SHORT REPORT

Extent of fussing and colic type crying preceding atopic disease

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Abstract

In a prospective follow up of 116 high risk infants, a 24 hour behavioural chart on seven consecutive days was analysed at seven and 12 weeks of age. Of children who manifested atopic disease at 2 years, 44/116 (38%), had shown significantly more fussing during the seventh, and colic type cry during the twelfth week than those who remained healthy (72/116, 62%).

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Early detection of atopic disease is important as early symptoms of sensitisation predispose an infant to impaired growth¹ and subsequent development of more permanent manifestations such as allergic rhinitis and asthma,² but, unlike established atopic diseases, they may be amenable to effective intervention. Increases in antigen specific IgE antibodies, typically regarded as a predisposing factor for later atopic manifestation, occur transiently in up to 80% of cases in healthy children during the first years of life.³ More precise methods are thus needed to help detect young children at risk of developing atopic disease.

To this end, we correlated records of infants' behavioural patterns during the first three months of life and a diagnosis of atopic disease at 2 years.

Subjects and methods

The study group comprised 116 newborn infants with at least one close relative (mother, father, sibling) with atopic eczema, allergic rhinitis, or asthma. Over half of the infants (64/116, 55%) had two or more close relatives with atopic disease. The children were clinically examined at three month intervals, always by the same physician (MK). Children were grouped as having atopic disease (atopic eczema, allergic rhinitis, asthma) or not having atopic disease (controls) at the age of 2 years. The extent of atopic sensitisation was evaluated by skin prick testing as described previously.⁴

Parents recorded their infant's behavioural pattern (awake and content, fussing, other cry, colic type cry) using a 24 hour Barr chart⁵ during seven consecutive days during the seventh and twelfth weeks. The parents of 106 infants filled out diaries during both the seventh and

twelfth week and parents of 10 infants filled out a diary for one week only. Fussing was defined as a state of irritability, "not quite crying but not awake and content".⁵ Other cry was defined as crying responsive to intervention (feeding, change of diaper, carrying, sucking a pacifier) and colic type cry was defined as a cry not responsive to such an intervention. Total distress was the sum of these various modes as reported by parents.

Results

Atopic disease was diagnosed in 44/116 (38%) children, most with atopic eczema (41/44, 93%). Asthma was diagnosed in 6/116 (5%) children, half of whom also had atopic eczema. One child had symptoms of atopic eczema, allergic rhinitis, and asthma. Median (interquartile range, IQR) age at the onset of atopic disease was 5.0 (2.8–10.0) months. Mean (95% CI) duration of exclusive and total breast feeding was comparable between controls, 2.8 (2.4–3.4) months and 6.5 (5.7–7.4) months, respectively, and children with atopic disease, 3.1 (2.5–3.6) months and 6.7 (5.5–7.9) months, respectively ($p = 0.47$ and $p = 0.81$, respectively; two sample t test). The frequencies of exclusive breast feeding, mixed breast and formula feeding, and sole formula feeding did not differ between controls and children with atopic disease during the seventh and twelfth week (data not shown; $p = 0.17$ and $p = 0.96$, respectively, χ^2 test).

Skin prick test reactivity at 2 years was more common among children with atopic disease, 12/42 (29%), than among controls, 5/70 (7%) ($p = 0.002$; χ^2 test). The most common antigens inducing positive skin prick test responses were egg, cow's milk, wheat, and birch.

The median (IQR) duration of total distress of the infants was 94 (49–141) minutes a day during the seventh week and 49 (24–93) minutes a day during the twelfth. Total distress was not significantly more common ($p = 0.06$), but fussing was more common ($p = 0.02$) among children developing atopic disease than in controls during the seventh week (table 1). During the twelfth week the amount of colic type cry was significantly greater in children developing atopic disease than in controls ($p = 0.04$). The difference was caused by a decrease in the amount of colic type cry in controls ($p = 0.002$) between the seventh and twelfth

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Table 1 The amount (minutes/day; median with interquartile range) of fussing and crying, and total distress reported by parents during the seventh and twelfth weeks of life

	Controls	Children with atopic disease	Mann-Whitney U test p value
<i>During the seventh week</i>			
Fussing*	41 (19–75)	72 (15–131)	0.02
Cry Colic type†	4 (0–17)	6 (0–19)	0.35
Other‡	24 (15–49)	30 (15–45)	0.71
Total distress‡	89 (47–124)	115 (64–197)	0.06
<i>During the twelfth week</i>			
Fussing*	21 (4–45)	29 (11–66)	0.13
Cry Colic type†	0 (0–5)	5 (0–11)	0.04
Other‡	13 (2–22)	14 (4–41)	0.22
Total distress‡	43 (21–68)	71 (24–109)	0.12

*Fussing was defined as a state of irritability, "not quite crying but not awake and content".⁵

†Other cry was defined as crying responsive to intervention (feeding, change of diaper, carrying, sucking a pacifier); colic type cry was defined as a cry not responsive to such an intervention.

‡The sum of colic type cry, other cry, and fussing reported by parents.

week but not in children who later developed atopic disease ($p = 0.07$; Wilcoxon signed rank test).

Discussion

We found among high risk children that the amount of fussing during the seventh week and that of colic type cry during the twelfth week were characteristics which significantly differentiated those who later developed atopic disease from those who did not. Maturation of gut barrier functions and especially the establishment of gut microecology take place during the first months of life,⁴ suggesting a potential causal relation between these maturational

events and behavioural patterns of infants. One study has shown that a reduced ratio of bifidobacteria to clostridia in early gut microflora preceded subsequent development of atopy and atopic disease.⁴ Differences in gut microflora have also been shown in colicky infants.⁶ These findings call for evaluation of gut barrier functions and behavioural patterns in the general paediatric population. If the hypothesis holds true in these children, then intervention with modulation of gut microflora might help prevent allergy and lessen fussing and prolonged colic type cry during the first three months of life.

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