

# Cow's Milk Allergy among Young Children: An Overview

Najwa Mohammad Al-Sawi<sup>1</sup>, Khalid Al-Hazmi<sup>2</sup>, Shereen Hamadneh<sup>3</sup>

<sup>1</sup>Consultant Pediatric Allergy-Immunology, Doctor Sulaiman Al Habib Medical Group, Riyadh, Saudi Arabia

<sup>2</sup>Consultant General Surgeries, King Salman General Hospital, Riyadh, Saudi Arabia

<sup>3</sup>Associate Professor, Department of Maternal Child Health, Faculty of Nursing, Al al-Bayt University, Mafraq, Jordan

**Abstract:** *This brief review discussed the subject of cow's milk allergy (CMA), including definition, symptoms, and classification of reaction; risk factors and management. The literature highlighted the importance of breastfeeding as a natural way that provides optimal food for infants' healthy growth and development. If breastfeeding is unavailable, the parents are looking for an alternative, which may lead to some allergies. Cow's milk allergy (CMA) is one of the most common food allergies in early life. Cow's milk contains more than 20 portions fractions; allergens belong to casein protein. CMA may comprise different organs and systems, most commonly the skin and the gastrointestinal tract, followed by the respiratory tract. Concerning epidemiology reports, CMA is more likely to be higher risk among male than female, and this reverses in adulthood. CMA conditions are also expected to have other atopic diseases, with the prevalence of multiple food allergies identified in more than 90% of CMA patients in the at-risk population, high rates of asthma, atopic dermatitis, and allergic rhinitis. There is evidence that genetic and environmental factors play an essential role in the development of CMA. The clinical diagnosis of CMA is sometimes tricky, as signs/symptoms such as regurgitation and colicky crying may also occur in more than 50% of healthy infants. Treatment of intolerance and allergies are different. The final cure for all food allergies is the complete elimination of food from the diet. If the child has a cow's milk allergy and accidentally consumes milk, Signs and symptoms begin shortly after consumption of milk; ranged of increased breathing, constriction of the airways, swelling of the throat, redness of the face, itching, and anaphylaxis. Antihistamines may reduce the mild allergic reaction, and the epinephrine injection is used for severe reaction cases. As a prevention measure for a severe reaction; the parents should have taught by health professionals and prepared them for emergencies.*

**Keywords:** Allergy; Nutrition; Breastfeeding; Emergency

## 1. Background

Cow's milk allergy (CMA) prevalence characteristically summits during early childhood. This brief review discussed the subject of cow's milk allergy (CMA), including definition, symptoms, and classification of reaction, risk factors and management.

Breastfeeding is a natural way that provides optimal food for infants' healthy growth and development. (American Academy of Pediatrics 2012; WHO 2003) If breastfeeding is unavailable, the parents are looking for an alternative, which may lead to some allergies. (American Academy of Pediatrics 2012) Cow's milk sensitivity (CMA) defines as an immune response to proteins in cow's milk that occur continuously with ingestion. (Savage et al. 2015) It is one of the most common food allergies in early life. (Hochwallner et al. 2014) cow's milk allergy (CMA) prevalence characteristically summits during early childhood and tends to recede later. (Savage et al. 2015; Hochwallner et al. 2014)

Cow's milk contains more than 20 portions fractions; allergens belong to casein protein (alpha-s1-, alpha-s2-, beta/kappa-casein) and whey proteins (alpha-lactalbumin and beta-lactoglobulin) (Martorell et al. 2006). Most individuals with cow's milk allergy are sensitive to both casein and whey proteins. (Høst et al. 2002) Harmful immune food reactions classified by two main categories: IgE-mediated, non-IgE-mediated. The non-intermediate mechanism IgE often causes an allergy to cow's milk. (Oranje, Wolkerstorfer, de Waard-van, & der Spek 2002)

Cow allergy usually appears in the first few months of life and generally before six months. Symptoms can perform a few days or weeks after eating cow's milk protein. Symptoms can vary from diarrhoea and vomiting to life-threatening anaphylaxis. (Flom & Sicherer 2019) In cases involving the digestive tract, the child can become dehydrated and exhibit a failure to grow. (Flom & Sicherer 2019)

### 1.1 CMA symptoms

CMA may comprise different organs and systems, most commonly the skin and the gastrointestinal tract, followed by the respiratory tract. (Koletzko et al. 2012) CMA Gastrointestinal symptoms comprise of food impaction due to impaired oesophageal motility, dysphagia, and swelling of the oral and perioral. (Spergel, et al. 2007) CMA associated also with regurgitation, vomiting, dyspepsia, early satiety and food refusal. (Nielsen et al., 2004) As well as, CMA patient may complain of rectal bleeding, abdominal pain, severe colic, diarrhoea or persistent constipation. (Arvola et al. 2006; Iacono et al. 1998; Lucassen et al. 2001) CMA can cause failure to thrive. (Nielsen et al. 2004)

### 1.2 Classification of cow's milk allergy reactions

Cow's milk allergy reactions classified into a rapid onset; usually, IgE-mediated, where symptoms occur within an hour after ingestion, and a slow beginning, other than IgE-mediated, where symptoms take hours or days to be presented. (Caffarelli et al. 2010; Kansu et al. 2016) Rapid

symptoms include, urticaria/hives, itching or tingling around the mouth or lips, angioedema, swelling of the lips, tongue, throat, wheezing, and cough, shortness of breath, vomiting, or anaphylaxis; while moderate symptoms include hematochezia, diarrhoea, abdominal cramps, colic and anaphylaxis. (Luyt et al. 2014) Signs and symptoms begin shortly after consumption of milk and may include; increased breathing, constriction of the airways, swelling of the throat, redness of the face, itching, and anaphylaxis that life threat. (Luyt et al. 2014)

### 1.3 CMA risk factors

Concerning epidemiology reports, CMA is more likely to be higher risk among male than female, and this reverses in adulthood. (Flom & Sicherer 2019) CMA conditions are also expected to have other atopic diseases, with the prevalence of multiple food allergies identified in more than 90% of CMA patients in the at-risk population, high rates of asthma, atopic dermatitis, and allergic rhinitis. (Flom & Sicherer 2019) There is evidence that genetic, genetic and environmental factors play an essential role in the development of CMA, although the underlying mechanisms are still described. (Savage & Johns 2015; Jansen 2018)

There is evidence that genetic, genetic and environmental factors play an essential role in the development of CMA. (Savage & Johns 2015; Jansen 2018) Evidence suggested that children who migrated in early ages are at higher risk to develop sensitivity to cow's milk, than those who migrated later in their life; (Keet, Wood, and Matsui 2012) although underlying mechanisms are still not elucidated.

### 1.4 Treatment and management

Treatment of intolerance and allergies are different. The doctor should be aware of the difference between milk sensitivity and intolerance to milk. (Luyt et al. 2014) The main difference between milk intolerance and allergy, the intolerance does not include the immune system; and its common symptoms gas, bloating and diarrhea. (Luyt et al. 2014) Thus, it is vital to make a correct CMA diagnosis to avoid unnecessary exclusion diet. However, the clinical diagnosis is sometimes difficult, as signs/symptoms such as regurgitation and colicky crying may also occur in more than 50% of healthy infants. (Vandenplas et al. 2015)

The final treatment for all food allergies is the complete elimination of food from the diet. When a child starts on a milk-free diet, the doctor or dietitian should plan nutritionally balanced meals. The child may need replacement supplementations for nutrients such as calcium, vitamin D and Riboflavin. (Koletzko 2012) Breastfeeding is recommended, mainly if the infant is at high risk of developing milk allergy. Cow's milk proteins passed through breast milk to the child and may cause an allergic reaction. Breastfeed mother of CMA infant should eliminate all foods containing cow's milk protein, including cheese, yoghurt, and butter from her diet [Kansu et al. 2016]. Cows' milk allergies rates in breastfeeding are lower than in infants fed in formulas. (Flom & Sicherer 2019) Therefore breastfeeding is recommended, especially if the infant is at high risk of developing milk allergy. (Kansu 2016) Cow's milk proteins

pass through the mother's milk to the baby and may cause allergies. A child with CMA, the mother, should rid of all foods that contain cow's milk proteins from her diet, including yoghurt, cheese and butter. (Brill 2008; Koletzko 2012; Kansu 2016; Academy of Breastfeeding Medicine 2011)

Substitute milk such as sheep and goat's milk is generally unacceptable due to a high degree of mutual interaction. However, research shows that there are incidents of reduced interaction via camel milk. (Restani 1999) Camel milk is quite different in its conformation associated to cow's milk, equivalent to human milk, the allergenic milk protein  $\beta$ -lactoglobulin (BLG) is likewise absent in camel milk. (Hinz et al. 2012)

Furthermore, similar to human milk, camel milk has approximately five times the amount of immunoglobulins in comparison to cow's and has almost double the amount of – casein milk. (Hailu et al. 2016) Camel milk is a promising alternative to cow's milk for infant formula manufacture. (Rastani et al. 2019) Goat's milk is not appropriate for use in infants, because of its protein and potassium very high load. It has about double and the chloride load four times the amount present in most infant formulas, which could cause allergy. (Hendriksz et al. 2006) The consumption of sheep's and goat's milk by infants linked with the metabolic disorder (acidosis) and severe electrolyte imbalances. (Hendriksz et al. 2006; Chapman et al. 2008) Reports also defined linked morbidity four consuming of sheep's and goat's milk among infants that associated with life-threatening anaphylactic shock and allergic reactions. (Hendriksz et al. 2006; Chapman et al. 2008) Consuming of sheep's and goat's milk among infants can cause certain infections, acute stroke, megaloblastic anaemia and haemolytic uremic syndrome. (Hendriksz et al. 2006; Chapman et al. 2008)

If the child has a cow's milk allergy and accidentally consumes milk, Signs and symptoms begin shortly after consumption of milk, ranged of increased breathing, constriction of the airways, swelling of the throat, redness of the face, itching, and anaphylaxis (Luyt et al. 2014). Antihistamines may reduce the mild allergic reaction, and the epinephrine injection is used for severe reaction cases. (Flom & Sicherer 2019) As a prevention measure for a severe reaction; the parents should have taught by health professionals to be prepared for emergencies, also carry injectable epinephrine at all times with them. (Yue, Ciccolini, Avilla, Wasserman 2018; Anagnostou et al. 2018; Flom & Sicherer 2019)

## 2. Summary

Breastfeeding is a natural way that provides optimal food for infants' healthy growth and development. If breastfeeding is unavailable, the parents are looking for an alternative, which may lead to some allergies. Cow's milk allergy is one of the most common food allergies in early life. Cow's milk contains more than 20 portions fractions; allergens belong to casein protein. CMA may comprise different organs and systems, most commonly the skin and the gastrointestinal tract, followed by the respiratory tract. Concerning epidemiology reports, CMA is more likely to be higher risk

among male than female, and this reverses in adulthood. CMA conditions are also expected to have other atopic diseases, with the prevalence of multiple food allergies identified in more than 90% of CMA patients in the at-risk population, high rates of asthma, atopic dermatitis, and allergic rhinitis. There is evidence that genetic and environmental factors play an essential role in the development of CMA. The clinical diagnosis of CMA is sometimes difficult, as signs/symptoms such as regurgitation and colicky crying may also occur in more than 50% of healthy infants. Treatment of intolerance and allergies are different. The final treatment for all food allergies is the complete elimination of food from the diet. If the child has a cow's milk allergy and accidentally consumes milk, signs and symptoms begin shortly after consumption of milk, ranging from increased breathing, constriction of the airways, swelling of the throat, redness of the face, itching, and anaphylaxis. Antihistamines may reduce the mild allergic reaction, and the epinephrine injection is used for severe reaction cases. As a prevention measure for a severe reaction; the parents should have taught by health professionals to be prepared for emergencies.

### 3. Recommendations

Further investigation to understand the epidemiology and diagnoses of CMA, and find out ways to manage reactions, and prevent the negative impacts on childhood growth.

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