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Efficacy of Feeding Team Recommendations for Infants/Children Presenting With Signs of Milk Allergy

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Abstract: Caregivers have reported feeding difficulties in approximately 25% to 40% of infants/toddlers that comprise a variety of signs/symptoms, though many of these are transient and resolve without significant medical intervention. Feeding problems, however, have been reported to persist in 3% to 10% of children, resulting in the caregivers seeking professional guidance. The purpose of this study was to evaluate the effectiveness of feeding team recommendations for infants and young children presenting with signs of milk allergies. Retrospective chart reviews were conducted, with associated follow-up phone surveys. Study participants met criteria based on presenting symptoms of possible milk allergy and received recommendations of milk-free diet and/or allergy testing. A total of 85 medical records were reviewed. Of the 85, 53% (45/85) met inclusion criteria for review; however, only 46% (39/85) were available for follow-up. Of the 39 patients available for follow-up, a milk-free diet was recommended for 67% (26/39), and 69% (18/26) of these families followed through with the recommendations. Of those 18 patients who followed the recommendations, 83% (15/18) reported improvement of symptoms. Our data suggest that recommendations resulting from comprehensive feeding

team evaluations of infants and children with suspected milk protein allergies can, when followed, result in improvement of patient symptoms.

Keywords: food allergies/intolerances; feeding and swallowing problems; infant/toddler nutrition; gastroesophageal reflux; eosinophilic esophagitis

Introduction

Feeding is an essential life activity for infants and young children. Caregivers

diarrhea,^{1,4} and bloody stools.¹ However, feeding problems have been reported to persist in 3% to 10% of children, resulting in the caregivers seeking professional guidance.¹

Research shows a significant increase in the prevalence of food allergies in children throughout the United States.⁷ Food allergies in infants and young children often present as gastroesophageal reflux (GER) and eosinophilic esophagitis (EE), particularly when they are non-immunoglobulin E

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have reported feeding difficulties in approximately 25% to 40% of infants and toddlers that consist of colic/irritability,^{1,2} vomiting,^{2,4} slow eating,³ and refusal to eat.^{1,4} Feeding problems, although they are transient and usually resolve without significant medical intervention, may be associated with failure to thrive,^{1,2} eczema,¹ rhinitis/cough,¹ urticaria,⁴ ear infections,¹ asthma,^{1,3,4} constipation,^{1,5,6}

(IgE) mediated. Irritability and distressed behavior commonly experienced during the first months of life has frequently been attributed to GER.^{2,8} Studies suggest that uncomplicated GER affects 40% to 65% of infants in the first year of life and in most cases is a normal physiological condition typically resolving by 1 year of age.⁸ Reflux primarily occurs as a

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result of transient relaxation of the lower esophageal sphincter. In some patients, a secondary factor, most commonly a food allergy, indirectly causes a motility disorder resulting in reflux.⁸ Research has indicated that 42% of infants with GER have been found to have a milk protein allergy.⁹ Those infants who failed to respond to antireflux medications have been found to react favorably to the removal of cow's milk protein, often with complete resolution of their symptoms.¹⁰ Some infants respond well to an extensively hydrolyzed formula (EHF); however, many infants require an amino acid formula before they experience relief.¹¹⁻¹⁸ EE, a condition that has become increasingly prevalent over the past 15 years, may present with symptoms suggestive of GER. However, EE does not respond to the medications used to treat GER. Several studies have noted improvement in EE with the use of an amino acid-based formula and removal of the food allergens.¹⁹⁻²¹ Clinicians need to be aware of all the various manifestations of food allergies when evaluating children with feeding difficulties. Dietary modifications such as the removal of milk protein should be considered as an initial or additional treatment modality in children presenting with feeding problems, which may be a result of food allergies.

For the purpose of our study, a *food allergy* was defined as an adverse reaction that arises from a specific immune response occurring when exposed to a specific food, which is reproducible.²² Conversely, *food intolerance* is typically a term used to describe adverse reactions to foods or food components that do not have established immunological mechanisms but are also reproducible.²² Identification of food allergies remains difficult, especially when the food allergy is non-IgE mediated, such as in gastrointestinal disorders.^{23,24} Sensitive fluorescence enzyme-labeled assays, skin testing, and patch testing, although helpful when positive, have limited reliability. Therefore, diagnosis is still heavily dependent on clinical assessment, elimination diets, and food challenges.^{23,25}

Several diagnostic tools have been suggested for use in diagnosing non-IgE-mediated reactions, such as double blind, placebo-controlled food challenge; contact dermatitis patch testing; atopy patch test; intradermal testing; lymphocyte activation assays; food-specific IgG testing; and endoscopic biopsy.²⁵

The Comprehensive Feeding Team at Children's Specialized Hospital provides 8 feeding team evaluations on a weekly basis and has been in existence for approximately 12 years. The feeding team consists of a neurodevelopmental physician, speech language pathologist, occupational therapist, clinical dietitian, and a psychotherapist. The evaluation includes a consultation by a neurodevelopmental physician who examines the child's development in relation to feeding as well as medical issues that may be affecting feeding. A group assessment is conducted by the other team members, which involves the gathering of information from the caregivers and presentation of food (both preferred and nonpreferred). The team's recommendations are then provided to the family at the conclusion of the evaluation, which may include outpatient services if appropriate. Outpatient speech therapy, occupational therapy, nutrition counseling, and psychotherapy services are provided at our facility to assist the family in addressing their child's feeding difficulties. Over the past several years, an increase in the number of infants/children presenting with feeding difficulties and signs of possible food allergies has been observed. These children often present with a history of GER, atopic dermatitis, congestion, frequent ear infections, loose stools or constipation, failure to thrive, dysphagia, enlarged tonsils/adenoids, asthma, and food refusal. In these cases, the feeding team has frequently recommended that the child be evaluated by a pediatric allergist to rule out food allergies and/or trial removal of cow's milk protein from the child's diet to see if symptoms improve. Once these recommendations were made, the team received minimal feedback on the results of allergy testing

and clinical outcomes associated with implementation of a milk-free diet. The recommendations across the various sites and among the various teams frequently differed depending on the practitioners on each team. Before specific protocols could be developed to be used across all sites, the outcomes from these recommendations needed to be examined.

Consequently, the purpose of this study was to assess the effect of recommendations by the Children's Specialized Hospital Comprehensive Feeding Teams for food allergy testing and/or trial removal of cow's milk protein from the child's diet. Specifically we sought to determine (1) the percentage of children presenting with feeding difficulties who demonstrated possible signs/symptoms of a milk allergy and (2) of these children who presented with signs/symptoms of possible milk allergy, the percentage with improved signs/symptoms after following a milk-free diet. A concomitant aim of this study was to obtain data to support evidence-based practice protocols within our organization.

Methods

Two separate retrospective case reviews were conducted of information associated with patients seen through the Comprehensive Feeding Teams at 2 sites, who presented with symptoms of a possible milk allergy between the periods of August to October 2009 and September to October 2010. These time periods were chosen for 2 reasons: (1) to keep the seasons consistent in an attempt to minimize environmental factors that may influence the presenting allergy symptoms and (2) to provide an opportunity to modify our recommendations and be more consistent across both sites in a subsequent year. The patients were provided with recommendations, including food allergy testing and/or trial removal of cow's milk protein from the child's diet. The first cohort showed inconsistent recommendations related to implementation of a milk-free diet

or allergy testing. In the second cohort, focus was placed on recommending a milk-free diet prior to allergy testing.

To be included in the study, patients had to meet all the following criteria: (1) they had to have been seen by the team during these time periods at the Hamilton or Toms River site, (2) they had to have presented with symptoms of a possible milk allergy at the time of their feeding team evaluation, and (3) they had to have been given the recommendations for food allergy testing, trial of a milk-free diet, or both. Age restrictions were not implemented in our criteria; however, our organization services children from birth to 21 years of age. Symptoms considered to reflect the presence of a milk allergy included one or more of the following: a history of GER, eczema, congestion, frequent ear infections, loose stools and/or constipation, failure to thrive, dysphagia, enlarged tonsils/adenoids, asthma, rhinitis/cough, irritability, limited intake, limited variety of foods accepted, overall disinterest in eating, and/or food refusal. Data regarding the patient's symptoms were obtained by a chart review conducted by 2 of the investigators, with 1 investigator reviewing all charts at 1 site and the second investigator conducting a review of all charts at the second site.

The procedure to obtain follow-up data for the case reviews included the co-investigators contacting the patients by telephone and recording all data obtained. The phone conversation garnered the following information: whether the child obtained milk allergy testing, results of testing, method of testing, whether a milk-free diet was trialed, extent of duration of trial, and results of the trial. Milk allergy tests included blood work, skin testing, or the skin patch test, which were ordered by their pediatrician, a pediatric allergist, or other physician not affiliated with our organization. It was the responsibility of these physicians to determine the type of allergy testing that was performed. A positive test result was determined by the treating physician, and these results were obtained by telephone contact with the parents. Positive results from the trial of a

Table 1.

Demographics of Study Participants

Cohort	Male	Female	Mean Age	Race
1	18 (78%)	5 (22%)	42 months	19 Caucasian, 2 Asian, 1 black, 1 other race
2	11 (69%)	5 (31%)	26 months	13 Caucasian, 3 Asian

milk-free diet consisted of improvement in symptoms as reported by parents.

The data were entered in an Excel spreadsheet for analysis. Means and medians were calculated for ratio level data, and proportions were calculated for categorical data.

Results

Chart review and data abstraction was completed on 85 patients seen by the Comprehensive Feeding Team during the study periods. The mean age of the patients who met the criteria for inclusion and were available for follow-up was 34 months, with a range of 5 months to 9 years, 4 months. The demographic data are summarized in Table 1. Study participants were primarily Caucasian (82%), mostly male (74%), and resided in suburban or exurban counties of New Jersey.

Figure 1 depicts the flow chart of study participants. The first cohort of patients included 57 children. Of these 57 children, 28 (49%) met the criteria for inclusion in the case review and were provided with recommendations for allergy testing and/or an elimination diet. Of these, 5 patients did not respond to follow-up contact and are not included in the analysis. The second cohort of patients included 28 children, 17 (60%) of whom met the study inclusion criteria and were provided with recommendations for allergy testing and/or elimination diet. One patient in the second cohort could not be reached for follow-up assessment. Hence, of the 85 children seen, 45 (53%) presented

with possible signs/symptoms of a milk allergy, and 39 of these responded to follow-up contact—23 in the first study cohort and 16 in the second cohort. Of the 6 children who did not respond to follow-up across both cohorts, 4 were boys and 2 were girls, with the average age being 37 months, ranging from 14 months to 8 years, 11 months. All 6 children were Caucasian.

Six of the 23 patients in cohort 1 were given recommendations to both trial a milk-free diet and test for allergies. Of these, 33% (2/6) followed through with allergy testing, and both had negative results. Neither trialed a milk-free diet because of the negative results. Both patients continued to consume milk, and symptoms are reported to persist. Of the 6 patients, 4 underwent a milk-free trial prior to allergy testing. After this, 2 patients chose not to pursue allergy testing and remained on a milk-free diet; 1 patient received a positive allergy test, whereas the remaining patient had a negative result, but the family nonetheless continued the child on a milk-free diet because of reported improvement of symptoms.

Of the 16 (63%) patients in the second cohort, 10 were given recommendations to both trial a milk-free diet and test for allergies. Of these patients, 40% (4/10) performed a milk-free trial first; 2 patients chose not to pursue allergy testing and remained on the milk-free diet; 2 patients are planning on completing allergy testing when the child is older, but are continuing with the milk-free diet because of improvement in symptoms; and the remaining 6 patients

Figure 1.

Flow Chart of Study Participants.



had completed or were in the process of completing allergy testing.

Of the 23 patients in cohort 1 who met inclusion criteria and for whom we were able to collect follow-up data, a milk-free diet was recommended for 43% (10/23), and 80% (8/10) of these patients followed through with this recommendation. Of these 8 patients, 7 reported improvement of symptoms. Of the 2 patients whose parents chose not to follow the milk-free diet, 1 patient had a negative allergy test, and the parents did not attempt the milk-free diet; the parents of the second patient simply did not agree with the recommendation. In addition, we found that allergy testing was recommended for 83% (19/23) of patients, and of these, 42% (8/19) followed through

with this recommendation. Negative results, indicating that the patient did not experience an IgE-mediated reaction to a food, were obtained for 7 of 8 patients who followed through on the recommendations for allergy testing, whereas positive results were obtained for only 1 patient.

A milk-free diet was recommended for 100% (16/16) of patients in the second cohort who responded to follow-up assessment, and 63% (10/16) of these patients followed through with this recommendation. Of these 10 patients, 80% (8/10) reported improvement of symptoms. The remaining 6 patients chose not to follow the milk-free recommendation for the following reasons: 3 patients were waiting for

allergy testing results, 1 patient did not agree with the recommendation and chose to trial a lactose-free diet without any success, 1 patient did not agree with the recommendation and chose to implement a more structured meal schedule with success, and 1 patient had negative allergy testing and chose not to trial the diet. In addition, allergy testing was recommended for 63% (10/16) of patients, and 60% (6/10) of these patients followed through with this recommendation or were in the process of following through with this recommendation. The delay in obtaining allergy testing or waiting for results lasted several months, affecting any intervention that could have occurred immediately following the feeding evaluation. Positive

results were obtained for only 1 patient out of the 5 who had followed through with the recommendation, but the patient was found to be allergic to foods other than milk.

A total of 85 medical records were reviewed. Of the 85, 46% (39/85) met inclusion criteria for review and were available for follow-up. Of the 39 patients who met the inclusion criteria and were available for follow-up, a milk-free diet was recommended for 67% (26/39), and 69% (18/26) of these families followed through with the recommendations. Of the 18 patients who followed the recommendations, 83% (15/18) reported improvement of symptoms.

Discussion

During the initial case review period, recommendations from the various teams were inconsistent. However, allergy testing was recommended more often than a trial of a milk-free diet. During the second case review period, the emphasis was on recommending a milk-free diet prior to allergy testing with less frequent recommendations for food allergy testing. Greater consistency across feeding teams is necessary based on these findings. Although the second case review's sample size was smaller, the modification in the recommendations and greater consistency among the various teams at 2 of our sites appeared to have had a compelling clinical effect. A milk-free diet was recommended more often (100% vs 43%), and allergy testing was recommended less frequently (63% vs 83%). This resulted in a greater number of patients trialing a milk-free diet prior to obtaining allergy testing, thus eliminating the chance of negative allergy testing interfering with trialing the elimination diet. Some patients received a recommendation to administer Prevacid prior to implementation of a milk-free diet and/or allergy testing. Some patients opted to try the Prevacid before making any dietary modifications. These patients were not included in our study.

The study limitations are mainly associated with the retrospective

design, which limits internal validity and our small, nonprobability samples from 2 associated institutions, which attenuates the generalizability of the study. A randomized trial would, of course, increase our ability to assess the independent causal impact of recommendations, but it would be infeasible in this context for both ethical and practical reasons. A follow-up study would do well to include multiple institutional settings with standardized treatment protocols to increase the generalizability of the findings with regard to treatment context.

At this time, we are using the findings of this study to develop treatment recommendations for the clinical dietitians as well as members of the comprehensive feeding team within our institution. The clinical nutrition department has developed a protocol to be followed when dealing with an infant presenting with possible food allergies/intolerances based on our findings and various protocols discussed in the literature.^{17,26,27} The first step is to obtain a feeding/clinical history and identify signs and symptoms of food allergies/intolerances that the infant is demonstrating. The second step is to initiate a formula change. If an infant is on a milk-based formula, the initial recommendation is to place the infant on an EHF. In some instances, an infant may be placed on a soy formula if the family so prefers. Since a large number of infants who present with a milk allergy/intolerance are also found to be allergic/intolerant to soy,^{25,28} an EHF formula may need to be considered if improvements are not observed with a soy formula. If symptoms of a food allergy/intolerance persist on an EHF, a trial of an elemental formula should be considered. This protocol is being used by the clinical dietitians within the inpatient rehabilitation unit, long-term care units, and comprehensive feeding team at our facility. Additional protocols are being discussed to address the management of food allergies/intolerances, specifically milk protein in older children.

Conclusion

The results of this study suggest that a clinically significant proportion of children who present with persistent feeding difficulties exhibit signs/symptoms of a milk allergy/intolerance. A milk-free diet was found to improve their signs/symptoms without any other medical intervention for a majority of these patients. Consequently, given the inaccuracies of food allergy testing, particularly as it relates to gastrointestinal symptoms, an initial trial of a milk-free diet was shown to be an effective intervention prior to food allergy testing.

The study also lends support to assertions that food allergy testing has low sensitivity and specificity. A trial of a milk-free diet even before allergy testing in addition to a strong education component for the family regarding allergy-related feeding problems appears to be a reasonable initial approach. Allergy testing and further workup may be indicated in the absence of a response to an elimination diet. ■

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