

# Clinical Case: Allergic Enterocolitis in Premature Infants

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## ABSTRACT

This publication presents a case of allergic enterocolitis that is directly related to the use of cow's milk in a premature newborn. This condition is rare in premature babies and is characterized by bloating, regurgitation, blood in the stool, anxiety, and in laboratory research it is manifested by eosinophilia in a general blood test; in severe clinical cases, intestinal pneumatosis can be detected on a radiograph of the abdominal organs. Timely diagnosis of this disease and differential diagnosis with manifestations of necrotizing enterocolitis determine the further tactics of treating the patient.

**Keywords:** *preterm neonates, cow's-milk protein allergy, allergic enterocolitis*

**How to cite this paper:** Guli Gayratovna Latipova | Umida Feruzovna Nasirova "Clinical Case: Allergic Enterocolitis in Premature Infants" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-5 | Issue-1, December 2020, pp.206-208, URL: [www.ijtsrd.com/papers/ijtsrd35838.pdf](http://www.ijtsrd.com/papers/ijtsrd35838.pdf)



IJTSRD35838

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## INTRODUCTION

An unusual clinical manifestation mimicking necrotizing enterocolitis (NEC) is allergic enterocolitis secondary to cow's milk protein allergy. Although milk protein allergy is the most common food allergy in infants and young children, the incidence and prevalence of this disease, which manifests as enterocolitis, is not well documented in newborns.

We report this case of milk protein-associated allergic enterocolitis to highlight the unusual recurrent manifestation of NEC (with recurrent pneumatosis, bloody stools) successfully treated with formula modification.

In newborns, CMP intolerance manifests itself in the form of allergic enterocolitis, which is a relatively benign condition. The symptoms are in many ways similar to the clinical picture of necrotizing enterocolitis, its recurrent course [3,6,7]. NEC is a life-threatening disease of premature babies and is an indication for emergency treatment and, in some cases, requires surgery. That is why timely diagnosis is important to determine the tactics of patient management.

Gastrointestinal manifestations of CMP allergy can be combined into the following syndromes: proctocolitis, enterocolitis, CMP-induced enteropathies. The main clinical manifestations of allergic enterocolitis are bloating, regurgitation, anxiety, and blood in the stool. A laboratory examination in a general blood test reveals eosinophilia. In severe clinical cases, pneumatosis of the intestine can be detected on a radiograph of the abdominal organs [5,6]. It should be noted that these clinical manifestations are not specific and are similar to those of NEC. Thus, the greatest

difficulties are caused by the differential diagnosis of these diseases.

First, an allergy to CMP, manifested by enterocolitis, can develop only if the intestines are exposed to products containing CMP (formulas based on cow's milk, breast milk fortifiers) [1]. Second, the timing of the onset of symptoms from the start of enteral feeding is important. In the observations of Y. Morita, this is on average 23 days from the start of enteral feeding, which is probably due to the immaturity of the immune system [5]. There are isolated cases of early development of CMP allergy in the first week of life, which can be associated with intrauterine sensitization. Thirdly, it is necessary to take into account the time of resolution of symptoms, which, in case of allergy to CMP, begin to fade away immediately after the elimination of the allergen from the diet, which does not occur when enteral nutrition is canceled in children with NEC [1,2,5]. The presence of an allergy to CMP in a deeply premature baby may be indicated by an increase in the content of eosinophils in the blood, which is not a specific criterion, since the number of eosinophils can also increase during an infectious process. In deeply premature infants, an increase in total IgE is usually not detected, which is associated with the immaturity of the immune system [2]. Allergic enterocolitis is relatively benign. We report a case of allergic enterocolitis masquerading as recurrent NEC in a 30-week premature baby who recovered completely without any short-term or long-term gastrointestinal complications by eliminating milk protein from the diet.

We present a case of observation of a child with symptoms of enterocolitis, regarded as a manifestation of allergy to cow's milk protein.

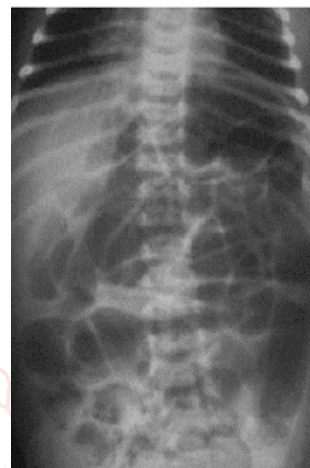
Boy M. was born in the maternity hospital in Almalyk, Republic of Uzbekistan in 2020. A 28-year-old woman was born prematurely at 30 weeks gestation. Second labor, by emergency caesarean section due to severe preeclampsia. All prenatal maternal screening serologic tests were negative. The child was born by caesarean section, birth weight 1260 g., Body length 37 cm, head circumference 27 cm, chest circumference 24 cm.

Apgar score 6/7 points. The amniotic fluid is light. The child's condition at birth is severe due to immaturity and respiratory distress. At birth, a short cry, heart rate > 100 in 1 min, hypotension, hyporeflexia, irregular breathing. A syndrome of respiratory disorders was diagnosed. Non-invasive respiratory support started. From the third day of life on spontaneous breathing without oxygen and respiratory support.

Trophic feeding was started on day 2 of life using formula for premature infants and continued on expressed breast milk. Feeding was increased to 20 ml / kg per day from 8 days of age. By the 15th day of life, the child received complete enteral nutrition, fortified with a breast milk fortifier. On the 17th day of life, the child developed abdominal distension with vomiting. The abdomen is strongly distended and distended, but not tense, intestinal noises, peristalsis is preserved. by zones did the gastric contents with an admixture bile, signs of hemocolitis were noted (frequent

stools, up to 6 times a day, yellow-green, mushy, mixed with scarlet blood). In the general analysis of blood, an increase in leukocytosis, eosinophilia was noted, with a normal level of C reactive protein (see Table 1).

In sowing feces, blood - there is no growth. Enteral feeding is suspended started full parenteral nutrition, antibacterial real therapy. In the general analysis of blood, marked eosinophilia was noted (38%). The initial x-ray of the abdominal cavity was characterized by the presence of nonspecific diffusely dilated bowel loops (Fig. 1). During ultrasound examination of the abdominal organs, flatulence is observed; convincing signs of pneumatosis of the intestinal wall are not recorded.



**Fig 1 Supine abdominal x-ray showing nonspecific diffuse bowel expansion**

**Table 1 Hemogram data and CRP values**

Day of life	Hemoglobin, g / l	Erythrocytes, *10 <sup>9</sup> /l	Platelets, *10 <sup>9</sup> /l	Leukocytes, *10 <sup>9</sup> /l	stab, %	segm, %	Eosinophils, %	CRP, mg/l
2	180	4,1	480	12,3	9	50	2	0,5
7	140	3,6	475	15,2	4	40	4	0,4
17	119	3,4	354	19,7	0	17	38	0,56
24	110	3,0	321	14,9	0	7	2	1,08
28	105	2,9	285	16	0	8	13	2,08
35	98	2,6	274	12	1	4	4	-

The child was pale and lethargic, with episodes of bradycardia requiring an increase in O2 over the next 12 hours, and pneumatosis (Fig. 2) in the right lower quadrant with persistent dilated loops on plain radiography. The child was treated as NEC (stage 2A) with intravenous antibiotics, gastrointestinal decompression, and parenteral nutrition. Clinical and radiological improvements were noted the following week. Feeding was resumed with expressed breast milk from day 8 after the initial diagnosis of NEC.



**Figure 2 Diffuse expansion of the intestine with foci of pneumatosis 12 hours after treatment**

Three days after the resumption of enteral feeding enriched with breast milk fortifier (28 days of age), the child developed diffuse abdominal distension with severe bleeding stools. The number of eosinophils increased from 2 to 13%. C-reactive protein was 2.8. Abdominal X-ray showed diffuse pneumatosis (Figure 3).



**Fig 3 Recurrent pneumatosis (extensive) - (second episode)**

Control ultrasound of the abdominal organs was performed on 26 JV: free fluid was not detected, peripheral lymph nodes were not enlarged, echo signs of small hepatomegaly, dyscholia at the time of examination, diffuse changes in the renal parenchyma against the background of morpho-functional immaturity, intestinal wall moderate thickened to 2.49 mm maximum, pneumatosis of the intestinal wall was not revealed during examination.



**Fig. 3 Thickening of the intestinal loop wall**

There was no evidence of a systemic inflammatory response in blood tests. Over the next few days, the child showed clinical and radiological signs of enterocolitis, which were stopped by 35 days of life. After resolving this episode, the baby was switched to a complete cow's milk protein hydrolyzate formula. The child continued to receive this mixture until the 58th day of life, absorbed. Mixture change quickly demonstrated symptom resolution with improved radiological and ultrasound data.

This 30-week-old preterm baby developed two clinical episodes of allergic enterocolitis mimicking NEC, with definitive pneumatosis each time on plain abdominal x-ray. Recovery was complete with conservative treatment and no disease progression, with recurrence of clinical signs and symptoms associated with milk protein exposure each time. The child received a formula based on complete hydrolyzate of cow's milk protein and was discharged home.

### Results and discussion

1. Milk protein allergy is the most common food allergy in infants and young children. The incidence and prevalence of this disease, which manifests itself as enterocolitis in newborns, is not well documented and does not affect clinical trials of NEC.
2. This article summarizes a presentation of cow's milk protein allergy in a premature baby, which presented repeated episodes of clinical, radiological results mimicking NEC associated with milk protein exposure, which were successfully resolved with formula modification.
3. Enterocolitis, caused by cow's milk protein, manifests itself in newborns already in the first week with an isolated manifestation of rectal bleeding and without other systemic, abdominal and radiological data on NEC. This early onset is thought to be secondary to intrauterine sensitization. Our case was new in the sense that, in addition to its early onset, there were relapses of enterocolitis episodes associated with an increase in

systemic eosinophilia, each episode mimicking NEC clinically and radiologically.

4. Symptoms may occur when taking formulas from cow's milk, formulas based on soy and breast milk fortified with cow's milk fortifiers. Suggested diagnostic criteria for the diagnosis of enterocolitis associated with milk protein allergy include: exposure to cow's milk products; bloating; more frequent stools, turning into bloody stools; pneumatosis in severe cases; the disappearance of symptoms after the withdrawal of the mixture and / or the transition to a mixture based on protein hydrolyzate.
5. The final diagnosis of allergic enterocolitis is difficult due to the lack of specific laboratory data or tests. The only hematological sign is peripheral eosinophilia.

### Conclusion

We concluded that the signs noted in allergic enterocolitis include the rapid onset of abdominal distention associated with severely bleeding stools and acute pneumatosis of the intestine. The rapid improvement or absence of progression of systemic signs and symptoms after elimination of milk protein exposure is different from NEC, and episodes may occur with repeated exposure to cow's milk protein.

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