Camel Milk for Food Allergies in Children

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Abstract

Background: Food allergies in children are often very serious and can lead to anaphylactic reactions. Observations that camel milk ameliorates allergic reactions were noted over the years. The effect of camel milk is probably related to its special composition.

Objectives: To investigate the effect of camel milk in several children with severe food (mainly milk) allergies.

Methods: We studied eight children with food allergies who did not benefit from conventional treatment. Their parents, or their physicians, decided to try camel milk as a last resort. The parents were advised by the authors – who have considerable experience with the use of camel milk – regarding how much and when the children should drink the milk. The parents reported daily on the progress of their children.

Results: All eight children in this study reacted well to the milk and recovered fully from their allergies.

Conclusions: These encouraging results should be validated by large-scale clinical trials.

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Historically, camel milk has been used for a number of medical problems [1,2]. Various foods can cause allergies, especially consumption of ruminant milk and milk products. Some food allergies are severe and can result in anaphylactic reactions. It has been noted that there are basically three different types of allergic reactions. The first type is an immediate reaction, i.e., within 45 minutes of drinking cow milk, and includes urticaria, angioedema and possibly a true anaphylactic reaction. The second type occurs between 45 minutes and 20 hours and manifests as pallor, vomiting and diarrhea. The third type may take longer than 20 hours and consists of mixed reactions involving the skin, respiratory tract, and gut.

Anaphylaxis is a sudden, severe, potentially fatal, systemic allergic reaction that can involve various areas of the body (such as the skin, respiratory tract, gastrointestinal tract, cardiovascular system). Symptoms occur within minutes to 2 hours after contact with the allergy-causing substance, but in rare instances may occur up to 4 hours later. Anaphylactic reactions can be mild to life-threatening. In the United States the annual incidence of anaphylactic reactions is about 30 per 100,000 persons, and individuals with asthma, eczema, or hay fever are at relatively greater risk of experiencing anaphylaxis. Allergies in general are associated with reduced immunologic protection.

The use of camel (*Camelus dromedarius*) milk for food-allergic children seems a bizarre idea and is usually met with the comment: "if the child is allergic to milk how can you suggest camel milk?" In fact, the camel is not a ruminant, although it ruminates, but is a Tylopode. Camel milk composition is vastly different from that of ruminants [2,3], as is their physiology [4]. Camel milk contains little fat (2%); this fat consists mainly of polyunsaturated fatty acids that are completely homogenized and gives the milk a smooth white appearance. Lactose is present in concentrations of 4.8%, but this milk sugar is easily metabolized by persons suffering from lactose intolerance [5]. The proteins of camel milk are the decisive components for preventing and curing food allergies because camel milk contains no beta-lactoglobulin [6] and a different beta-casein [7] – the two components in cow milk that are responsible for allergies. Camel milk contains a number of immunoglobulins that are compatible with human ones. Camel milk is also rich in vitamin C, calcium and iron [3].

Patients and Methods

The parents of eight children suffering from severe food allergies who did not respond to conventional treatments asked for advice regarding camel milk for their children. The ages of the children ranged from 4 months to 10 years. All suffered from severe allergic reactions. The most prominent symptom was diarrhea and vomiting after eating. Other accompanying symptoms were skin rashes, lactase deficiency, chemical imbalance, and asthma symptoms. While all had food allergies, milk allergies were common to all. The children were followed for about 30 days.

One child, 4 months old, was taken home from hospital because of the lack of improvement and was losing blood and liquid in constant diarrhea. Another, a young girl from the United States, was extremely allergic to all but a few foods. Any food containing milk immediately caused an anaphylactic reaction. All the parents agreed to feed their children with camel milk under strict daily supervision (contact by phone) in order to maintain or change the initial regimen.

Camel milk was obtained by the families from a source that was considered hygienic. The parents were instructed not to heat the milk, which would destroy the immunoglobulins and protective proteins.

Based on our experience, we determined the amount of milk and times of drinking according to the child's age and the severity of symptoms [3]. Milk was supplied frozen and a bottle was thawed as needed (without adverse effects on the milk, which returns to its initial solution). The milk replaced all other foods for 2 weeks, after which other food was gradually added to the diet as chosen by the parents.

Results

Within 24 hours of starting to drink the milk all the children showed diminished symptoms. Within 4 days all symptoms had disappeared. No recurrence of the allergic reactions was reported. Most parents continued giving their children camel milk for another month.

The child from the U.S. returned home after 2 weeks, with no allergic reaction to camel milk and able to eat food to which she had previously been allergic. Treatment was halted because camel milk could not be imported to America. It appears that she remained healthy and stable after returning home.

The 4 month old infant suffered from ear infections with oozing pus 2 months after ceasing to drink camel milk. No treatment was effective, including a number of surgical interventions. After drinking camel milk again, the child was healed within 48 hours.

One child said her legs felt heavier, and in fact she was heavier, suggesting a rapid increase in bone calcium, an observation in osteoporotic women who drink the milk (R. Yagil, personal observation).

A young girl who showed severe reactions to cow milk, even in minute amounts, consumed the camel milk without problems.

Discussion

In all eight cases the results of drinking camel milk were spectacular compared to conventional treatments – a rapid improvement in the children's health, followed later by an ability to digest other foods. The healing effect of drinking camel milk has also been found in other diseases associated with the immune system, including autism [8]. In many Arab countries it is common practice, even today, to give camel milk to children to strengthen their immune system, without knowing how it works.

The effect of camel milk on food allergies is based on the fact that it does not contain allergens that are so potent in cow milk. There is no beta-lactoglobulin [6,7] and another beta-casein is present [7]. Another pertinent fact is that the components of camel milk include immunoglobulins similar to those in mothers' milk, which reduce children's allergic reactions and strengthen their future response to foods.

The importance of camel milk for treating food allergies in children is therefore found in its non-allergenic properties and the child's immunologic rehabilitation. Clinical immunology takes the approach that allergy and autoimmune disease are the two major categories of hypersensitivity disease. If the term "food allergy" refers to all interactions between molecules derived from the food supply and the immune system, then many hypersensitivity disorders fall into the category of food allergy. How strongly and rapidly the immune system develops and whether it is challenged at a young age would also be contributing factors. "Milk protein allergy" is an allergic reaction to proteins commonly found in cow milk. It is caused by the immune system reacting to the protein in the milk as a threat to the body, thus activating the immune system, just as it would to a foreign virus or poison. Most people with allergies produce immunoglobulin E antibodies.

In vitro tests have shown that camel milk reduces anti-immunoglobulins in the blood (Y. Brenner, personal communication). In 1992 Hamers-Casterman et al. [10] described the remarkable immune system of the camel, which is different from that of all other mammals. IgG2 and IgG3 (inherent in camels) consist of only two heavy chains. There are no light chains. There is a single V domain (VHH) [11]. Camel VHH has a long complementary determining region (CDR3) loop, compensating for absence of the VL [12]. Conventional antibodies rarely exert a complete neutralizing activity against enzyme antigens. Camel IgG has full neutralizing activity even against the tetanus toxin as it enters the enzyme structure. Camel hypervariable regions have increased the repertoire of antigen binding sites [12]. Camel VHH domains are better suited to enzyme inhibitors than human antibody fragments [11]. As viral enzymes play a key role in triggering diseases, their neutralization would prevent their replication. A camel variable domain antibody fraction is a potent and selective inhibitor of the hepatitis C enzyme system [13].

A major flaw in the development of immunotherapy is the size of the antibodies. Larger antibodies cannot reach their target. The camel's antibodies have the same antigen affinity as human antibodies but are ten times smaller [14]. The above pertains to examinations of camel blood; however, these immunoglobulins and antibodies pass into the milk and, as they are small, enter the bloodstream via the intestines. There are many "protective proteins" in camel milk that exert immunologic, bactericidal and viricidal properties [15]. The most prominent of these are lactoferrin, lactoperoxidase, NAGase and PGRP.

The only obstacle preventing greater use of camel milk for treatment is pasteurization. On the one hand the Ministry of Health demands the pasteurization of all milk (even if camel milk is not mentioned in the list of milk-producing animals) while, on the other, heating or pasteurization will destroy all immunoglobulins and other protective proteins, mainly bacterial enzymes. If the regulation is enforced that camel milk must be pasteurized because it contains more bacteria than the allowed maximum, then milk products violating this regulation should also be removed from the market. This includes Actimel® (a probiotic active drink containing *Lactobacillus casei defensis* "friendly" bacteria), as there is no such thing as "good bacteria" but either pathogens or non-pathogens. Since Actimel® contains non-pathogens, microbiologic testing could show that the same applies to camel milk as well. It must be noted that pasteurized camel milk still retains its low fat, non-allergenic proteins and digestible lactose.

Ig = immunoglobulin

Conclusions

It appears that camel milk has a positive effect in children with severe food allergies. The reactions are rapid and long lasting. Much research still needs to be done on the healing effects of the milk. We are preparing a research program to be submitted to the Helsinki Committee for permission to carry out clinical trials.

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