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FREQUENCY OF NECROTIZING ENTEROCOLITIS IN EARLY VERSES LATE TROPHIC FEEDING IN VLBW (VERY LOW BIRTH WIGHT) PRETERM INFANTS

Original Research

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ABSTRACT

Background: Because the gastrointestinal tract is immature, feeding (very low birth weight) VLBW or very preterm infants presents a special problem. Improving optimal growth, long-term results, and reducing morbidities all depend on early nutrition.

OBJECTIVE: To assess the frequency of necrotizing enterocolitis with early trophic feeding in very low birth weight preterm infant**.**

STUDY DESIGN: Descriptive vase study.

SETTING: Pediatrics Department, Sir Gangs Ram Hospital, Lahore.

DURATION OF STUDY: 6 months

METHODOLOGY: A total of 90 infants fulfilling selection criteria were included in the study. Demographic information (name, gender, gestational age at birth, birth weight) was obtained. Then infant was given early feed within 24 hours after birth. The choice of milk was of mother's milk. Then infants were followed-up in NUCI for next 24 hours. On the first day of feeding infant received 1- 2cc/kg of milk every 2-3hr and then the volume is set up of feed according to given feeding schedule table in succeeding days. Infant could be shift to oral feed when able to suck effectively. Daily feeding chart was maintained in each subject file. These infants were observed daily for 15 days in OPD. Parents were given feeding pattern. After 15 days, if infant showed NEC signs, then NEC was labeled. Infants with NEC were managed as per hospital protocol.

DATA ANALYSIS: Data was entered and analysed using SPSS version 20.

RESULTS: In our study, out of 90 cases, 48.88%(n=44) had <34 weeks of gestation whereas 51.12%(n=46) had >34 weeks of gestation, mean±sd was calculated as 33.09±1.88 weeks. Mean birth weight was calculated as 1306.67±129.95 grams, 35.56%(n=32) were male and 64.44%(n=58) were females. Frequency of necrotizing enterocolitis with early trophic feeding in very low birth weight preterm infant was recorded as 5.56%(n=5).

CONCLUSION: The conclusion was the frequency of necrotizing enterocolitis with early trophic feeding is not very higher in very low birth weight preterm infant resulting in better neurodevelopmental and growth outcomes, which could lessen the social and financial burden that preterm places on society. However, the occurrence of NEC may be in mind of the pediatricians and parents as well.

KEYWORDS: Preterm infants, very low birth weight, early trophic feeding, necrotizing enterocolitis.

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INTRODUCTION

Despite the advances in intensive care for infants to improve the survival rate of new born infants, Necrotizing enterocolitis (NEC) has major contribution in mortality and morbidity rate of newborn infants. Preterm infants, very low birth weight infants (VLBW) <1500 grams are at high risk of having NEC. An additional specific risk for NEC is also intrauterine growth restriction.[1] In low-birth-weight infants, NEC still remains a challenge. Strategies and guidelines to provide care to premature infants had been improved with the passage of time but still to improve the survival of premature infants' new approaches are to be sought constantly to reduce the morbidity and mortality and to increase in quality of life in infants with NEC as survivors of NEC experience morbid states such as functional impairment in their childhood, blood stream infections and short gut syndrome.[2]

The global incidence rate of NEC varies. In most parts of the world, it ranges from 3 to 12%. However, other investigations noted seasonal fluctuation, with wintertime seeing a higher prevalence of NEC. [3,4] A comprehensive analysis of the Neonatal Network Glutamine at the National Institute of Child Health and Human Development To ascertain the risk of NEC linked to human milk in VLBW newborns, a trial was conducted. According to the study, VLBW babies have a lower risk of developing NEC [5]. According to a study done in Wah Cantt, Pakistan, preterm low birth weight babies had a significant frequency of NEC[6].

Preterm birth (PTB) is defined as delivery before 37 weeks of gestation and is considered the leading cause of neonatal mortality and the second leading cause of death for children under five globally.[7] It is considered one of a nation's most significant health indicators.

The clinical presentation and gestational age at delivery are frequently used to analyze preterm deliveries. The risk of newborn morbidity and mortality is inversely correlated with gestational age at delivery. 19–20 Prematurity-related complications are disproportionately more common in infants born in the very early <28 weeks, early 28+0 – 31+6 weeks, and moderate 31+6---33+6 weeks preterm periods, which make up the smallest percentage of births 0.7%, 1.2%, and 1.5% of all births in the USA in 2013, respectively. The late preterm 34+0–36+6 weeks period is when the majority of preterm deliveries (8.0% of all births) take place[8]. Even though late-preterm infants had lower rates of morbidity and death than infants delivered at earlier gestational ages, they are nonetheless higher than full-term infants[9,10]

Infants weighing fewer than 1000 g (2 lb, 3 oz) are classified as very low birth weights, or VLBWs. The majority of babies with extremely low birth weights are also the youngest preterm babies, typically delivered at 27 weeks or less. Infants classified as very low birth weight (VLBW) are those born weighing less than 1500 g.

In 2012, there were about 3,952,841 births in the United States. [11] VLBW was observed in 1.42% of all births, while low birth weight (< 2500 g) was observed in 7.99% of the births. The US birth weight distribution has been steadily declining over the past 20 years, primarily due to a relative decline in newborns weighing more than 3500 g and a continuous rise in babies weighing less than 3500 g.

One of the main causes of death and morbidity in preterm children is necrotizing enterocolitis (NEC), a dangerous intestinal infection that primarily affects these babies. A variety of pathologies are involved, such as extensive intestinal mucosal inflammation, enteric gas-forming bacteria invading the young gut, and the gas dissecting the gut wall and portal veins, which frequently results in ischemia necrosis of the intestine.

It has been found that NEC accounts for 2–5% of all NICU admissions globally.[12] Only 7% to 15% of NEC cases are caused by late preterm and term children, whereas 85% of cases are caused by premature infants (b1500 g or b32 weeks). According to Swedish [13] and Canadian neonatal networks, the incidence rate of NEC in VLBW neonates is approximately 7%, with lower rates recorded.[14] Prematurity and incidence are inversely correlated, with infants born between 22 and 28 GA having a greater incidence (11%). The gestational age at birth has an inverse relationship with the age of onset.

NEC is a complex illness, and it is now thought that abnormal intestinal colonization patterns (dysbiosis) cause the preterm infants' innate immune to produce an unbalanced pro-inflammatory response. This results in the final frequent pathway of NEC, intestinal necrosis, which is caused by the destruction of the gut mucosal barrier.[15]

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OBJECTIVE:

- To assess the frequency of necrotizing enterocolitis with early trophic feeding in very low birth weight preterm infant.

METHODOLOGY:

It was a Descriptive vase study conducted in the Pediatrics Department, Sir Gangs Ram Hospital, Lahore. This study continued six months after the synopsis was approved. This study includes 90 infants; confidence level 95%, 8% margin of error and taking expected percentage of NEC i.e. 18% with early feeding in preterm VLBW infants.[16] Sample Technique used was non-probability consecutive sampling. Its Inclusion Criteria was Preterm VLBW infants (as per operational definition) of either gender delivered in department of Obstetrics & Gynecology of same hospital admitted in NICU**.** Exclusion criteria were Infants with asphyxia (APGAR >7), sepsis (TLC <400 or 11,000/mm^2), RIDS, apnea of prematurity (on clinical examination)**.** Infants with congenital malformation like cleft palate, congenital heart disease (on clinical examination).

90 infants satisfying selection criteria were included in the study from NICU of Department of Pediatrics, Sir Ganga Ram Hospital, Lahore. Informed consent was obtained from parents/ guardians. Demographic information (name, gender, gestational age at birth, birth weight) was obtained. Then infant was given early feed within 24 hours after birth. The choice of milk was mother's milk. Then infants were followed-up in NUCI for next 24 hours. On the first day of feeding infant received 1- 2cc/kg of milk every 2-3hr and then the volume is set up of feed according to given feeding schedule table in succeeding days. Infant could be shift to oral feed when able to suck effectively. Daily feeding chart was maintained in each subject file. These infants were observed daily for 15 days in OPD. Parents were given feeding pattern. After 15 days, if infant showed NEC signs, then NEC was labeled (as per operational definition). Infants with NEC were managed as per hospital protocol. All this information was recorded on proforma.

DATA ANALYSIS:

Data entry and analyze was done using software called SPSS version 20. The mean and standard deviation were used to display quantitative information such as birth weight and gestational age at birth. Frequencies and percentages were used to display qualitative factors such as gender and NEC. Birth weight (>1250 or <1250 grams) and gestational age (>34 weeks, <34 weeks) at birth were used to stratify the data. Stratified groups in NEC after stratification were compared by using The Chi Square test. A P value of less than 0.05 was considered significant.

RESULTS

To determine the frequency of necrotizing enterocolitis with early trophic feeding in extremely low birth weight preterm infants, 90 cases who met the inclusion/exclusion criteria were enrolled.

DISTRIBUTION OF AGE

Age distribution of the patients was done, it shows that 48.88% n=44 had <34 weeks of gestation whereas 51.12% n=46 had ≥34 weeks of gestation, mean±sd was calculated as 33.09±1.88 weeks as shown in Table-1. Mean birth weight was calculated as 1306.67±129.95 grams presented as mean ± SD.

Table-1: GESTATIONAL AGE AT BIRTH (n=90)

G.Age(in weeks)	**No. of patients**	**%**
<34 weeks	44	48.88
≥34 weeks	46	51.12
Total	**90**	**100**
Mean±SD	**33.09±1.88**	

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MEAN BIRTH WEIGHT OF NEONATES (n=90)	
Weight (grams)	**1306.67±129.95**

Distribution of gender shows that 35.56%(n=32) were male and 64.44%(n=58) were females as shown in Table-2. Frequency of necrotizing enterocolitis with early trophic feeding in very low birth weight preterm infant was recorded as 5.56%(n=5) whereas 94.44%(n=85) had no findings of the morbidity as shown in Table-2.

Table-2: DISTRIBUTION OF GENDERS IN NEONATES

Gender	**No. of patients**	**%**
Male	32	35.56
Female	58	64.44
FREQUENCY OF NECROTIZING ENTEROCOLITIS (NEC)		
NEC	**No. of patients**	**%**
Yes	5	5.56
No	85	94.44

DATA STRATIFICATION

The data was stratified for gestational age (≥34 weeks, <34 weeks) at birth and birth weight (≥1250 or <1250 grams). Post stratification, NEC was equated in stratified groups by using chi square test P value <0.05 was taken as significant table 3.

Table 3: STRATIFICATION FOR FREQUENCY OF NECROTIZING ENTEROCOLITIS WITH EARLY TROPHIC FEEDING IN VERY LOW BIRTH WEIGHT PRETERM INFANT WITH REGARDS TO G. AGE

G. Age (in weeks)	**NEC**		**P value**
	Yes	**No**	
<34 weeks	3	41	0.60*
≥34 weeks	2	44	
STRATIFICATION FOR FREQUENCY OF NECROTIZING ENTEROCOLITIS WITH EARLY TROPHIC FEEDING IN VERY LOW BIRTH WEIGHT PRETERM INFANT WITH REGARDS TO BIRTH WEIGHT			
Birth weight (grams)	**NEC**		**P value**
	Yes	**No**	
<1250 grams	4	24	0.01*
≥1250 grams	1	61	

*** Statistically significant**

DISCUSSION

Because of the immaturity of the gastrointestinal tract, feeding very low birth weight (VLBW) or very preterm infants presents a special problem. Improving optimal growth, long-term results, and reducing morbidities all depend on early nutrition. Reaching a growth rate comparable to the fetal growth in utero is the aim. In an effort to address the deficiency of gastrointestinal stimulation during total

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parenteral nutrition, trophic feeding (TF) of premature infants was implemented in the late 1980s. Early hypocaloric feeding, limited enteral nutrition, and gut priming are other terms. In order to stimulate and give nutrients to the developing gastrointestinal system, TF is defined as giving nutritionally unimportant quantities of enteral substrate to infants that are impaired.

The reason to conduct this study was to assess the frequency of NEC with early graphic feeding in VLBW preterm infant. As the literature showing that with early feeding, the frequency of NEC is very low. But controversial data has been retrieved from literature.

In our study, out of 90 cases, 48.88%(n=44) had <34 weeks of gestation whereas 51.12%(n=46) had >34 weeks of gestation, mean±sd was calculated as 33.09±1.88 weeks. Mean birth weight was calculated as 1306.67±129.95 grams, 35.56%(n=32) were male and 64.44%(n=58) were females. Frequency of necrotizing enterocolitis with early trophic feeding in very low birth weight preterm infant was recorded as 5.56%(n=5).

Previous data reveals that it varies between 3 and 12% in most parts of world.[3,4] Another study reported that NEC was found in 0.8% with early feeding in VLBW preterm infants,[7] these findings are lower than reported in our study.

Another study showed that NEC was found in 3% with early feeding in VLBW preterm infants[17], these findings are in agreement with our study. But one trial for early enteral feeding for preterm neonates was done in which NEC was found in 18% preterm VLBW infants.[9] It shows a higher rate of NEC.

Keeping in view the above discussion, we are of the view that early trophic feeding in very low birth weight preterm infant is helpful, however, occurrence of NEC may be under observation for its early and effective management. However, the incidence of NEC is not higher in these cases, but it needs more support from some other local trials.

CONCLUSION

We found that extremely low birth weight preterm infants have a relatively low frequency of necrotizing enterocolitis with early trophic feeding, leading to improved growth and neurodevelopmental outcomes that may help lessen the social and economic burden that prematurity places on society. However, parents and pediatricians may also be concerned about the occurrence of NEC.

AUTHOR CONTRIBUTION

Author	Contribution
Aqsa Javied*	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Muneeba Iftikhar	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Ayesha Hafeez	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Muhammad Omar Nisar Awan	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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