

Technical Review

Clinical observational studies of goat formula in infants with atopic dermatitis

Background

Several observational studies of the use of goat formula produced by Dairy Goat Co-operative (DGC) have been conducted in Russia. These studies were in infants who experienced atopic dermatitis when on cow formula or cow milk. Goat formula was used to replace the cow formula as part of the therapy for treating atopic dermatitis. In three of the studies the effectiveness of goat formula was compared to either soy formula or a milk-free diet. In most instances, the dietary therapy was used as an adjunct to other anti-allergenic therapies such as topical ointment, anti-inflammatories or anti-histamines. These studies are summarized below.

Denisova et al 2003

67 infants aged 1-9 months were initially enrolled

All infants had symptoms of dermatitis following the transition from breastfeeding to formula feeding with an adapted cow milk formula.

Goat infant formula was substituted for the formulas used previously. The goat formula was introduced into the diet gradually, replacing the previously used formula over a period of 10-14 days. The change in formula was combined with application of ointment, depending on the degree of skin irritation. In some infants, anti-histamines were also used. The ointment used or dosages of anti-allergenic therapies were not stated.

Detailed immunological examination was conducted in 52 of the 67 infants enrolled and only data for these infants were presented. Of these 52 infants, 40 had elevated IgE (13-155 IU/ml) and antibodies reacting to cow milk proteins. The other 12 had normal levels of IgE (1.8-6.6 IU/ml).

The authors stated that 44 of the 52 infants had reduced symptoms of atopic dermatitis after 1-3 weeks on the goat formula. Five of the 40 infants with elevated total IgE and specific cow milk antibodies and 3 of the 12 infants with normal IgE had no change in atopic dermatitis when given goat formula. In these infants the atopic dermatitis was left untreated for more than 5 months before transferring to the goat formula. Eighteen children had also been given soy-based formula and twelve children were given a hydrolysate of cow milk proteins without effect, prior to the change to goat formula.

Conclusion – Symptoms of atopic dermatitis was reduced in 85% of infants when transferred to goat formula.

Denisova et al 2004

79 infants aged 12-36 months were followed.

All infants had symptoms of dermatitis following the transition from breastfeeding to formula feeding with an adapted cow milk formula or when whole cow milk or supplementary foods were introduced.

They were divided into two feeding groups

1. 41 given goat formula
2. 38 given a milk-free diet

The change in diet was combined with applications of ointment depending on the degree of skin irritation. In some infants, anti-histamines were also used. The ointment used or dosages of anti-allergenic therapies were not stated.

The authors stated that after 1-3 weeks, 33 of the 41 infants fed the goat formula had reduced symptoms of atopic dermatitis. The infants of both feeding groups were subdivided into three sub-groups depending on their SCORAD index.

SCORAD indices before and after transfer to goat formula or milk-free diet

Feeding group	Period	Subgroup according to SCORAD		
		mild	medium	severe
Goat formula	Before	17.1 ± 0.8	31.2 ± 1.1	45.8 ± 2.2
	after	7.8 ± 1.5	9.4 ± 1.6	22.7 ± 1.5
Milk-free	Before	16.3 ± 0.8	31.6 ± 2.5	67.1 ± 3.7
	after	0	10.2 ± 2.4	18.7 ± 1.0

Conclusion – Goat formula helped to reduce symptoms of atopic dermatitis relating to use of cow milk in most infants. The reduction in symptoms depended on the severity of atopic dermatitis before transfer to goat formula. In infants with medium to severe atopic dermatitis goat formula was just as effective in reducing symptoms as a milk-free diet.

Kazan State Medical University 2006

There were three parts to this publication, with parts 2 and 3 relating to formulas produced by DGC.

Part 2

58 infants aged 3-12 months were studied

All infants had atopic dermatitis complicated by secondary bacterial and fungal infections. Severity of atopic dermatitis was classified on the SCORAD scale. An analysis of fungal infections in damaged areas of skin and a test for circulating *Candida albicans* antigen in blood were also conducted.

Dietary therapy consisted of replacing the cow formula with goat formula or soy formula. The numbers in each of the two feeding groups were

1. 32 infants fed goat formula
2. 26 infants fed soy formula

The goat or soy formula was gradually introduced over 7-10 days, with 10 ml in each feeding in the first day, 20 ml in the second, 30 ml in the third and so on, until the goat formula has completely replaced the cow formula.

Anti-allergenic therapy, consisting of external anti-inflammatory, cosmetic treatment and anti-histamine remedies, were continued equally in each feeding group. In addition infants were given external and systemic anti-mycotic therapies as required. The types or dosages of anti-allergenic or anti-mycotic therapies were not stated.

Outcomes related to atopic dermatitis

	Goat formula	Soy formula
Reduction in SCORAD	35%	18%
Average length of remission (months)		
Before therapy	3.1 ± 1.4	3.2 ± 1.6
During therapy	9.0 ± 1.3*	5.5 ± 1.5
Average serum IgE (IU/ml)		
Before therapy	260.6	265
During therapy	93.2	147.3

* Significantly different ($p < 0.05$) to group fed soy formula

Outcomes related to infant growth

	Goat formula		Soy formula	
	1 st 6 months	2 nd 6 months	1 st 6 months	2 nd 6 months
Average increase in body weight (g/month)	900 ± 30	530 ± 30*	790 ± 40	390 ± 60
Average increase in body length (cm/month)	2.7 ± 0.3	2.0 ± 0.2	2.3 ± 0.4	1.7 ± 0.3

* Significantly different ($p < 0.05$) to milk-free group

Conclusion – goat formula provided a more effective dietary management of atopic dermatitis complicated by secondary fungal infections and providing significantly better growth outcomes compared to soy formula.

Part 3

64 infants aged 1-3 years were studied.

All infants had atopic dermatitis complicated by secondary fungal infections. Severity of atopic dermatitis was classified on the SCORAD scale. An analysis of fungal infections in damaged areas of skin and a test for circulating *Candida albicans* antigen in blood were also conducted.

The cow formula was replaced by goat formula in 34 infants. Another 30 infants were put on to a milk-free diet. Traditional anti-allergenic and anti-mycotic therapies (not described) were continued for all infants.

Outcomes related to atopic dermatitis

	Goat formula	Milk-free diet
Reduction in SCORAD	30%	32%
Average length of remission (months)		
Before therapy	3.2 ± 1.3	3.3 ± 1.5
During therapy	8.2 ± 1.2	6.3 ± 1.4
Average serum IgE (IU/ml)		
Before therapy	230.3	255
During therapy	90.8	124.2

Outcomes related to infant growth

	Goat formula		Milk-free diet	
	Year 2	Year 3	Year 2	Year 3
Average increase in body weight (g/month)	250.4 ± 30.5*	170.4 ± 10.2*	190.2 ± 18.3	145.1 ± 11.3
Average increase in body length (cm/month)	3.1 ± 0.2	1.5 ± 0.3	2.6 ± 0.3	1.0 ± 0.4

* Significantly different ($p < 0.05$) to milk-free group

Conclusion – goat formula reduced the severity and incidence of atopic dermatitis similar to a milk-free diet, whilst providing significantly better growth outcomes compared to a milk-free diet.

Summary

These studies are informative for how goat formula might be used in the clinical setting for reducing symptoms of atopic dermatitis in infants and young children. Of note is the fact that

- Goat formula was introduced into the diet gradually over 1-2 weeks.
- Symptoms were commonly observed to diminish in severity after at least 1-3 weeks following transfer to the goat formula.
- Substituting cow formula with goat formula reduced, but did not completely eliminate the symptoms of atopic dermatitis. The effect depended on the severity of dermatitis prior to transfer to goat formula.
- Goat formula provided a more effective dietary management of atopic dermatitis than soy formula and a similar reduction in symptoms as a milk-free diet.
- Use of goat formula provided significantly better growth outcomes compared to either soy or milk-free diets.
- Goat formula was used as an adjunct to therapies such as topical skin ointment, anti-inflammatories or anti-histamines.

References

Denisova et al (2003) Formula Nanny in diet therapy of atopic dermatitis in infants Voprosy Detskoi Dermatologii 1:86-89

Denisova et al (2004) Using a fortified formula based on goat's milk in the treatment of atopic dermatitis in young children Voprosy Detskoi Dermatologii 3:42-46

Kazan State Medical University (2006) New possibilities in diet therapy for treating children aged 0-3 diagnosed with atopic dermatitis complicated by secondary fungal infections Kazan State Medical University of the Federal Agency for Public Health Services and Social Development

Prepared October 2008

Colin Prosser

Chief Scientific Officer

Dairy Goat Co-operative (N.Z.) Ltd