



## Primary Care Approaches

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# Promoting Breastfeeding in Infants with Cow's Milk Protein Allergy: A Case Study

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**C**ow's milk protein allergy (CMPA) is the most common food allergy in infancy and occurs in about 2% to 3% of the population (Huang & Kim, 2012). However, the incidence is significantly less in exclusively breastfed infants at a rate of about 0.5% to 1% (Academy of Breastfeeding Medicine [ABM], 2011). In addition to all the known benefits of breastfeeding, many immunomodulators found in breast milk are protective against allergies (ABM, 2011).

### Case Study

#### Chief Complaint

O.M. is a six-month-old male with a four-month history of suspected CMPA and occasional blood seen in his stool. O.M.'s mother, a reliable historian, expressed that she is concerned that O.M. is still having occasional streaks of blood in his stools, and she is willing to eliminate additional possible allergens from her diet if necessary.

#### History of Present Illness

O.M. was born at 38 weeks gestational age, weighing 3.4 kilograms. He has been exclusively breastfed since birth. O.M.'s mother was initially on a regular diet but states that at about four weeks of age O.M. was increasingly fussy with feedings, and she began seeing small specks of bright red blood and mucus daily in his stools. O.M.'s mother was advised to eliminate dairy from her diet due to concern about CMPA. O.M. was referred to pediatric gastroenterology at three months of age to confirm the diagnosis because he was still having occasional blood streaks in his stool but was gaining weight, and his mother reported he was "happy as a clam." O.M.'s stools were reported to occur two to three times a day, and were loose, watery, and green. At this visit, O.M.'s mother reports she had been on a milk and soy-free diet for about eight weeks to try to reduce the incidence of blood in the stools. However, she had just recently noticed that a cereal she ate on a regular basis contained

milk and soy. The mother stated that she was adamant about continuing breastfeeding. She also wanted to begin introducing solid foods to O.M. and needed advice on how to do that considering his probable CMPA.

#### Past Medical History

As reported by the mother, there were no complications during pregnancy, birth, and the neonatal period, and O.M. has had no hospitalizations, surgeries, or visits to the emergency department since birth. O.M.'s mother denies additional medical or health problems in O.M. He is receiving regular well-baby care and is up to date for immunizations. O.M. is not currently taking any medications and has no known allergies other than the suspected CMPA.

#### Family History

The mother reports there is a strong family history of gastroesophageal reflux disease (GERD) in the mother, maternal grandmother, and O.M.'s father. The mother denies a family history of inflammatory bowel disease (IBD), celiac disease, other gastrointestinal conditions, coagulopathies, allergies to milk or other foods, difficulty feeding in infancy, atopy, or autoimmune conditions. There is no reported family history of heart disease, respiratory conditions, diabetes, thyroid conditions, seizures, cancer, and neurological conditions. O.M.'s mother reports the family feels supported and does not have any financial struggles at this time.

#### Social and Developmental History

O.M. lives with his mother, father, and a three-year-old brother at home. O.M. does not attend daycare, and the primary caregivers are the parents, who indicate they are adjusting well to having an infant at home. O.M.'s mother reports O.M. is developing appropriately with no physical, mental, or social delays.

#### Review of Systems

O.M.'s mother reports that in addition to the occasional blood and mucous in O.M.'s stools, he occasionally has flatulence, belching, and spitting-up without apparent discomfort. She denies O.M. has other symptoms, and she has no other concerns regarding his health or development.

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The **Primary Care Approaches** section focuses on physical and developmental assessment and other topics specific to children and their families. If you are interested in author guidelines and/or assistance, contact Patricia L. Jackson Allen at [pat.jacksonallen@yale.edu](mailto:pat.jacksonallen@yale.edu)

## Physical Examination

O.M.'s height and weight at three months of age were 60.3 centimeters and 6.9 kilograms, respectively. At six months of age, O.M.'s height was 64.5 centimeters, and his weight was 8.6 kilograms. O.M. was smiling, alert, and in no apparent distress. He was well-developed and well-nourished, and appeared healthy. His sclera and conjunctiva were clear without icterus, and extraocular movements were intact. Ears and nose were normal in appearance. Lips and oral mucosa were pink and moist. A normal respiratory rate and effort were noted, without the use of accessory muscles. Lungs were clear to auscultation bilaterally. The heart had a regular rate and rhythm, with no audible murmurs. The skin was of normal pigmentation, without cyanosis, jaundice, rashes, or lesions. Capillary refill was less than three seconds and no edema was noted. The abdomen was rounded, bowel sounds were present in all four quadrants, and normal percussion sounds were noted. The abdomen was soft, non-distended, and non-tender, with no guarding, grimacing, or crying upon palpation. There was no hepatosplenomegaly, masses, hernias, or palpable stool appreciated. The anus appeared normal with no fissures, skin tags, or other signs of perianal disease. Overall muscle strength and tone were normal. Sensory and motor examinations were also normal.

## Differential Diagnoses

According to Jarvienen-Seppo (2013), some differential diagnoses that should be included when considering CMPA as a primary diagnosis are egg and other allergies in addition to milk, GERD, colic, and infant "fussiness." The presence of hematochezia expands the possible differential to include infectious colitis, intussusception, anal fissure, colonic polyps, IBD, and lymphonodular hyperplasia (Sreedharan & Liacouras, 2011). Taking into account O.M.'s age, onset of symptoms, and clinical presentation, the most likely additional diagnoses are infectious colitis, anal fissure, and food protein-induced/allergic colitis secondary to an allergen such as CMPA.

Infectious colitis in infants can result from bacterial, viral, or parasitic agents, and is a common cause of colitis in the pediatric population (Piccoli, 2012). Some common manifestations of infectious colitis include acute onset of fever, nausea, cramps, or abdominal pain (extreme irritability or fussiness in infants), multiple diarrheal stools in a day, and in some cases, blood in the stool (Piccoli, 2012). Diagnosis is often made based on history and physical examination; however, stool cultures can also be performed to verify diagnosis.

Anal fissures are lacerations of the anus and are most common in infants less than one year of age, with an unclear etiology (Stafford & Klein, 2011). Pain with defecation (especially with hard stools), and bright red blood in the stool, on the toilet paper, or baby wipe, are often noted (Stafford & Klein, 2011). A diagnosis is made by inspection of the anus in which the skin is pulled taut in order to allow visualization of any possible lacerations (Stafford & Klein, 2011).

Food protein-induced colitis can affect both breastfed and formula-fed infants at about one to three weeks of age and presents with vomiting, diarrhea, and blood and mucous in the stool (Piccoli, 2012). In the case of milk hypersensitivity specifically, classic symptoms are blood streaks and mucous in a diarrheal stool that presents before six months of age in an otherwise well-appearing infant

(Piccoli, 2012). CMPA can also present with symptoms in other body systems, such as rashes, hives, or atopic dermatitis in the integumentary system, and allergic rhinitis or wheezing in the respiratory system (Koletzko et al., 2012). When these symptoms are present, the CMPA is more likely to be immunoglobulin E (IgE) mediated (Lake, 2013).

## Diagnostic Studies

CMPA can involve an IgE mediated response, a non IgE mediated response (also known as cell-mediated), or a mixed response (Koletzko et al., 2012). Many children and infants with CMPA do not have positive serum IgE levels (Merris-Salmio, Pelkonen, Kolho, Kuitunen, & Makela, 2013). An IgE mediated response usually results in an immediate reaction within two hours of ingestion of an allergen. A delayed response would be a reaction that occurs 48 hours to one week following exposure to an allergen and is characteristic of a cell-mediated response (Koletzko et al., 2012). CMPA that is due to an IgE response usually presents with gastrointestinal, integumentary, and respiratory symptoms, but if the only symptoms are gastrointestinal, a cell-mediated response is more likely (Lake, 2013).

Diagnostic testing can help confirm a clinical suspicion of CMPA. The gold standard for diagnosis of CMPA is the implementation of a provider-supervised oral food challenge (OFC) to assess for an immediate reaction (Elizur et al., 2012). Other options for testing include either a skin prick test (SPT) (a wheal greater than six millimeters in children younger than two years of age is considered positive) or a specific IgE test via blood sample (value of 5 kilounits per liter or greater, for children younger than two year of age is considered positive). Both tests are at or above 95% predictability for CMPA. These two tests, along with a positive history and physical examination, can be diagnostic of CMPA (Huang & Kim, 2012). However, if these tests are negative, an OFC needs to be performed, if feasible, to support a diagnosis (Koletzko et al., 2012). In infancy, the SPT test and serum IgE can often produce a false-negative result, and are therefore not usually performed until the child is about one to two years of age (Nowak-Wegrzyn, 2013).

Because of O.M.'s age and relatively mild but persistent symptoms suggesting a cell-mediated response, these two tests were not indicated at this time (Lake, 2013). In rare cases where it is not clear what an infant is allergic to and multi-system symptoms are typical of food allergies (suggestive of IgE response), these two tests may be indicated. If a supervised OFC is not performed, elimination of cow's milk products from either the infant's diet or the breastfeeding mother's diet for a two- to four-week period can also be diagnostic; if symptoms do not improve, and there was no possible exposure to milk, CMPA is unlikely, though it would be important to consider other possible allergens (Koletzko et al., 2012).

## Assessment

O.M. was a healthy six-month-old infant with mild hematochezia who was growing consistently with length along the 50th percentile and weight along the 75th percentile, and developing appropriately. He was diagnosed with a probable cell-mediated CMPA due to his symptoms being limited to the gastrointestinal track. No diagnostic tests were ordered. O.M.'s mother was willing and able to reinstitute a milk and soy-free diet to continue breastfeeding.

Exclusively breastfed infants presenting with gastrointestinal symptoms of CMPA typically experience a cell-mediated response to the allergen. In this case, due to O.M.'s age and symptoms limited to his gastrointestinal track, the diagnosis was made based on history, physical examination, the improvement of symptoms with the avoidance of milk in the mother's diet, and the return of symptoms with accidental ingestion of milk products by the mother (ABM, 2011). This is an accepted method of diagnosing CMPA in infancy and can be diagnosed by the primary care provider (Lake, 2013). Because O.M. presented only with mild gastrointestinal symptoms, his chance of severe or anaphylactic reactions to milk products are low (ABM, 2013).

## Treatment and Plan

Treatment for CMPA is strict avoidance of any products containing cow's milk protein (Fiocchi et al., 2010). For infants in whom the risk of anaphylaxis is minimal, the first line formula substitute is extensively hydrolyzed formula (Fiocchi, 2010). Infants that are at high risk of anaphylaxis should be placed on an amino acid formula rather than an extensively hydrolyzed formula as first line treatment (Fiocchi, 2010). Soy formulas should not be used in infants under six months of age with CMPA (Fiocchi, 2010). Breastfeeding mothers, such as O.M.'s mother, should be encouraged to continue breastfeeding and to completely eliminate milk and milk products from their diet (Koletzko et al., 2012). This can be difficult and requires ample teaching about reading food labels and possible hidden milk in products, and may even warrant a referral to a registered dietician (Koletzko, 2012). Counseling for the mother should also include alternate ways to get calcium and maintain a well-rounded diet without milk products. Improvement of symptoms in the infant should be seen in two to four weeks and may be apparent as early as 72 to 96 hours (ABM, 2011).

In severe cases of CMPA, laboratory studies should be performed to monitor hemoglobin and albumin levels for anemia and protein loss from the hematochezia (ABM, 2011). Amino acid formula may be needed to ensure reversal of anemia and hypoalbuminemia (ABM, 2011). In persistent cases, such as O.M.'s case, where symptoms are improved but not resolved, the mother should continue breastfeeding but additionally eliminate soy and then eggs from her diet (Lake, 2013). If symptoms continue, working with a registered dietician to place the mother on an allergen-free diet until the infant's symptoms completely resolve, and then reintroducing foods one by one as tolerated by the infant, may be necessary (ABM, 2011). The risks and benefits of continued breastfeeding versus beginning an amino acid formula must be weighed, and it is imperative that the mother receives adequate nutrition for herself and the infant who is breastfeeding.

Blood in the stool can be a frightening sign for mothers, and reassurance must be given that the infant is thriving and being monitored for complications. However, hemoglobin and albumin levels should be monitored if a moderate amount of blood is noted in the stools (ABM, 2011). In the case of anemia, low albumin levels, or in stunted or delayed growth, the infant should be switched to an amino acid formula (ABM, 2011).

*Lactobacillus* is a probiotic, and if given to the infant with CMPA, may further relieve symptoms; infants who

received *Lactobacillus GG* had significantly less hematochezia than infants who were only on an extensively hydrolyzed formula (Baldassarre et al., 2010). The administration of pancreatic enzymes to the mother, in an attempt to further breakdown milk proteins before the infant ingests them, is also being studied, but further research is needed (ABM, 2011).

About 50% of children with CMPA will build a tolerance to cow's milk protein by one year of age, about 75% by three years of age, and about 90% by six years of age (ABM, 2011). Reintroduction of small amounts of cow's milk protein in the diet can occur between nine and 12 months of age (AMB, 2011), or four to six months after milk products were eliminated in the diet (Lake, 2013). The reintroduction of the milk should occur gradually over three to five days, starting with small amounts of either hydrolyzed or cow's milk formula and increasing the amount each day (Lake, 2013). Infants who have started solid foods should first be introduced to foods that contain baked milk or a small amount of milk product and gradually increase the milk content of the foods. If symptoms return, the infant and mother must return to a restricted diet for an additional four to six months (Lake, 2013).

Dietary options were discussed with O.M.'s mother; she could reinstitute a soy and milk-free diet reading product labels carefully, and in addition, exclude eggs from her diet, attempt a completely allergen-free diet, or begin an amino acid formula for O.M. Although complete resolution of blood in O.M.'s stool is ideal, it is also important to educate the infant's mother that as long as the amount of blood is minimal and O.M. continues to thrive, this symptom is considered benign. Understanding and support are imperative in this instance because O.M.'s mother has a toddler at home, a new infant with symptoms that are concerning to her, and she is following dietary restrictions that can be quite difficult. Praising O.M.'s mother for her commitment to breastfeeding, as well as promoting adequate nutrition for the mother, are key.

## Application to Future Practice

Cow's milk protein allergy is the most common allergy in infants and often presents solely with hematochezia. Many guidelines and studies state that an infant with a CMPA should be on an extensively hydrolyzed or amino acid formula, and do not provide recommendations on how breastfed infants with CMPA should be managed. It is crucial for providers to promote breastfeeding even in mothers of infants with CMPA. Breastfeeding can continue if the mother is willing to eliminate cow milk protein from her diet, the infant's symptoms are mild, and the infant is growing and developing normally. Education, counseling, and close follow up are needed to assure the nutritional health of both the infant and mother. ■

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