

Pattern of Neonatal Surgical Emergencies in Tertiary Care Hospital: A Retrospective Study

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ABSTRACT

Background: Neonatal surgical emergencies are major contributors to neonatal morbidity and mortality. Early diagnosis, timely referral, prompt surgery, and specialized neonatal care are essential for improving outcomes.

Objectives: To evaluate the pattern of neonatal surgical emergencies, associated congenital anomalies, postoperative complications, clinical outcomes, and hospital stay among neonates at a tertiary care hospital.

Methods: A retrospective observational study included 58 neonates with surgical emergencies admitted to the Pediatric Surgery Department and NICU of a tertiary care hospital. Data on demographics, diagnosis, congenital anomalies, postoperative complications, clinical outcomes, and hospital stay were collected from medical records. Statistical analysis was performed using SPSS. Descriptive statistics, Fisher's Exact Test, and Kruskal–Wallis Test were applied, with $p < 0.05$ considered statistically significant.

Results: Among the 58 neonates studied, anorectal malformation (ARM) was the most common surgical emergency, accounting for 20.7% of cases, followed by pelviureteric junction (PUJ) obstruction (17.2%) and tracheoesophageal fistula (TEF) (13.8%). Associated congenital

anomalies were most frequently observed in congenital diaphragmatic hernia (66.7%), intestinal atresia (60.0%), and ARM (58.3%). Postoperative morbidity was highest in intestinal atresia (100.0%), followed by CDH (66.7%) and TEF (62.5%), with a significant association between diagnosis and morbidity ($p = 0.0021$). Mortality was observed only in intestinal atresia (20.0%) and TEF (12.5%). The longest hospital stay was noted in intestinal atresia (28.8 ± 5.3 days), while PUJ obstruction had the shortest stay (5.3 ± 1.3 days). Duration of hospital stay differed significantly among diagnostic categories ($p < 0.001$).

Conclusion: Anorectal malformation was the most common neonatal surgical emergency in the present study. Intestinal atresia, CDH, and TEF were associated with higher morbidity and prolonged hospitalization. Early diagnosis, multidisciplinary management, and advanced neonatal surgical care are essential for improving outcomes and reducing neonatal morbidity and mortality.

Keywords: Anorectal Malformation; Congenital Anomalies; Neonatal Surgical Emergencies; Neonatal Outcome, Tracheoesophageal Fistula.

1. INTRODUCTION

The neonatal period, which encompasses the first 28 days of life, is one of the most critical phases in human development. During this period, newborns undergo significant physiological adaptations to extrauterine life and are particularly vulnerable to various congenital and acquired disorders [1]. Among these, neonatal surgical emergencies represent a major cause of morbidity and mortality, requiring immediate recognition, prompt referral, and timely surgical intervention. Advances in neonatal intensive care, pediatric anesthesia, diagnostic imaging, and surgical techniques have improved the survival rates of affected neonates; however, neonatal surgical emergencies continue to pose substantial challenges, particularly in developing countries where access to specialized healthcare facilities may be limited [2].

Neonatal surgical emergencies comprise a wide range of conditions that necessitate urgent surgical evaluation and management. These conditions may be congenital, resulting from developmental abnormalities during fetal life, or acquired during the neonatal period. Common neonatal surgical emergencies include gastrointestinal obstructions, anorectal malformations, esophageal atresia with tracheoesophageal fistula, congenital diaphragmatic hernia, abdominal wall defects, Hirschsprung disease, intestinal atresias, malrotation with volvulus, meconium-related disorders, and necrotizing enterocolitis [3]. These disorders often present with symptoms such as respiratory distress, abdominal distension, vomiting, feeding intolerance, failure to pass meconium, and signs of sepsis, requiring urgent medical attention and surgical management [4].

Congenital anomalies are among the leading causes of neonatal mortality worldwide and contribute significantly to the burden of neonatal surgical diseases. The incidence of congenital malformations has been increasing due to improved diagnostic capabilities and greater survival of high-risk

pregnancies. Many congenital anomalies require surgical correction shortly after birth to prevent life-threatening complications and improve long-term outcomes. The prognosis of neonates with surgical conditions depends on multiple factors, including the type and severity of the anomaly, birth weight, gestational age, presence of associated malformations, nutritional status, and the availability of specialized neonatal intensive care facilities [5].

The management of neonatal surgical emergencies is complex and requires a multidisciplinary approach involving neonatologists, pediatric surgeons, anesthesiologists, radiologists, and specialized nursing staff. Early diagnosis and stabilization are essential to optimize outcomes [6]. Delays in diagnosis, transportation, referral, or surgical intervention can significantly increase the risk of complications such as sepsis, electrolyte imbalance, respiratory failure, and death. Therefore, efficient healthcare infrastructure and well-established referral systems play a crucial role in improving survival among affected neonates [7].

Tertiary care hospitals serve as referral centers for complicated neonatal surgical cases and provide advanced diagnostic and therapeutic facilities. These institutions are equipped to manage critically ill neonates requiring intensive monitoring, ventilatory support, and specialized surgical procedures. Understanding the pattern and distribution of neonatal surgical emergencies encountered in tertiary care settings is important for healthcare planning, resource allocation, training of healthcare professionals, and improving the quality of neonatal surgical services [8]. Knowledge regarding the most common surgical conditions, age at presentation, gender distribution, associated risk factors, treatment modalities, and outcomes can assist in developing effective strategies for reducing neonatal morbidity and mortality [9].

In developing countries, neonatal surgical emergencies continue to account for a significant proportion of neonatal admissions and deaths. Challenges such as inadequate antenatal diagnosis, delayed referral from peripheral centers, limited transportation facilities, financial constraints, and shortage of specialized healthcare personnel contribute to poor outcomes [10]. Furthermore, low birth weight, prematurity, neonatal infections, and associated congenital anomalies often complicate management and adversely affect prognosis. Identifying local disease patterns and outcome determinants is therefore essential for strengthening neonatal healthcare systems and improving patient survival.

A retrospective evaluation of neonatal surgical emergencies provides valuable information regarding disease burden, clinical presentation, management practices, and treatment outcomes. Such studies contribute to evidence-based healthcare planning and help identify areas requiring improvement. Therefore, the present study was undertaken to assess the pattern of neonatal surgical emergencies in a tertiary care hospital, with the aim of enhancing understanding of these conditions and supporting measures to improve neonatal surgical care and outcomes.

2. METHODOLOGY

The present study was conducted as a retrospective observational study after obtaining approval from the Institutional Ethics Committee. The study was carried out in the Department of Pediatric Surgery and Neonatal Intensive Care Unit (NICU) of a tertiary care teaching hospital. Hospital records of neonates admitted with surgical emergencies during the study period were reviewed to evaluate the clinical profile, management practices, and outcomes of neonatal surgical emergencies.

Inclusion criteria: Neonates aged 0–28 days admitted with surgical emergencies, including congenital surgical anomalies

requiring emergency intervention and acquired surgical conditions requiring urgent management, were included in the study. Neonates managed either surgically or conservatively under the Department of Pediatric Surgery were enrolled. Only medical records containing complete demographic, clinical, management, and outcome details were included for analysis.

Exclusion criteria: Neonates older than 28 days, patients admitted for elective surgical procedures, records with incomplete or missing information, neonates referred to other hospitals before definitive diagnosis or treatment, and records lacking information regarding clinical outcomes were excluded from the study.

All eligible cases fulfilling the inclusion criteria during the study period were included using a consecutive sampling technique. Since the study was retrospective, no direct patient recruitment was undertaken. Hospital admission registers, neonatal intensive care records, operation theatre registers, discharge summaries, and individual case files were systematically reviewed to identify eligible patients. A total of 58 neonates satisfying the selection criteria were included in the final analysis.

The study evaluated demographic, clinical, management, and outcome-related parameters. Demographic variables included age at presentation, gender, birth weight, gestational age, and place of birth (inborn/outborn). Clinical variables comprised presenting complaints, duration of symptoms, type of surgical emergency, associated congenital anomalies, and final diagnosis. Management-related variables included referral status, preoperative stabilization, surgical procedure performed, ventilatory support, and duration of hospital stay. Outcome variables included postoperative complications, recovery, survival, and mortality.

Hospital admission registers, operation theatre records, NICU registers, inpatient case sheets, investigation reports, and

discharge summaries were reviewed systematically after ethical approval. Information regarding demographic characteristics, clinical presentation, investigations, diagnosis, operative findings, treatment details, postoperative management, complications, duration of hospitalization, and final outcome was extracted using a predesigned data collection proforma. The diagnosis of each patient was verified using available clinical records, imaging findings, operative notes, and discharge summaries. Surgical procedures performed for different neonatal emergencies were documented, and postoperative progress, ventilatory support, complications, and discharge status were recorded.

Data collection was performed using a standardized data extraction form. Information obtained from multiple hospital records was cross-verified wherever necessary to ensure completeness and accuracy. Records with incomplete information were excluded according to the predefined exclusion criteria. Patient identifiers were removed before data entry, and all information was entered into a computerized database while maintaining confidentiality.

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 25.0. Categorical variables were expressed as frequencies and percentages, whereas continuous variables were summarized using mean, standard deviation, median, and range wherever appropriate. The results were presented in the form of tables and charts. Comparative analyses were performed whenever required to evaluate associations between clinical variables and outcomes. A p-value <0.05 was considered statistically significant.

The study was conducted after obtaining approval from the Institutional Ethics Committee. As the study was retrospective and record based, no direct patient contact or intervention was involved. Confidentiality of patient information was strictly maintained throughout the study by removing all personal identifiers from the database. The collected data were used exclusively for academic and research purposes and were handled in accordance with the ethical principles of the Declaration of Helsinki and institutional guidelines governing biomedical research involving human participants.

3. RESULTS

Table 1 depicts the spectrum and frequency of neonatal surgical emergencies among the 58 neonates included in the study. Anorectal malformation (ARM) was the most common surgical emergency, accounting for 12 cases (20.7%), indicating that ARM constituted a major burden among neonatal surgical admissions. Pelviureteric junction (PUJ) obstruction was the second most common diagnosis, observed in 10 neonates (17.2%). Tracheoesophageal fistula (TEF) accounted for 8 cases (13.8%), while miscellaneous conditions categorized as "Others" represented 12.1% of cases. Intestinal atresia and Hirschsprung disease (HSD) each contributed 8.6% of the total study population. Bladder outlet obstruction (BOO) with posterior urethral valve and intestinal obstruction each accounted for 6.9% of cases. Congenital diaphragmatic hernia (CDH) was the least frequent diagnosis, representing only 5.2% of all neonatal surgical emergencies. The findings indicate that gastrointestinal and genitourinary congenital anomalies constituted the majority of neonatal surgical emergencies encountered in the tertiary care center.

Table 1: Distribution and Pattern of Neonatal Surgical Emergencies

Diagnostic Category	Count	Percentage	Cumulative %
ARM	12	20.7	20.7
PUJ OBSTRUCTION	10	17.2	37.9
TEF	8	13.8	51.7

Others	7	12.1	63.8
Atresia	5	8.6	72.4
HSD	5	8.6	81.0
BOO + post urethral valve	4	6.9	87.9
obstruction	4	6.9	94.8
CDH	3	5.2	100.0

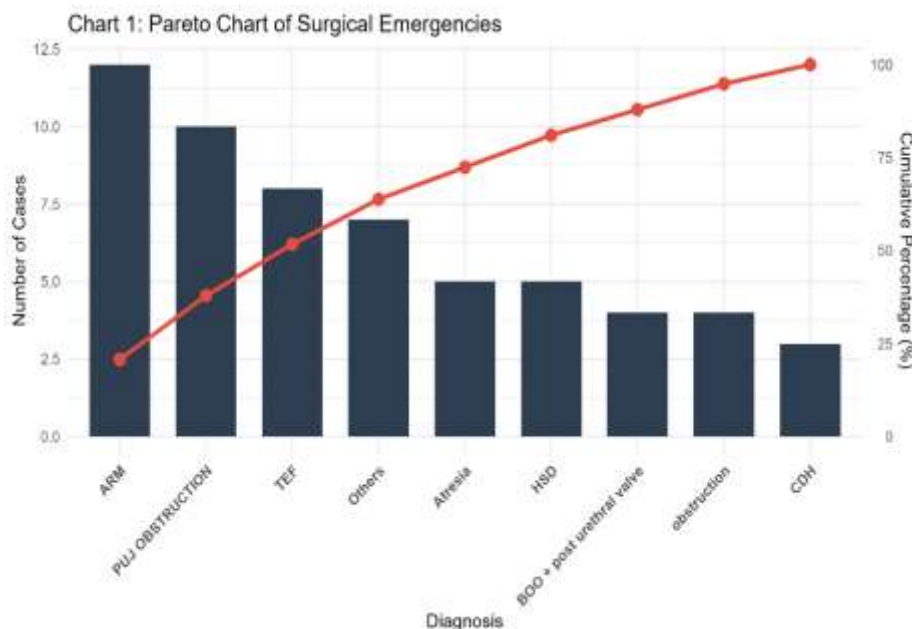


Table 2 summarizes the demographic and perinatal characteristics of the study population. An equal gender distribution was observed, with both males and females contributing 29 cases each (50.0%), indicating no gender predominance among neonatal surgical emergencies. Regarding mode of delivery, lower segment cesarean section (LSCS) was the predominant mode, accounting for 40 cases (69.0%), while normal vaginal delivery (NVD) was reported in 16 neonates (27.6%). Only 2

cases (3.4%) had other or unknown modes of delivery. With respect to place of birth, most records lacked documentation (91.4%), while only 5.2% were inborn and 3.4% were outborn. Fisher's Exact Test comparing place of birth and mode of delivery yielded a p-value of 0.308, indicating no statistically significant association between these variables. Thus, mode of delivery did not appear to influence the place of birth among neonates admitted with surgical emergencies.

Table 2: Baseline Demographics and Perinatal Characteristics

Variable	Category	Count	Percentage
Sex	F	29	50.0
	M	29	50.0
Delivery Mode	LSCS	40	69.0
	NVD	16	27.6
	Other/Unknown	2	3.4
Place of Birth	Inborn	13	22.4
	Outborn	45	77.6
Statistical Comparison (Place of Birth vs Delivery Mode): Fisher's Exact Test p-value = 0.848			

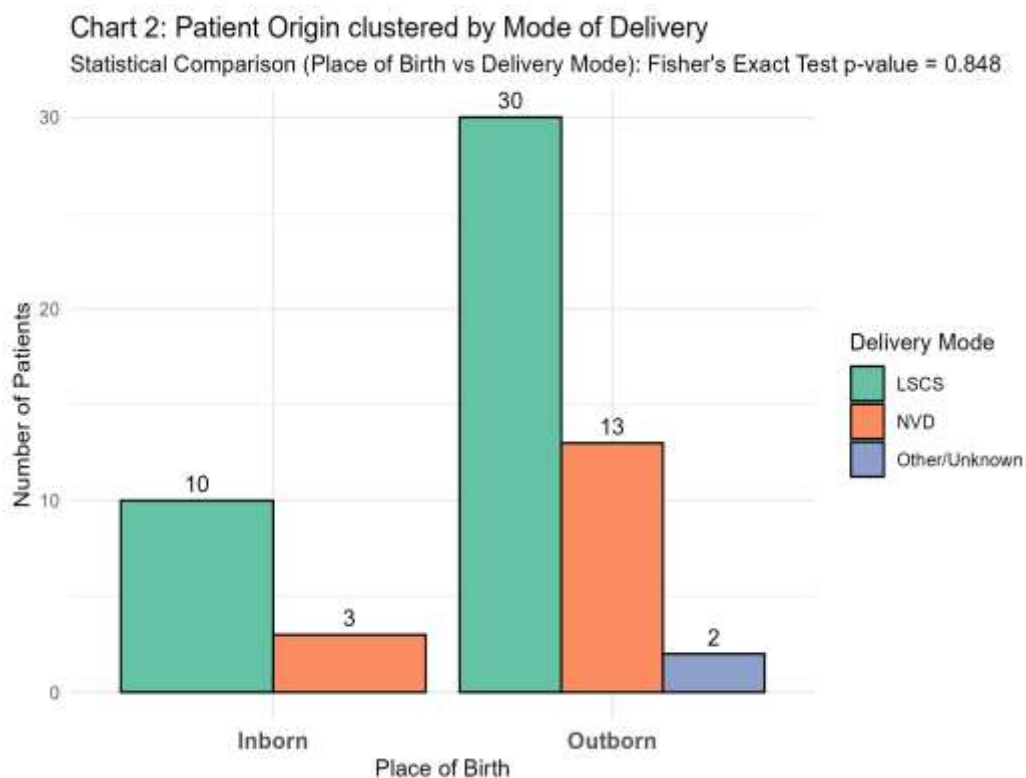


Table 3 demonstrates the occurrence of associated congenital anomalies among different neonatal surgical conditions. The highest proportion of associated anomalies was observed in CDH, where 66.7% of patients had additional congenital abnormalities. This was followed by intestinal atresia (60.0%) and ARM (58.3%), suggesting that these conditions were frequently associated with multisystem congenital defects. BOO with posterior urethral valve and TEF each demonstrated associated anomalies in 50.0% of cases. PUJ obstruction and intestinal obstruction showed relatively lower anomaly rates of

30.0% and 25.0%, respectively. Notably, no associated congenital anomalies were identified among neonates with Hirschsprung disease or miscellaneous surgical conditions. Statistical analysis using Fisher's Exact Test revealed a p-value of 0.0846, indicating that the association between diagnosis and presence of congenital anomalies was not statistically significant. Nevertheless, clinically important trends suggest that CDH, atresia, ARM, and TEF are more commonly associated with additional congenital malformations.

Table 3: Frequency of Associated Congenital Anomalies across Diagnoses

Primary Diagnosis	Isolated (No Anomalies)	Anomalies Present	Total	Percent with Anomaly
CDH	1	2	3	66.7
Atresia	2	3	5	60.0
ARM	5	7	12	58.3
BOO + post urethral valve	2	2	4	50.0
TEF	4	4	8	50.0
PUJ OBSTRUCTION	7	3	10	30.0
obstruction	3	1	4	25.0
HSD	5	0	5	0.0
Others	7	0	7	0.0

Statistical Comparison (Diagnosis vs Anomalies): Fisher's Exact Test p-value = 0.0846

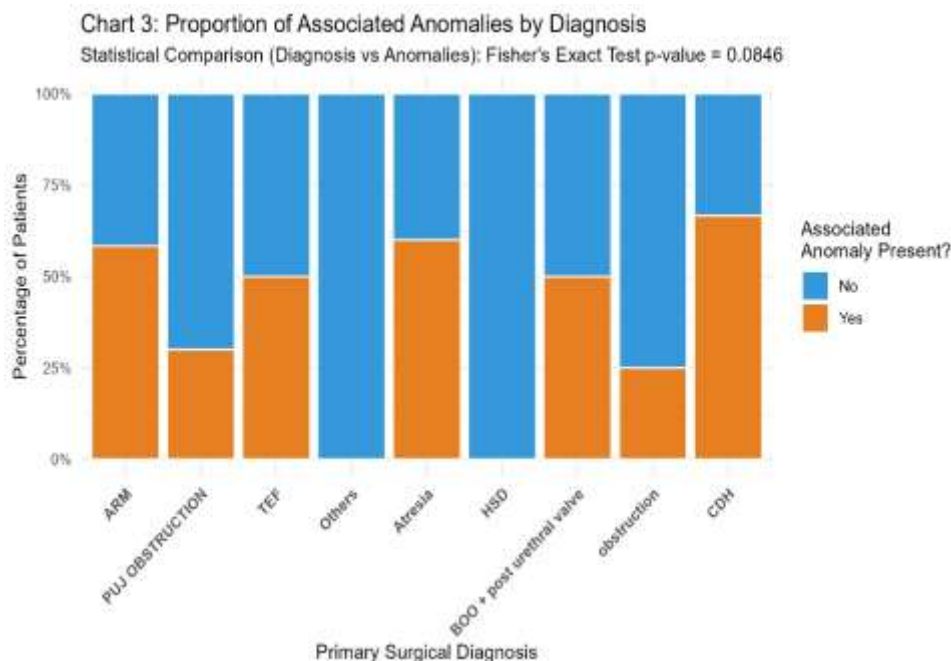


Table 4 presents the distribution of postoperative morbidity among various neonatal surgical emergencies. The highest morbidity rate was observed in neonates with intestinal atresia, where all patients (100.0%) developed postoperative complications. CDH demonstrated a morbidity rate of 66.7%, while TEF showed a complication rate of 62.5%, reflecting the complex nature of these conditions and their postoperative management challenges. In contrast, morbidity rates were substantially lower among neonates with ARM (25.0%),

BOO with posterior urethral valve (25.0%), intestinal obstruction (25.0%), and HSD (20.0%). Remarkably, none of the neonates with PUJ obstruction experienced postoperative complications. Fisher's Exact Test revealed a statistically significant association between diagnosis and postoperative morbidity ($p = 0.0021$). This finding suggests that the type of neonatal surgical emergency significantly influenced the risk of postoperative complications, with atresia, CDH, and TEF carrying the highest postoperative morbidity burden.

Table 4: Post-Operative Complications and Sepsis Incidence

Diagnostic Category	Complications Present	Uneventful	Total	Morbidity Rate (%)
Atresia	5	0	5	100.0
CDH	2	1	3	66.7
TEF	5	3	8	62.5
Others	2	5	7	28.6
ARM	3	9	12	25.0
BOO + post urethral valve	1	3	4	25.0
obstruction	1	3	4	25.0
HSD	1	4	5	20.0
PUJ OBSTRUCTION	0	10	10	0.0
Fisher's Exact Test p-value = 0.0021				

Chart 4: Overall Post-Operative Morbidity (Doughnut Chart)

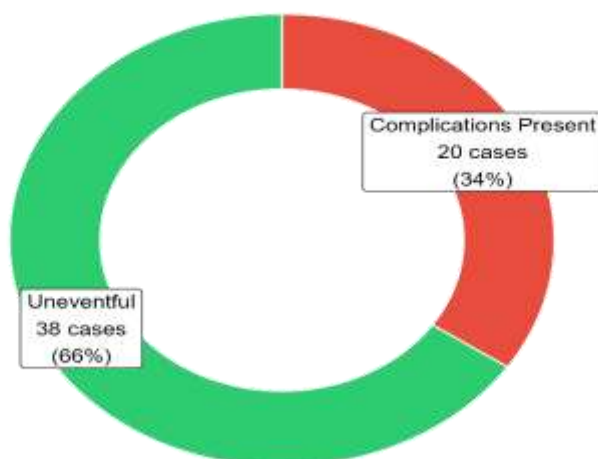


Table 5 summarizes the final clinical outcomes among the study population. Overall survival was favorable, with most neonates being discharged in stable condition. Mortality was observed only in cases of intestinal atresia and TEF. Intestinal atresia demonstrated the highest mortality rate (20.0%), followed by TEF (12.5%). One patient with TEF left against medical advice (DAMA), while another required prolonged NICU care. No deaths were reported among neonates diagnosed with ARM, PUJ obstruction, HSD, CDH, BOO with posterior urethral valve,

intestinal obstruction, or miscellaneous conditions. Fisher's Exact Test yielded a p-value of 0.64, indicating no statistically significant association between diagnostic category and final clinical outcome. Although mortality appeared numerically higher in atresia and TEF, the difference was not statistically significant, likely due to the limited sample size. Overall, the results demonstrate favorable treatment outcomes and high survival rates among neonatal surgical emergencies managed at the tertiary care center.

Table 5: Final Clinical Outcomes and Mortality Rate by Diagnostic Category

Major Diagnosis	Other/NICU	Stable/Discharged	Death	DAMA	Total	Mortality Rate
Atresia	0	4	1	0	5	20.0
TEF	1	5	1	1	8	12.5
ARM	2	10	0	0	12	0.0
BOO + post urethral valve	0	4	0	0	4	0.0
CDH	0	3	0	0	3	0.0
HSD	0	5	0	0	5	0.0
Others	0	7	0	0	7	0.0
PUJ OBSTRUCTION	0	10	0	0	10	0.0
obstruction	0	4	0	0	4	0.0

Fisher's Exact Test p-value = 0.64

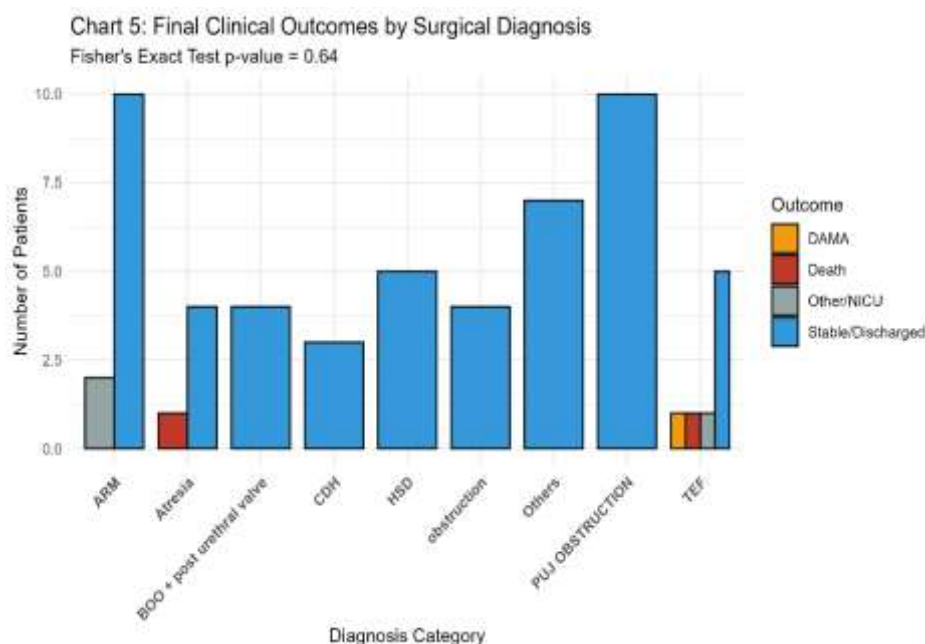


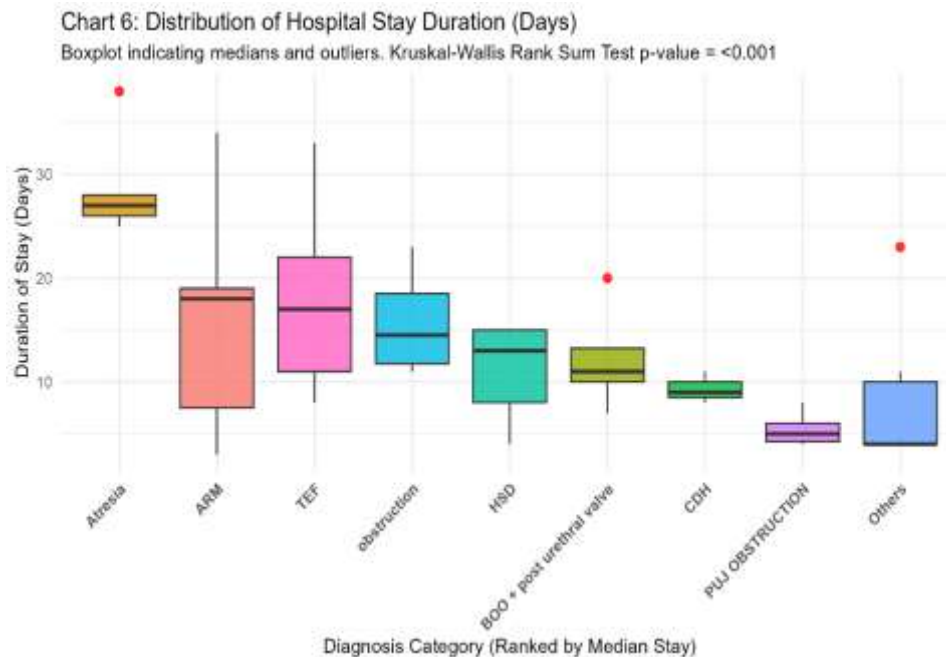
Table 6 compares the duration of hospital stay among different neonatal surgical emergencies. Neonates with intestinal atresia had the longest hospitalization, with a mean stay of 28.8 ± 5.3 days and a median stay of 27 days. This prolonged hospitalization likely reflects the complexity of surgical correction and postoperative care required for these patients. TEF patients also experienced extended hospital stays, with a mean duration of 17.9 days, followed closely by ARM patients with a mean stay of 16.1 days. Conversely, PUJ obstruction was associated with the shortest hospital stay, with a mean duration of only 5.3 days.

CDH and miscellaneous conditions also demonstrated relatively shorter hospitalizations. The Kruskal–Wallis Rank Sum Test showed a highly statistically significant difference in hospital stay across diagnostic categories ($p < 0.001$). This finding indicates that the type of neonatal surgical emergency had a significant impact on hospitalization duration. More complex conditions such as atresia and TEF required longer postoperative monitoring and management, whereas PUJ obstruction and some other conditions were associated with quicker recovery and discharge.

Table 6: Comparison of Duration of Hospital Stay (DOS) across Surgical Emergencies

Major Diagnosis	N	Mean (Days)	Std Dev	Median (Days)	Min	Max
Atresia	5	28.8	5.3	27.0	25	38
ARM	11	16.1	10.6	18.0	3	34
TEF	8	17.9	9.1	17.0	8	33
obstruction	4	15.8	5.5	14.5	11	23
HSD	5	11.0	4.8	13.0	4	15
BOO + post urethral valve	4	12.2	5.5	11.0	7	20
CDH	3	9.3	1.5	9.0	8	11
PUJ OBSTRUCTION	10	5.3	1.3	5.0	4	8
Others	7	8.4	7.0	4.0	4	23

Kruskal-Wallis Rank Sum Test p-value = <0.001



4. DISCUSSION

The present retrospective study evaluated the spectrum, demographic characteristics, associated congenital anomalies, postoperative morbidity, clinical outcomes, and duration of hospital stay among 58 neonates presenting with surgical emergencies at a tertiary care hospital. Neonatal surgical emergencies remain an important contributor to neonatal morbidity and mortality, particularly in resource-limited settings, where delayed diagnosis, inadequate neonatal intensive care support, and associated congenital anomalies adversely influence outcomes. The findings of the present study provide valuable information regarding the burden and outcomes of neonatal surgical emergencies and are comparable with observations reported in previous studies.

In the present study, anorectal malformation (ARM) was the most common neonatal surgical emergency, accounting for 20.7% (12/58) of all cases, followed by pelviureteric junction (PUJ) obstruction (17.2%), tracheoesophageal fistula (TEF) (13.8%), miscellaneous conditions (12.1%), intestinal atresia (8.6%), Hirschsprung disease (8.6%), bladder outlet obstruction (BOO) with posterior urethral valve (6.9%), intestinal obstruction (6.9%), and congenital

diaphragmatic hernia (CDH) (5.2%). These findings are consistent with the study conducted by Virupakshappa et al., [11] reported that gastrointestinal anomalies constituted 50% of neonatal surgical emergencies and that anorectal malformations represented 18.5% of all surgical neonatal admissions, making them the most common congenital surgical emergency requiring intervention. Similarly, Puri et al. [12] reported that tracheoesophageal fistula was the most common diagnosis (29.9%), followed by anorectal malformation (14.3%) among neonates undergoing emergency surgical procedures. The predominance of ARM and TEF in both the present and previous studies highlight the significant burden imposed by congenital gastrointestinal anomalies during the neonatal period.

The demographic analysis in the present study revealed an equal gender distribution, with males and females each accounting for 50.0% of cases. In contrast, Ilori et al. [13] reported male predominance, with 28 males and 17 females, corresponding to a male-to-female ratio of 1.7:1. Similarly, Kaur et al. [14] observed a male predominance with a male-to-female ratio of 2.8:1 among pediatric surgical patients. The equal sex distribution observed in the present study

may indicate that neonatal surgical emergencies affect both genders similarly, although variations among studies may reflect regional demographic differences and disease patterns.

Regarding perinatal characteristics, 69.0% of neonates in the present study were delivered through lower segment cesarean section (LSCS), while 27.6% were delivered through normal vaginal delivery. Fisher's Exact Test demonstrated no statistically significant association between delivery mode and place of birth ($p = 0.308$). Although previous studies have not extensively evaluated this relationship, increasing institutional deliveries and antenatal surveillance may contribute to improved identification and referral of congenital anomalies requiring neonatal surgical intervention.

Associated congenital anomalies significantly influence surgical outcomes in neonates. In the present study, CDH exhibited the highest frequency of associated anomalies (66.7%), followed by intestinal atresia (60.0%), ARM (58.3%), TEF (50.0%), and BOO with posterior urethral valve (50.0%). No associated anomalies were observed among neonates with Hirschsprung disease or miscellaneous surgical conditions. Although the association between diagnosis and associated anomalies did not reach statistical significance ($p = 0.0846$), the findings suggest a clinically important trend. These observations are supported by the study of Hasan et al., [15] reported that more than 70% of neonatal surgical anomalies involved the gastrointestinal tract and abdominal wall and emphasized that complex congenital malformations frequently coexist with additional systemic defects, thereby increasing the risk of adverse outcomes. The high prevalence of associated anomalies among ARM, TEF, and atresia cases in the present study reinforces the importance of comprehensive preoperative evaluation and multidisciplinary management.

Postoperative morbidity remains a major determinant of neonatal surgical outcomes. In the present study, intestinal atresia demonstrated the highest morbidity rate, with complications occurring in all patients (100.0%). High morbidity rates were also observed in CDH (66.7%) and TEF (62.5%). In comparison, ARM, BOO with posterior urethral valve, and intestinal obstruction each exhibited morbidity rates of 25.0%, while Hirschsprung disease showed a complication rate of 20.0%. Importantly, none of the neonates with PUJ obstruction developed postoperative complications. Statistical analysis revealed a significant association between diagnosis and postoperative morbidity ($p = 0.0021$), indicating that morbidity varied significantly according to the underlying surgical condition. These findings are in agreement with Hasan et al., [15] identified hospital-acquired sepsis, inadequate monitoring facilities, lack of intensive care support, and limited access to parenteral nutrition as major contributors to poor postoperative outcomes in neonatal surgery. Furthermore, Puri et al. [12] identified postoperative mechanical ventilation, postoperative inotropic support, and postoperative leukopenia as independent predictors of mortality and adverse postoperative outcomes. The high complication rates observed among atresia, TEF, and CDH patients in the present study likely reflect the complexity of these conditions and the intensive perioperative care they require.

The overall clinical outcomes observed in the present study were encouraging. Mortality occurred only among patients with intestinal atresia and TEF. Intestinal atresia demonstrated the highest mortality rate (20.0%), while TEF exhibited a mortality rate of 12.5%. No deaths were reported among neonates with ARM, PUJ obstruction, HSD, CDH, BOO with posterior urethral valve, intestinal obstruction, or miscellaneous conditions. Statistical analysis revealed no significant association between diagnosis and final

clinical outcome ($p = 0.64$). The overall mortality observed in the present study was substantially lower than that reported in several previous studies. Hasan et al. documented an overall mortality rate of 14.6%, with gastroschisis accounting for mortality exceeding 90% and esophageal atresia contributing mortality exceeding 85% (5). Puri et al. [12] reported an in-hospital mortality rate of 34.8% and a six-week postoperative mortality of 36.2% among surgical neonates. Similarly, Ilori et al. [13] documented an overall mortality rate of 62.2%, with tracheoesophageal fistula demonstrating a case fatality rate of 100%. In contrast, Firomsa et al. [16] reported a comparatively low mortality rate of 2.0% among pediatric surgical emergencies, with 96.7% of patients being discharged improved. The markedly lower mortality observed in the present study likely reflects improvements in neonatal intensive care services, availability of specialized pediatric surgeons, better perioperative monitoring, and advances in postoperative management.

The duration of hospital stay is an important indicator of disease severity, healthcare utilization, and recovery. In the present study, intestinal atresia was associated with the longest hospitalization, with a mean duration of 28.8 ± 5.3 days and a median stay of 27 days. TEF patients required a mean hospital stay of 17.9 ± 9.1 days, while ARM patients stayed for an average of 16.1 ± 10.6 days. In contrast, PUJ obstruction demonstrated the shortest duration of hospitalization, with a mean stay of 5.3 ± 1.3 days. The Kruskal–Wallis test demonstrated a highly significant difference in hospital stay among diagnostic categories ($p < 0.001$). Similar findings were reported by Puri et al., [12] documented a median hospital stay of 14 days among survivors following neonatal surgery. Kaur et al. [14] reported that 32.2% of pediatric surgical patients had hospital stays ranging between 24 and 48 hours; however, gastrointestinal surgical conditions generally required longer admissions and delayed initiation of

enteral feeding. The prolonged hospitalization observed among atresia and TEF patients in the present study reflects the complexity of surgical correction, nutritional management, respiratory support requirements, and postoperative monitoring necessary for successful recovery. The findings of the present study demonstrate that ARM, PUJ obstruction, and TEF constitute the major neonatal surgical emergencies encountered in tertiary care practice. The burden of associated congenital anomalies was greatest among CDH, intestinal atresia, ARM, and TEF. Postoperative morbidity was significantly influenced by the underlying diagnosis, with intestinal atresia, CDH, and TEF exhibiting the highest complication rates. Despite these challenges, overall survival outcomes were favorable, with mortality limited to a small number of atresia and TEF cases. Compared with previously published studies, the present study demonstrated substantially lower mortality and improved clinical outcomes, suggesting advancements in neonatal surgical and intensive care services. Early diagnosis, prompt referral, multidisciplinary management, comprehensive perioperative care, and availability of neonatal intensive care facilities remain essential for further improving survival and reducing morbidity among neonates presenting with surgical emergencies.

CONCLUSION

Neonatal surgical emergencies were predominantly due to congenital gastrointestinal and genitourinary anomalies. Associated congenital anomalies contributed to higher postoperative morbidity and longer hospital stay. Despite diagnosis-specific variations in complications, most neonates recovered successfully following timely surgical intervention and intensive supportive care. Early diagnosis, prompt referral, multidisciplinary management, and advanced neonatal intensive care are

essential to improve outcomes and reduce morbidity.

Declaration by Authors

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Conflict of Interest: The authors declare that they have no conflicts of interest.

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