What to Do when Babies Turn Blue

Beyond the Basic Brief Resolved Unexplained Event

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KEYWORDS

• Brief resolved unexplained event (BRUE) • Apparent life-threatening event (ALTE) • Apnea • Gastroesophageal reflux (GER) • Nonaccidental trauma • Pertussis • Respiratory syncytial virus (RSV)

KEY POINTS

- Infants who meet low-risk brief resolved unexplained event classification criteria can be briefly observed in the emergency department and discharged after caregiver reassurance and education.
- Infants who demonstrate historical or physical examination elements suggestive of a specific etiology of their event, such as gastroesophageal reflux or trauma, should be evaluated and treated accordingly.
- Patients who demonstrate no specific historical or physical examination clues yet who are high risk should be evaluated for the most common etiologies of apneic events and admitted.

INTRODUCTION

A perceived near death event of an infant is a frightening experience for parents, frequently triggering a visit to the emergency department. Often, on arrival, the baby is well-appearing without any evident cause for the event. This presentation can leave the provider aimless with regard to direction of work-up and the parent dissatisfied with answers regarding the cause of the event. Over the years, many strategies have been developed to assist the provider in the evaluation of these patients.

The term "apparent life-threatening event" (ALTE) was coined in 1986. Before this, these events were categorized as "near-miss sudden infant death syndrome (SIDS)." Once it was discovered that these patients with near-miss events were not actually at increased risk of SIDS, the verbiage was changed to ALTE. Although this change may seem like semantics, the goal was to further define these events and thus aid the

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physician to focus the evaluation of these infants. An ALTE was defined as an episode that is frightening to the observer and that is characterized by some combination of apnea (central or obstructive), color change (usually cyanotic or pallid but occasionally erythematous or plethoric), marked change in muscle tone (usually marked limpness), choking, or gagging.

Although ALTE was a vast improvement on near-miss SIDS, it remained imperfect. The ALTE categorization remained subjective and imprecise. Infants who fit the criteria for ALTE are a heterogeneous group that can include both babies who are asymptomatic and those with ongoing symptoms and an abnormal examination. Symptoms concerning to the caregiver, and thus fitting definition of ALTE, can represent simple normal neonatal behaviors such as periodic breathing. Furthermore, by including "life-threatening" in the name, the diagnosis of ALTE can increase parental anxiety when not warranted. Additionally, the increased parental anxiety and perceived risk often compelled physicians to order testing and admission, subjecting the baby to unnecessary testing without addressing actual diagnosable and/or treatable conditions or preventing any future events.[1]

In an effort to further categorize these infants, in 2016 an American Academy of Pediatrics Task Force coined the term "brief resolved unexplained event" (BRUE) to replace the diagnosis ALTE. The goal was to further refine the diagnosis, better assessing the risk of an underlying serious disorder, and providing actual evidence-based recommendations on the management of low-risk infants.

By narrowing the definition of BRUE, a more homogenous patient population is created. This classification allows more specific recommendations for management as well as future study of these patients. It also emphasizes the typical nature of the event by using words such as "brief" and "resolved," hopefully reassuring the parents. However, it also excludes many infants brought to the emergency department for apneic or frightening episodes. Although BRUE has given providers specific guidelines with regard to low-risk infants, it does not attempt to address the evaluation of an infant with such an episode not meeting BRUE classification or meeting a high-risk stratification. Thus, in the absence of evidence-based guidelines, providers may again feel obligated to order aimless workups and admission. This article defines and reviews the most recent BRUE guidelines. Additionally, it attempts to provide some guidance to the provider for patients who fall outside of the low-risk BRUE population. **Fig. 1** outlines a clinical pathway for an infant who presents after such an event.

WHAT IS A BRIEF RESOLVED UNEXPLAINED EVENT?

The clinical practice guidelines that define BRUE focus the event characteristics more specifically. By definition, a BRUE occurs in children younger than 1 year of age. The event must be brief, lasting less than 1 minute. The event should be perceived as life-threatening by the clinician rather than caregiver. The event must also be resolved. Although this definition clearly means that the patient cannot currently be cyanotic or hypotonic, the authors go so far as to say that the patient must be completely asymptomatic on presentation with a completely normal examination, normal vital signs, and a reassuring history. The qualifying event must be unexplained, without any suggestion of causation. For example, infants with fever or nasal congestion on examination may suggest temporary airway obstruction from viral infection. A history of choking or gagging suggests reflux. These common scenarios, even if associated with apnea, would therefore not fall under definition of BRUE, because they have some explanation of cause.

The event should include 1 or more of the following characteristics.

- Cyanosis or pallor. This specifically excludes redness, because it is a common phenomenon in healthy infants when crying, straining, or coughing.