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## Brief resolved unexplained event - BRUE

A brief resolved unexplained event (BRUE) is when an infant younger than one year stops breathing, has a change in muscle tone, turns pale or blue in color, or is unresponsive. The event occurs suddenly, lasts less than 30 to 60 seconds, and is frightening to the person caring for the infant.

BRUE is present only when there is no explanation for the event after a thorough history and exam. An older name used for these types of events is an apparent life-threatening event (ALTE).

### Causes

It is unclear how often these events occur.

BRUE is not the same as sudden infant death syndrome (SIDS). It is also not the same as older terms such as near-miss SIDS or aborted crib deaths, which are no longer used.

Events that involve a change in an infant's breathing, color, muscle tone, or behavior may be caused by an underlying medical problem. But these events would then not be considered a BRUE. Some of the causes for events that are not a BRUE include:

- Reflux after eating
- Severe infections (such as bronchiolitis, whooping cough)
- Birth defects that involve the face, throat, or neck
- Birth defects of the heart or lungs
- Allergic reactions
- A brain, nerve, or muscle disorder
- Child abuse
- Certain uncommon genetic disorders

A specific cause of the event is found about half the time. In healthy children who only have one event, the cause is rarely identified.

The main risk factors for BRUE are:

- A prior episode when the child stopped breathing, turned pale, or had blue coloring
- Feeding problems

- Recent head cold or bronchitis
- Age younger than 10 weeks

Low birth weight, being born early, or secondhand smoke exposure also may be risk factors.

## Symptoms

These events are more likely to occur during the first two months of life and between 8 a.m. and 8 p.m.

A BRUE includes one or more of the following:

- Breathing changes -- either no effort at breathing, breathing with great difficulty, or decreased breathing
- Color change -- most often blue or pale (many infants turn red, when crying for example, so this does not indicate a BRUE)
- Change in muscle tone -- most often they are limp, but they may become rigid
- Change in level of responsiveness

Choking or gagging means the event was likely not a BRUE. These symptoms are more likely caused by reflux.

## Exams and Tests

Your health care provider will ask you to describe what occurred during the event. The provider will also ask about:

- Other events like this one in the past
- Other known medical problems
- Medicines, herbs, or extra vitamins the infant may be taking
- Other medicines at home the child could have taken
- Complications during pregnancy and labor, or at birth, or being born early
- Siblings or children in the household who also had this type of event
- Illegal drugs or heavy alcohol use in the house
- Prior reports of abuse

When deciding if more testing is needed, the provider will consider:

- The type of event that occurred
- How severe the symptoms were
- What was going on right before the event
- Other health problems that are present or that are found on physical exam

A thorough physical exam will be done, checking for:

- Signs of infection, trauma, or abuse
- Low oxygen level
- Abnormal heart sounds

- Signs of birth defects that involve the face, throat, or neck that may cause breathing problems
- Signs of abnormal brain function

If there are no findings to suggest a high-risk BRUE, lab tests and imaging tests are often not needed. If choking or gasping occurred during feeding and the infant recovered quickly, more testing will often not be needed.

Factors that suggest a higher risk for recurrence or the presence of a serious cause include:

- Infants under 2 months of age
- Being born at 32 weeks or earlier
- More than 1 event
- Episodes lasting longer than 1 minute
- CPR by a trained provider was needed
- Signs of child abuse

If risk factors are present, testing that may be done includes:

- A complete blood count (CBC) to look for signs of infection or anemia.
- A metabolic profile to look for problems with how the kidneys and liver are working. Abnormal levels of calcium, protein, blood sugar, magnesium, sodium, and potassium may also be found.
- Urine or blood screen to look for drugs or toxins.
- Chest x-ray.
- Holter monitoring, echocardiogram, or other tests for heart problems.
- CT or MRI of the brain.
- Laryngoscopy or bronchoscopy.
- Tests to evaluate the heart.
- Test for pertussis.
- Sleep study.
- X-rays of the bones looking for prior trauma.
- Screening for genetic disorders.

## **Treatment**

If the event was brief, included no signs of breathing or heart problems, and corrected on its own, your child will likely not need to stay in the hospital.

Reasons your child may be admitted overnight include:

- The event included symptoms that indicate a more serious cause.
- Suspected trauma or neglect.
- Suspected poisoning.
- The child appears unwell or is not thriving well.

- Need to monitor or observe while feeding.
- Concern over ability of parents to care for child.

If admitted, your child's heart rate and breathing will be monitored.

Your provider may recommend that you and other caregivers:

- Place your infant on their back when sleeping or napping. Their face should be free.
- Avoid soft bedding materials. Babies should be placed on a firm, tight-fitting crib mattress without loose bedding. Use a light sheet to cover the baby. Do not use pillows, comforters, or quilts.
- Avoid exposure to secondhand smoke.
- Consider saline nose drops or using a nasal bulb if the nose is congested.
- Learn proper techniques to respond to any future events. This includes not shaking the infant. Your provider can instruct you.
- Avoid overfeeding, perform frequent burping during feedings, and hold the infant upright after feeding.
- Talk to your provider before thickening your child's feedings or using medicines that reduce acid and reflux.

Although not common, home monitoring devices may be recommended.

## Outlook (Prognosis)

Most often, these events are harmless and not a sign of more serious health problems or death.

BRUE is unlikely to be a risk factor for SIDS. Most victims of SIDS do not have any types of events beforehand.

A child with risk factors for BRUE may have a higher risk for recurrence or the presence of a serious cause.

## When to Contact a Medical Professional

Contact your provider right away if child abuse is suspected. Possible signs of abuse include:

- Poisoning or head injury that are not caused by an accident
- Bruising or other signs of a prior injury
- When events occur only in the presence of a single caretaker when no health problems are found as the cause for these events

## Alternative Names

Apparent life-threatening event; ALTE

## References

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