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PEDIATRIC ALLERGY AND IMMUNOLOGY

Educational Series

Educational clinical case series for pediatric allergy and immunology: Allergic proctocolitis, food protein-induced enterocolitis syndrome and allergic eosinophilic gastroenteritis with protein-losing gastroenteropathy as manifestations of non-IgE-mediated cow's milk allergy

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Cow's milk protein allergy is the most common food allergy in infants and young children. It is estimated that up to 50% of pediatric cow's milk allergy is non-IgE-mediated. Allergic proctocolitis is a benign disorder manifesting with blood-streaked stools in otherwise healthy-appearing infants who are breast- or formula-fed. Symptoms resolve within 48–72 h following elimination of dietary cow's milk protein. Most infants tolerate cow's milk by their first birthday. Food protein-induced enterocolitis syndrome presents in young formula-fed infants with chronic emesis, diarrhea, and failure to thrive. Reintroduction of cow's milk protein following a period of avoidance results in profuse, repetitive emesis within 2–3 h following ingestion; 20% of acute exposures may be associated with hypovolemic shock. Treatment of acute reactions is with vigorous hydration. Most children become tolerant with age; attempts of re-introduction of milk must be done under physician supervision and with secure i.v. access. Allergic eosinophilic gastroenteritis affects infants as well as older children and adolescents. Abdominal pain, emesis, diarrhea, failure to thrive, or weight loss are the most common symptoms. A subset of patients may develop protein-losing enteropathy. Fifty percent of affected children are atopic and have evidence of food-specific IgE antibody but skin prick tests and serum food-IgE levels correlate with response to elimination diet poorly. Elemental diet based on the amino-acid formula leads to resolutions of gastrointestinal eosinophilic inflammation typically within 6 wk.

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Cow's milk protein is a major dietary allergen in infants and young children. (1) Up to half of all cases of cow's milk allergy in childhood may manifest with symptoms limited to gastrointestinal tract. Here, we review three distinct disorders because of non-IgE-mediated immune responses to cow's milk protein.

Case 1: a breast-fed infant with bloody stools

An 11-month-old breast-fed boy presented to the allergy office for evaluation of food allergy. He was breast-fed since birth without any maternal dietary restrictions, and he was also supplemented with cow's milk-based formula, on average 4–5 times a week. At 8.5-wk gross blood was noted in the stool, and he appeared somewhat uncomfortable. At this point, cow's milk formula was discontinued and milk products were eliminated from his mother's diet with some improvement, however, without complete resolution of the bloody stools. A pediatric gastroenterologist suspected food protein-induced proctocolitis and recommended stopping soy in the maternal diet. Apparently, the mother started ingesting significant amounts of soymilk to substitute for cow's milk, and when she discontinued soymilk there was a significant improvement in the amount of visible blood in the stools. His stools became entirely negative for gross blood within 4 days following elimination of deli meats in his mother's diet that were suspected for being likely contaminated with traces of cheese during the process of slicing. Subsequent stool checks were negative for occult blood. He continued to be breast-fed with maternal dietary restrictions for cow's milk and soy protein. The patient tolerated gradual introduction of solid foods (rice cereal, yellow fruits, and vegetables) starting at the age of 6 months without any problems. His personal history of atopy was negative for atopic dermatitis, wheezing, or chronic rhinitis. Family history of allergy was significant for fish, melon, and pollen allergy in the mother and cat allergy in the father.

At the presentation to the allergy office, the patient was a healthy infant, with weight of 11.8 kg (90th percentile) and height of 80.6 cm (>95th percentile). His physical findings were entirely within normal limits.

Allergy evaluation with prick skin tests to commercial milk and soy extract and measurement of serum milk- and soy-IgE (UniCAP System FEIA, Phadia, Inc.; Uppsala, Sweden) revealed negative results.

Based on his clinical manifestations, the child was diagnosed with cow's and soy milk-induced allergic proctocolitis. His mother was advised to gradually introduce soy and cow's milk products into her diet, prior to directly feeding these two foods to her son after his first birthday. He tolerated soy and milk in his diet without any adverse reactions and breast-feeding was discontinued, and he was subsequently given cow's milk.

Allergic proctocolits discussion

Allergic proctocolitis typically presents in the first few weeks to months of life (2), but the exact prevalence is unknown. In a series of 22 infants with rectal bleeding, 14 (64%; 95% CI 41–83%) infants were diagnosed with allergic colitis by rectal biopsies, using ≥6 eosinophils per high-powered field as the diagnostic criteria (3). A recent 2-yr study followed 40 infants who presented to a University hospital with the chief complaint of visible rectal bleeding. Children were evaluated by colonoscopy, and underwent multiple screening measures to determine if a viral or bacterial cause could be found. Cow's milk allergy was determined to be the cause of the rectal bleeding for 18% of the study population (4).

With the exception of blood and mucus in the stool and possibly diarrhea, infants appear in good health. (Box 1) Parents typically note a gradual onset of bloody stools which increases in frequency unless the causal allergen is removed (2). Children with proctocolitis do not have growth delay or poor weight gain. Occasionally, infants may be slightly anemic (5), with hypoalbuminemia being a rare manifestation (6). On examination, the abdomen is benign. Case series have shown that patients with proctocolitis may have peripheral eosinophilia, elevated serum IgE, and a positive family history of atopy (6–9).

Proctocolitis commonly occurs in breast-fed infants (as many as 60% of cases) (5, 6, 10, 11), with milk and soy formulas being the causative foods in the majority of the remaining cases (7–9). For most infants who develop proctocolitis while breast feeding, it is believed that cow's milk proteins consumed by the mother are the triggering agents in breast milk. Kilshaw and Cant demonstrated that β-lactoglobulin (one of the major allergens in milk) could be detected in the majority of breast milk samples following maternal cow's milk consumption (12). Elimination of cow's milk from the mother's diet usually will lead to gradual resolution of symptoms for the infants and permits the continuation of breast feeding (5, 6, 10). However, if cessation of bleeding does not occur with maternal dietary manipulation, a casein hydrolysate formula, or in

rare instances, an amino-acid-based formula (13), accomplishes symptom clearance, typically within 48–72 h. Sampson et al. (14) estimate that more than 80% of patients will have resolution of rectal bleeding with a casein hydrolysate formula.

Lake reported a subset of 21 infants who continued to have bleeding despite maternal dietary restrictions and those whose mothers decided not to stop breast-feeding. Six of these infants developed iron deficiency anemia despite iron supplementation, but they gained weight and had normal development. These infants were able to tolerate a regular diet by their first birthday (2). The persistence of rectal bleeding despite maternal dietary restrictions may be explained by the inability to remove all sources of allergen from the diet or by an allergen that has not been identified. In addition, it has been hypothesized that the baby might react to an antigen inherent to the breast milk (15).

For most of the remaining proctocolitis cases, infants are formula-fed (ingesting either a cow's milk- or soy-based formula). A large percentage of patients with milk-induced proctocolitis will also become symptomatic with soy ingestion (9). Odze et al. (11) reported up to 30% of patients develop symptoms with both milk and soy ingestion. For these patients, changing to a casein hydrolysate or amino-acid formula is the recommended treatment.

Diagnosis is usually made through clinical history and response to an elimination diet. Exclusion of other medical diagnoses, such as infection, necrotizing enterocolitis, intussusception, or anal fissure, is essential. Although not routinely recommended for diagnosis, histopathology from biopsy specimens demonstrate eosinophilic infiltration of the colonic epithelium, lamina propria, and muscularis (2, 6–9).

Following diagnosis, treatment is via dietary restriction. Bloody stools usually regress over several days with milk/soy avoidance (5). Progression to a normal diet, including the eliminated allergen, is usually possible by 1 yr of age (5, 14). If food skin prick tests and serum food-specific IgE antibody levels are negative, gradual food introduction typically takes place at home.

Case 2: a boy with severe emesis following yogurt ingestion

A 9-month-old boy who was born full term without complications presented for evaluation. He was breast-fed from birth on an unrestricted maternal diet, although he had received cow's milk formula in the newborn nursery as supplementation and received cow's milk formula for a couple of days at 2 months of life. Solids were introduced and tolerated starting at 5 months with cereals, vegetables, and fruits. At 8 months of age, yogurt was introduced. Approximately, 2 h after eating two spoonfuls of yogurt, he developed irritability and repetitive, non-bloody, non-bilious vomiting. Additionally, he developed diarrhea later in the day. He did not have associated fever. He was taken to the emergency department where he was found to be hypotensive and listless. Examination revealed marked pallor. An i.v. line was placed and normal saline was given. Given the extreme symptoms, a 'rule-out-sepsis' work-up was conducted and i.v. antibiotics were started. Serum chemistries revealed dehydration. Complete blood count revealed leukocytosis with a left shift. His stools were guaiac positive.

Within 2 h of i.v. fluids, our patient's condition improved, and his behavior returned to baseline. He was admitted to the hospital for observation and i.v. antibiotics. He was discharged when cultures were negative for 48 h.

Two weeks after his admission, he ate a piece of cheese. Again, he developed excessive vomiting and diarrhea within 2–3 h after cheese ingestion. He was brought to the emergency department where he required i.v. fluid resuscitation. Within a few hours of i.v. fluids, baseline behavior returned. His mother was certain that the symptoms were the result of the cheese that he had eaten. Upon discharge from the ER, recommendations included the continuation of breast feeding, milk avoidance, and evaluation by an allergist.

Allergy evaluation revealed no concomitant atopic disease such as atopic dermatitis or asthma. Family history was significant for paternal allergic rhinitis and penicillin allergy. Physical examination was unremarkable. Prick skin testing was negative to milk with a negative saline control and a positive histamine control. The diagnosis of milk protein-induced enterocolitis syndrome was made based on the clinical history. Recommendations included strict milk avoidance and follow-up evaluation in approximately 1 yr.

After 1 yr of milk avoidance, our patient returned for follow-up evaluation. He had had no adverse reactions to foods since his last visit; however, he had had accidental ingestions of foods, which likely contained milk (i.e., cookie, bread prepared with butter). An oral food challenge to milk was recommended and conducted approximately 6 months after the follow-up visit.

On the day of the food challenge, an i.v. cannula was sited prior to feeding milk. Our patient tolerated two separate feedings of milk (total of 0.6 g of protein per kg as recommended by Powell) (16, 17). He was observed for 3 h following the 2nd feeding. On discharge from the challenge, the family was advised to add milk into the diet.

Food protein-induced enterocolitis syndrome (FPIES) discussion

Food protein-induced enterocolitis syndrome is a constellation of symptoms, which occur in formula-fed infants and is characterized most notably by excessive, vigorous vomiting and diarrhea. (Box 2) Diarrhea may have occult blood and stool smears may reveal leukocytes and eosinophils. Additionally, the stool may be positive for reducing substances. Depending on the severity of symptoms, patients may develop dehydration with accompanying hypotension and lethargy. Metabolic derangements such as acidosis and hyponatremia can occur as does leukocytosis and bandemia (16–18). Methemoglobinemia has also been reported in a significant number of patients who present acutely, and on presentation, these patients have a dusky appearance. Murray and Christie (19) reported that 35% of their case series (n = 17) had transient methemoglobinemia at the time of hospital admission for FPIES. Conditions of mucosal inflammation may predispose patients to the metabolic imbalances that lead to the accumulation of methemoglobin. Two patients with FPIES who developed methemoglobinemia in Murray and Christie's series were described in detail. At presentation, both patients were severely acidotic and required fluid resuscitation, illustrating the gravity of associated methemoglobinemia with FPIES (19).

For children who are fed the causal food from birth or shortly thereafter, symptoms may be more chronic in nature. These children typically have failure to thrive and hypoalbuminemia in conjunction with chronic emesis and diarrhea. When the causal food is removed and later reintroduced by challenge or accident, extreme vomiting within 2–3 h and late-onset diarrhea recur (20, 21).

Since FPIES in not a classic IgE-mediated disorder, prick skin tests are typically negative (20, 21). However, if skin tests are positive to the causal food, case series suggest that these patients have a decreased probability of developing tolerance. Allergy confirmation requires a negative work-up for other disease entities, symptom resolution with removal of the causal food, and recurrence of symptoms with an oral food challenge. Milk and soy are the foods most commonly implicated in FPIES (20, 22). In fact, approximately 50% of patients reactive to milk are also reactive to soy (17, 20, 23). Although milk and soy are the frequent foods to be problematic, solid foods such as oat, rice, chicken, and turkey may also be responsible (20, 21), requiring a high index of suspicion if the symptom constellation presents.

The treatment approach is avoidance of the offending food. For milk specifically, changing to a casein hydrolysate formula is recommended. In rare cases, symptoms do not regress on a hydrolysate formula and for those, an amino-acid-based formula is necessary (24). Interestingly, breast-feeding appears to be protective of FPIES; as to our knowledge, there are no published reports of FPIES in breast-fed babies to date. Our patient did not react to cow's milk protein in his mother's breast-milk but developed severe symptoms upon direct ingestion of dairy milk products. Rigorous label reading and anticipatory guidance regarding the risks of cross-contact should be discussed. Parents and clinicians must have an action plan in place in the case of an accidental ingestion. FPIES symptoms usually occur approximately 2 h after ingestion and may result in dehydration because of substantial fluid loss and third-spacing. First-line treatment is via fluid resuscitation rather than epinephrine and anti-histamines (although these medications should be administered if there is concomitant IgE-mediated disease). The use of corticosteroids, especially when past history reveals serious reactions, should be considered to repress the assumed T-cell immune response (25).

The majority of patients with FPIES because of milk become tolerant to the incriminated food, usually by the age of 3 yrs (20, 26). Oral food challenges are required prior to food introduction and should be performed in a controlled environment with an overseeing physician and access to emergency medications and i.v. fluids (Table 1).

Case 3: a boy with puffy eyes

A 17-month-old boy was referred for evaluation of environmental allergies. Two weeks prior to the visit, he developed ocular pruritus and periorbital edema that were worse in the morning. He had one episode of emesis during this time, but otherwise had no changes in stool pattern or quality. He had no fevers. He was

Table 1. Oral food challenge in FPIES

Challenge protocol
High risk procedure, requires immediate availability of fluid resuscitation
Gradual (over 1 h) administration of food protein 0.06*–0.6 g/kg body weight
If no reaction, discharge after 6 h
50% of positive challenges require treatment
Symptoms
Emesis (typically in 2–4 h)
Diarrhea (typically in 5–8 h)
Laboratory findings
Fecal blood: gross or occult
Fecal smear: leukocytes and/or eosinophils
Increase in peripheral polymorphonuclear leukocyte count >3,500 cells/mm^3 peaking at 6 h
Interpretation of the challenge outcome
Positive challenge: three of five criteria positive
Equivocal: two of five criteria positive

*Lower dose recommended in children with history of previous severe reaction.
Adapted from references 15 and 17.

given an over the counter oral antihistamine (diphenhydramine) to relieve his symptoms.

The patient was born at full term from a normal, uncomplicated pregnancy. He was breast- and bottle-fed with cow's milk-based formula for the first 6 wks. He developed blood-streaked stools at 2 months of age while exclusively fed cow's milk-based formula. Allergic proctocolitis was diagnosed clinically by the gastroenterologist and symptoms resolved promptly with discontinuation of cow's milk formula and introduction of an amino-acid-based formula (Neocate®, Nutricia, North America; Gaithersburg, MD, USA). Solids were started at 4 months of age, and banana, rice cereal, applesauce, and vegetables were tolerated fine. Cow's milk and dairy milk products were introduced at 10 months on and were tolerated well, although milk caused occasional perianal rash and pruritus. At the time of the initial allergy evaluation, the patient's diet included dairy, corn, wheat, rice (rice milk), raisins, applesauce, carrot, broccoli, egg, chicken, and turkey. Allergy review of systems was negative for asthma, rhinitis, medication allergy, urticaria, or eczema, although he had generally dry skin. Family history was significant for a father with Crohn's disease.

On examination, vital signs were normal for age. His height was 81.4 cm (50th percentile) and weight was 10.9 kg (35th percentile). He was a playful and interactive boy in no apparent distress. Further exam revealed bilateral periorbital edema and clear conjunctivae without erythema or exudates. Lungs were clear to auscultation, cardiac exam was normal. His abdomen was soft and non-tender with normal, active bowel sounds. He passed a bowel movement during examination that was positive for occult blood. His extremities showed 1+ edema over hands and feet. Skin exam was without rashes or other lesions.

Allergy evaluation showed detectable food-specific IgE antibody [kAU/l]: egg white 2.9, corn 0.4, wheat 1.8, peanut 0.8, soy 0.4, and chicken 0.6. Undetectable (<0.35 kAU/l) were: cow's milk, turkey, potato, rice, and environmental allergens, including dust mites, cat dander, dog dander, birch, grass, and ragweed pollens. Complete blood count with differential showed white blood count of 16.8 K/mm^3 with 8% of eosinophils (normal $<7\%$; absolute eosinophil count 1344/mm^3), hemoglobin of 10.6 g/dl and hematocrit of 33%. Platelet count was 213 K/mm^3. Blood chemistries revealed albumin of 1.4 (normal 1.9–5.0 g/dl) and total protein of 3.3 (normal 3.7–7.5 g/dl). Serum electrolytes and liver function tests were within the normal range for age. Urinalysis was negative for protein.

The patient was diagnosed with hypoproteinemia and hypoalbuminemia with suspected loss via the gastrointestinal tract and was referred to a pediatric gastroenterologist. He underwent esophagogastroduodenoscopy and colonoscopy. The mucosa appeared grossly normal. The gastric antral mucosal biopsy showed increased eosinophils in the lamina propria (maximum >30 eosinophils per high power field). There was mild chronic esophagitis associated with a maximum of 10 intraepithelial

Box 1. Key features of allergic proctocolitis

Usually presents by 6 months of life
Blood streaked, loose stools ± diarrhea in otherwise well-appearing infants
Usually occurs in breast-fed or cow/soy milk formula-fed infants
Diagnosis is via clinical history; food prick skin tests and serum food-IgE negative
Treatment via protein elimination; resolution of symptoms in 48–72 h
Tolerance to allergen usually occurs by 1 yr of life

Box 2. Key features of food protein-induced enterocolitis syndrome

Usually occurs in formula-fed infants, not reported in breast-fed infants
Profuse vomiting (within 2–3 hr) and diarrhea causing profound dehydration and lethargy upon acute exposure
Failure to thrive with hypoalbuminemia when chronically exposed
Resolution of symptoms with removal of causal food
Negative prick skin tests and serum food-specific IgE tests
Treatment of acute reactions with vigorous i.v. hydration
Reintroduction of the suspected foods under physician supervision with i.v. access
Usual resolution of reactivity with age

eosinophils per high power field. Biopsies of the duodenum and colon were without evidence of Crohn's disease. In this clinical setting, these findings were considered to be compatible with allergic eosinophilic gastroenteritis.

Food allergy evaluation revealed evidence of IgE sensitization to egg, wheat, peanut, chicken, corn, and soy. However, this patient's history of cow's milk protein-sensitive proctocolitis and the temporal association of onset of his current symptoms with reintroduction of dairy milk products into his diet pointed toward non-IgE-mediated hypersensitivity to cow's milk and possible additional foods. Therefore, he was started on a diet restricted for cow's milk, egg, soy, and rice. Following 6 wks of minimal improvement in albumin levels and persistence of occult blood in stool, an elemental diet (Neocate® 1+) was implemented. Over 3 wks, edema and heme-positive stools resolved. Albumin improved to 3.7 g/dl. Solid foods were subsequently reintroduced with one new food per week, while clinically observing for development of occult blood loss in the stool and peripheral edema. The patient subsequently tolerated a variety of fruits, vegetables, chicken and oat in his diet. Twice, he experienced recurrence of emesis and heme-positive stools that resolved after corn, apple, and tomato, and, on another occasion, chickpea were removed from the diet. At the age of 5 yrs, he remained on Neocate® 1+ and a diet restricted for dairy milk products, beef, pork, legumes, egg, peanut, tree nuts, seeds, fish, and shellfish. He is growing well and has no chronic gastrointestinal symptoms. He developed allergic rhinitis and viral upper respiratory infection-induced wheezing by the age of 3 yrs.

Allergic eosinophilic gastroenteropathy with protein loss discussion

Allergic eosinophilic gastroenteropathy is a group of heterogeneous disorders characterized by eosinophilic inflammation of the gastrointestinal tissues (14) (Box 3). Inflammation may affect the esophagus, causing allergic eosinophilic esophagitis (AEE) and/or the stomach and intestines, resulting in allergic eosinophilic gastroenteritis (AEG). Clinical manifestations depend on location and extent of the inflammation. The mucosal form of the disease is the most common and causes pain, nausea, poor appetite, vomiting, and diarrhea (27–29). Involvement of the muscular layer of the gastrointestinal wall causes strictures and dysmotility (30, 31). Serosal inflammation may lead to ascites. Peripheral blood eosinophilia is seen in 50% (AEE) to 66% (AEG) patients. A subset of patients is atopic (up to 70% of AEG.) Many patients, especially children, have dietary food protein-responsive disease, and GI inflammation resolves following dietary restriction of the offending food(s). Currently, there is no standardized treatment for AEE and AEG and no non-invasive diagnostic tests; endoscopy and biopsy remain the gold standard for diagnosis.

Box 3. Key features of allergic eosinophilic gastroenteritis in children

Usually occurs from infancy through adolescence
Chronic symptoms of poor appetite, poor weight gain or weight loss, emesis, diarrhea, occult blood in stool
Definitive diagnosis by endoscopy and biopsy; marked eosinophilic infiltration of mucosa and submucosa
Approximately, 50% are atopic; 50% have peripheral blood eosinophilia
Resolution of symptoms with removal of causal food within 6 wk Most common foods: cow's milk, egg, soy, cereals, fish
Excellent response to amino-acid-based formula
Responsive to steroids
Typically prolonged; natural history not well understood

In a subset of pediatric patients, protein-losing enteropathy has been reported (Chehade M, et al., pers. comm. New York, Mount Sinai). Protein loss is thought to occur in the stool, as demonstrated by elevated levels of fecal alpha-1-antitrypsin that can be seen in the affected patients. Increased intestinal permeability is likely the culprit for protein loss, though the site of increased permeability is not known with certainty. Protein loss has been primarily described with eosinophilic infiltration of small intestinal mucosa. However, one paper reported a patient with hypoalbuminemia and eosinophilic infiltrates in the gastric mucosa but not in the duodenal mucosa, and the authors speculated that protein loss could be due to increased gastric permeability (27).

Allergic eosinophilic gastroenteritis may occur at any age, and in a subset of patients, it is presumably caused by mixed IgE- and non-IgE-mediated food hypersensitivity. Cow's milk, soy, egg, wheat, and fish are the most commonly implicated foods. Some studies point to a delayed, cell-mediated Th-2 type reaction to certain foods. Restricted and elemental diets (based on an amino-acid formula) have been successfully tried in children with AEE and AEG with improvement of symptoms and resolution of eosinophilic inflammation within 3–6 wk (32–35). Dietary management is, however, complicated by the poor palatability of elemental formulas and typically requires feedings via a naso-gastric tube. Considering the mixed nature

of the immune responses to food proteins, selection of the avoidance diet based on the results of tests detecting food-IgE (skin or blood) is typically unsuccessful. As can be seen in our patient, cow's milk protein was the most likely culprit in his GI inflammation but milk-IgE was negative. A recent study evaluated patch testing and prick skin testing for diagnosis of AEE. The investigators found that the patch test was most commonly positive for wheat whereas milk and egg were the most common positive foods with skin testing (35), indicating that combination of prick and patch allergy skin tests may be most sensitive in detecting causative foods. However, at this time, atopy patch testing for food allergy has not been standardized, and it will require more validation before it can be recommended for use in clinical management of patients.

CME questions

A 9-month-old boy with FPIES secondary to cow's milk has been maintained on a casein hydrolysate formula. His grandmother was babysitting and fed him a piece of milk-free whole wheat bread (which he had eaten before) with butter. Within 2 h of ingestion, he developed repetitive vomiting with diarrhea. Shortly after commencement of symptoms, he became lethargic and had a dusky appearance.

1 What is the most appropriate immediate treatment plan?

(A) Administer epinephrine and diphenhydramine.
(B) Proceed to the emergency department for fluid resuscitation.
(C) Administer syrup of ipecac to induce more vomiting to aid in removal of the food allergen.
(D) Call the pediatrician's office and discuss the situation.

2 When the patient's blood was drawn, it was noted to be exceptionally dark. The dark colored blood and 'dusky' appearance is most consistent with

(A) Cyanosis because of decreased blood flow and impaired oxygenation.
(B) Cardiogenic shock.
(C) Methemoglobinemia.
(D) Overwhelming sepsis.

3 A 2-wk-old breast fed-infant presents with blood in the stool. The blood was first noted at 1 wk of life but has been progressing. Now, every stool is streaked with bright red blood. The infant is otherwise in no distress. He weighs more than his birth weight. Physical examination is unremarkable; an anal fissure is not present. What would be your advice to his mother ?

(A) Stop breast feeding immediately and switch to a soy formula.
(B) Stop breast feeding immediately and switch to an amino-acid formula.
(C) Discuss a cow's milk elimination diet for the mother and encourage the continuation of breast feeding.
(D) Refer to a pediatric gastroenterologist for possible colonic biopsies.

4 An 18-month-old girl presented with poor weight gain, diarrhea, and occasional emesis since age 13 months. Her current diet includes dairy products (introduced around age 11 months), meats, all grains and a variety of fruits. Allergy evaluation is positive for detectable serum food-IgE antibody (kIU/l, ImmunoCAP) to rice, soy, tomato, and orange; negative to cow's milk, egg white, wheat, and beef. Endoscopy and biopsy reveals eosinophilic inflammation in duodenum with average of 40 eosinophils per high power field. Diagnosis of allergic eosinophilic gastroenteritis is made and rice, soy, tomato and orange are removed from her diet for 6 wks without any improvement in symptoms and no weight gain. What is the most appropriate next step ?

(A) Repeat endoscopy and biopsy because sometimes improvement in clinical symptoms may lag behind resolution of GI inflammation on biopsy.
(B) Conclude that food allergy is not likely in this child and prescribe a course of oral steroids.
(C) Eliminate dairy products, egg, wheat, and soy for 8 wks from her diet.
(D) Perform additional skin tests and blood tests to other foods that she has in her diet to identify other foods that may contribute to AEG.

The answers will be available in the next issue.

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