

Gastrointestinal food allergy in Ghanaian children: a case series

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SUMMARY

Background: Food allergy is an adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food. Food allergies are classified into three types: Ig(immunoglobulin)E mediated, mixed IgE and cell mediated and cell-mediated non IgE mediated. Gastrointestinal (GIT) food allergy has classically encompassed a number of different clinical entities: food protein-induced enterocolitis syndrome (FPIES), food protein-induced proctocolitis (FPIP), food protein-induced enteropathy and eosinophilic gastrointestinal disorders (EGID).

Case presentations: These are 5 cases of infants and toddlers who presented with various features of gastrointestinal food allergies, the commonest of which is lower gastrointestinal bleed. Two infants on exclusive breast feeding, presented with lower gastrointestinal bleeding and these resolved with maternal dietary milk and all dairy elimination. The third infant had rectal bleeding at age 6 months after the introduction of infant formula. The bleeding and eczema resolved with the introduction of hydrolyzed formula. One of the toddlers presented with severe eczema and malnutrition which improved with 6 food elimination. The last case had massive lower gastrointestinal bleed which resulted in hemicolectomy with no improvement until dietary elimination was instituted.

Conclusion: Gastrointestinal food allergy is not uncommon in children in Ghana. A high index of suspicion is required to make the right diagnosis, to minimize morbidity and unnecessary therapy.

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INTRODUCTION

Food allergy is defined as an adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food. Food allergy differs from food intolerance which is undesirable reactions to food which does not involve the immune system.¹ Food allergies are classified into three types: IgE mediated, mixed IgE and cell mediated and cell mediated, depending on the involvement of immunoglobulin in their pathogenesis.² Most food allergies that exhibit cutaneous and or respiratory symptoms within one hour after ingestion of offending foods belong to IgE mediated food allergies.²

Unlike IgE mediated food allergy, some patients exhibit gastrointestinal symptoms such as vomiting, diarrhoea and bloody stool several hours (at least 1 hour) after ingestion of offending foods, with only rare cutaneous or respiratory manifestations. Those patients are diag-

nosed as having a subtype of food allergy, called gastrointestinal food allergy (GI allergy).³ Specific antibodies to offending foods are rarely detected in sera from patients with GI allergy, especially infants. Therefore, GI allergy is thought to be cell mediated or mixed IgE and cell mediated disease. However, the precise mechanisms and pathogenesis of GI allergy remain unclear.⁴

GI allergy has classically encompassed a number of different clinical entities: food protein-induced enterocolitis syndrome (FPIES), food protein induced proctocolitis (FPIP), food protein induced enteropathy and eosinophilic gastrointestinal disorders (EGID).² In the first three, most patients are infants and rarely have detectable food-specific IgE antibodies. Therefore, they have been classified as non IgE mediated diseases.

On the other hand, most patients with EGID are adults and older children, and often have detectable food specific IgE antibodies.⁵ Food protein induced allergic proctocolitis (FPIP) is among the earliest and most common food allergic diseases of infancy.⁶

The prevalence of food allergy varies significantly based on geographical region, allergens tested, criteria used for diagnosing food allergy, age of the population, setting of the population sample and intercurrent atopic conditions.⁷ The prevalence of true mediated food allergy is difficult to measure because of large variations in study methodology, which includes those relying on self-reporting questionnaires that tend to vastly exceed the true prevalence due to their reliance on lay perceptions of allergy, to studies using more rigorous double-blind placebo-controlled food challenges but only including small numbers of patients.⁸

Food allergy is more common in children than adults, and seems to be increasing in prevalence in many developed countries for the past decades.^{7,9} After birth, the gastrointestinal mucosal lining is challenged by a myriad of antigens, from viruses to commensal microbiota and dietary antigens which are better handled in the mature gut. However in the developing gastrointestinal tract, these antigens may induce inflammatory response which may manifest as allergic phenomenon.¹⁰ Exposure to an increased diversity of foods in early life is inversely associated with allergic diseases including food allergy.¹¹

Although food allergies are commonly encountered by paediatricians, and the public demonstrate a marked interest in food allergies and intolerances, this diagnostic arena is little regarded by most health care practitioners.⁸ Because gastrointestinal food allergy is a non IgE mediated immune response, the best means of diagnosis and treatment is by eliminating the offending food allergen for at least 2 weeks. This is followed by food challenge once a response has been observed. There is lack of awareness of the varied presentation of food allergies in children coupled with poor availability of information from sub Saharan Africa. This write up is to present some cases seen in Ghana and to throw light on gastrointestinal food allergies in the Sub region.

CASE REPORTS

Case 1

A 10 weeks old exclusively breastfed female infant presented with bloody diarrhoea of 4 days and stool frequency of 3-4 times per day. There was no fever, vomiting or abdominal distension. Both parents have food allergies. Physical examination finding was normal. Lab investigations done included Full Blood Count (FBC)

and abdominal ultrasound both of which were normal. Stool testing showed red blood cells. A diagnosis of gastroenteritis was made and a differential of intussusception was ruled out following the normal abdominal ultrasound. Oral cefuroxime and metronidazole were given for 5 days without resolution of bloody stool. The case was reviewed, and it was noted that, the absence of fever, vomiting and abdominal distension did not support the diagnosis of gastroenteritis. Gastrointestinal food allergy, specifically allergic proctocolitis was considered. Maternal dairy product was eliminated from the diet for 1 week and the bloody stools stopped within 48 hours of the dietary elimination. Maternal dairy elimination was continued for 3 months. Dairy products were introduced to the infant diet at age 6 months without recurrence of bloody stools.

Case 2

A 6 months old male infant presented with bloody mucoid stools 4 days after the introduction of weaning feeds (mixed cereal flour and infant formula). There was no fever, vomiting, intermittent restlessness or abdominal distension. There was a family history of aero allergy. Prior to being referred, the infant had had hydrostatic reduction for a suspected diagnosis of intussusception despite a normal abdominal ultrasound, and there was no resolution of symptom. Physical examination was normal except for eczema on the face, chest and upper back which was noticed prior to the introduction of weaning feeds. Hence, the infant formula and the mixed cereal flour were both stopped and extensively hydrolyzed formula was started, which led to the resolution of both the bloody stools and eczema within 1 week. After the 4th week of treatment the mother changed the milk to standard infant formula and the eczema recurred but not the bloody stools. She then stopped and restarted the hydrolyzed formula and the eczema cleared.

Case 3

A 2 years old male toddler presented with chronic diarrhoea and poor growth since the age of 7 months, as well as speech and language regression for 4 months. He had been seen in 3 different hospitals and managed for protein calorie malnutrition for over 1 year with Ready to Use Therapeutic food and home based foods. HIV test was negative. He looked chronically ill and miserable with depigmented sparse and easily pluckable silky hair. His skin was dry with papular eruptions and very pruritic. His weight for age was below the minus 3 standard deviation without oedema. FBC showed hypochromic microcytic anaemia. Stool testing showed pus cells. Faecal elastase, calcium, magnesium and phosphorus, BUE and Cr, liver and thyroid function tests were all normal. Serum vitamin D level was low.

A diagnosis of rickets with severe malnutrition as a result of probable allergic enteropathy was made. The following foods: milk and all dairy, egg, nuts, sea food, wheat and soy were eliminated from his diet. In addition to what he was already eating, hydrolyzed formula (for toddlers), calcium, vitamin D and multivitamins were added to his diet. The diarrhoea improved within a week as well as his affect. Six weeks later, his hair texture and weight improved. He also started walking and eczema resolved completely. At 6 months review, he had achieved his expected weight for age.

Case 4

A 2 days old female neonate presented with abdominal distension, bilious vomiting and passage of bloody stools on first day of life. Examination findings included abdominal distension with no palpable masses and bloody stool on the examining finger. Ultrasound done showed malrotation, which was surgically corrected, and an ileostomy created. The infant was well until a month later, when she presented with passage of frank blood per rectum and normal stools from the stoma. Investigations done: FBC, clotting profile, LFT and stool for CMV were all normal.

A colonoscopy done showed no abnormality. A suspicion of food protein induced proctocolitis was made. Because the infant was exclusively on breast milk, maternal dairy products were eliminated and she was put on calcium supplement. The bloody stool stopped completely until the age of six months when the mother started soy formula which caused intermittent bloody stools, thus confirming a diagnosis of food protein induced proctocolitis. Subsequently the soy formula was removed from the infant's diet.

Case 5

An 18months old male child was admitted on different occasions with recurrent rectal bleeding, which required a total of 5 units of blood transfusion and multiple upper and lower gastrointestinal endoscopies which were grossly normal. At age 2 years, he had a massive rectal bleeding for which he had an exploratory laparotomy and right hemicolectomy was done with ileocolic anastomosis. This was based on the finding of blood in the right colon. Two weeks after surgery, bleeding recurred. All this while, his growth had been normal.

The following labs were done: FBC, Blood Urea Electrolyte and Creatinine (BUE and Cr), Calcium Magnesium Phosphate (CMP), Liver Function Test (LFT), clotting profile, Tissue Transglutaminase Immunoglobulin A (TTG IgA) and total IgA. He had anaemia, elevated WBC and the rest were essentially normal. A repeat colonoscopy showed blood in the entire colon. A diagnosis of FPIP was made.

Dietary elimination similar to case 4 above was started with resolution of bleeding for 3 months. Individual foods were reintroduced at 2 weekly intervals until nuts and milk were found as the offending foods. He failed a nuts and milk challenge after one year and he is currently doing well without nuts and milk in his diet.

DISCUSSION

The above cases presented indicate the occurrence of gastrointestinal food allergy in Ghanaian infants and toddlers or early childhood in line with what has been reported in literature.¹² This can be of significant worry to caregivers and affect the quality of life of affected children hence it is important to increase awareness and the ease or difficulties associated with its presentation and diagnosis.¹³ It is known world over that the incidence of food allergy has risen.¹⁴ It is known that, the common foods producing allergy in these children are cow's milk, hen's egg, nuts, wheat and soy which are foods commonly given to this age group.³

It would have been easier for paediatricians and parents to diagnose gastrointestinal food allergy if the causal foods were uncommon or rare, and subsequent treatment a lot easier and more tolerable. This would have been especially so if they fall into the IgE mediated group whose symptoms are rapid in onset and easily identifiable since they manifest externally as well as internally.¹⁵ A careful history is very important in unraveling food allergy in children. The presentation of bloody mucoid diarrhoeal stool in almost all the presented cases is worth noting as this is usual with FPIP (food protein induced proctocolitis).¹⁶

Bloody mucoid stool is however not a symptom exclusively reserved for food allergy but also common in other conditions such as gastroenteritis and intussusception among others which are equally common in this age group. To be able to differentiate these other conditions from food allergy, a good history and thorough physical examination is required to be able to have a fair differential diagnosis as extensive investigation in food allergy is not usually helpful. Failure to do so can lead to misdiagnosis and institution of wrong therapy as noted in some of our cases.

One of the patients had growth impairment with associated skin changes and systemic manifestations of malnutrition. This is not an uncommon presentation in patients with food protein induced enteropathy (FPIE).^{15,17} FPIE occurs commonly from the age of 6 months with severe symptoms of non-bloody diarrhoea, failure to thrive, vomiting, malabsorption, oedema and anaemia.

This is as a result of small bowel injury with villous atrophy and resolves within 2-3 years.³ It is not uncommon for patients presenting with significant gastrointestinal bleed, to be referred to surgeons. In the absence of knowledge of food allergy as possible causes, unwarranted surgical interventions may be instituted with its antecedent complications. In managing children presenting with haematochezia, one should have a high index of suspicion for food allergy as a possible cause whilst investigating for other causes, so as to avoid misdiagnosis and unwarranted therapy.

In the presence of haematochezia with negative macroscopic findings on colonoscopy, mucosal biopsies for histopathology are a necessity so that one does not miss microscopic evidence as may be seen in eosinophilic gastroenteropathies. When it comes to treatment of food allergies, dietary elimination is the mainstay of treatment and this applied to all the patients seen in this report. In two of the patients, the elimination was in their mothers because the children were exclusively on breastmilk,¹⁶ indicating that maternal transmission of antigens through breast milk can result in food allergy. Strict avoidance of causal food is the only treatment that prevents recurrence of symptoms.

This subsequently leads to improvement in the health of the patient as was seen in our patients. In young infants, who are on formula feed, the use of hydrolyzed formulas becomes the appropriate substitute for standard cow's milk formula, whilst complete elimination of the offending food is used in children on other foods.¹⁸ In our effort in managing food allergies, we should not lose track of the need for nutrients required for adequate growth and development of all children.¹⁶ Oral food challenge, which is the introduction of suspected or confirmed causal food, was inadvertently done in some of our patients resulting in recurrence of symptoms. This was confirmatory of the causal food as the source of food allergy. Oral food challenge is an integral part of the work-up as it can confirm or rule out the diagnosis of allergy to the tested foods.

Reintroduction of causal food, also known as rechallenge, can be done during follow up to assess the timing at which the patient might have outgrown the allergy. In our cases, follow-up is being done to ascertain when our patients would have outgrown their allergy

CONCLUSION

Gastrointestinal food allergy is not uncommon in children in Ghana, presenting with symptoms akin to other disease entities.

A high index of suspicion is required to get the diagnosis right and avoid misdiagnosis or wrong therapy.

In the current situation, awareness must be created among family physicians and paediatricians so as to facilitate early diagnosis and minimize morbidity and unnecessary therapy. Also gastrointestinal bleeding does not imply early surgical consult and or interventions in most of the cases.

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