

# Allergic Colitis With Pneumatosis Intestinalis in an Infant

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**Abstract:** Inflammatory causes of bloody diarrhea during infancy include necrotizing enterocolitis and allergic colitis, often due to cow's milk protein. We report this case of cow's milk protein allergy, managed successfully with elimination of dietary antigen, to highlight the unusual finding of pneumatosis intestinalis on abdominal x-ray, a radiographic hallmark associated with necrotizing enterocolitis. Detailed patient's history, clinical presentation, and physical examinations are discussed for cow's milk protein allergy and necrotizing enterocolitis.

**Key Words:** allergic colitis, cow's milk protein allergy, necrotizing enterocolitis, pneumatosis intestinalis

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## CASE

A 5-week-old male infant (birth weight, 2.7 kg), born by cesarean delivery at 35 weeks' gestation to a 31-year old G3P2 mother, presented to the emergency department with a 4-day history of bloody stool, as well as increased sleepiness and decreased feeding. He was breastfed since birth without any maternal dietary restrictions. He was seen with minimal symptoms and normal vital signs, discharged with the diagnosis of cow's milk protein allergy and with instructions to limit the mother's milk intake. He presented the following day at a peripheral hospital owing to ongoing blood in the stool, and an abdominal x-ray (AXR) was done showing significant pneumatosis intestinalis (Fig. 1); hence, he was called to return to the emergency department for further investigation. Vital signs were temperature, 36.2°C; pulse, 156 beats per minute; respiratory rate, 50 breaths per minute; blood pressure, 90/30; weight, 3.4 kg; and oxygen saturation, 99%. On examination, he was slightly irritable, sleepy but rousable, and had a slightly sunken anterior fontanelle. Abdomen was soft, with no irritability reproduced with palpation. Bowel sounds were present and no masses were noted. Aside from jaundice at birth and at 4 weeks old, he was previously healthy.

The patient was admitted for diffuse pneumatosis intestinalis with a diagnosis of necrotizing enterocolitis (NEC), possibly secondary to cow's milk protein allergy (CMPA). He was started on intravenous ampicillin, gentamicin, and metronidazole. On admission, blood work was unremarkable with normal complete blood count, electrolytes, and nonelevated inflammatory markers. After 1 day, metronidazole was discontinued and total parental nutrition was started. Blood and urine cultures were negative, and total parental nutrition blood work (ie, electrolytes, creatinine, urea, blood glucose, calcium, magnesium, phosphate, prealbumin, triglyceride, conjugated and unconjugated bilirubin, and C-reactive protein) was within normal limits during the hospitalization.

Abdominal x-ray done 6 days later showed complete resolution of the pneumatosis with no distension, no air fluid levels, and no free air. At this time, intravenous antibiotics were discontinued and oral feeds were slowly introduced, up to 5 mL every 3 hours as tolerated. He had no bloody stools during his hospital stay and was discharged home 10 days after admission on full feeds with Nutramigen formula.

## DISCUSSION

Inflammatory conditions that cause bloody diarrhea during the neonatal period and early infancy include NEC and allergic colitis. Necrotizing enterocolitis primarily affects premature infants and remains a leading cause of death in the neonatal period, affecting approximately 10% of infants with very low birth weight (<1500 g).<sup>1</sup> It generally presents in the first 2 to 4 weeks of life, with late presentations occurring up to 5 to 6 weeks. In contrast, allergic colitis is more benign and is the most common food allergy in infants, typically affecting term infants in the first 1 to 6 months of life.<sup>1</sup> The inflammatory process is mediated by an allergic reaction to dietary antigens, typically cow's milk protein; hence, it is often known as CMPA. This case illustrates a rare presentation of CMPA because pneumatosis was noted on AXR, a hallmark radiographic finding associated with NEC.<sup>1</sup> Whereas CMPA may have some clinical features similar to those of NEC, diagnosis can usually be made through clinical history, exclusion of other medical conditions such as infectious causes, and rapid response to elimination of dietary antigen.

Cow's milk protein allergy is the most common food allergy in infants, typically presenting in the first 1 to 6 months of life with decreased feeding, irritability, bright red bloody stools, often with mucus, and sometimes with extraintestinal symptoms such as eczema, urticaria, and wheeze.<sup>1</sup> It commonly occurs in breastfed infants where the cow's milk protein consumed by the mother is the triggering dietary antigen in breast milk, or in infants fed formulas based on cow's milk. If symptoms present shortly after birth, intrauterine sensitization from the mother's diet may be the cause.<sup>2</sup> The pathogenesis of CMPA is driven by aberrant response to milk proteins, commonly casein and whey proteins, resulting in gastrointestinal mucosal inflammation.<sup>1</sup> It predominantly presents in term infants who are otherwise healthy and occasionally may result in mild anemia, with peripheral eosinophilia.<sup>1</sup> A definitive diagnosis is often difficult, as there are no specific laboratory tests or investigations.<sup>1</sup> Previous case reports have used upper and lower gastrointestinal contrast studies, proctoscopy/colonoscopy and mucosal biopsy to aid the diagnosis.<sup>1,3</sup> The mainstay treatment is the elimination of cow's milk from the mother's diet if she wishes to continue breastfeeding, or introducing a hydrolyzed protein or amino acid–based milk formula to the infant.<sup>2</sup> Prognosis is good for these infants and spontaneous remission often occurs within the first 3 years of life.<sup>2</sup>

In contrast to CMPA, which is fairly benign, NEC is the most common gastrointestinal emergency affecting premature infants, particularly those who are of very low birth weight.<sup>1</sup> Despite advancements in detection and treatment, mortality rates remain unchanged and it remains a leading cause of neonatal death. Main contributing factors of NEC include prematurity and enteral

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**FIGURE 1.** Abdominal radiograph showing extensive pneumatosis intestinalis.

feeding.<sup>1</sup> The premature intestinal mucosal barrier is more permeable to macromolecules, has altered mucosal glycosylation, and has reduced production of immunoglobulins, leading to immature mucosal immunity.<sup>1</sup> Clinical presentation is largely variable, often with nonspecific signs including apnea, bradycardia, and lethargy. Infants may also show feeding intolerance, abdominal distension, bloody stools, localized abdominal tenderness, or a palpable mass.<sup>1</sup> Abnormal laboratory findings are expected and may include increased C-reactive protein levels, metabolic acidosis, and thrombocytopenia, a poor prognostic indicator.<sup>4</sup> Medical treatments for NEC include cessation of enteral feeding, abdominal decompression, parenteral antibiotics, and monitoring

for systemic sequelae, such as hypotension, coagulopathy, anemia, or respiratory failure.<sup>1</sup> Surgical resection of necrotic bowel may be warranted in severely ill infants with frank bowel perforation, indicated by pneumoperitoneum.<sup>4</sup> Prognosis is poor with mortality averaging 30%.<sup>4</sup> Infants who do survive may have persistent long-term gastrointestinal morbidities and poor neurodevelopmental outcomes.

On AXR, the finding of pneumatosis intestinalis is often held to be pathognomonic for NEC<sup>4</sup>; however, as this case has shown and has been described in the literature,<sup>3</sup> severe CMPA may also yield the same radiographic findings. As such, correlation of clinical findings to patient's history and clinical examination is essential in making the correct diagnosis.

Given that this infant presented with symptoms at 5 weeks old, was previously healthy, and only mildly premature, the diagnosis of NEC is less likely. However, it requires a high index of suspicion given its associated high mortality and morbidity rates. In addition, rapid improvement, lack of systemic deterioration, and complete resolution of signs and symptoms after elimination of cow's milk from the infant's diet further points to the diagnosis of CMPA.

## CONCLUSIONS

In summary, this case illustrates the diagnosis of CMPA, rather than NEC, in patients with radiographic evidence of pneumatosis intestinalis accompanied by a benign clinical course with no systemic deteriorations and rapid improvement after elimination diet.

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