

Evaluation of the Higher-Risk Infant After a Brief Resolved Unexplained Event



Yes → **Diagnosis of BRUE is made** → No → **Not a BRUE**
 • Manage accordingly

Concerns identified from

- History
- Physical Exam

No →

Apply risk criteria to history and physical examination

- Age ≤ 60 days
- Born < 32 weeks/ gestation and corrected gestational age < 45 weeks
- Cardiopulmonary resuscitation by trained medical provider
- Event lasted > 1 minute
- More than one event (at this visit or before presentation)

No →

Lower-risk patient

See AAP CPG

Yes → **Higher-risk patient**

Perform initial evaluation in ambulatory or emergency setting

Monitoring

- Continuous pulse oximetry monitoring for at least 4 hours

Consultation

- Social worker screens for child abuse and social and mental health contributors and to provide parenting support
- Feeding evaluation (feeding therapist, if available)

Diagnostic testing

- Electrocardiogram
- Rapid viral respiratory panel
- Pertussis in under immunized and/or exposed patient in endemic regions and outbreaks
- Hematocrit
- Blood glucose, bicarbonate or venous blood gas, lactic acid
- If there is concern for child maltreatment (e.g., bruising, torn frenulum, concerning history, etc.)
- Consultation with child abuse expert
- CT or MRI of head
- Skeletal survey

Diagnosis that explains event

No longer a BRUE
 • Manage accordingly

Diagnosis that explains event

No explanation →

Admit to hospital

- Continue prolonged oximetry
- Observation for repeat events, better characterization of event, or social concerns
- Clinical swallow evaluation and feeding consultation

Evaluation based on event characteristics

If concern for silent aspiration due to feeding problem

- VFSS (video fluoroscopic swallowing study)

If concern for GERD

- Gastroenterology consultation

If concern for obstructive apnea

- Otolaryngology consultation for airway evaluation
- Pulmonology consultation
- Comprehensive polysomnography

If concern for central apnea

- CT or MRI of head
- Pulmonary consultation

If concern for seizures

- Neurology consult
- Prolonged electroencephalogram (~ 12 hours)

If concern for arrhythmia or congenital heart disease

- Cardiology consult

If concern for episodic hypoglycemia or acidosis

- Biochemical genetics consult
- Blood sodium, potassium, chloride, blood urea nitrogen, creatinine, calcium, ammonia

No repeat events and no explanation within 24 hours

- Discharge home
- Cardiopulmonary resuscitation teaching
- Provide detailed information to the primary care clinician and arrange close follow-up

If unavailable in ED, consider hospital admission

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Systematic approach is helpful for evaluation of BRUE given that it is a problem that can involve a multitude of organ systems. The most common etiologies of subsequent diagnosis after high risk include gastro-esophageal reflux, seizure, and lower respiratory tract infection [1]. Upon admission review possible differential diagnoses to optimize choices for consultation, testing, and patient education. Above all, for high-risk BRUE the objective should be to limit medical interventions unless there is concern for a serious underlying condition such as:

Gastrointestinal

- Nearly every infant has some degree of reflux, though common GI abnormalities in higher-risk infants include laryngospasm, aspiration, dysphagia, GERD of GI tract anatomic abnormalities
- Review feeding history for symptoms of choking, gagging, color change with feeds, and requiring >30 minutes to feed
- Consider feeding team evaluation

Neurologic

- Seizure, structural brain abnormalities (hydrocephalus, AVM), infantile spasms
- Review associated movements with events with focus on those that are paroxysmal, sustained, recurrent or stereotyped
- Consider EEG or Neurology consult

Respiratory

- Obstructive vs central apnea, airway infection, apnea of prematurity
- Consider CXR and RVP testing (RSV and pertussis are more likely especially in <60 days of life)

Cardiology

- Cardiac arrhythmias, congenital heart disease
- Strong review of family history for first degree relatives with sudden, unexplained death, before age 35, long QT syndrome, or arrhythmia
- Consider EKG

Metabolic

- In born errors of metabolism have been reported in up to 5% of BRUE/ALTE [1]
- Urea cycle disorders, fatty acid oxidation disorders, organic anemias, lactic acidemia
- Consider glucose, bicarbonate, and lactic acid levels in high-risk infants

Infectious

- In any infant with GA <36weeks, prior antibiotics, and complicated neonatal course if <60 days has a higher risk of infection [2]

Maltreatment

- Abusive head trauma, suffocation
- Consider skeletal survey and SCAN consult

If all these diagnoses have been considered and the clinical presentation does not align, and the child has been monitored for 24 hrs with NO repeat event

Education

- CRP teaching prior to discharge
- Information on safe sleep
- Strong communication with primary care doctor and scheduled follow up

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