

Review Article

Infantile colic: is it an early sign of an allergy?

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ABSTRACT

Infantile colic is a worrisome problem to the parents and caregivers, characterized by the inconsolable crying of infants that usually occur in the first 4 months of life. It constitutes the frequent complaint seen by physicians in early infants' life. The episodes generally disappear by the age of five or six months. However, there was growing evidence demonstrate the later impact of these episodes in later children's life. Many interventions were tried to reduce the symptoms associated with infantile colic and to foresee the etiological backgrounds. The allergic role is implicated to have a major role in the pathophysiology of infantile colic and in the later atopic outcome; however, more intensive reliable studies should be done to strengthen these evidences.

Keywords: Allergy, Infants, Infantile colic, Food allergy

INTRODUCTION

The causes of infantile colic remain inscrutable although abundant intensive studies tried to correlate between it and several maternal and neonatal factors. This disorder constitutes the frequent complaint seen by physicians in early infants' life as it causes paternal distress and lack of sleeping when the episodes start. This paper tried to highlight on the infantile colic definition, possible causes behind it, management strategies and to review the relationship between infantile colic and allergic conditions that manifested in early and later childhood.

INFANTILE COLIC DEFINITION

Is functional gastrointestinal disorder occurring in an episode of inconsolable continuous crying with pulling of legs in a healthy, normally developing infant without apparent cause. These episodes tend to occur in the first weeks of life and relieve spontaneously by four to five months of life.¹ Typically, with high peak occurrence at night time that leads to parent anxiety, frustration, and

distress or even it may become a risk factor for shaken baby syndrome.²

The prevalence rates for infantile colic showed wide diversity between studies and that was attributed to the variable parental perception of infant crying episode and its duration, besides reliance of some studies on different criteria in the definition of infantile colic.^{3,4} Some studies estimated it to affect up to 43% of infants under 3 months of age while in recent systematic review the prevalence rates were found to be ranging from 2-73%, with a median of 17.7%.⁵⁻⁷

DIAGNOSTIC CRITERIA FOR INFANTILE COLIC

Wessel was firstly introduced diagnostic criteria for the diagnosis of infantile colic, these latterly modified to involve recent evident and updates informations.⁸ Recently Rome III Diagnostic Criteria (provided by a group of pediatric gastroenterology experts) defined the episode of colic in an infant aged 2 weeks to 4 months that

should last for at least 3 hours a day and occur at least 3 days a week for at least 1 week.⁹

CAUSES OF INFANTILE COLIC

The crying episodes of healthy infant generally increase after birth, reach its peak around one to one and half months of age and then declines at 3 months.¹⁰ Underlying organic causes were found only in less than 5% of infants with inconsolable crying in one study.¹¹ However, the causes of these episodes were intensively studied to assess the pathophysiology behind it. Generally, the direct causes were incompletely understood, but it has been assumed that it is imputed to different contributors such as central nervous system pathway disturbance, inconvenient infant-family relationship, parental anxiety, and different gastrointestinal pathologies like cow's milk allergy, gastroesophageal reflux or motility disorders.¹²⁻¹⁶ Moreover, altered micro-biota theory is also suggested to affect gut motility and gas production, leading to the colicky episodes.¹⁷ There was old concept linked to breastfeeding influential effect against infantile colic, but recently one study rejects this concept and proved that breastfeeding did not have a protective effect on the development of colic.¹⁸

MANAGEMENT MODALITIES OF INFANTILE COLIC

Infantile colic treatment options are widely diverse and controversial. They involve behavioral, pharmaceutical, and dietary strategies, but parental reassurance and education about the benign nature of colic constitute the most important part of management. Manipulative therapies (such as chiropractic and osteopathy) were thought to reduce the colic symptoms although one meta-analysis study found lacking evidence about the safety of these methods.¹⁹ Infants' massage, sucrose solution, and herbal tea are other options tried by some studies to decrease colic episodes.^{20,21} The mothers' diet modification with reduced allergenic feeds in breastfed infants and hydrolyzed formula in formula-fed infants showed effective strategy to decrease the infant colic symptoms.^{21,22} The role of probiotic *Lactobacillus* in reducing infantile colic showed growing evidence in several clinical trials.²³⁻²⁷

THE LATER OUTCOME OF INFANTILE COLIC

Although there is little evidence of direct colic affection on infants' health, the persistent crying and discomfort suffered by infants may adversely affect the quality of life of parents with significant health care professional consultations.²⁸ Several studies tried to correlate between the infantile colic and other diseases that may appear in later childhood. Some studies found an association between infantile colic and the later presentation of allergic disorders, recurrent abdominal pain, and migraine.²⁹⁻³¹ Another study found correlations between infantile colic and behavioral changes in early childhood

like temper tantrums, sleeping problems, and mental disorders.^{32,33} A prospective cohort study concludes that infants with prolonged infantile crying during the colic showed lower intelligence quotient scores at the age of 5 years compared to the control group, while another study stated lower academic achievement in later childhood.³⁴⁻³⁶

INFANTILE COLIC AND ALLERGY

The relative influence between infantile colic and development of allergy in children looks like a sequence of reciprocal cause and effect, thus many studies tried to link between the two conditions. One study stated that infantile colic constitutes early life factor for frequent wheezing and confirmed asthma, another study done by Kalliomäki M, et al found good evidence that relates the extent of fussing and colic type crying and atopic disease.^{37,30}

The gastrointestinal tract represents an unrivaled challenge to the immune system as it receives the wide variety of food which may constitute different types of antigens. There is growing evidence supports that food allergy is a major causative factor behind the development of infantile colic episodes.³⁸ Food allergy is considered as an immune response towards certain allergens like specific food proteins that may be manifested as gut dysmotility in association with high inflammatory markers release like cytokine, mast cell mediators, and other neurotoxins, usually it presents earlier as infantile colic or gastroesophageal disease.³⁹ Otherwise, if the body responds to the food allergen is not mediated by immune enhancement this is considered as food intolerance. Food allergy is proved to have a major role in the development of infantile colic as the evidence in sharing the same pathophysiology of gut dysmotility, visceral neuronal hypersensitivity and dysbiosis are growing on. Elimination of allergens from the diet of breastfeeding mothers showed good outcome in relieving colic symptoms; On the other hand, switching formula-fed infants to a hydrolyzed formula also is documented to ameliorate colic symptoms as many studies showed.^{40,41} In spite of controversial role of food allergy in infantile colic, a high quality randomized clinical trial reported the absolute risk reduction of infantile colic symptoms with the elimination of dairy products, eggs, peanuts, wheat, soy, and fish from the diet of breast fed mothers.^{40,42} Another study reported that cruciferous vegetables, cow's milk, and onions were related to increased risk of infantile colic, while chocolate and garlic had no any influence on colic.⁴³

Good evidence that links between infantile colic and allergy is the estimated response to the probiotic administration notably there are many studies tested its preventive effects for allergic conditions, since probiotic is found to protect from atopy by means of low-grade systemic or local inflammation which tend to increase plasma C-reactive protein as seen in children with

eczema and cow's milk allergy who received probiotic.^{23-27,44} One meta-analysis of trials concluded that reduced level of IgE and atopic sensitization can be achieved by early introduction of probiotic during the neonatal period.⁴⁵ Yet, the combination between hydrolyzed formula and probiotic showed resolution of milk allergy in comparison to using hydrolyzed formula alone as one study accomplished.⁴⁶ In a recent randomized clinical trial, the high dose multi-strain probiotic administration during pregnancy is found to affect cytokines and IgA production in breast milk, and improve colic symptoms in infants.⁴⁷

It is proposed that infantile colic is affected by the cytokine tumor necrosis factor α (TNF α) secreted in the mother milk that increases baby's melatonin and serotonin concentrations, resulting in infantile colic, but this does not explain the presence of colic in formula-fed babies.⁴⁸ Future studies need to consider the role of cytokines and immunological biomarkers to prove the allergic role behind infantile colic.

CONCLUSION

Infantile colic constitutes a stressful disorder that affects younger infant and may be reflected as paternal depression, exhaustion or even become one risk factor for shaken baby syndrome, although it has benign course and self-limiting character, it may be an early sign of allergy in childhood as it has relative influence and strong link to some allergic pathophysiology. This paper tried to highlight the two-way relationship between infantile colic and allergy and review the present evidence. Further trials and extensive studies should be conducted to prove this fact.

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