contributing cause in 22, allergy in 6; both allergy and family tension together in 9; in 11 there was no apparent cause.

Allergy as a cause of the colic or fussing was assigned in the above 6 infants because in these the colic was markedly reduced by the removal of specific foods, either by limiting the mother's diet in the case of breast fed infants, or by changing the protein fed the artificially fed infants. The colic or fussiness promptly returned when the suspected food was again ingested.

Because of the multiple meanings, varied usages, and lack of clear definition of the term "colic," the term "paroxysmal fussing" is suggested, defined as the condition of an infant who, otherwise healthy and well fed, has paroxysms of irritability, fussing or crying lasting for a total of more than 3 hours a day and occurring on more than 3 days in any one week.

Paroxysmal fussing or colic in infants is possibly one of the earliest somatic responses to the presence of tension in the family setting. The particular degree to which any infant reacts is probably determined by constitutional factors.

REFERENCE


EMOTIONAL FACTORS IN THE ETIOLOGY OF COLIC IN INFANTS

By Milton I. Levine, M.D.

There is probably no practicing pediatrician who has not attempted to treat the so-called "colicky" baby. Changes in the formula, the type of nipple used and the size of the nipple hole, attempts at posturing the baby, giving warm water, barley water, fennel tea, sedatives, antihistamine drugs, and antispasmodics—all of these have been tried with varied degrees of success but none with spectacular success.

It is obvious from the numerous treatments advised that little is really understood as to the true etiology. Is it a reaction to some gastrointestinal allergy; is it due to poor feeding techniques, with subsequent swallowing of air; is it due to a fat or carbohydrate intolerance, or is it related to something more inherent in the physiological structure or emotional environment of the particular child?

It seems evident from the abdominal distention, the flexing of the legs, and the passage of flatus that there is undoubtedly abdominal pain. But what causes colicky babies to develop abdominal pain?

If one observes these infants he will note that in almost every instance the child can be categorized as a "hypertonic" baby. Such are the active, keyed-up infants so sharply differentiated from more relaxed and placid infants—often from birth.

These hypertonic infants react more acutely to their environment, to their unsatisfied needs or to outward stimulation. They react violently to sudden noises, they vomit and regurgitate easily, and they usually sleep shorter periods and less soundly than other infants.

On the assumption that this hypertonicity might be related to the colic, a study was instituted in 1947 in an attempt to determine: 1) if relaxation of the baby would cause a disappearance of the symptoms; 2) if there were unsatisfied emotional or physiological needs of the infant causing the child to react with increased hypertonicity and subsequent colic, and 3) if such needs were satisfied could the symptoms of colic be dispelled without resorting to other

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means such as formula changes, sedatives, rocking or carrying?

It had long been recognized that a great many infants relax completely while being nursed or while sucking their fingers or fist. Many of us in the field of pediatrics had knowledge of a simple quieting device used on crying infants when desirous of listening to the heart and lung sounds—merely bringing the baby’s fist to his mouth and letting him suck on it. It had also been noted that following the trauma of circumcision most infants will quiet down immediately if a nipple or pacifier is placed in his mouth.

These observations prompted us to attempt an answer to the question as to whether the pains of colic could be relieved by offering the infant a pacifier.

The study was made on 28 infants selected because they presented the typical picture of colic. These were all private patients and with very few exceptions were on a self-demand or modified self-demand schedule.

Of course the time at which the pacifier was offered varied considerably depending on when the parents first complained, whether other treatments had been tried previously and, in a few instances, when infants were brought in for consultation on treatment of crying and irritability.

Of the 28 infants treated by the pacifier the onset of such treatment was instituted in 16 before they were 4 weeks of age, in 7 between 4 and 8 weeks of age, and in 5 over 8 weeks of age.

There was no evidence, by the way, that these infants given a pacifier swallowed air while sucking on it. The sucking seemed to differ considerably from the sucking during a breast or bottle feeding when the baby sucks and swallows automatically. When the pacifier was used there rarely was any swallowing motion—the activity being almost entirely confined to the motion of the lips.

Without going into the details of the study which was based on careful reports of the home environment, the type of feedings used, the difficulty or ease in “bubbling,” the use of sedatives, etc., it was reported that in this particular series the signs of colic practically disappeared in all but 3 of the infants almost as soon as the pacifier was given and accepted. Observation of many so-called colicky infants treated with pacifiers, since the first series was reported, has generally followed this pattern of success although approximately 20 to 25 per cent of the infants were refractory to this particular type of treatment.

But if 75 or 80 per cent of colicky babies respond to the pacifier by the cessation of their crying and irritability, it is of interest to attempt to determine the relationship of this approach to treatment and the physiological condition causing colic.

Today it is generally accepted that an infant has not only a sucking reflex but, even more, a sucking urge—a deep need for oral satisfaction. This need is entirely separate from the necessity of sucking as an adjunct to eating. That oral satisfaction brings a sense of relaxation to the infant has already been pointed out as a common observation to pediatricians and students of child development. On the other hand it has been demonstrated that many children when deprived of adequate oral satisfaction resort to thumbsucking as a substitute.

The favorable results of our studies on the treatment of colic by use of the pacifier led us to conclude that the crying of a great many infants suffering with this condition is due directly or indirectly to an unsatisfied need for sufficient oral satisfaction. In other words, the infant was uncomfortable either from an unfulfilled desire to suck or that the tension due to this lack of oral satisfaction causes an otherwise relaxed baby to become tense which probably brings on intestinal spasm accompanied by distention and pain.

Now, there is another rather common observation which leads us to feel that certain of these colicky infants may have their “colic” originate in emotional rather than physiological factors. Many pediatricians
have observed that not infrequently the colic disappears when an infant is taken from the care and handling of a tense nervous person and placed in the care of one who is relaxed and assured.

But these observations, both on the use of the pacifier and the handling of the infant by a relaxed person by no means rule out the importance of allergy, improper diet and specific food intolerances as causative agents. Every pediatrician has observed infants where the signs of colic subside with shifts to hypo-allergenic formulae. And we have also seen infants respond to changes in the milk or carbohydrate content of formulae, and then there are children who react favorably when specific vitamin preparations or orange juice are removed from the diet.

All these possible factors must be considered by the pediatrician when presented with an infant suffering from colic, but he should also consider the possibility of the emotional causes of this condition, as they apparently are of great significance.

It may be that this hypertonicity of the baby makes him more sensitive to certain materials or certain food proportions, or makes his digestive tract more prone to the absorption of specific proteins. We all know the effect of emotional tension on the allergic response of older children and adults. Perhaps some similar relationship exists in the case of the colicky baby.

\section*{AN ANALYSIS OF ETIOLOGY OF COLIC IN INFANTS}

\textit{By Lawrence Breslow, M.D.}

The subject of so-called “three-months-colic” in infancy can be considered from two major viewpoints. The first, and by far the most popular today, is the emotional or psychosomatic; other papers in this panel consider this in some detail. The second point of view is based on the belief that colic in infants is essentially a manifestation of gastroenterospasm, resulting from overloading the small intestine with disturbing substances. This may be due to a low threshold in a hypertonic (psychosomatic) infant when subjected to an ordinary quantity of poorly tolerated material, or to a normal threshold being exceeded by an abnormal quantity.

With the latter in mind, 90 infants who seemed to have the usual manifestations of colic were studied as to etiology. Five main factors were considered:

1. Poor feeding technique.
2. Hunger.
3. Intolerance to carbohydrate added to the formula.
4. Intolerance to butter fat added to the formula.
5. Intolerance for, or allergy to, cows milk proteins.

After the first 2 factors were eliminated by the usual methods from consideration as a cause of gastroenterospasm, carbohydrate was removed from the formula as completely as possible. In those infants in whom the symptoms disappeared, this procedure was repeated one or more times until there was no question as to the role played by the sugars. If the symptoms failed to be alleviated, the infant was placed on a formula low in, or free of, butter fat. Originally a powdered half-skimmed milk was used but more recently, a reconstituted milk (Varamel®) in which animal and vegetable oils have replaced butter fat. Once again, only those infants in whom the symptoms could be reproduced by the addition of butter fat to the formula were classified in the butter fat intolerance group.
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