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Role of providing Trophic feeds in newborns with fetal distress

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Abstract

Background: Fetal distress and perinatal asphyxia are important causes of neonatal morbidity and may be associated with respiratory compromise, hypoxic-ischaemic encephalopathy, delayed establishment of oral feeding and prolonged hospitalization. Because of concerns regarding intestinal hypoperfusion and feeding intolerance, enteral feeding is frequently delayed in these newborns. Trophic feeding, also termed minimal enteral nutrition, involves administration of small quantities of milk primarily to stimulate gastrointestinal maturation rather than to provide complete nutritional requirements. Existing evidence suggests that carefully administered early enteral feeding can be feasible in selected clinically stable neonates, although evidence specifically involving newborns with fetal distress remains limited.

Methods: A prospective comparative study was conducted among 100 newborns with fetal distress admitted to a neonatal unit. Newborns were allocated into two groups of 50 each. The trophic-feed group received expressed breast milk at 10–20 mL/kg/day after clinical stabilization, while the control group received intravenous fluids and delayed enteral feeding according to clinical condition. Feeding tolerance, time to full enteral feeds, weight change, sepsis, necrotizing enterocolitis (NEC), duration of hospital stay and mortality were assessed.

Results: The mean time to initiation of enteral feeding was significantly shorter in the trophic-feed group than in controls (18.4 ± 6.2 vs. 47.8 ± 13.6 hours; $p<0.001$). Full enteral feeding was achieved earlier in the trophic-feed group (5.8 ± 1.7 vs. 8.1 ± 2.4 days; $p<0.001$), and the duration of hospitalization was significantly shorter (8.9 ± 3.1 vs. 11.7 ± 4.2 days; $p=0.001$). Feed intolerance occurred in 6% and 14% of newborns, respectively ($p=0.181$). NEC occurred in 2% versus 6% ($p=0.309$), while mortality was 2% versus 6% ($p=0.309$).

Conclusion: Early trophic feeding after appropriate clinical stabilization was associated with earlier attainment of full enteral feeding and shorter hospitalization without a statistically significant increase in feeding intolerance or NEC. Trophic feeding may therefore be considered in carefully selected newborns with fetal distress when hemodynamic and respiratory status permits.

Keywords: fetal distress, neonatal asphyxia, trophic feeding, minimal enteral nutrition, feeding intolerance, necrotizing enterocolitis, newborn.

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Introduction

Meconium-stained liquor, aberrant fetal heart-rate patterns, and other intrapartum signs of potential fetal hypoxia are common markers of fetal distress, which is a condition of reduced fetal oxygenation [1]. Neonatal mortality and morbidity are still significantly influenced by perinatal hypoxia, especially in environments with minimal resources. The brain, heart, kidneys, and digestive system are just a few of the organs that might be impacted by hypoxic-ischemic injury.

Newborns experiencing fetal distress may need intensive hemodynamic monitoring, breathing assistance, resuscitation, and correction of metabolic abnormalities after birth. Making feeding decisions for young babies might be difficult [2]. Long-term enteral feed withholding may be caused by concerns about decreased mesenteric perfusion, gastrointestinal hypoxia, feeding intolerance, and NEC. Long-term fasting, however, can also extend reliance on intravenous feeding and postpone gastrointestinal adaption.

Trophic feeding is the practice of giving a baby very little amounts of milk, usually with no intention of meeting their nutritional needs [3]. Luminal stimulation and gastrointestinal maturation assistance are the goals. Although definitions differ throughout neonatal units, commonly utilized quantities are roughly 10–20 mL/kg/day.

Early trophic feeding has not been shown to clearly enhance NEC in extremely preterm and very low-birth-weight infants, but there has historically been conflicting evidence regarding significant therapeutic benefits [4]. Crucially, recommendations have stressed that intestinal blockage or ileus remain significant contraindications to trophic feeding; hypoxia alone is not always a contraindication when the newborn is otherwise clinically fit.

The practice of habitually delaying enteral feeding has been further challenged by more recent research with infants with HIE undergoing therapeutic hypothermia. Early enteral nutrition was linked to quicker achievement of full enteral feeding, shorter hospital stays and parenteral nutrition, and no significant increase in eating intolerance, according to a randomized controlled experiment [5-6]. Additionally, a 2023 systematic review revealed no significant difference in NEC between enterally fed and unfed newborns and observed a very low overall incidence of stage II/III NEC in chilled infants with HIE [7].

Therefore, the goal of the current study was to determine whether giving adequately stabilized neonates with fetal distress early trophic meals could enhance feeding-related outcomes without raising gastrointestinal issues.

Aim

To study the role of trophic feeds in newborns with fetal distress.

Objectives

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1. To compare the time of initiation of enteral feeding between trophic-feed and delayed-feed groups.
2. To compare the time required to achieve full enteral feeding.
3. To assess feeding intolerance and gastrointestinal complications.
4. To compare weight change and duration of hospital stay.
5. To compare neonatal morbidity and mortality between the two groups.

Materials and Methods

A prospective comparative observational study was conducted in the neonatal unit of a tertiary-care hospital over a defined study period. A total of 100 newborns with evidence of fetal distress requiring neonatal observation or admission were enrolled. Newborns were considered eligible when fetal distress was documented during labor or immediately before delivery and the infant required neonatal monitoring or resuscitative support.

Inclusion criteria

- Newborns with documented fetal distress.
- Gestational age ≥34 weeks.
- Birth weight ≥1500 g.
- Admission within the first 6 hours of life.
- Infants clinically considered suitable for enteral feeding after stabilization.
- Written informed parental consent.

Exclusion criteria

- Major congenital gastrointestinal malformation.
- Suspected intestinal obstruction or ileus.
- Severe hemodynamic instability despite treatment.
- Persistent severe metabolic acidosis.
- Severe abdominal distension at baseline.
- Major congenital anomalies incompatible with enteral feeding.
- Infants requiring emergency abdominal surgery.

Study groups

The 100 newborns were divided into two groups of 50 each:

Group A – Trophic-feed group: Following clinical stabilization, infants received expressed breast milk at approximately 10–20 mL/kg/day, divided into small intermittent feeds. Feeding was administered by breast, cup or orogastric/nasogastric tube according to gestational age and clinical status. Feed volume was subsequently increased as tolerated.

Group B – Delayed-feed group: Infants received intravenous fluids and enteral feeds were initiated later according to conventional clinical practice and stabilization criteria.

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The choice of feeding method and subsequent advancement was individualized according to respiratory status, abdominal examination, perfusion, urine output and overall clinical condition. Current WHO recommendations support early enteral feeding in preterm/LBW infants when clinically appropriate, but specifically emphasize clinical judgment in unstable infants and note that evidence from feeding trials may not directly apply to babies with birth asphyxia.

Statistical analysis

Data were analyzed using appropriate statistical methods. Continuous variables were expressed as mean ± standard deviation and categorical variables as frequency and percentage. Independent Student's *t* test was used for normally distributed continuous variables, while the chi-square test or Fisher's exact test was used for categorical variables. A p value <0.05 was considered statistically significant.

Results

A total of 100 newborns with fetal distress were included, with 50 infants in each group. Baseline characteristics were comparable between the groups.

Table 1: Baseline characteristics of study participants

Variable	Trophic-feed group (n=50)	Delayed-feed group (n=50)	p value
Mean gestational age (weeks)	38.1 ± 1.5	37.9 ± 1.7	0.529
Mean birth weight (kg)	2.78 ± 0.46	2.71 ± 0.49	0.463
Male sex, n (%)	28 (56.0)	27 (54.0)	0.840
Cesarean delivery, n (%)	31 (62.0)	29 (58.0)	0.688
Meconium-stained liquor, n (%)	24 (48.0)	22 (44.0)	0.689
Mean Apgar score at 5 min	6.8 ± 1.1	6.6 ± 1.2	0.386
Respiratory support required, n (%)	18 (36.0)	20 (40.0)	0.680

There was no statistically significant difference between the groups with respect to gestational age, birth weight, sex, mode of delivery, meconium-stained liquor, 5-minute Apgar score or requirement for respiratory support (all p>0.05).

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Table 2: Feeding-related outcomes

Outcome	Trophic-feed group (n=50)	Delayed-feed group (n=50)	p value
Time to start enteral feeding (hours)	18.4 ± 6.2	47.8 ± 13.6	<0.001
Time to full enteral feeding (days)	5.8 ± 1.7	8.1 ± 2.4	<0.001
Parenteral/IV nutritional support (days)	3.4 ± 1.2	5.6 ± 1.8	<0.001
Weight loss at nadir (%)	5.9 ± 2.4	7.1 ± 2.8	0.025
Weight at discharge (kg)	2.71 ± 0.45	2.57 ± 0.48	0.139

The trophic-feed group commenced enteral feeding significantly earlier than the delayed-feed group. They also achieved full enteral feeding approximately 2.3 days earlier. Duration of intravenous nutritional support was significantly shorter in the trophic-feed group.

Table 3: Feeding tolerance and neonatal complications

Complication	Trophic-feed group n (%)	Delayed-feed group n (%)	p value
Feed intolerance	3 (6.0)	7 (14.0)	0.181
Vomiting	2 (4.0)	5 (10.0)	0.238
Abdominal distension	2 (4.0)	5 (10.0)	0.238
NEC	1 (2.0)	3 (6.0)	0.309
Culture-positive sepsis	4 (8.0)	9 (18.0)	0.136
Hypoglycemia	3 (6.0)	6 (12.0)	0.487

Feed intolerance was numerically lower in the trophic-feed group, although the difference was not statistically significant. NEC was observed in one infant in the trophic-feed group compared with three infants in the delayed-feed group; this difference was not statistically significant.

Table 4: Clinical outcomes

Outcome	Trophic-feed group (n=50)	Delayed-feed group (n=50)	p value
Duration of hospital stay (days)	8.9 ± 3.1	11.7 ± 4.2	0.001
Oxygen requirement >72 h, n (%)	8 (16.0)	11 (22.0)	0.452
Breastfeeding at discharge, n (%)	43 (86.0)	35 (70.0)	0.059
Readiness for oral feeds by day 7, n (%)	40 (80.0)	28 (56.0)	0.011

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Outcome	Trophic-feed group (n=50)	Delayed-feed group (n=50)	p value
Mortality, n (%)	1 (2.0)	3 (6.0)	0.309

The trophic-feed group had a significantly shorter hospital stay and a significantly greater proportion of infants ready for oral feeding by day 7. Breastfeeding at discharge was more frequent in the trophic-feed group, although the difference did not reach statistical significance.

Discussion

The potential benefit of early trophic feeding for infants experiencing fetal distress was assessed in this study. The main conclusions were that, compared to infants whose enteral feeding was delayed, properly chosen infants receiving trophic feeds attained enteral feeding significantly earlier and had shorter hospital stays [8]. Crucially, there was no statistically significant rise in feeding intolerance, NEC, hypoglycemia, or death linked to early trophic feeding.

Concerns regarding intestinal hypoperfusion have historically been the basis for the decision to restrict enteral nourishment in neonates experiencing fetal distress. Redistribution of blood flow toward critical organs due to perinatal hypoxia may jeopardize gastrointestinal perfusion [8]. Long-term intravenous treatment and delayed gastrointestinal development are two potential drawbacks of delaying enteral feeding.

The current results are in line with new research that suggests cautious early enteral nutrition for certain infants with HIE. Early enteral nutrition was linked to significantly earlier achievement of full enteral feeds and shorter duration of parenteral nutrition and hospitalization in a randomized controlled trial of infants undergoing therapeutic hypothermia, but it did not significantly increase feeding intolerance [9].

Mesenteric oxygenation was also investigated in a recent randomized research assessing minimal enteral nutrition during therapeutic hypothermia, offering physiological data pertinent to the safety of low feeding in neonatal encephalopathy [10]. These results are significant since one of the main causes of feeding delays in asphyxiated neonates is worry about impaired splanchnic perfusion.

According to the current study, the trophic-feed group's mean time to full enteral feeding was 5.8 days, while the delayed-feed group's was 8.1 days. The development of intestinal motility and eating tolerance may be aided by early gastrointestinal stimulation. However, it is crucial to acknowledge that prior Cochrane research in very preterm/VLBW infants did not show a substantial rise in NEC or conclusive benefits of trophic feeding on growth or eating tolerance [11].

Both groups had a low incidence of NEC. Three infants in the delayed-feed group and just one newborn in the trophic-feed group experienced NEC. The investigation was not sufficiently powered to show a difference in this rare result, even if the numerical difference favored trophic

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feeding [12–13]. Similarly, stage II/III NEC was rare and did not significantly differ between feeding and non-feeding techniques, according to a systematic study of enteral feeding during therapeutic hypothermia.

However, not all infants experiencing fetal discomfort should be given early feedings. According to WHO guidelines, clinical judgment should be used when making feeding decisions for unstable infants, and the results of feeding experiments might not immediately apply to infants who have experienced birth asphyxia. Until properly assessed, infants with suspected intestinal obstruction, ileus, severe continuing hemodynamic instability, or major abdominal pathology should not receive normal trophic meals [14].

The potential availability of nutritional and immunological components while encouraging maternal participation is another benefit of utilizing expressed breast milk. When mother's milk is not accessible, WHO guidelines advise using donor human milk [15–16].

Conclusion

In certain neonates with fetal distress, early trophic feeding after proper clinical stabilization seems to be a workable approach. In this trial, trophic feeding was linked to shorter hospital stays, shorter intravenous nutritional support durations, and much earlier beginning and attainment of full enteral feeding. Feeding intolerance, NEC, hypoglycemia, and death did not rise statistically significantly.

Therefore, in clinically stable infants, routine prolonged enteral feeding withholding based alone on a history of fetal distress may not be required. However, trophic meals should not be started until respiratory status, perfusion, abdominal examination, and general clinical stability have been evaluated. To determine the ideal timing, amount, and progression of trophic feeds, particularly in newborns with perinatal hypoxia, larger multicenter randomized studies are needed.

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