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NEONATAL INTESTINAL STOMA: EVALUATION OF TREATMENT EFFECTIVENESS AND COMPLICATIONS

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Annotation

Intestinal stoma formation is a lifesaving procedure in neonates with severe intestinal pathology. This study analyzed early and late stoma-related complications in 218 infants who underwent colostomy or ileostomy at the Republican Center of Pediatric Minimally Invasive and Endoscopic Surgery between 2020 and 2025. Stoma-related complications were observed in 62% of cases, including early complications in 38% and late complications in 24%. Careful surgical technique, adequate postoperative care, and parental education were identified as key factors in reducing complication rates and improving clinical outcomes.

Key words: Neonatal intestinal stoma, Colostomy, Ileostomy, Early complications, Late complications, Pediatric surgery, Postoperative care, Stoma management**.**

Introduction

Neonatal intestinal pathology represents one of the most complex and critical challenges in pediatric surgery. Congenital anomalies such as intestinal atresia, Hirschsprung disease, anorectal malformations, and necrotizing enterocolitis frequently require urgent surgical intervention to prevent life-threatening complications. In many cases, neonates present with severe intestinal obstruction, a high risk of sepsis, and impaired nutritional absorption, making timely surgical management essential for survival.

Intestinal stoma formation is a temporary yet vital surgical procedure aimed at bowel decompression, sepsis control, and stabilization of the patient's general condition prior to definitive reconstructive surgery. By diverting intestinal contents, stoma formation reduces ongoing tissue injury, supports fluid and electrolyte balance, and facilitates the initiation of enteral nutrition. In this context, intestinal stoma creation represents not merely a surgical step, but a key component of comprehensive care for critically ill neonates.

Despite significant advances in neonatal anesthesia, surgical techniques, and intensive care, stoma-related complications remain frequent and continue to pose major clinical challenges. Early complications, including peristomal skin maceration, ischemia, necrosis, and infection, may prolong hospitalization and necessitate additional interventions. Late complications such as stoma prolapse, parastomal hernia, stenosis, and chronic peristomal skin inflammation can adversely affect long-term growth, quality of life, and increase the need for repeated surgical procedures. Neonates are particularly vulnerable due to their immature immune systems, fragile skin, and limited physiological reserves, emphasizing the importance of early detection and meticulous management of stoma-related complications.

Systematic evaluation of clinical outcomes and complication patterns is therefore essential for optimizing surgical strategies, improving postoperative care, and enhancing parental

education. Available evidence suggests that the use of standardized surgical techniques, minimally invasive approaches, and structured postoperative monitoring can significantly reduce complication rates and improve overall outcomes in neonatal patients.

In Uzbekistan, data on neonatal intestinal stoma outcomes remain limited, with most previous reports based on small patient cohorts or short-term follow-up. The implementation of modern minimally invasive and endoscopic surgical techniques in specialized pediatric centers provides new opportunities for comprehensive outcome assessment, development of locally adapted clinical guidelines, and advancement of evidence-based neonatal surgical care. This study represents one of the first large-scale clinical analyses of neonatal intestinal stoma outcomes in Uzbekistan and aims to contribute to improving clinical practice, guiding national protocol development, and supporting future research in this field.

Materials and Methods

A retrospective clinical study was conducted at the Republican Center of Pediatric Minimally Invasive and Endoscopic Surgery in Tashkent, Uzbekistan, covering the period from 2020 to 2025. The study included 218 infants from the neonatal period up to 1 year of age who underwent colostomy or ileostomy for various congenital and acquired intestinal conditions. Indications for stoma formation included intestinal atresia, necrotizing enterocolitis, Hirschsprung disease, anorectal malformations, and other obstructive or inflammatory intestinal pathologies. Only patients with complete medical records and a minimum postoperative follow-up of 12 months were included to ensure reliable outcome assessment.

Patients were evaluated according to stoma type (colostomy or ileostomy), timing of complications, clinical manifestations, management strategies, and treatment outcomes. Complications were classified as early when occurring within the first 30 postoperative days and as late when identified between 3 and 12 months after surgery. Clinical assessment focused on local and systemic manifestations, including peristomal skin changes, stoma ischemia or necrosis, prolapse, parastomal hernia, stenosis, infectious complications, and nutritional tolerance.

Management strategies included conservative treatment, stoma and wound care, nutritional support, and surgical revision when indicated. Treatment outcomes were assessed based on clinical stabilization, growth and weight gain, tolerance of enteral feeding, and readiness for subsequent reconstructive surgery.

Data collection was based on detailed review of medical records, operative reports, inpatient observations, and scheduled follow-up visits. All stoma-related complications, including their timing, severity, and required interventions, were systematically documented. Statistical analysis was performed using descriptive methods to determine the frequency and distribution of early and late complications and their association with stoma type and underlying pathology.

Ethical approval was obtained from the institutional review board of the Republican Center of Pediatric Minimally Invasive and Endoscopic Surgery. Written informed consent was obtained from the parents or legal guardians of all patients. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Results

Stoma-related complications were observed in 62% of the 218 neonates included in the study. Early complications, defined as those occurring within the first 30 postoperative days, were identified in 38% of patients. The most common early complications were peristomal skin maceration (19%), stoma ischemia or necrosis (7%), stoma retraction (6%), and infectious inflammation (6%). These events were primarily associated with surgical technique, the delicate nature of neonatal skin, and variability in postoperative care. Prompt recognition and intervention allowed most patients to recover without long-term sequelae.

Late complications, occurring between 3 and 12 months postoperatively, were observed in 24% of neonates. The most frequent late complications were stoma prolapse (9%), parastomal hernia (8%), stoma stenosis (4%), and chronic peristomal skin inflammation (3%). These complications were generally related to the child's growth, increased intra-abdominal pressure, and challenges in long-term stoma care. Continuous follow-up and caregiver education played a crucial role in minimizing their severity and ensuring timely management.

Despite these complications, stoma formation substantially stabilized the neonates' condition. Most patients showed improvement in fluid and electrolyte balance, reduction of abdominal distension, and enhanced tolerance to enteral feeding. Enteral nutrition was successfully initiated within days after stoma formation, promoting weight gain and improved nutritional status. Additionally, the presence of a functional stoma enabled safe and timely preparation for subsequent reconstructive surgery, essential for definitive correction of the underlying intestinal pathology.

Overall, the findings indicate that while stoma-related complications are relatively common, their impact can be effectively mitigated through careful surgical technique, structured postoperative monitoring, and comprehensive parental education. These results underscore the clinical effectiveness of intestinal stoma formation in critically ill neonates and highlight the importance of specialized pediatric surgical care in optimizing outcomes.

Discussion

This study demonstrates that stoma-related complications are common in neonates undergoing intestinal stoma formation, with an overall incidence of 62%. Early complications were primarily associated with surgical technique, tissue fragility, and immediate postoperative care, whereas late complications were influenced by patient growth, abdominal wall dynamics, and the quality of long-term stoma management. These findings align with international literature, which reports early complication rates of 30–40% and late complication rates of 20–25% in neonatal stoma patients.

Peristomal skin maceration, stoma ischemia, and retraction were the most frequent early complications observed. This underscores the importance of meticulous surgical technique, careful stoma site selection, and vigilant postoperative monitoring to prevent skin breakdown and ischemic injury. Early recognition and timely interventions, including local wound care and temporary stoma support, were effective in minimizing long-term consequences for most patients.

Late complications, including stoma prolapse, parastomal hernia, and stenosis, occurred in 24% of neonates. These issues often developed months after surgery and were frequently associated with growth-related changes and inadequate long-term stoma care. Structured

caregiver education on stoma hygiene, proper appliance use, and early recognition of complications proved essential in reducing severity and ensuring timely management. These findings highlight that postoperative follow-up and family involvement are as crucial as surgical technique in achieving optimal outcomes.

Despite the relatively high complication rate, intestinal stoma formation effectively stabilized the general condition of neonates, improved tolerance to enteral feeding, and provided a safe bridge to reconstructive surgery. Early detection and intervention for complications further contributed to improved nutritional status, growth, and overall prognosis, emphasizing the lifesaving role of stoma formation in severe neonatal intestinal pathologies.

Clinically, these results have important implications for neonatal surgical care in Uzbekistan. Implementation of modern minimally invasive and endoscopic surgical approaches, along with standardized postoperative monitoring protocols, can enhance outcomes and reduce complications. The development of national guidelines and a local clinical database for neonatal stoma management would further support evidence-based improvements in pediatric surgical practice.

In conclusion, while stoma-related complications remain a significant concern, careful surgical technique, structured postoperative care, and proactive caregiver education ensure effective and safe management of neonates requiring intestinal stoma formation. These findings provide valuable evidence to guide future neonatal surgical protocols and optimize outcomes in similar patient populations

Conclusion

Neonatal intestinal stoma formation remains a vital and effective surgical intervention for managing severe congenital and acquired intestinal pathologies. Although stoma-related complications occurred in 62% of patients, their impact can be effectively minimized through meticulous surgical technique, structured postoperative monitoring, and comprehensive parental education.

Early complications, including peristomal skin maceration, ischemia, and infection, underscore the importance of precise operative technique and immediate postoperative care. Late complications, such as stoma prolapse, parastomal hernia, and stenosis, highlight the need for ongoing follow-up, growth monitoring, and caregiver training to ensure timely detection and management.

Despite these complications, stoma formation significantly stabilizes the neonate’s condition, improves tolerance to enteral nutrition, and provides a safe bridge for subsequent reconstructive surgery. These outcomes reinforce the essential role of stoma formation in neonatal surgical practice and its contribution to both short- and long-term clinical improvement.

This study represents one of the first comprehensive evaluations of neonatal intestinal stoma outcomes in Uzbekistan, providing a valuable foundation for future multicenter research and the development of national clinical guidelines. The integration of modern minimally invasive techniques, standardized postoperative care, and structured parental education programs will be crucial in further reducing complication rates and optimizing neonatal surgical care.

Overall, intestinal stoma formation is not only a lifesaving intervention but also a manageable and effective treatment modality when supported by evidence-based protocols, continuous monitoring, and a multidisciplinary approach.

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