



USC University of Southern California

EXCESSIVE CRYING IN INFANTS

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Disclosures

- I have no relevant financial disclosures

Objectives

1. Formulate a differential diagnosis for excessive crying in an infant.
2. Review the definition and proposed etiologies of infantile colic.
3. Discuss current evidence for common treatments of infantile colic.



Excessive crying in infants: initial evaluation

- History and physical
- Focus on any concern for fever or illness, feeding history, stool and urine output
- Observe the infant crying and caregiver response, ability to calm infant
- On physical exam assess hydration status, any signs of illness or injury

Selected identifiable causes of prolonged/excessive crying in an infant younger than four months of age

Condition	Clinical features
General	
Drug ingestion or overdosage (eg, pseudoephedrine)	History of medication administration
Hunger/inadequate feeding	Signs of hypovolemia or undernutrition (eg, sunken fontanelle, dry mucous membranes, decreased subcutaneous fat, etc)
Neonatal abstinence syndrome	Maternal history of prenatal substance use or positive urine screen (maternal or fetal)
Skin	
Hair tourniquet of digit or penis	Apparent on physical examination
Open diaper pin poking the skin, diaper rash	Apparent on physical examination
Trauma (abusive or nonabusive)	Bruising, laceration
Eyes	
Corneal abrasion or foreign body	May have photophobia, positive fluorescein examination
Glaucoma	Chronic or intermittent tearing, photophobia, corneal enlargement, corneal clouding, optic nerve cupping, ocular enlargement
Ears, nose, oropharynx	
Otitis media	Bulging tympanic membrane
Thrush	White plaques on the buccal mucosa, tongue, or palate
Cardiovascular	
Anomalous origin of the left coronary artery	Cardiomegaly, heart failure
Heart failure	Feeding intolerance, tachycardia, poor perfusion, tachypnea
Supraventricular tachycardia	Pallor, irritability, poor feeding, cyanosis, restlessness

Gastrointestinal	
Anal fissures	Apparent on physical examination
Constipation	Passage of hard stools
Gastroenteritis	Vomiting, diarrhea
Gastroesophageal reflux	Vomiting, poor weight gain, feeding refusal, gross or occult blood in the stool
Gastrointestinal obstruction (eg, pyloric stenosis, intussusception, volvulus)	Vomiting (may or may not be bilious or forceful), gastrointestinal bleeding, forceful vomiting, abdominal tenderness, distension, right-sided sausage-shaped abdominal mass (intussusception), palpable "olive" (pyloric stenosis)
Inguinal hernia	Bulge in the groin area (may be intermittent), vomiting and abdominal distension may indicate incarceration
Genitourinary	
Meatal ulcer	Apparent on examination
Ovarian torsion	Feeding intolerance, vomiting, abdominal distension, fussiness/irritability
Testicular torsion	Acute testicular swelling and tenderness
Urinary tract infection	Fever, suprapubic tenderness, poor feeding, poor weight gain
Urinary tract obstruction	Abdominal distension (due to enlarged bladder), difficulty voiding, poor urinary stream, straining or grunting during voiding
Skeletal	
Fracture	Decreased movement of extremity, asymmetric Moro reflex, localized swelling and crepitation, increased pain response with movement of the extremity
Osteomyelitis or septic arthritis	Fever, decreased movement of extremity, asymmetric Moro reflex, increased pain response with movement of the extremity
Neurologic	
Abusive head trauma	Seizures, respiratory difficulty or apnea, retinal hemorrhages, cutaneous bruising, associated injuries
Meningitis	Fever, bulging fontanelle, lethargy, irritability, meningismus (often not present in infants)
Neuromuscular disease, CNS disorder, metabolic disease	Abnormal tone, muscular weakness

CNS: central nervous system.

Data from:

1. *Drug and Therapeutics Bulletin. Management of infantile colic. BMJ 2013; 347:f4102.*
2. *Parker S, Magee T. Colic. In: The Zuckerman Parker Handbook of Developmental and Behavioral Pediatrics for Primary Care, 3rd ed, Augustyn M, Zuckerman B, Caronna EB (Eds), Lippincott Williams & Wilkins, Philadelphia 2011. p.182.*
3. *Roberts DM, Ostapchuk M, O'Brien JG. Infantile colic. Am Fam Physician 2004; 70:735.*

Superficial hair tourniquet



Infant brought in by mother who noticed toe was red and swollen while bathing child. Note the grossly visible hair tourniquet at the base of the fourth toe. It was removed using fine forceps without difficulty and with return of normal appearance of the toe within 24 hours.

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Definition of Infantile Colic

- Most common definition of Infantile Colic
  - "Rule of Threes" (aka Wessel Criteria)
- Crying for no apparent reason that
  - Lasts for ≥ 3 hours per day
  - Occurs on ≥ 3 hours per week
  - In an otherwise healthy infant <3 months of age

Wessel Criteria: 1954

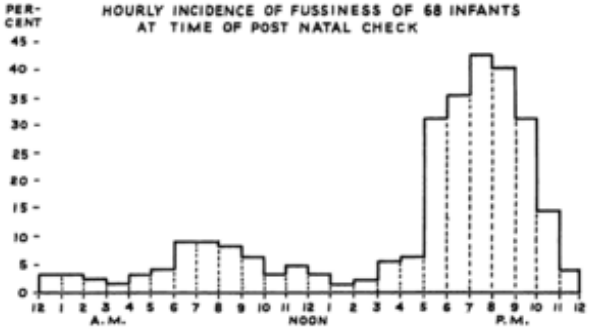


Fig. 1. Hourly incidence of fussiness of 68 infants at time of post-natal check.

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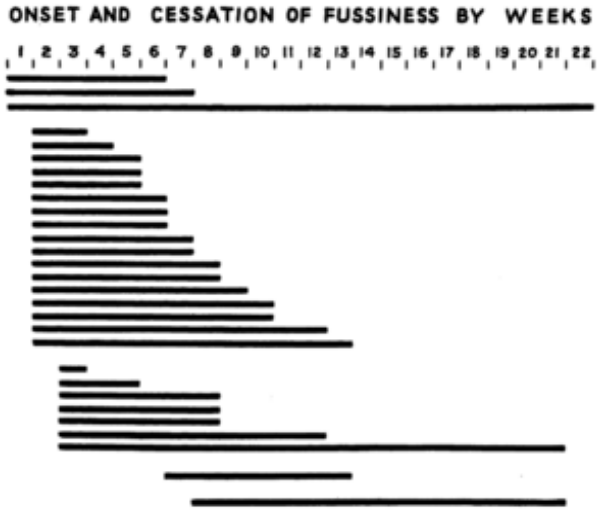


Fig. 4. Onset and cessation of fussiness by weeks in 29 infants.

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(Wessel et al., 1954)

Colic Prevalence

- Systematic review of crying and fussing duration, colic prevalence in infants
- Based on 28 diary studies in multiple countries
- Mean colic prevalence:
  - 1-2 weeks of age: 17.4%
  - 3-4 weeks of age: 18.4%
  - 5-6 weeks of age: 25.1%
  - 8-9 weeks of: 10.8%

Wolke, et at. *J of Peds* 2017

Mean cry/fuss duration

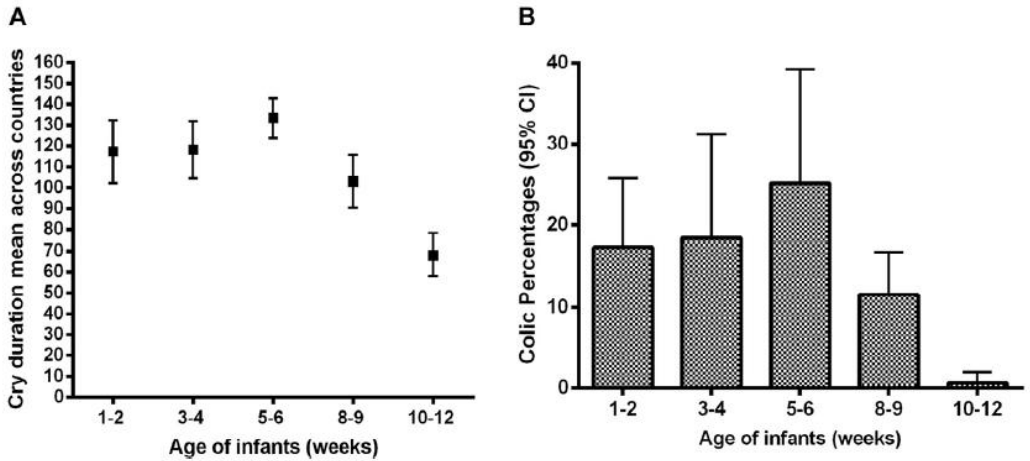
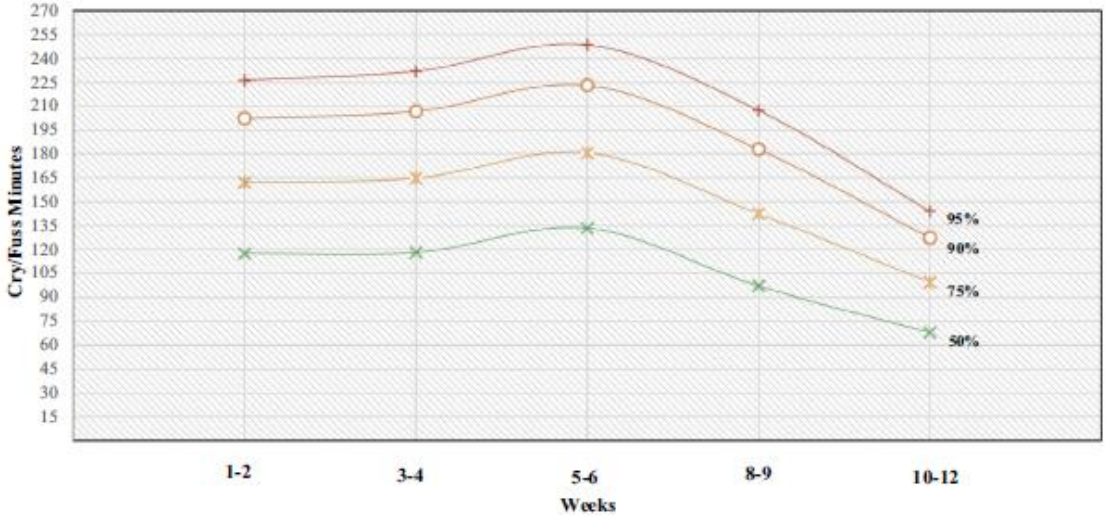


Figure 2. **A,** Weighted mean fuss/cry duration (in minutes) across countries (1-2 vs 10-12 weeks of age [$P < .001$]; 3-4 vs10-12 weeks of age [$P < .01$]; 5-6 vs 10-12 weeks of age [$P < .001$]) and **B,** overall colic percentages (95% CI) for all studies combined in each period (1-2 vs 10-12 weeks of age [$P < .01$]; 3-4 vs 10-12 weeks of age [$P < .001$]; 5-6 vs 10-12 weeks of age [$P < .001$]; 8-9 vs10-12 weeks of age [$P < .05$]; and 5-6 vs 8-9 weeks of age [$P < .05$]).

Wolke, et at. *J of Peds* 2017

Fuss/cry percentiles



Please note that this is an approximation of average to high fuss/cry amount percentiles based on the samples included in the meta-analysis. It should only be used as a rough guide to identify excessively crying infants according to age.

Figure 4. Percentile chart of above average fuss/cry at the ages 1-2, 3-4, 5-6, 8-9, and 10-12 weeks in infants.

Wolke, et at. *J of Peds* 2017

Etiology of Infantile Colic

- Etiology of colic unknown, likely multifactorial
- Thought to be a normal developmental process
- May be related to
  - Gastrointestinal discomfort: overfeeding, underfeeding, excessive air swallowed, poor burping, alterations in gut microflora, cow's milk intolerance
  - Immature motor regulation, increased serotonin levels
  - Psychosocial: infant temperament, parental stress, anxiety, depression

PURPLE Crying

- Definition by Dr. Ronald Barr
  - Work to improve parents understanding of colic to help prevent shaken baby syndrome
- P = Peak of crying at 2 months, then improves
- U = Unexpected
- R = Resists soothing
- P = Pain-like face
- L = Long lasting
- E = Evening

Barr, R. et al. (2009).

PURPLE Crying



http://purplecrying.info/

Infant Dyschezia

- Infant dyschezia = different from infantile colic
- Infants with dyschezia may strain for 10-20 mintues, scream, turn red or purple in the face with each effort to defecate
- Stools are soft
- Infant is otherwise healthy
- Happens during the first months of life, usually resolves in 3-4 weeks

(Benninga et al., 2016)

Infant Dyschezia

- Prevalence: up to 4% of infants 1-3 months of age, decreases to <1% by 9 months of age
- Etiology likely failure to coordinate increased abdominal pressure with relaxation of the pelvic floor
- Treatment: reassurance! Will improve with time, not necessary to change feeding type or try laxatives

(Benninga et al., 2016)

Infantile Colic: Treatment

- Reassurance
- Support for the caregiver, screening for depression and anxiety
- Basic soothing techniques
  - Holding infant, placing them in a front carrier
  - Rocking infant
  - Taking for a walk or car ride
  - Changing environment, minimizing stimuli
  - Rubbing abdomen
  - White noise, playing sounds of heartbeats

Infantile Colic: Treatment

- Dr. Harvey Karp: The 5 S's
  - Swaddling (hip-safe, room for hip/knee flexion and leg movement)
  - Side-lying (not while sleeping)
  - Shushing
  - Swinging
  - Sucking
- Think of the first 3 months of life as "4th Trimester" and mimicking the womb to comfort baby

https://www.happiestbaby.com/blogs/baby/the-5-s-s-for-soothing-babies

Infant colic: Treatment

- If no response to first-line, basic soothing interventions:
  - May consider time-limited trial of eliminating cow's milk from mother's diet if breastfed, or trying a hydrosylated (broken down) protein formula if infant is formula fed
- No evidence that soy-based formulas help
- Treatment for Gastroesophageal Reflux Disorder (GERD) does not help with colic

(Benninga et al., 2016)

Infantile Colic: Treatment

- Probiotics
  - Some evidence of reduced crying in breastfed infants with use of probiotic *Lactobacillus reuteri*
  - Meta-analysis determined that all the *L. reuteri* trials had potential bias, and in 7 trials looking at *L. reuteri* to prevent colic, only 2 demonstrated any benefit
- Overall: insufficient evidence that probiotics can help treat colic

(Sung et al., 2013)

Infantile Colic: Treatment

- Cochrane review of pain-relieving agents to treat colic
  - No evidence that simethicone is better than placebo
  - No evidence that herbal agents (such as fennel, commonly found in gripe water) better than placebo
  - No evidence that sucrose better than placebo
  - No evidence that dicyclomine better than placebo: and this had adverse side effects
  - No evidence that cimetropium bromide is better than placebo

(Biagioli et al., 2016)

Conclusions

- First step in evaluating excessive crying in infant:
  - Good history and exam, look for signs of illness or injury
- Colic very common, improves after first 6 weeks of life
- Common soothing techniques are first line
- Can trial elimination of cow's milk protein from diet
- Common treatments lack evidence
- Parent support and reassurance essential

Thank you!



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