

Early Identification of Cow's Milk Protein Allergy in Infants in Kirkuk, Iraq, Using Milk-Related Symptom Scores

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Abstract

Background: Milk is related to many gastrointestinal disorders from the cradle to the grave due to the many milk ingredients that can trigger gastrointestinal discomfort and disorders. Cow's milk protein allergy (CMPA) is the most common food allergy, especially in infancy and childhood, which may persist into adulthood. **Objectives:** The aim of this study was to evaluate the effect of cow's milk protein allergy (CMPA) in infants in its early identification using CMPA scoring system. **Materials and Methods:** We carried out an observational study at Azadi teaching Children's Hospital's pediatric gastrointestinal clinic from March to December 2021. Children seen in our pediatric GI clinic between the ages of 1 and 12 months were included. Infants with suspected CMPA were evaluated by cow's milk-related symptom score (CoMiSS) tool. An allergic reaction, a gastrointestinal, respiratory, or dermatologic presentation, excluding an acute infectious disease, and at least one of the following conditions were required for a diagnosis of suspected CMPA. All participating doctors received the required training on CoMiSS, the oral challenge test procedure, and CMPA diagnosis and treatment guidelines before subject recruitment. **Results:** In this study, most of studied infants were men, and no significant difference between CMPA and non-CMPA infants regarding sex, age, and weight was found. In this study, 17.85% of infants with CMPA score suffered from occult blood in their fecal samples compared with 11.15% of non-CMPA infants ($P < 0.05$). In this study, most of infants with CMPA have score 12, and the mean was 13.65 and the maximum value was 18. **Conclusions:** The CMPA score system provides primary healthcare clinicians with a simple, fast, and easy-to-use awareness tool for cow's milk-related symptoms.

Keywords: CMPA, cow's milk protein allergy, infants, milk-related symptom scores

INTRODUCTION

After consuming milk, infants who are allergic to cow's milk, may experience symptoms such as bloody diarrhea and vomiting. On occasion, it appears in the form of eczema on the skin. Sometimes, symptoms that involve the respiratory system, such as a constantly running nose or congestion, may express themselves with respiratory discomfort such as crowing. Examples of these symptoms include that when an allergy to cow's milk protein has progressed to a more severe stage, milk allergy symptoms such as generalized redness of the skin, shortness of breath, and chest tightness can be observed.^[1,2] If a milk allergy develops gradually over time, it may be difficult to spot in its early stages. The introduction of symptoms following the consumption of cow's milk ought to be regarded as a potential indicator. A blood test should be used to determine whether or not an individual has

IgE-type antibodies directed against cow's milk. In the event that the results are positive, it is recommended that the individual refrain from consuming any form of cow's milk, including yoghurt, cheese, biscuits with milk, and cake.^[3] Symptoms vary depending on the child and the severity of the allergy. Some children have one symptom, while others have more than one symptom. Clinical findings generally begin in the first six months, but can sometimes occur at a late age. The main symptoms are^[4-6]:

1. Excessive crying and intense gas pain in the first months.
2. Vomiting after feeding and inability to weigh.
3. Bloody and sticky defecation and diaper constipation.

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4. Red, itchy rash in the form of eczema on the skin.
5. Constant wheezing, coughing, and nasal congestion.

Frequent episodes of bronchitis and/or bronchiolitis. The main principle of treatment is to avoid the substance that causes allergies. In a baby fed with breast milk, treatment will begin with the removal of milk and dairy products from the mother's diet.

Three methods are used in the diagnosis of milk allergy.

1. Skin test: can be done at any age, the reliability is 95%.
2. Detection of antibodies specific to cow's milk in the blood: 90% reliable.
3. Disposal method: Foods containing cow's milk are not given to the baby for a while. During this time, the current symptoms are expected to disappear. After the symptoms disappear, cow's milk is re-tried again. The reappearance of symptoms will support cow's milk allergy.^[6,7]

Delays in CMPA diagnosis reflect a lack of awareness of the condition and an inability in primary care to implement the indicated diagnostic procedure.^[4] Exclusion diets without reintroducing cow's milk to confirm CMPA leave patients on needless exclusions. When testing exclusion diets. Correctly diagnosing CMPA early improves patient outcomes. In clinical settings, an excess of specific symptoms is taken as a possible sign of CMPA. Online information about the development, validity, and accuracy of CMPA symptom scores is lacking. By measuring patients' performance, clinicians can improve early CMPA diagnosis.^[5,6] The development and evaluation of symptom scores for use in the diagnostic work-up of CMPA have been one of our primary focuses throughout this study. We aimed to evaluate the effect of CMPA Scores system in early identification cow's milk protein allergy in infants.

MATERIALS AND METHODS

Between the period from March and December of 2021, we carried out an observational research at the pediatric gastrointestinal clinic at Azadi Teaching Hospital in Kirkuk City, Iraq. All infants with ages ranging one month to one year who were seen in our pediatric gastrointestinal clinic were included in the following enclosure. CoMiSS tool was used to evaluate infants who were suspected of having CMPA. Documented dietary exposure of infants and their mothers to cow's milk protein, in addition to at least one of the following conditions: (1) anaphylactic reaction; (2) gastrointestinal, respiratory, or dermatologic manifestations, excluding acute infection diseases, was used to define suspected cases of CMPA. Before the recruitment of subjects, each and every one of the participating physicians was required to complete the required training for the research, which included the determination of CoMiSS, the oral challenge test protocol, and CMPA diagnosis and treatment criteria.

Determination of cow's milk-related symptom score

All participating infants' general characteristics and anthropometry, medical and feeding history, and clinical examination were collected using a predesigned questionnaire with parental agreement and CoMiSS (7). A child's sobbing was only taken into account if the parents determined that it had persisted for one week or longer without an apparent cause.

Interpreting the outcome: The possible points are between zero and thirty-three. Except for respiratory symptoms, which can only receive a maximum score of 3, all other symptoms can receive a maximum value of 6.

Cow's milk intolerance is highly probable if the total score is greater than 12. It is possible that CMPA is the culprit here.

Cow's milk is less likely to be the cause of symptoms if the final score is less than 12. Find other explanations. An elimination diet followed by an oral food challenge is the only way to confirm a CMPA diagnosis.

Ethical approval

The study was carried out in conformity with the moral standards set forth in the Children Hospital in Kikruk. Before a sample was obtained, it was done with the patient's verbal and analytical consent. A local ethics committee examined and approved the research protocol, subject information, and permission form in accordance with document number 1772 (containing the number and the date in 01/03/2021).

RESULTS

In this study, most of studied infants were males and no significant difference existed between CMPA and non-CMPA infants regarding sex, age and weight [Table 1].

In this study, 17.85% of infants with CMPA score were suffered from occult blood in their fecal samples compared with 11.15% of non-CMPA infants ($P < 0.05$) [Table 2].

Table 1: Demographic characteristics of studied CMPA and non-CMPA infants

Demographic properties	CMPA (Score ≥ 12)	No CMPA (Score < 12)	Total	P-value
No.	32	20	38	
Sex				
Male	21 (65.63%)	13 (65%)	34	>0.05
Female	11 (34.38%)	7 (35%)	18	
Age				
1–5 days	24 (75%)	18 (90%)	42	>0.05
>8 days	8 (25%)	2 (10%)	10	
Weight	5.7 $\pm$ 1.1	5.12 $\pm$ 1.09		>0.05

In this study, most of infants with CMPA have a score of 12, followed by 13 and 14 ; the mean was 13.65 and the maximum value was 18 [Figures 1 and 2].

DISCUSSION

Allergy in infants is most commonly seen in the form of cow's milk allergy. Although it is not known exactly why cow's milk allergy develops, it is known that the baby's not consuming cow's milk protein prevents the symptoms. There are various options in the nutrition of babies with cow's milk allergy, from breaking down the proteins in cow's milk to turning them into amino acids. As most babies get older, the problem goes away.^[4-6] Many milk ingredients, such as lactose and cow's milk proteins, can trigger gastrointestinal discomfort and disorders. Milk decreases gut bacterial diversity. Dairy and dairy products, such as yogurt and kefir, can modulate and alter the gut microbiota.^[7] In contrast, a diet that is not suggested for

a child or that is prolonged after the child may already have established a tolerance to the food may hinder the child's growth and quality of life while also contributing to unnecessary costs associated with healthcare. Because of this, it is absolutely vital to have a methodical strategy available in order to prevent needless suffering, inaccurate diagnosis, and long-term effects on one's health caused by CMPA.^[8,9] The majority of the infants in this study were found to be boys, and there was no discernible difference between CMPA and non-CMPA infants with regard to their ages, weights, or sexes.

In this study, 17.85 percent of children with a CMPA score had occult blood in their fecal samples, compared with 11.15 percent of infants who did not have a CMPA score (with a *P* value of 0.05). The majority of the infants in this study had a CMPA score of 12, while the study's mean was 13.65 and its highest value was 18. The frequency of CMPA in babies during the first year after birth is approximately 2–3% .^[7] CMPA is the type of food allergy that affects infants most frequently, and it is also the most prevalent type. The lack of specificity in its clinical presentations makes it easy to make an incorrect diagnosis. The tests consist of a skin prick test, a patch test, a sIgE test, and a meal challenge test that is double-blind and controlled with a placebo. CoMiSS is a straightforward score that, in accordance with what Vandenplas^[3] stated, will assist clinicians in the early and effective identification of CMPA; nonetheless, it is not a diagnostic instrument and cannot serve as a stand-in for the OFC test.

Table 2: Distribution of studied CMPA and non-CMPA infants according to presence of occult blood in their feces

Studied infants		Occult blood	
		Present	Absent
With confirmed CMPA	No	21	11
	%	17.85	14.15
No CMPA	No	8	12
	%	11.15	8.85

P < 0.05

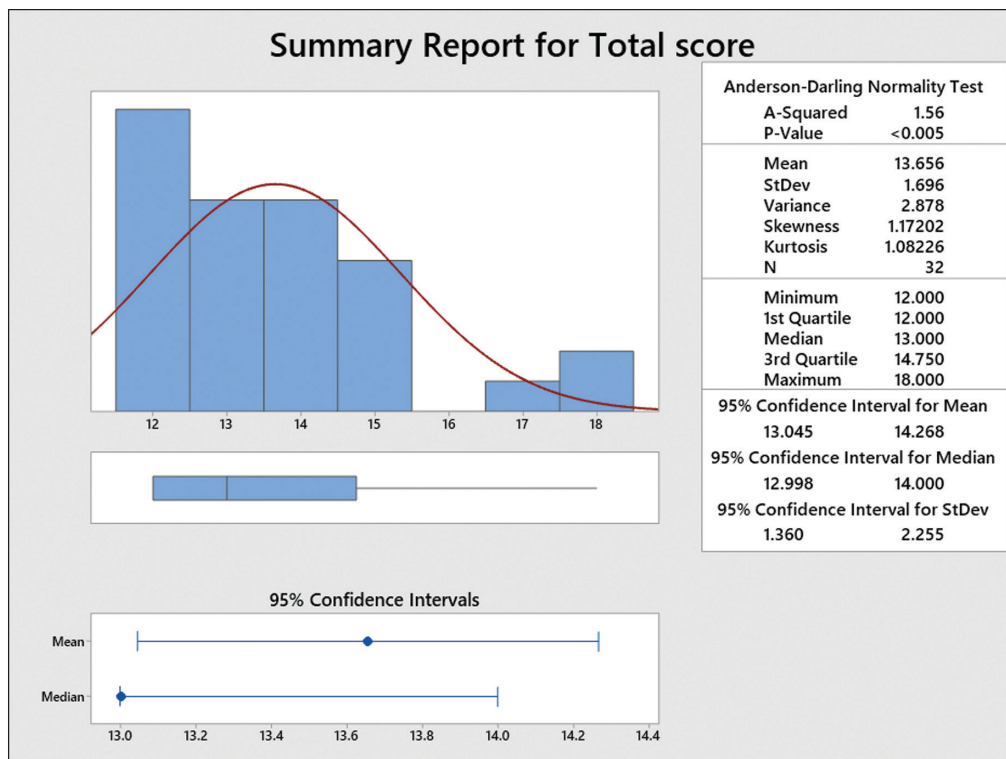


Figure 1: Descriptive statistics of infants with +ve CMPA scores

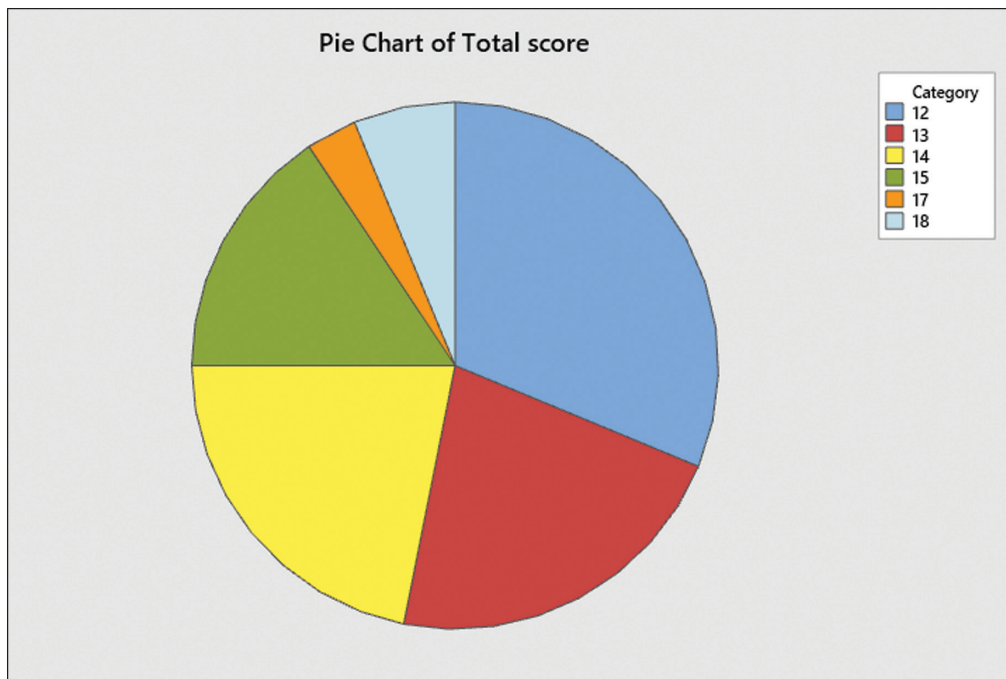


Figure 2: Distribution of CMPA scores of studied infants

According to the findings of our study, we have reason to suspect that if CoMiSS 12 is used as a diagnostic criterion for the early detection of CMPA in Chinese newborns, this may raise the likelihood of under-diagnosis. However, on the other hand, if the criterion was altered to CoMiSS 6 according to our cut-off point, many children who have colic and reflux may achieve the criteria and be falsely positive, which would result in the specificity of the CoMiSS being decreased. When it came to infants who were thought to be healthy, the overall median and mean CoMiSS scores were, respectively, 3.0 and 3.7. The CoMiSS was found to be higher in the newborns from Poland.^[10] The findings indicate that a CoMiSS of >12 may be a useful cut-off value to select infants showing symptoms due to cow's milk protein. Even though the study was not powered adequately to allow for definitive conclusions,^[11] the findings do indicate that this may be the case. In the interim, it has been demonstrated that the CoMiSS is a reliable instrument for enhancing knowledge among primary health care providers to more accurately suspect symptoms connected to cow's milk. There is still a requirement for a validation path before the score can be utilized as a diagnostic tool.

CONCLUSIONS

The CMPA provides primary healthcare clinicians with a simple, fast, and easy-to-use awareness tool for cow's milk-related symptoms.

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Conflicts of interest

There are no conflicts of interest.

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