



CODEN (USA): IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.569283>Available online at: <http://www.iajps.com>

Research Article

**FREQUENCY & OUTCOME OF NECROTIZING
ENTEROCOLITIS IN PRE TERM INFANTS AT TERTIARY
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Received: 19 December 2016

Accepted: 10 January 2017

Published: 26 January 2017

Abstract:

Objective: The objective of this study is to find out the frequency of necrotizing enterocolitis (NEC) in pre-term infants, as well as its outcome in study participants.

Material & Methods: This cross sectional study was conducted over a period of 6 months from January 2015 to June 2015 in LUMHS. All neonates who were preterm i.e. from 26 up to 36 week of gestation were included in the study. While all babies having congenital anomalies and gut anomalies were excluded from the study. Total 150 patients had fulfilled the inclusion criteria. All the information was gathered on pre designed proforma including gestation age, weight, enteral feed etc. All the babies who were diagnosed NEC were included in this study. Final outcome in terms of recovery, discharge, referral to other hospital were recorded in proforma.

Results: Total 150 preterm infants were included in the study. Out of these, 21 patients had NE. Necrotizing enterocolitis was seen mostly in males i.e. in 13 (61.90%) and 8(38.0%) in females out of 21. Outcome were assessed when these babies were admitted in the hospital. 11(52.38%) patients were discharged, while 2(9.52%) were referred and 8(38%) were expired. Mean birth weight was 1.6 ± 0.38 kg with range of (0.69-2.1) while mean gestational age SD was 32.12 ± 2.56 with range of 26-36 weeks. 3(14.28%) babies took no feed while 5(23.80%) received mother feed, 6(28.57%) were given formula feed while 7(33.33%) had taken both types of feed.

Conclusion: Necrotizing enterocolitis is one of the major challenges in neonatology and there is a high prevalence in premature babies presenting in our set-up, with high mortality rates.

Key Words: Necrotizing enterocolitis, Frequency, Pre-term infants.

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Please cite this article in press as Abdul Rehman Siyal et al, *Frequency & Outcome of Necrotizing Enterocolitis in Pre Term Infants at Tertiary Care Hospital* , Indo Am. J. P. Sci, 2016; 3(12).

INTRODUCTION:

Necrotizing enterocolitis (NEC) is a gastrointestinal emergency that mostly affects premature infants [1]. Up to the present time there is no one theory to explain the etiology of NEC; however, most researchers agree that the pathogenesis is multifactorial and is often been associated with enteral feedings, ischemia and infectious causes [2]. The process which leads to NEC is thought to be followed by toxic or ischemic event that results in damage to the immature gastrointestinal mucosa and loss of mucosal integrity [3]. The initiation of enteral feedings results in bacterial proliferation in which damaged mucosa is invaded by gas producing bacteria. This process leads to necrosis which can cause either sepsis or perforation of the bowel [4]. In preterm infants surgical NEC is the leading cause of morbidity followed by chronic lung disease, premature retinopathy and nosocomial infections [5]. Necrotizing enterocolitis affects approximately 10% (per 100,000) of premature infants who are born >1500 grams. The mortality rate for premature infants classified as extremely low birthweight (<1000 grams) who are diagnosed with NEC is 35-50% [6]. Over the past 25 years population studies conducted in the United States indicate a relatively stable incidence, which is from 0.3-2.4 cases per 1000 live births. The disease characteristically presents among the smallest premature infants. Although it is reported among term infants with perinatal asphyxia or congenital heart disease, differences in their severity and outcome suggest presentation in this population may represent a different pathophysiologic entity [7].

Population-based studies from different countries suggest an incidence similar to the United States. However, nations with a lower rate of pre term births than that in the United States generally have a lower rate of NEC as well. For example, a large study of NICUs in Japan identified a 0.3% incidence of NEC, which is significantly lower than that in similar patient populations in the United States [8]. An epidemiologic review of the disease in infants with weight of less than 32 weeks' gestation who survived past 5 days of life in Canada reported an incidence of 6.4%. [9]. Diagnosis is made completely on the basis of clinical criteria due to deficiency of a specific clinical presentation and a reliable diagnostic test. Bell et al [10], presented an original system for the uniform clinical staging of neonates with NEC. The original criteria of Bell were modified by other authors to integrate therapeutic and prognostic

aspects of the disease-systemic, gastrointestinal, and radiographic features. Identifying prospective biomarkers would offer adequate opportunities for early intervention. In an acute medical situation like NEC, since every hour count and a rapid result are needed for medical decision-making. The objective of this study is to find out the extent of NEC and its outcome in the terms of discharge, referral to other hospital and death in study population.

MATERIAL AND METHODS:

This cross sectional study was conducted over a period of 6 months from January 2015 to June 2015 in paediatrics department of LUMHS. All neonates who were preterm i.e. from 26 up to 36 week of gestation were included in the study. While all babies having congenital anomalies and gut anomalies were excluded from the study. Total 150 patients had fulfilled the inclusion criteria. All the information was gathered on pre designed proforma including gestation age, weight, enteral feed etc. All the babies who were diagnosed NEC were included in this study. Final outcome in terms of recovery, discharge, referral to other hospital was recorded on proforma. Data was analyzed on SPSS version 16. Frequency and percentages were calculated to for the qualitative data and mean was calculated for the quantitative data.

RESULTS:

Total 150 patients who fulfilled the inclusion criteria were included in the study, out of these 21 patients had necrotizing enterocolitis with percentage of 14%. **(Table:1)**

In this study, NE was seen mostly in males i.e. in 13 (61.90%) patients while only 8(38.0%) females have necrotizing enterocolitis out of 21. **(FIG 1)**

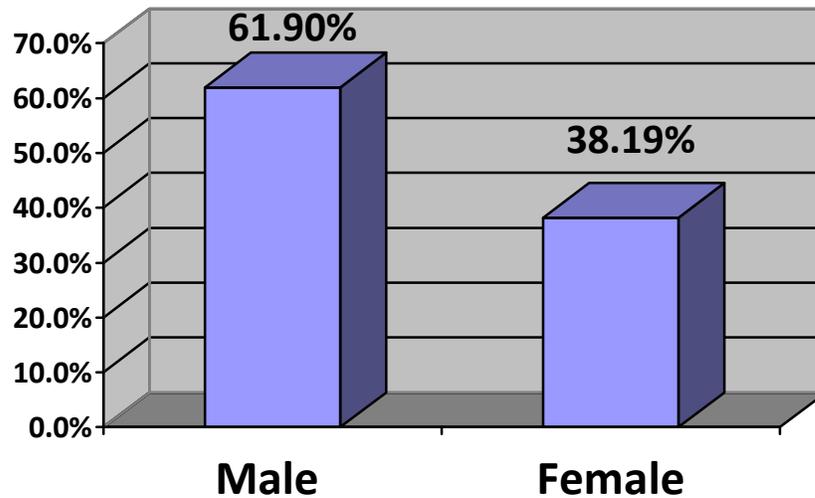
In our study mean birth weight was 1.6±0.38 kg with range of (0.69-2.1) while mean gestational age SD was 32.12 ±2.56 with range of 26-36 weeks. **(Table 2)**

3(14.28%) babies took no feed while 5(23.80%) received mother feed, 6(28.57%) were given formula feed while 7(33.33%) had taken both types of feed. **(Table 3)**

Outcome was assessed when these babies were admitted in the hospital. In this study 11(52.38%) patients were discharged, while 2(9.52%) were referred and 8(38%) were expired out of 21. **(Fig 2).**

Table 1: Frequency of necrotizing enterocolitis (n= 150)

Variable	Number (%)
Present	
stage 1	6 (4.0%)
stage 2	8(5.33%)
stage 3	7(4.66%)
Absent	129 (86.0%)

**Fig 1: Gender distribution according to NEC (n=21)****Table 2: Birth weight and gestational age n=21**

variables	Mean+SD
Birth weight (kg)	1.6±0.38 kg
Gestational age (weeks)	32.12±2.56 weeks

Table 3: Cases distribution according to feed(n=21)

Enteral feed	Number (%)
Not feed	3 (14.28%)
Mother feed	5(23.80%)
Formula feed	6(28.57%)
Both feeds	7(33.33%)

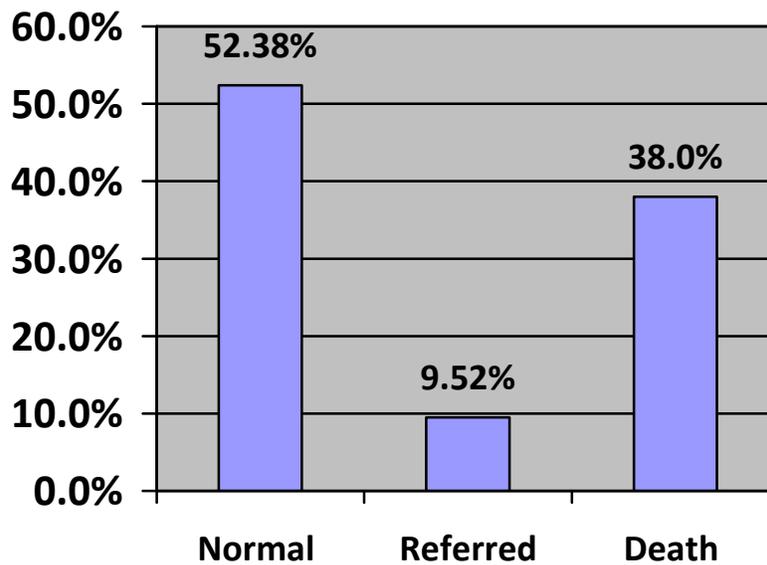


Fig 2: Outcome of pre mature infants according to NEC (n=21)

DISCUSSION:

In our study, necrotizing enterocolitis was seen in 14% of cases. Similar results are seen in the study conducted by Shah *et al* found that frequency of NE was 14.28% [11]. However Martin and Walker¹² got prevalence of NEC in 7–14 % of preterm neonates with birth weight in between 500 and 1500 grams. In this study, NE was seen mostly in males i.e. in 13 (61.90%) patients while only 8(38.0%) females have NE. similarly study conducted by Shah *et al* [11] also found that males have more NE as compare to females.

Gender is also risk factor for NEC. Majority of the studies either did not investigate gender or found a statistically non-significant association between male gender and NEC. Although the results were not statistically significant one study had found that the prevalence of NEC was less in females as compare to males [13]. Thus, whether gender is a risk factor for NEC is unclear. However, when males and female preterm infants of similar gestational age were compared, mortality rates were greater for males (51%) than for females (35%) [14]. This possible gender effect should be investigated further to find out the role of NEC to these high mortality rates. Outcome was assessed when these babies were admitted in the hospital. In this study 11(52.38%) patients were discharged, while 2(9.52%) were referred and 8(38%) were expired out of 21 cases.

In comparison to this study conducted by Shah *et al* found that 57.14% of patients were discharged and about 40% patients expired and 2.86% patients were referred [11].

In our study, mean birth weight was 1.6 ± 0.38 kg with range of (0.69-2.1) while mean gestational age SD was 32.12 ± 2.56 with range of 26-36 weeks. Several investigators have suggested that very low birthweight and mechanical ventilation are also risk factors for NEC. Infants with birthweights of <1500 grams and NEC had a greater need for mechanical ventilation before development of NEC than infants of the same birthweight without NEC [15]. Low birthweight has been recognized as a contributor to increased mortality and morbidity of the preterm infant [16]. The frequency and severity of NEC increase with decreasing birthweight. Infants with lower birthweight (<1000 grams) had more episodes of nosocomial sepsis than those of higher birthweight (>1000 grams) and require more mechanical ventilation [17].

Extremely low birthweight infants' initial survival mostly depends on intubation at birth potentially increasing the risk of infections including NEC. The act of intubation and the indwelling endotracheal tube may destroy the integrity of the infant's esophageal mucosal barriers, increasing the risk for infection. Invasions of the esophagus could possibly lead to the

introduction of pathogens to the bowel initiating the NEC process. On the other hand, having NEC increases the need for mechanical ventilation. The intestinal inflammation caused by NEC increases metabolic demands causing respiratory decompensation, which can result in intubation [18].

3(14.28%) babies took no feed while 5(23.80%) received mother feed, 6(28.57%) were given formula feed while 7(33.33%) had taken both types of feed. These findings repeated the protective role of breast feeding demonstrated in one of study by Montgomery D et al [19]. This fact pointed towards the recognized relationship between enteral feeds and development of NEC in preterm neonates as study showed done by Henderson G et al[20].

Human breast milk is there important source of enteral nutrition for premature[21]. A recognized benefit is that the delivery of immune protective factors to the immature gut mucosa may reduce the risk of necrotizing enterocolitis (NEC).Case-control data indicate that NEC is less common in infants nourished with human milk than in those fed with formula milk[22]. Large prospective studies have found a lesser incidence of NEC in preterm infants fed with their own mother's expressed breast milk as compare with those fed with formula milk[23].

CONCLUSION:

Necrotizing enterocolitis is one of the important challenges in neonatology and there is a high prevalence in premature babies presenting in our set-up, with high morbidity and mortality rates. Very few studies are conducted on this topic. Keeping in view the rising level of the problem in developing countries, multi-centre studies are required with a larger sample size.

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