Journal of Case Reports and Studies
Volume 6 | Issue 3
ISSN: 2348-9820

Case Report Open Access

Non-Ige-Mediated Cow's Milk Protein Allergy Presenting with Generalized Edema: Case Report and Review of the Literature

Alharbi AO[1], Albalawi RM[1], Alsharif A[2], Alsharif E[2], Hasosah M[*3] and Alharbi MS[4]

[1]Department of Pediatric Gastroenterology, Maternity and Children hospital, Buraidah, Qassim, Saudi Arabia
[2]Departments of Family Medicine, King Abdul-Aziz Medical City, King Saud bin Abdulaziz University for Health Sciences, National Guard Hospital, Jeddah, Saudi Arabia
[3]Pediatric Gastroenterology, King Abdul-Aziz Medical City, King Saud bin Abdulaziz University for Health Sciences, National Guard Hospital, Jeddah, Saudi Arabia
[4]Internal medicine consultant, Qassim University, Saudi Arabia

[*]**Corresponding author:** Hasosah M, Associate Professor of Pediatrics, Consultant Pediatric Gastroenterologist, King Saud bin Abdulaziz University for Health Sciences, King Abdullah International Medical Research Center, National Guard Hospital, PO BOX 8202, Jeddah 21482, Saudi Arabia, Tel: 00966550105599, E-mail: hasosah2007@yahoo.com

Citation: Alharbi AO, Albalawi RM, Alsharif A, Alsharif E, Hasosah M, et al. (2018) Non-Ige-Mediated Cow's Milk Protein Allergy Presenting with Generalized Edema: Case Report and Review of the Literature. J Case Rep Stud 6(3): 302. doi: 10.15744/2348-9820.6.302

Received Date: February 27, 2018 **Accepted Date:** June 25, 2018 **Published Date:** June 27, 2018

Abstract

Cow's milk protein allergy (CMPA) is the most common food allergy in young children. A 40-day-old boy on regular formula presented with generalized edema and chronic watery diarrhea since birth. Laboratory data revealed serum albumin at 0.9 g/dL, and urine analysis did not reveal proteinuria. Echocardiogram was normal. CMPA was diagnosed based on history and rapid response to amino-acid-based infant formula (Neocate®). At the infant's last follow-up examination at 24 months, he was thriving on a regular diet, with normal growth.

Keywords: Cow's Milk Protein Allergy; Hypoalbuminemia; Watery Diarrhea

Introduction

Cow's milk protein allergy (CMPA) is the most common food allergy in infants and young children and has a prevalence of 2% - 3% in the general population [1]. Allergic reactions to cow's milk may be categorized as IgE-mediated, non-IgE-mediated, and mixed types [1,2].

IgE-mediated reactions typically occur immediately after ingestion, whereas non-IgE mediated reactions are delayed and take up to 48 hours to develop but still involve the immune system. An infant with suspected IgE-mediated milk allergy will require testing for specific IgE to milk (skin prick test or blood tests). Infants with suspected non-IgE-mediated disease do not need these tests (8).

However, in infancy, there is no definitive means of differentiating IgE- and non-IgE-mediated CMPA, owing to significantly overlapping presentations (1). Symptoms and signs of CMPA usually involve skin and the gastrointestinal and respiratory tracts. Gastrointestinal tract manifestations of CMPA are nonspecific and are the only type that can be diagnosed in all age groups [1]. When the diagnosis is delayed, the allergy may impair the growth and quality of life and even be life-threatening [3]. Rarely, CMPA may also present with severe hypoalbuminemia [4,5]. Here, we report an unusual presentation of non-IgE CMPA in a small infant with severe hypoalbuminemia and chronic diarrhea. Review of the literature will be provided.

Case report

A 40-day-old boy was admitted to the hospital with chronic diarrhea since birth (i.e., from day 1) and generalized edema of the whole body (anasarca), which developed in the 3rd week of life. He had watery, non-bloody diarrhea four times per day. His mother noticed that the infant's weight had decreased progressively since birth in spite of feeding with aregular cow's milk formula (premium care), accompanied by infrequent breast milk feeding approximately 1-3 times per day. There was no history

of overfeeding and no cardiac symptoms. His prenatal, natal, and postnatal history revealed normal vaginal delivery, full term, no neonatal intensive care admission, and other parts of his history were not significant. His mother's diet during pregnancy was regular, with no history of allergy.

Family history revealed that his sister was allergic to eggs and nuts.

Physical examination revealed pallor and generalized edema (anasarca). Laboratory data revealed a white blood cell count of 10.000/ mm^3, hemoglobin at 13 g/dL, MCV at 88 fL, platelets at 405 × 10/ mm^3, and albumin at 0.9 g/dL. The serum Na, K, urea, creatinine, and alanine-aspartate aminotransferase levels were normal. His urinary analysis did not show proteinuria, and the reticulocyte count was normal. The patient's serum folic acid and ferritin levels were normal, and the anti-gliadin, anti-endomysium, and anti-tissue transglutaminase antibodies were negative. Serum IgA, IgM, IgG, and IgE were normal.

Stool analysis, culture, anti-alpha 1 antitrypsin, and elastase were normal, and a skin prick test was negative. During hospitalization, albumin was administered as an infusion twice per day for one week to achieve a serum albumin level of 2.4 g/dL. However, albumin decreased again, and the infant required another albumin infusion. CMPA was suspected, based on his history of receiving a cow's-milk-based formula and family history of allergy. Fortunately, an amino-acid-based infant formula (Neocate®) was started. Within 72 hours, he showed significant clinical improvement in the form of reduced edema and cessation of diarrhea; however, no further albumin transfusions were required becausehis albumin level reached 3.2 g/dL. During outpatient follow-up, he gained 2000 grams of body weight over the following 30 days. After one month, the serum albumin reached a normal level (3.8 g/dL) spontaneously. At the last follow-up examination at 24 months, he was thriving on a regular diet with normal growth.

Result

	Clinical presentation	CBC	Albumin (g/dl)	Renal profile	Bone profile	IGE	Urine for protein	SPT
At admission	Edema Chronic diarrhea	Normal	0.9 (low)	Normal	Normal	Normal	Negative	Negative
24 h post albumin infusion	Stopped diarrhea	Normal	2.4 (low)	Normal	Normal			
72 h post elemental formula		Normal	3.2	Normal	Normal			
1 week post elemental formula		Normal	Normal	Normal	Normal			
2 weeks post elemental formula		Normal	Normal	Normal	Normal			
2 months post elemental formula		Normal	Normal					

Table 1: Cow's milk protein allergy

Discussion

The symptoms and signs related to CMPA may involve many different organ systems, mostly the skin and the gastrointestinal and respiratory tracts (9). Gastrointestinal symptoms of CMPA may be caused by inflammation, dysmotility, or a combination of both [1]. The signs of CMPA include dysphagia, vomiting, regurgitation dyspepsia, early satiety, anorexia, diarrhea (with or without malabsorption or protein loss due to enteropathy), rectal bleeding, failure to thrive, abdominal pain, severe colic, and persistent constipation that is often accompanied by perianal abnormalities [1,3]. The state of inflammation may result in reduced bioavailability or an excessive loss of nutrients due to the increased intestinal permeability that causes poor growth in children with food allergies [6]. Our patient had non-IgE CMPA accompanied by severe hypoalbuminemia, which is a rare association. Hwang *et al.* described several children with enterocolitis caused by cow's milk and reported that a failure to gain weight (< 10 g/day) and serum hypoalbuminemia (< 3.5 g/dL) upon admission are the highest indices of suspicion for CMPA [4]. In addition, rapid reduction in the serum albumin level to < 3 g/dL, during follow-up or after admission may be considered an important diagnostic clue [4]. Harikul *et al.* reported that 4 of their 29 CMPA patients had a serum albumin level less than 2.5 g/dL [5]. The nutritional status was normal in 38%, while first and second degrees of protein energy malnutrition were observed in 27.6% and 34.4% of the patients, respectively [5]. Upon admission, our patient presented a mild degree of protein energy malnutrition and severe hypoalbuminemia caused by the clinical manifestation of edema. The most common causes of edema and hypoalbuminemia were ruled out because he had no loss of protein in the urine and stool. Any diagnosis of CMPA must be either confirmed or excluded

through an allergen elimination and challenge procedure. Our patient was diagnosed with non-IgE-mediated CMPA based on his IgE and skin-prick test results. An oral cow's milk challenge test was planned, but the patient did not attend the follow-up. As soon as the diagnosis was made, she started being fed with an amino-acid-based infant formula (Neocate®), it is an elemental formula (complete protein hydrolyzed), and breast milk was not stopped, as the mother's diet was reconfigured as a cow's milk protein-free diet. There was a significant clinical improvement in the patient after a period of one month, and an encouraging decrease in hypoalbuminemia was seen. The long-term prognosis for most affected infants is generally good, with 80% - 90% naturally acquiring a tolerance of cow's milk proteins by the age of five [1]. However, recent studies suggest that the natural history of CMPA is changing, with an increasing persistence until later in life and an increasing severity of illness (2).

Conclusion

Hypoalbuminemia and anasarca are uncommon presentations of CMPA. CMPA should be kept in mind as a cause, although it is unclear whether the hypoalbuminemia is the result of persistent vomiting or a diet with low protein content. Therefore, the diagnosis of CMPA still must be based on strict, well-defined elimination and milk-challenge procedures.

References

1. Koletzko S, Niggemann B, Arato A, Dias JA, Heuschkel R, et al. (2012) Diagnostic approach and management of cow's-milk protein allergy in infants and children: ESPGHAN GI Committee practical guidelines. J Pediatr Gastroenterol Nutr 55: 221-9.

2. Berni Canani R, Nocerino R, Terrin G, Frediani T, Lucarelli S, et al. (2013) Formula selection for management of children with cow's milk allergy influences the rate of acquisition of tolerance: a prospective multicenter study. J Pediatr 163: 771-7.

3. Yimyaem P, Chongsrisawat V, Vivatvakin B, Wisedopas N (2003) Gastrointestinal manifestations of cow's milk protein allergy during the first year of life. J Med Assoc Thai 86: 116-23.

4. Hwang JB, Lee SH, Kang YN, Kim SP, Suh SI, et al. (2007) Indexes of suspicion of typical cow's milk protein-induced enterocolitis. J Korean Med Sci 22: 993-7.

5. Giovannini M, D'Auria E, Caffarelli C, Verduci E, Barberi S, et al. (2014) Nutritional management and follow up of infants and children with food allergy: Italian Society of Pediatric Nutrition/Italian Society of Pediatric Allergy and Immunology Task Force Position Statement. Ital J Pediatr 40: 1.

6. Høst A (1994) Cow's milk protein allergy and intolerance in infancy. Some clinical, epidemiological and immunological aspects. Pediatr Allergy Immunol 5: 1-36.

7. Luyt D, Ball H, Makwana N, Green MR, Bravin K, et al. (2014) Standards of Care Committee (SOCC) of the British Society for Allergy and Clinical Immunology (BSACI). Clin Exp Allergy 44: 642-72.