

**DR RUPERT HINDS** MBBS

Dr Rupert Hinds commenced working as Paediatric Gastroenterologist at Monash Medical Centre in March 2009. Prior to this he had worked in the UK as a consultant at King's College Hospital and St Thomas's Hospital in London from November 2004. He trained within his speciality in London including at Great Ormond Street Hospital. He manages children and adolescents with gastrointestinal problems and his clinical and research interests include nutrition, hepatology and inflammatory bowel disease. He is now head of the department of gastroenterology at Monash Children's Hospital as well as Senior Lecturer in Paediatrics at Monash University.

This article discusses the diagnosis and management of infantile colic.

Introduction

Infantile colic is a very common problem, affecting between 10% to 40% of infants in the first few months of life. It typically resolves by four months of age.¹ Infantile colic is generally thought to be a benign, self-limiting physiological process. However, the impact it has on families can be profound. A significant proportion of families with babies suffering from this condition seek medical attention and may well spend vast sums of money on unproven treatments. In addition to these issues, infantile colic is also a risk factor for both maternal depression and non-accidental head trauma.^{2,3,4}

Most clinicians have typically used Modified Wessel's criteria as the basis for diagnosis of infantile colic. These criteria are that babies cry without an explanation for more than three hours per day, on at least three days of the week, and for the last three weeks. However, the Rome IV criteria have suggested that the impact on parents may be equally as important in terms of both diagnosis and deciding on treatment.⁵

Take Home Messages

- ✔ Infantile colic affects between 10% to 40% of infants in the first few months of life and typically resolves by four months of age.
- ✔ Infantile colic is also a risk factor for both maternal depression and non-accidental head trauma.
- ✔ Less than 5% of babies with inconsolable crying will turn out to have an underlying organic diagnosis.
- ✔ If no concerning explanations are likely, no diagnostic testing for colic is useful or helpful.
- ✔ Reassurance and support of the family remains the mainstay of treatment.
- ✔ If alternative explanations for infantile colic have been excluded, a trial of *Lactobacillus reuteri* probiotics may be worthwhile in breast-fed babies.

It is important to think beyond the crying itself when one is offering treatments to families with babies affected by infantile colic

The pathophysiology of infantile colic is poorly understood. We do know, however, that less than 5% of babies with inconsolable crying will turn out to have an underlying organic diagnosis. Abnormal gut motility in an immature gastrointestinal tract, as well as variations in gut microbiota, have been suggested as potential causes for infantile colic. Many studies have observed differences in the gut flora of babies with this diagnosis when compared to controls.⁶

The most important aspect of the initial consultation for infantile colic is to take a careful history and to do a thorough examination, looking out for red-flags that would suggest an alternative pathological diagnosis (see Table 1).³ In most clinical situations, unless one of these concerning explanations is being sought, no diagnostic testing for colic is useful or helpful. Reassurance and support of the family remains the mainstay of treatment.

Table 1. 'Red Flags': Signs and Symptoms

| Signs |
|--|
| Irritability, tachycardia, pallor, mottling, poor perfusion |
| Petechiae, bruising, tachypnoea, cyanosis, nasal flaring |
| Hypotonia, meningism, full fontanelle |
| Weight <4th centile for age (or decreasing on the centile charts) |
| Head circumference >95th centile (or increasing on the centile charts) |
| Symptoms |
| Bilious or projectile vomiting, bloody stool |
| Fever, lethargy, poor feeding |
| Perinatal risk factors for sepsis (premature rupture of membranes, maternal fever or infection, group B streptococcus) |

There is a lack of agreement about the likely pathophysiology of infantile colic. As a result, a number of different, and indeed, contrasting approaches have been studied and there is a significant variability in their efficacy. Table 2 lists some of the treatment modalities that have been investigated as potential treatments for the condition. None of the studies show any definite benefit when compared to placebo.⁷ Studies concerning the management of infantile colic are always difficult to perform and analyse for a whole host of reasons. Data collection is hard, given it is based

on parental recall and timing of crying length, and also by the fundamental fact that infantile colic is a self-limiting condition.

Table 2. Studied Treatment Approaches to Infantile Colic that Studies Show no Definite Benefit⁷

| No Definite Benefit |
|--|
| Dietary manipulation – hydrolysed formula, soy formula |
| Herbal tea supplements |
| Anti-spasmodics – Simethicone |
| Chiropractic treatment/massage |
| Swaddling |
| Acupuncture |
| Pain relief/sucrose |
| Probiotics |

It is important to think beyond the crying itself when one is offering treatments to families with babies affected by infantile colic. The management will clearly be modified by impact of the crying on the family, the age of the child and the confidence that the clinician has that there is no alternative explanation. Similarly, the likely efficacy of treatments, as well as potential side-effects, their availability, the parental acceptance of an approach, the cost and the possibility that there are additional contributory factors to the crying, will all influence the management chosen. For example, hydrolysed feeds are likely to be effective in 'infantile colic treatment' if the correct diagnosis was cow's milk allergy all along.

In the recent past there have been rapid rises in studies of the faecal microbiota. New techniques, such as 16s RNA, allow much greater access to the gut microbiome,⁸ and so there is an increased interest in the implications of aberrant gut microbiota. As mentioned, this has allowed us to understand that there are differences in babies' gut microbiota. This can depend on whether they suffer from colic or not, as well as whether they are breast-fed or bottle-fed, or whether they were delivered vaginally or by caesarean section.^{6,8} Consequently, much of the contemporary investigation of infantile colic therapy has focused on probiotics. Although our ability to manipulate the gut microbiota is clearly in its infancy, there are already a number of very promising studies suggesting a benefit in treating affected babies with probiotics.^{9,10} A recent meta-analysis researched the use of the probiotic strain *Lactobacillus reuteri* and confirmed a benefit through a reduction in crying time in breast-fed babies; interestingly, it was apparently ineffective in formula-fed babies.¹¹

In conclusion, whilst infantile colic is clearly a common, self-limiting physiological condition, its impact on the family should not be forgotten. In almost all cases no diagnostic tests are needed, unless there are either signs of concern or there is a possible alternative explanation for crying. Most of the studied treatment options appear to have minimal benefit, but there is increasing evidence

for the efficacy of probiotics, predominantly *Lactobacillus reuteri*, particularly in breast-fed infants. It would be reasonable that, if alternative explanations for infantile colic have been excluded, a trial of *Lactobacillus reuteri* probiotics may be worthwhile in breast-fed babies.

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