



CASE REPORT

Clinical impact of using a human milk-based fortifier in a preterm infant demonstrating intolerance to bovine milk-based fortifiers – a case report.

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Abstract

Preterm infants have higher risk of acute and chronic health complications due to immature organs including respiratory, immune, and gastrointestinal systems which are affected the most. Preterm infants have sensitive and fragile gut and hence the enteral feeds for premature infants needs to be precise and safe. Cow's milk protein allergy (CMPA) is the most common food allergies in infants, CMPA in a preterm infant could lead to serious complications during the Neonatal Intensive Care Unit (NICU) stay. Bovine milk consists of substantial quantities of allergens such as β -lactoglobulin and several other biomolecules with allergic potential, the same are invariably found in bovine milk-based nutritional products including bovine milk-based fortifiers (BMBF) and formulas which can lead to CMPA in preterm infants. Here we present a case report of CMPA in a girl baby born at 30 weeks gestation weighing 1500 gm, admitted in NICU with birth asphyxia and severe respiratory distress syndrome (RDS) Baby developed CMPA to BMBF's involving severe feed intolerance episodes and poor weight gain (5 g/day). The CMPA was mitigated by switching to human milk-based fortifier (HMBF), which resulted in ceasing the feed intolerance and providing an effective weight gain (30 g/day). HMBF can be considered as a safe and effective fortification option for preterm infants.

Keywords: HMBF, BMBF, preterm, fortification, feed intolerance, CMPA

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1 | CASE REPORT

Baby girl, born at 30 weeks gestation weighing 1500 gm was admitted in NICU

with birth asphyxia and severe RDS. Parenteral nutrition was initiated along with trophic feeds through pasteurized donor human milk (Neo-Lacta PHBM) as mother's own milk (MOM) was not

available on day 1. Slowly feeds were stepped up and MOM was sufficient by day 2 of life. By day 3, infant was on adequate enteral feeds and parenteral nutrition was discontinued. Infant was started on bovine milk-based fortifier (BMBF) [Lactodex HMF] at feed volume of 100 ml/kg/day. Infant developed feed intolerance in the form of bilious vomiting, significant gastric residual volume (GRV) and abdominal distension after the addition of BMBF. Infant was treated as Necrotizing enterocolitis (NEC) stage 1 and was kept nil by mouth (NBM) for 48 hours and first line antibiotics was started. Once infant recovered, feeds with expressed breast milk (EBM) was restarted, infant tolerated the feeds well and antibiotics were stopped on day 5.

Infant was started with another brand of BMBF (Pre NAN) keeping in view the financial burden and lack of adequate weight gain on MOM. Infant again developed feed intolerance post fortification of feeds with BMBF and the weight gain remained poor (5 gm/day). A probable diagnosis of Cow's Milk Protein Allergy (CMPA) was made, as the infant was fed only with human milk throughout and the only source of bovine milk-based nutrients was from the BMBF's. A collaborative decision was made with the consent of parents to initiate a human milk-based fortifier (HMBF) [NeoLact MMF]. HMBF's are derived completely from donor human milk and are now available in India, scientific evidence from published literature suggests that HMBF has proven effectiveness in premature infants who had shown intolerance to BMBF..

Subsequently once the infant was started on HMBF, there were no incidences of feed intolerance nor the need for antibiotics during the period of fortification with HMBF (NeoLact MMF). Infant had a good overall growth with average weight gain of 30 gm/day and was discharged at 1.63 kgs with advice to continue fortification with HMBF at home.

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2 | DISCUSSION

Preterm infants require comprehensive nutritional management care, which would usually be based on the gestational age, birth weight and complications of prematurity. The vital objective of comprehensive nutritional management is to support the catchup growth and overall development of the preterm infants in NICU.

Premature birth poses multiple risks to the infant, one of the major risk factors being the immaturity of all organ systems which can hinder the overall development, of which the immature gut makes the preterm infants highly susceptible to feed related adverse reactions.

CMPA also referred to as Cow's-milk protein intolerance (CMPI) is the aberrant reaction to proteins present in bovine milk or nutritional products containing bovine milk products. CMPA results in gastrointestinal inflammatory response to bovine milk proteins that affects 3% to 7% infants during the first year of life which usually occurs after a brief exposure to bovine-milk based infant feeds (1).

The clinical manifestations of CMPA varies from vomiting, persistent colic to reflux, feeding difficulty, abdominal distension, diarrhea, mucus stools, and ileus. A confirmatory diagnosis is made when the symptoms resolve after the cessation of bovine-milk based feeds. (1, 2)

Prevalence and clinical presentation of CMPA is poorly understood in preterm infants because of shared pathological and clinical features with NEC. NEC can present with feed intolerance, abdominal distension and increased gastric residuals after the initiation of enteral feeds within the early 2 weeks of birth (3, 4) In term infants, CMPA typically manifests as colic, reflux, diarrhea, hematochezia, or generalized feeding intolerance following a period of antigenic exposure and sensitization which may occur at any time between ten days to ten months (5) . Reports of CMPA in preterm infants within 24 hours of initial exposure to bovine milk proteins have been observed, suggesting the possibility of intrauterine sensitization in some patients (6) . Many cases of CMPA has been reported in premature infants when fed with bovine milk-based nutrition. CMPA would

resolve with exclusion of bovine milk-based nutrition and returns with the reintroduction. (7) .

Fortification of human milk is important to meet the nutritional requirements of low birth weight (LBW) infants, currently two categories of fortifiers are available in India which are BMBF and HMBF. Human milk derived fortifiers make it feasible to avert the use of bovine milk-based feeds and thereby supports the 100% human milk diet for pre-mature infants. (8, 9) Both the quantity and quality of proteins in the feeds assumes importance in a premature infant, casein fraction in human lacks the α s1-fraction, a major element triggering milk-protein allergy. Inversely, the casein in bovine milk is abundant (38.4%) in the α s1-fraction. Bovine milk consists of more than twenty proteins with allergic potential. The allergenic potential of human milk is also lesser due to the scanty presence of beta-lactoglobulin levels, which is comparatively present in larger amounts in bovine milk, these factors contribute to allergy and feeding intolerance. (10, 11)

In this case, we noticed that CMPA had presented when the infant was on predominant breast feeding with the addition of BMBF with complete recovery after its elimination and introduction of HMBF. Although rare, CMPA can result in severe feeding intolerance which ultimately leads to prolonging the NICU stay and increasing the hospital costs. HMBF's can be considered as a safe option for fortification in preterm infants.

3 | CONCLUSIONS

CMPA presenting in a premature infant can be encountered in NICU, which requires early detection and prompt elimination of bovine milk-based feeds. Most of these cases may follow the course similar to NEC, which makes the diagnosis challenging. Using BMBF can also lead to CMPA, hence HMBF can be considered as a safe and effective fortification option for preterm infants.

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DEMONSTRATING INTOLERANCE TO BOVINE MILK-BASED FORTIFIERS – A CASE REPORT

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