



Research Article

Outcome of Neonates Undergoing Surgical Intervention at a Tertiary Care Hospital in Northern India: A 2-Year Prospective Cohort Study

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Abstract

This prospective cohort study was conducted to evaluate the demographic profile, diagnosis, hospital stay duration and outcomes of neonates who underwent surgical intervention at the Department of Pediatric Surgery, Jawaharlal Nehru Medical College, Aligarh, from January 2023 to January 2025. The study included 102 neonates, aged 1 to 28 days, with a mean age of 7.1 ± 7.6 days. The mean hospital stay was 6.0 ± 6.9 days, with a range of 1 to 53 days. Of the 102 patients, 61 (59.8%) were discharged in satisfactory condition, while 41 (40.2%) succumbed to their conditions. The most common diagnoses were Ano-Rectal Malformation (ARM) at 22.5%, followed by Tracheoesophageal Fistula Type C (TEF) at 19.6% and Acute Intestinal Obstruction at 14.7%. The highest mortality rates were observed in patients with TEF (85%) and Gastroschisis (100%), while conditions like Abscess and Rectovaginal Fistula had a 100% survival rate. This high mortality was attributed to late patient presentation, lack of specialized neonatal anesthesia and inadequate multidisciplinary support. The findings emphasize the need for improved neonatal surgical care infrastructure, early diagnosis and enhanced surgical expertise, particularly in resource-limited settings.

Keywords: Neonates; Ano-Rectal Malformation (ARM); Tracheoesophageal Fistula Type C (TEF)

Introduction

The conduction of research in neonatal surgery presents significant challenges. These challenges stem from the rarity and small number of cases, which limit the experience of individual surgeons and institutions. Additionally, variations in healthcare systems and disparities in financial and professional resources can result in differences in treatment approaches and follow-up protocols across various centres and countries. Interventions for newborns require careful and precise planning. Many congenital surgical disorders are associated with other anomalies and conditions, making it difficult to assess them in isolation accurately. Moreover, the maturation of organ systems like the lungs and gastrointestinal tract continues throughout growth and the long-term functional outcomes of specific interventions may only become fully apparent in adulthood. Certain conditions and their surgical management can lead to significant pathophysiological changes, resulting in new health issues, such as gastroesophageal reflux and increased cancer risk in esophageal atresia or liver injury associated with parenteral nutrition in cases of intestinal failure [1-3]. Given these complexities, the evaluation and management of neonatal surgical disorders should be researched.

Most research in neonatal surgery has traditionally been based on case series, primarily retrospective and observational. This is mainly due to the rarity of most neonatal surgical conditions, which typically occur in approximately 1 in 1,000 to 1 in 20,000 live births [4]. Surgical risks in neonates are often influenced by complications arising from prematurity, congenital anomalies or associated malformations. Respiratory complications account for three-quarters of all critical incidents and one-third of perioperative cardiac arrests in pediatric anesthesia [5]. Preterm and term infants face an even higher risk of anesthesia-related critical events compared to older children, largely due to their distinct respiratory physiology, which makes them especially vulnerable. Advancements in technology and increasing expertise in surgery and anesthesia have contributed to the expanded use of laparoscopic surgery in neonates [6].

Materials and Methods

This prospective cohort study was done in the Department of Pediatric Surgery, Jawaharlal Nehru Medical College Aligarh, from January 2023 to January 2025 to assess the demographic profile, diagnosis, duration of hospital stay and outcome of neonates undergoing surgical intervention at our hospital. All neonates presenting to the hospital were assessed thoroughly; detailed history, clinical examinations and relevant investigations were conducted. After a thorough assessment, neonates requiring surgical intervention were identified and well-informed consent was taken from the patient's parents for inclusion in the study.

Inclusion Criteria: All neonates admitted to the neonatal ward who underwent surgical intervention and whose parent consent to the study were included.

Exclusion Criteria: Neonates admitted elsewhere and whose parents did not give consent to the study were excluded.

Management Protocol

The patients requiring surgical intervention were managed and operated based on their specific disease condition. After the procedure, patients were shifted to the Intensive Care Unit (ICU)/ High Dependency Unit (HDU) based on their condition and monitored subsequently.

Statistical Analysis

The patient data was exported on the excel sheet and descriptive analysis was performed. Statistical Package for the Social Sciences (SPSS) version 24.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analyses.

Results

A total of 102 patients were included during the study period. The age of presentation for the neonates ranged from 1 to 28 days. The mean age of presentation was 7.1 ± 7.6 days. There were 67.65% male and 32.35% female. The duration of hospital stays for the patients ranged from 1 to 53 days. The mean hospital stay is approximately 6.0 ± 6.9 days. The most common diagnosis was Ano-Rectal Malformation (22.5%), followed by Tracheoesophageal Fistula Type C (19.6%) and Acute Intestinal Obstruction (14.7%). These three conditions accounted for more than half of the cases. Other notable conditions included Necrotizing Enterocolitis (7.8%) and Abscess (6.8%). Rarer conditions like Congenital Diaphragmatic Hernia, Sacrococcygeal Teratoma and PVID each accounted for less than 1% of cases. Out of the 102 neonates, 61 patients (59.8%) were discharged in satisfactory condition, while 41 patients (40.2%) succumbed. Ano-Rectal Malformation had a high survival rate, with 82.6% of patients discharged, whereas Tracheoesophageal Fistula had the highest mortality, with 85% of cases resulting in death. Similarly, Perforation Peritonitis/Necrotizing Enterocolitis showed a poor prognosis, with 75% mortality. The conditions, such as Abscess, Rectovaginal Fistula, Posterior Urethral Valve, Infantile Hypertrophic Pyloric Stenosis, Myelomeningocele and Inguinal Hernia, had 100% survival rates. Conversely, Gastroschisis had a 100% mortality rate, indicating its severe prognosis. The "Rest other causes" (9 cases) had a 66.7% mortality rate, indicating a poor prognosis for various less common conditions.

Discussion

Although neonatal surgical conditions are associated with substantial mortality, most of the research is done on neonatal medical conditions, owing to the low incidence of neonates requiring surgical interventions. In our study, the majority of the neonates (22.5%) had ARM; similarly, Vishwakarma, et al., 7 found that around 25.7% of the neonates admitted to the pediatric surgical ward had ARM. The tracheoesophageal fistula was the second most common condition seen in 19.6% of neonates; similarly, Vishwakarma, et al., found TEF in 21% of neonates.8 TEF was associated with the highest mortality of about 85% and was the

leading cause of death (41%). Vishwakarma, et al., found that TEF was associated with a fatality of 65% and constituted 25% of the total deaths. In contrast, Gangopadhyay, et al., found that TEF was associated with a fatality rate of only 34% [9].

Acute Intestinal obstruction due to intestinal atresia or any intestinal pathology was the second most common etiology (14.7%) of neonatal emergency surgery. Similarly, acute intestinal obstruction was seen in 15% of the patients in John Radcliffe Hospital, UK (JRH) and 10% of the patients of Kilimanjaro Christian Medical Centre (KCMC), Tanzania [10,11].

Perforation peritonitis/ NEC was seen in 7.8% of the neonates. A study done in Kilimanjaro Christian Medical Centre (KCMC), Tanzania, found the incidence of Perforation/NEC to be 10%. Other relatively uncommon diseases like Abscess, omphalocele PUV, Inguinal hernia, rectovaginal fistula, Infantile hypertrophic pyloric stenosis and sacrococcygeal teratoma, showed similar incidences as shown by Vishwakarma, et al.

Gastroschisis was seen in 1.9% of the patients and was associated with 100% of mortality. Vishwakarma, et al., found that Gastroschisis was seen in about 3% of the population and John Radcliffe Hospital, UK (JRH) found the incidence is 0.9%. Vishwakarma, et al., found high mortality in neonates of gastroschisis. The high mortality rate associated with neonatal surgical conditions in our hospital is largely attributed to the absence of specialized anesthesia care by senior faculty in emergency operation theatre, moreover lack of skilled nursing staff for post-operative care, needless to mention how overburdened with disproportionate patient load and the lack of a coordinated multidisciplinary approach in peri operative setting. Enhancing these critical aspects of care could significantly improve patient outcomes.

Conclusion

Neonatal surgical conditions remain a significant challenge in paediatric healthcare, with high morbidity and mortality rates. Our study highlights the burden of congenital anomalies requiring surgical intervention, with Ano-Rectal Malformation, Tracheoesophageal Fistula and Acute Intestinal Obstruction being the most common diagnoses. The overall mortality rate was 40.2%, with Tracheoesophageal Fistula (85%) and Gastroschisis (100%) showing the highest fatality rates. In contrast, conditions such as Abscess, Posterior Urethral Valve, Myelomeningocele and Inguinal Hernia had excellent survival outcomes. The major contributing factors to poor outcomes included a late presentation, lack of specialised neonatal anaesthesia care and limited multidisciplinary support. Comparisons with other studies reveal regional variations in disease incidence and outcomes, emphasising the need for improved neonatal surgical care infrastructure. Strengthening early diagnosis, access to neonatal intensive care and surgical expertise can significantly enhance survival rates and long-term patient outcomes. Future research should focus on developing cost-effective and region-specific treatment protocols to improve neonatal surgical care in resource-limited settings, focus on improving nurse to patient ratio, moreover, focus on human resource development such as regular training of nursing staff.

Conflict of Interests

The authors declare that they have no conflicts of interest.

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Author Contributions

The authors contributed equally to the work.

References

1. Mutanen A, Pöntinen V, Gunnar R. Efficient achievement of enteral autonomy facilitates resolution of liver injury in necrotizing enterocolitis-induced short bowel syndrome. *Sci Rep.* 2022;12:17516.
2. Brooks G, Gazzaneo M, Bertozzi M, Riccipetoni G, Raffaele A. Systematic review of long-term follow-up and transitional care in adolescents and adults with esophageal atresia-why is transitional care mandatory? *Eur J Pediatr.* 2023;182(5):2057-66.
3. Abi-Aad SJ, Lovell M, Khalaf RT, Sokol RJ. Pathogenesis and management of intestinal failure-associated liver disease. *Semin*

- Liver Dis. 2025;45(1):66-80.
4. Hossain MZ, Ali MN, Shahid SMA, Paul SR, Al Mamun A. Burden of neonatal surgical conditions and their outcomes in a resource-limited tertiary hospital in Bangladesh. *Sch J App Med Sci.* 2024;12(6):776-85.
 5. Hasegawa T, Takano S, Masuda K, Fujiwara Y, Miyahara A, Miura M. Retrospective analysis of neonatal surgery at Tottori University over the past ten years. *Yonago Acta Med.* 2023;66(4):413-21.
 6. Costa S, Capolupo I, Bonadies L. Current management of surgical neonates: Is it optimal or do we need to improve? A national survey of the Italian Society of Neonatology. *Pediatr Surg Int.* 2024;40:109.
 7. Vishwakarma RK. Spectrum and outcome of neonatal surgical conditions: A hospital-based study in North India. *J Neonatal Surg.* 2018;7(3):25-30.
 8. Vishwakarma RK. Neonatal surgical emergencies: An Indian experience. *Pediatr Surg Int.* 2008;24(9):1085-90.
 9. Gangopadhyay AN. Neonatal surgery: A 20-year experience from a tertiary care centre in India. *Pediatr Surg Int.* 2008;24(7):655-60.
 10. John Radcliffe Hospital (JRH), Oxford, UK. Annual neonatal surgical audit report. 2010.
 11. Kilimanjaro Christian Medical Centre (KCMC), Tanzania. Spectrum of neonatal surgical conditions: institutional report. 2012.

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