The diversity of outcomes highlights the need to adapt surgical tactics and organizational approaches to the specific conditions of the healthcare system. For countries with low and medium levels of resources, measures for early diagnosis and improved access to surgical care remain key. For highly developed systems, the introduction of prognostic models, minimally invasive technologies, and multidisciplinary surveillance programs are important. Thus, global experience shows that further reduction of the burden of congenital abdominal diseases is only possible by taking into account regional characteristics and optimizing healthcare resources [3].

Conclusion

Congenital abdominal diseases in children are a complex interdisciplinary problem that requires early detection, timely surgical intervention, and subsequent dynamic monitoring.

Modern research shows that the success of treatment is determined not only by the technical level of the operation, but also by the quality of prenatal diagnosis, timely risk stratification, and the organization of postoperative care. The introduction of prognostic models, minimally invasive technologies, and long-term rehabilitation programs opens up new prospects for increasing survival and improving the quality of life of patients, while the standardization of surgical tactics and the development of multidisciplinary interaction remain key conditions for further progress.

References

1. Raitio A, Syvänen J, Tauriainen A, Hyvärinen A, Sankilampi U, Gissler M, et al. Longterm hospital admissions and surgical treatment of children with congenital abdominal wall defects: a population-based study. Eur J Pediatr [Internet]. 2021 Jul 1 [cited 2025 Sep 18];180(7):2193–8. Available from: https://link.springer.com/article/10.1007/s00431-021-04005-2
2. Adane SG, Negussie T, Temesgen F, Yirdachew E, Geremew D. Congenital segmental intestinal dilation in children: A case series. J Pediatr Surg Case Rep [Internet]. 2025 Oct 1 [cited 2025 Sep 18];121:103092. Available from: https://www.sciencedirect.com/science/article/pii/S221357662500137X?utm
3. Luo X, Luo J, Zhao J, Du J, Lu D, Gu H. Burden of digestive congenital anomalies among children aged 0–14 years in 204 countries and territories, 1990–2021: results from the Global Burden of Disease Study 2021. BMJ Open [Internet]. 2024 Dec 23 [cited 2025 Sep 18];14(12):e093902. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11667325/
4. Tamirat A, Nigussie J, Biset G. Surgical outcome of pediatric intestinal obstruction in Amhara comprehensive specialized hospitals, September 2024. BMC Surg [Internet]. 2025 Dec 1 [cited 2025 Sep 18];25(1):1–10. Available from: https://bmcsurg.biomedcentral.com/articles/10.1186/s12893-025-02975-w
5. Serban AM. Short-term mortality prediction in children with gastrointestinal congenital anomalies using a random forest classifier. Pediatric Research 2025 [Internet]. 2025 Sep 15 [cited 2025 Sep 18];1–6. Available from: https://www.nature.com/articles/s41390-025-04378-2
6. Liu M, Cheng F, Liu X, Zheng B, Wang F, Qin C, et al. Diagnosis and surgical management strategy for pediatric small bowel obstruction: Experience from a single medical center. Front Surg [Internet]. 2023 [cited 2025 Sep 18];10:1043470. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC9989272/
7. Kim SE, Johnston WR, Hwang R, Nace GW. Intraoperative diagnosis of rare pediatric internal hernias: A case series. J Pediatr Surg Case Rep [Internet]. 2025 May 1 [cited 2025 Sep 18];116:102983. Available from: https://www.sciencedirect.com/science/article/pii/S2213576625000284?utm

8. Lan Q, Zhong J, Wang Y, Zhu H, Liu X, Guo Y, et al. Acute small bowel obstruction caused by a fan-shaped congenital band in a child: a case report. Front Pediatr [Internet]. 2025 [cited 2025 Sep 18];13:1539677. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC11932897/

9. Etskovitz H, Kim RS, Wang SZ, Nandivada P. Surgical management of short-segment Hirschsprung disease. World Journal of Pediatric Surgery [Internet]. 2024 Dec 31 [cited 2025 Sep 18];7(4):916. Available from: https://wjps.bmj.com/content/7/4/e000916