Infantile Colic

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Infantile colic can be distressing to parents whose infant is inconsolable during crying episodes. Colic is often defined by the "rule of three": crying for more than three hours per day, for more than three days per week, and for longer than three weeks in an infant who is well-fed and otherwise healthy. The physician's role is to ensure that there is no organic cause for the crying, offer balanced advice on treatments, and provide support to the family. Colic is a diagnosis of exclusion that is made after performing a careful history and physical examination to rule out less common organic causes. Treatment is limited. Feeding changes usually are not advised. Medications available in the United States have not been proved effective in the treatment of colic, and most behavior interventions have not been proved to be more effective than placebo. Families may turn to untested resources for help, and the physician should offer sound advice about these treatments. Above all, parents need reassurance that their baby is healthy and that colic is self-limited with no long-term adverse effects. Physicians should watch for signs of continuing distress in the child and family, particularly in families whose resources are strained already. (Am Fam Physician 2004;70:735-40,741-2. Copyright© 2004 American Academy of Family Physicians.)

✉ **Patient information:** A handout on colic, written by the authors of this article, is provided on page 741.

See page 633 for definition of strength-of-recommendation labels.

Excessive crying or colic in an infant during the first few months of life can be alarming for physicians and parents. Estimates of the occurrence of infantile colic in community-based samples vary from 5 to 25 percent of infants, depending on study design, definition of colic, and method of data collection.[1,2] Fussing and crying are normal aspects of development during the first three months of life. During this time, infants cry an average of 2.2 hours per day, peaking at six weeks of age and gradually decreasing.[3] Parents who think their infant cries excessively may seek a physician's help.

Physicians and parents use the term colic to describe an infant with excessive crying, irritability, or fussiness. The most commonly accepted definition of colic, which originated in 1954,[4] describes using the "rule of three": crying for more than three hours per day, for more than three days per week, and for more than three weeks in an infant that is well-fed and otherwise healthy. This definition has been used repeatedly in clinical studies of colic. The motor behaviors of infants with colic also were first described in 1954.[4] Colicky infants have attacks of screaming in the evening with associated motor behaviors such as flushed face, furrowed brow, and clenched fists. The legs are pulled up to the abdomen, and the infants emit a piercing, high-pitched scream.[5]

Behavior characteristics usually are classified by the timing of the event, paroxysmal crying, and associated behaviors.[6] Colic typically begins at two weeks of age and usually resolves by four months of age. Crying is concentrated in the late afternoon and evening, occurs in prolonged bouts, and is unpredictable and spontaneous. It appears to be unrelated to environmental events. The child cannot be soothed, even by feeding.

Etiology

The cause of infantile colic remains unclear. Underlying organic causes of excessive crying must be considered during the evaluation. Organic causes account for less than 5 percent of infants presenting with excessive crying *(Table 1)*.[6,7] Gastrointestinal, psychosocial, and neurodevelopmental disorders have been suggested as the cause of colic.

GASTROINTESTINAL

Gastrointestinal disorders have been implicated in colic because of the infant's leg position and grimacing during a crying spell. Excessive crying or increased gas production from colon function can result in intraluminal gas formation and aerophagia. This mechanism does not appear to be the cause of colic, however, because radiographic images taken during a crying episode have shown a normal gastric outline.[8] There is conflicting evidence showing that colic is caused by allergy to human and cow's milk protein. It also has been speculated that abdominal cramping and colic may be a result of hyperperistalsis. The latter theory is supported by evidence that the use of anticholinergic agents decreases colic symptoms. Gut hormones such as motilin also may play a causative role in colic. Motilin is thought to cause hyperperistalsis, leading to abdominal pain and colic.[9]

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PSYCHOSOCIAL

Although studies have addressed possible psychosocial causes of colic, no evidence has been found in support of this mechanism. Even when colicky infants are cared for by trained occupational therapists, they cry twice as long as infants without colic.[10,11] The hypothesis that colic is an early manifestation of a difficult temperament is not supported by prospective longitudinal studies.[10]

Parents of a colicky infant may think that they have poor parenting skills. However, there is no evidence that maternal (or paternal) personality or anxiety causes colic.[11] In families with a colicky infant, there may be problems with communication and family functioning, as well as parental anxiety and fatigue.[12]

NEURODEVELOPMENTAL

Studies have suggested that colic may lie at the upper end of the normal distribution of crying in infants. The crying patterns of colicky infants (i.e., peaking around six weeks of age with crying late in the afternoon and evening) are the same in normal infants. However, colicky infants cry longer and are more difficult to soothe once crying has begun. The fact that most infants outgrow colic by four months of age lends support to a neurodevelopmental cause of colic.[6]

TABLE 1
Organic Causes of Excessive Crying in Infants*

CNS
CNS abnormality (Chiari type I malformation)
Infantile migraine
Subdural hematoma
Gastrointestinal
Constipation
Cow's milk protein intolerance
Gastroesophageal reflux
Lactose intolerance
Rectal fissure
Infection
Meningitis
Otitis media
Urinary tract infection
Viral illness
Trauma
Abuse
Corneal abrasions
Foreign body in the eye
Fractured bone
Hair tourniquet syndrome

CNS = central nervous system

**—Organic causes account for less than 5 percent of infants with colic.*

Adapted with permission from Barr RG. Colic and crying syndromes in infants. Pediatrics 1998;102(5 suppl E):1283, and Poole SR. The infant with acute, unexplained, excessive crying. Pediatrics 1991;88:452.

Diagnosis

When parents seek advice about a colicky baby, their concerns must be substantiated by the physician. The parents may feel tired and inadequate, and be worried that their child has a serious medical disorder. There may indeed be an underlying organic cause in an infant presenting with excessive crying. A careful history and physical examination

usually are sufficient to determine if there is an organic cause for crying or to relieve parental fears and allow for a diagnosis of colic. The physician should ask about the infant's behavior and the time of day and length of the crying episodes. Parents should be asked to document this information. A history of apnea, cyanosis, or struggling to breathe may suggest previously undiagnosed pulmonary or cardiac conditions. Documentation of frequency and quantity of spitting up is necessary to rule out gastroesophageal reflux or pyloric stenosis.[13]

The physical examination begins with careful observation while the infant is being held on the parent's lap. The infant is observed for lethargy, poor skin perfusion, and tachypnea. A rectal temperature greater than 38°C (100.4°F) or poor weight gain suggests infection, a gastrointestinal disorder, or nervous system disorder, and requires further work-up. During the examination, the infant's clothing should be removed to facilitate inspection of the skin for evidence of trauma and palpation of the large bones for possible fractures, which may indicate abuse. The examination may proceed with the infant in the parent's lap or on the examination table. A thorough gastrointestinal and neurologic examination should be performed.[13] The examination itself may reassure the parents.

Laboratory tests and radiographic examinations usually are unnecessary if the child is gaining weight normally and has a normal physical examination.[14]

Management

The mainstay of colic management is an acknowledgment by the physician of the difficulties the parents are facing and an inquiry into the well-being of the parents.[15]

FEEDINGS

Because the incidence of colic in breastfed and bottle-fed infants is similar, mothers who are breastfeeding should be encouraged to continue.[16] Early termination would deny the infant the beneficial effects of breastfeeding without relieving the colic symptoms. A systematic review[17] of randomized controlled trials (RCTs) found a possible therapeutic benefit from eliminating milk products, eggs, wheat, and nuts from the diet of breastfeeding mothers.

Parents of colicky bottle-fed infants often ask which formula to feed their child. One RCT found an improvement in colic symptoms with soy-based formulas, while another RCT studied only infants hospitalized with colic and did not adequately report results.[17] However, infants may develop an allergy to soy. The American Academy of Pediatrics' Committee on Nutrition does not recommend changing to soy formula in the management of colic.[18] RCTs found that infants who were fed lactase enzyme–treated formula had no significant differences in colic symptoms compared with infants who received placebo.[17] Another RCT found no significant differences in crying behavior in infants fed fiber-enriched formulas and those fed nontreated formulas.[17]

Hypoallergenic formulas may be tried in infants with cow's milk intolerance who have regurgitation or loose or bloody stools.

There is conflicting evidence about the role of hypoallergenic formulas in children with a family history of atopy. Physicians may choose to recommend a trial of hypoallergenic formula (e.g., casein or whey hydrolysate) for a week.[19,20] Hypoallergenic formulas also may be tried in infants with cow's milk intolerance who have regurgitation or loose or bloody stools. Infants who respond to the formula change may be tried on cow's milk formula again at three to four months of age. Otherwise, most infants can remain on their original formulas.

MEDICATIONS

Simethicone (Mylicon), a safe, over-the-counter drug for decreasing intraluminal gas, has been promoted as an agent to decrease colicky episodes. A randomized, placebo-controlled, multicenter trial concluded that treatment with this agent produces results similar to those of placebo.[21] The perceived improvement may be a placebo effect, and gas may be a marker of colic and air swallowing rather than a cause of the disorder. Two

other RCTs found no benefit for treatment with simethicone.[21]

Systematic reviews of studies using anticholinergic drugs in the treatment of colic found them to be more effective than placebo.[19] The most commonly used agent, dicyclomine (Bentyl), has been associated with apnea and is no longer indicated for use in infants younger than six months. Cimetropium, which is not available in the United States but is widely used in Italy to treat infantile colic, showed a decrease in duration of crying crises in the treated group compared with placebo. The major side effect was sleepiness; there were no reports of life-threatening events.[22]

OTHER TREATMENTS

Herbal teas containing mixtures of chamomile, vervain, licorice, fennel, and lemon balm, used up to three times a day (150 mL per dose) have been shown to decrease crying in colicky infants.[23,24] Given the multiplicity of herbal products, the lack of standardization of strength and dosage, and potential interference with normal feeding, parents should be cautioned about their use.

Interventions aimed at decreasing crying in colicky infants have produced varied results. Colicky infants who were placed in car-ride simulators showed no significant improvement in symptoms. Other techniques include early response to crying, gentle soothing motions, avoidance of overstimulation, use of a pacifier, prophylactic holding and carrying, use of an infant carrier, and maintenance of day-night orientation. Counseling parents about these specific management techniques was not shown to provide benefits above routine advice, support, and reassurance.[25] Crib vibrators have not been shown to decrease crying. Infant massage shows no significant improvement in symptoms and cannot be recommended.[26] Chiropractic treatment has shown no benefit over placebo.[27]

A study to assess the benefits of increased carrying of colicky infants during noncrying times failed to show any benefit.[28] An earlier study of noncolicky breastfed infants showed an overall decrease in crying time with supplemental carrying, but the effect was not noted in infants with established colic.[29]

Other methods to reduce infant crying, such as placing a colicky infant near a clothes dryer or vacuum cleaner (for the "white noise"), specific "colic holds" that put pressure on the infant's abdomen, and taking the infant for a ride in a car or stroller have been proposed. A product called "Gripe Water," which may include any of a variety of herbs and herbal oils, such as cardamom, chamomile, cinnamon, clove, dill, fennel, ginger, lemon balm, licorice, peppermint, and yarrow, is available online and in health food stores. This product is touted to provide relief from flatulence and indigestion but is not entirely without risk. Parents who choose to use this product should avoid versions made with sugar or alcohol and look for products that were manufactured in the United States. Noninvasive remedies recommended by family and friends may be beneficial but have not been scientifically evaluated.

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Strength of Recommendation

Key clinical recommendation	SOR labels	References
Eliminating milk products, eggs, wheat, and nuts from the diet of breastfeeding mothers may help relieve symptoms of colic.	B	17
Feeding infants fiber-enriched formula does not significantly improve crying compared with infants who are fed nontreated formulas.	B	17
Counseling parents about specific colic-management techniques does not provide benefits above routine advice, support, and reassurance.	B	26
Infant massage does not significantly improve colic symptoms and is not recommended.	B	26

Internet-savvy parents will run across many opportunities to buy items that have not been proved to be effective in the treatment of colic. Some Web sites advertise products that are "guaranteed" to soothe colic symptoms. It is important that physicians advise parents about these products, because there may be risks associated with their use. Parents should be encouraged to look for Web sites linked to medical references and those maintained by the American Academy of Family Physicians and the American Academy of Pediatrics.

OUTCOMES

At one-year follow-up, a group of colicky infants compared with noncolicky infants showed no differences in behavior in nine dimensions assessed using the Toddler Temperament Scale.[12] An association between infantile colic and later development of asthma or allergic disease has not been shown.[30] Once colic resolves, there is little lasting effect on levels of maternal anxiety or depression.[2] When superimposed on poor communication skills within the family, colic may damage family dynamics. Physicians must watch for signs of family distress and assess the family's coping resources.

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