

ORIGINAL ARTICLE

Surgical Neonates: Their Patterns, Prevalence and Causes of Death at a tertiary care hospitalTanmay Prasad¹, Smiti Narain²¹Senior Resident, Department of Surgery, ²PG Resident, Department of Community Medicine, Rohilkhand Medical College hospital, Bareilly, Uttar Pradesh, India

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Abstract

The survival of neonates with surgical pathology has improved considerably in developed countries but is still poor in developing countries due to many factors. The study was done to report the prevalence, patterns, and factors that influenced deaths of surgical neonates in a tertiary care hospital in India. 102 neonates were included in the study and the prevalence of neonatal death was evaluated and statistically analysed. Gastrointestinal lesions were the major indications for treatment and accounted for the largest proportion of surgical neonatal deaths. Timely referrals, early resuscitative measures and above all a team for neonatal care is needed to decrease mortality in surgical neonates.

Key Words

Prevalence; Pattern; Surgical neonates; Deaths

Introduction

There has been steady improvement in outcome with low incidence of surgical neonatal deaths in developed countries owing to a lot of factors, including well organized surgical neonatal intensive care units, availability of facilities and highly skilled personnel(1). In a developing country intrauterine diagnosis and fetal surgery are not feasible and outcome of neonatal surgery is still very poor (2-5). Prognostic systems established in surgical neonates are the Waterston criteria, Montreal classification and Spitz risk grouping in assessing prognosis of child with esophageal atresia with or without tracheo-esophageal fistula, Breaux et al for babies with congenital diaphragmatic hernia and Nixon and Tawes for patients with small bowel atresia (6-10).

Aims & Objectives

To report the prevalence, patterns and factors that influenced morbidity and mortality of surgical neonate.

Material and Methods

A prospective study was carried out which enrolled 102 neonates between January 2011 and December 2012 after taking clearance from ethical committee and informed consent from the parents. The standard care of treatment was provided to all neonates. Clinical parameters were sought with each admission such as birth and admission weight (Grams), Gestational age (weeks), Heart rate (per minute), Respiratory rate (per minute), Temperature (°F), Blood pressure (mm Hg), APGAR score (at 1, 5 and 10 minute), Seizure (present or absent), Grade of respiratory distress, Urine output (ml/kg/hr) and associated congenital malformations. Laboratory Parameters such as Hematocrit (%), WBC Count (cells/μL), Platelet Count (cells/μL), Blood urea (mg/dl), Serum creatinine (mg/dl), Blood glucose (mg/dl), Serum sodium (mEq/l), Serum Potassium (mEq/l), Serum Calcium (mEq/l), pH, pO₂ (mmHg), pCO₂ (mm Hg), Base excess (mEq/l), Serum Bicarbonate (mEq/l), Serum Bilirubin – Direct and indirect (mg/dl) and C- Reactive Protein (raised or normal) were recorded.

The babies were followed up till discharge from the hospital or death. The data was summarized in tabular form and converted to a numbers for statistical analysis. SPSS were used for the statistical analysis. All the variables were individually tested by parametric and non-parametric tests [either t-test (difference of mean) or chi-square test (difference of proportion)] for calculating statistical association, if any.

Results

A total of 102 neonates who weighed from 1.4 to 5.9 kg (mean 2.8 ± 1.7 kg), aged between 1 and 30 days (mean 8.3 ± 2.7 days), comprising of 63 males and 39 females with male: female ratio 1.6 : 1 were managed during this period. A total of 43 deaths were recorded, giving a prevalence rate of 42.2% among the neonates. Among the neonates who failed to survive, 62.1% were males and 37.9% females. Gastrointestinal lesions were the major indications for treatment, accounting for 72.6% of the total. These included intestinal atresia 45.9%, gastroschisis 2.7%, omphalocele 10.3%, and high anorectal anomaly 10.3%. Others were necrotizing enterocolitis 9%, malrotation 9%, gut perforation 5.1% and Hirschsprung's disease 6.4%.

Gastrointestinal lesions accounted for the largest proportion of surgical neonatal deaths which was 32 of 43 deaths i.e 74.4%. The mortality recorded from lesions in other systems were: 5 of the 8 neonates (62.5%) with tracheoesophageal fistula, 4 of 11 with genitourinary lesions (36.4%) and 1 of 1 with cranio-spinal lesions (100%), with 1 of 7 (14.3%) from lesions in head/neck and no deaths from musculoskeletal systems. The associated morbidities were mainly sepsis/wound infection, burst abdomen, respiratory failure, fluid and electrolytes derangement, hypothermia, hypoglycaemia and leakage of anastomosis.

Resistant overwhelming sepsis has had time to establish in 23 (53.5% of total mortality) neonates who presented late. Many of these neonates had post-operative sepsis, wound infections and anastomotic leakage. Lack of nutrition (TPN) posed a big challenge in 35 (81.4% of total mortality) cases. Anaesthetic related deaths were common, and contributed to 8 (18.6% of total mortality). These deaths were due to laryngeal trauma during intubation, aspiration, respiratory compromise and drug related complications.

Discussion

The prevalence of death of surgical neonates owing to nutritional problems and late referrals is still very high. The causes of deaths of surgical neonates are also multifactorial and the death of any neonate may be due to a combination of many causes as revealed by this study and other similar studies (11). The prevalence rate of mortality, 42.2%, recorded in this study is high compared to results from developed countries where close to 100% survival rates are recorded among surgical neonates(1). Lesions of the gastrointestinal tract were the major indication for neonatal surgery during the study period as similarly reported by other authors (2). Correcting the compromised clinical conditions were difficult in many neonates, instead, many of them continued to deteriorate. Operating on such clinically compromised neonates resulted in high mortality as reported by other authors (12).

Conclusion

Gastrointestinal lesions were the major indications for treatment and accounted for the largest proportion of surgical neonatal deaths. Late referrals resulting in resistant overwhelming sepsis and nutritional problems of surgical neonates contributed to the high number of deaths. Timely referrals, early resuscitative measures and above all a team for neonatal care is needed.

Recommendation

A proposed 'team neonate' comprising of a radiologist, an obstetrician, a community physician, a pediatrician, a surgeon and an intensivist all operating with synergy for earlier detection and management of surgical neonates. (Figure 1)

Relevance of the study

Conceptualizing a 'team neonate' for early referrals and prompt management of surgical neonates.

Authors Contribution

TP: conceptualized, designed the study and collected the data. SN: the data analysis and interpretation.

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Tables

TABLE 1

System	Frequency	%age	Morbidity	%age	Mortality	%age
Gastrointestinal	74	72.6	46	62.2	32	43.2
Genitourinary	11	10.9	8	72.7	4	36.4
Tracheoesophageal	8	7.8	8	100	5	62.5
Head and Neck	7	6.9	3	42.8	1	14.3
Cranio-spinal	1	0.9	1	100	1	100
Musculoskeletal	1	0.9	1	100	0	0
TOTAL	102	100	67	65.7	43	42.2

TABLE 2

	Frequency	%age	Mean Time before death (days)
Nutritional Problems	35	33.65	12 ± 2
Late Referral	28	26.92	2 ± 4
Sepsis	23	22.12	3 ± 6
Financial Constraints	10	9.62	3 ± 1
Anaesthetic Complications	8	7.69	1 ± 0.5

FIGURE 1: THE 'TEAM NEONATE'

