Scary Seconds: BRUEs **Twitter/Instagram: @emboardbombs**

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Author: Blake Briggs, MD
Peer Reviewer: Larry Mellick, MD

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Introduction

A "brief resolved unexplained event" or BRUE, is not a specific diagnosis, but rather a diverse group of patients with various pathology. It reflects a general "catch-all" chief complaint. It peaks in incidence at <2 months of age but can occur anytime within the first year of life. The real challenge is to identify which infants require further investigation versus those who can be discharged from the ED. The old term was ALTE (apparent life-threatening event), but this term was too broad and incorrectly associated symptoms and SIDS. Incidence of BRUE rates are not completely known, but it is suggested to be around 3-40 per 10,000 infants.
This review will cover the risks of BRUE, common causes, along with workup and disposition.

Clinical features that define BRUE (includes any of the following):

- cyanosis or pallor
- absent, decreased, or irregular breathing
- change in tone
- altered mental status

Estimated duration of the event is typically <1 minute. *The term BRUE can only be applied if the infant is asymptomatic on presentation in the ED*. If not, another diagnosis should be sought.

Risk Factors

Risk factors include issues with feeding, maternal smoking history, premature birth or low birth weight, recent upper respiratory illness, age <2 months old, history of prior episodes, gastroesophageal reflux (GER), and seizures.
Causes are many, but the most common ones uncovered include GER, seizures, and respiratory infections account for the vast majority of BRUEs.
Child abuse is the cause in <10% of cases.
Cardiac disease, upper airway obstruction, metabolic diseases, bacterial infections <3% of cases.

Evaluation

The most important part of BRUE evaluation is the history and physical exam, as it allows the clinician to decide on the infant being low or high risk. In fact, one study demonstrated the history/physical alone diagnosed ~20% of cases. Another 50% of diagnoses were confirmed from testing that was prompted by the history/physical.
In other words, the most critical diagnostic tool is a description of the episode, with as much detail as possible.

The decision to proceed with workup depends on if the presentation is deemed "high risk" or "low risk". See table below for details:

Low risk BRUE criteria:
Age >60 days
If premature, born at gestational age >32 weeks and current age is >45 weeks
Occurrence of only one BRUE
Duration of BRUE <1 minute
No CPR was performed by a **trained** medical provider
No concerning history or physical findings

So what are the concerning historical and physical exam findings?
In simplest terms, anything that suggests a tangible, concerning cause: Child abuse, respiratory illness, trauma, ingestion, developmental delay, congenital anomalies, or family history of sudden unexplained death in a primary relative.

Physical exam findings are fairly obvious and include injuries (e.g. bleeding/bruising), bulging fontanelle, altered status, fever, respiratory distress, decreased pulses, or abdominal distension or masses.

Infants who are low risk do not benefit from any further investigation. These patients are managed outpatient and no further intervention is required in the ED.

Recommended: extensive education about BRUE with caregivers, reinforce measures to prevent (sudden infant death syndrome) SIDS, offer resources in CPR, and arrange f/u in 24 hours with PCP. Parents should be told never to shake the infant if unresponsive.

Minimizing the risk of SIDS:
Ensure the infant is sleeping in a **supine** position on a **hard** crib, no loose bedding, no pillows, no excessive clothes, no smoking in the home.

Not recommended by the American Academy of Pediatrics (AKA do not do): *any* lab work, chest x-ray, echocardiogram, or any other diagnostic tests. Here's a bombshell: *no* cardiopulmonary monitoring for these patients at home. If you are that concerned about the infant admit them.

Optional: if you are unsure about the patient, brief ED observation for 1-4 hours is not unreasonable, a 12-lead EKG is not unreasonable either.

Lastly, if you are going to order one diagnostic test, pertussis testing is not a bad idea in those with respiratory symptoms.

High risk infants
Admit and do a full workup. Continuous cardiopulmonary monitoring, EKG, CBC, BMP, respiratory viral panel and pertussis testing are all typically performed. Further diagnostic studies are tailored to the patient based on the findings from the history and physical. Many of these tests are outside the scope of emergency medicine, as these will occur inpatient, but you still should be familiar with them as they are related to many other pathologies that present on their own to the ED.

If there are neurological findings or concern for child abuse, CT head is warranted.
RSV and pertussis are known to cause sudden infant death in premature infants, hence their routine testing.

Hypoglycemia and vomiting might suggest metabolic disease like inborn errors of metabolism.

Suggestion of seizure-activity might prompt inpatient EEG and neuroimaging.

A word on GER…
GER is a common cause of BRUE by mechanism of laryngospasm. There is no evidence that treating GER prevents future episodes. Features that suggest GER include regurgitated food at the time of event, infant was awake, and feeding was recent or at time of event. It is *not* recommended to start antihistamines. Have them follow up with pediatrician for further GERD discussion.

Prognosis
Recurrence risk ranges 10-25% in several studies for ALTE, with an overall death rate of <1%. There are no new studies on BRUE rates at the time of this writing.

Risks for recurrence include respiratory illness, prematurity, and history of prior events.

There is no established relationship between BRUE and SIDS. SIDS occurs without warning and no studies have documents preexisting cases of apnea.

References- Please refer to the website under this topic's heading for a complete list of references.