# Guideline for the Management of Apparent Life Threatening Events in Children

**Reference:** ALTE  
**Version No:** 1

**Applicable to:** Children admitted to the Children’s Hospital for Wales, attending the ED or CAU

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**Classification of document:** Guideline (best practice document)  
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**Author:** Paul Davis, Consultant Paediatrician  
**Group Consulted:** Practitioners within the Children’s Hospital for Wales  
Current literature and opinion  
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<th>Version Number</th>
<th>Date of Review</th>
<th>Reviewer Name</th>
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**Disclaimer**

These have been ratified at the Child Health Governance Meeting, however clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date.

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*Guideline for the management of Apparent Life Threatening Events*
Definition

**Apparent Life-Threatening Event (ALTE):** An episode that is frightening to the observer and that is characterized by some combination of apnea (central or occasionally obstructive), colour change (usually cyanotic or pallid but occasionally erythematous or plethoric), marked change in muscle tone (usually marked limpness), choking, or gagging. In some cases, the observer fears that the infant has died.

Introduction

The essential feature is that the carer perceived it as a life threatening event. A minority are genuinely life threatening but many parents experience significant anxiety afterwards. Most occur in children less than 1 year old. Apnoea of prematurity is generally not included unless it persists after term. The incidence of ALTE is estimated at between 0.46 and 10 per 1,000 live births. An audit at the CHfW identified 40 general paediatric admissions in one year (2006-7) following ALTE, involving 37 infants some of whom had more than one admission.

**Common causes of ALTE**

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>GOR</td>
<td>31%</td>
</tr>
<tr>
<td>Unknown</td>
<td>23%</td>
</tr>
<tr>
<td>Seizures</td>
<td>11%</td>
</tr>
<tr>
<td>LRTI</td>
<td>8%</td>
</tr>
<tr>
<td>ENT</td>
<td>3.6%</td>
</tr>
<tr>
<td>Breath-holding</td>
<td>2.3%</td>
</tr>
<tr>
<td>Metabolic</td>
<td>1.5%</td>
</tr>
<tr>
<td>Ingestion</td>
<td>1.5%</td>
</tr>
<tr>
<td>UTI</td>
<td>1.1%</td>
</tr>
<tr>
<td>Cardiac</td>
<td>0.8%</td>
</tr>
<tr>
<td>FII</td>
<td>0.3%</td>
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</table>

Possible Causes of ALTE (not exhaustive)

- **Gastrointestinal:** GOR, Gastroenteritis
- **Respiratory:** URTI, LRTI, Bronchiolitis (RSV), Aspiration of food
- **Central Nervous System:** Seizures, Meningitis, Encephalitis, Neuromuscular disease, Hypocalcaemia, Head/brainstem injury, Hydrocephalus, Central apnoea syndrome, Intracranial haemorrhage
- **Cardiovascular System:** Congenital Heart Disease, Arrhythmia, Cardiomyopathy
- **ENT:** Congenital Adrenal Hypoplasia
- **Metabolic:** Medium Chain Acyl CoA Dehydrogenase Deficiency, Organic Acidopathy, Hypoglycaemia, Congenital Adrenal Hypoplasia
- **Other:** Breath holding spells, UTI, Drugs/Toxins, Choking/Foreign Body, Fabricated or Induced Illness, Physical Child Abuse, Dehydration, Apnoea of prematurity
- **Unknown**
- **Normal**

The following recommendations are made for:

1. Management for all cases.
2. Management of the infant who has one confirmed but uncomplicated ALTE
3. & 4 Management for severe and/or recurrent cases

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**Guideline for the management of Apparent Life Threatening Events**
1. Management for all cases:

A detailed History:

Details of the event:
- Before the event:
  - Location of baby
  - Position of baby
  - What was baby/carer doing?
  - Any possibility of foreign body aspiration?
  - State of alertness of baby
  - Any history of trauma
  - Presence of apnoea monitor
- Who was there?
- Was entire event witnessed?
- Time of the event
- Relationship of event to feeding
- How were they alerted?
- Condition when found:
  - Breathing effort: none, shallow, irregular, increased, distressed
  - Colour and colour distribution – was the ambient light adequate to assess this?
  - Tone: floppy, rigid
  - Abnormal movements: tonic-clonic, twitching
  - Conscious state
  - Eyes: open, closed, staring, rolled, twitching
  - Fluid in mouth/nose: none, mucus, milk, gastric contents, blood
  - Associated noises: choking, gargling, cough, stridor, gasp, cry
  - Sweating
  - Duration of event
- Degree of intervention required:
  - None, gentle stimulation, vigorous stimulation, mouth-to-mouth, CPR by health professional
  - Duration of resuscitation
- Condition at end of ‘event’
- Time to full recovery
- What did carer do?
- Does the carer still think this was a severe or life threatening event?

Past Medical History:
- Ask for the ‘red book’ (or bring it in)
- Pregnancy/Birth history
- Neonatal history
- Feeding - any difficulties?
- Growth history
- Developmental history
- Previous episodes
- Medication/Drug history – particularly breast-feeding mothers (“Do you use any other substances yourself?”)
- Previous admissions
- Recent health

Family History:
- ALTE/SUDI
- Atopy
- Cardiac disease or any family history of unexplained sudden death in a person under 40
- Epilepsy
- Psychiatry
Social History:
- Family composition
- Parental information – occupation, age, drugs, alcohol.
- Smoking in the home
- Housing
- Ethnicity
- Previous social concern (“Do you have any help from social services?”)

Examination
- General impression – Well or Ill child
- Any dysmorphic features or obvious malformations?
- Jaundice/A Anaemia/Cyanosis
- Cardiovascular system
- Respiratory system
- Gastro-intestinal system
- Basic neurological examination
- ENT examination
- Any signs of trauma
- If concern about NAI discuss with senior medical staff and use Child Protection Proforma
- Measure height, weight and head circumference and plot on a growth chart.

Baseline observations
- TPR, O2 sats, BM, weight.

Subsequent investigation depends on history and examination findings.
Admission for a period of observation is mandatory.

At any time if an obvious illness is identified (sepsis, bronchiolitis, GOR etc.) then abandon the ALTE algorithm and manage the illness as usual.

2. Management of ‘minor’ cases

‘Minor’ cases may be those where:
- The infant remained vigorous throughout, recovered quickly and fully, did not lose respiratory effort at any time, may have gone red/purple. Episode might have been feed related or thought to be ‘infantile colic’. No other concerning features in history.
- Child appears normal on examination or has features of mild GOR or URTI and has normal initial observations (or observations compatible with URTI).
- Parents and hospital staff are all of the opinion that this was not a serious episode.

Management:
- Offer observation in hospital for a minimum of 6 hours, to include at least one feed. This is negotiable if parents want to go sooner and are able to observe the child carefully.
- If normal observation period, no further investigation is required and the infant may be discharged home (by an experienced Paediatrician) with reassurance and advice to return immediately if there are more episodes.
- If parents are very anxious this is itself a valid reason for admission
- Discontinue Sats/apnoea monitoring at least 1 hour before discharge
- No apnoea alarm needed.
- Open Access for 24 hours.
3. Management of confirmed/significant ALTE

**Significant ALTE**
- Cases which meet the criteria for ALTE, and where initial history and examination do not allay all concerns.

**Suggested Initial Investigations** (adapt to clinical scenario):
- Oxygen saturation measurement, ideally overnight oximetry with printout
- Full blood count and differential
- Blood gas/Lactate
- Urea and electrolytes, calcium, liver function tests, CRP
- Glucose, measured by rapid test and confirmed by laboratory (if hypoglycaemic proceed to ‘complicated ALTE’ section below and consider pre-feed BG’s)
- Chest radiography
- ECG
- Nasopharyngeal aspirate
- Per-nasal swab
- Urine dipstick/microscopy
- Urine sample saved for possible toxicology screen
- Check weight gain, Head Circumference
- Contact HV for background information and to flag up the likely need for ongoing support.

**Management:** These infants should be offered admission for a minimum of 24 hours.

If well at the end of that period and no disease identified:
- Reassure that most of these infants remain well and do not have further episodes.
- Offer CPR training for reassurance.
- Discuss pros and cons of Apnoea Alarm. Explain that apnoea alarms are not proven to reduce the risk of SUDI and carry a risk of false alarms. However, many families find one reassuring. (experienced paed)
- If parents strongly desire an apnoea alarm but there is no clear increased risk of future ALTE the parents can purchase alarms in retail outlets.
- If the medical opinion is that an alarm is indicated either because of an increased risk of further ALTE or heightened parental anxiety then discuss with ward manager about obtaining one (not readily available to loan and may have to be purchased specially).
- If parents are not planning to use an alarm at home, discontinue apnoea alarm/sats monitor for at least 2 hours before discharge.
- Discharge with open access for 24 hours.
- Advise to return if further episodes.
- Arrange follow up, preferably within 2 weeks, usually with consultant on service or NP clinic.

4. Recurrent or complicated ALTE

**Complicated could mean:**
- Severe ALTE requiring resuscitation.
- Further ALTE in hospital.
- Slow to recover clinically.
- Abnormal findings secondary to ALTE e.g. abnormal observations, acidosis, hypoglycaemia, hypoxia, reactive changes on bloods (WBC, glucose, coag, lactate) or CXR (diffuse shadowing).
- Nasal or oral bleeding, facial petechiae, pulmonary oedema or haemorrhage in
Recurrent and severe ALTE is a life threatening situation. These infants should not be discharged unless the cause is found or the problem has resolved. Observation in hospital will need to be prolonged (until 1-2 weeks after the last episode).

**Investigation and management** will depend on clinical findings but consider:
- **Gastrointestinal:** GORD, gastroenteritis. (Barium study, pH study, stool culture and viruses)
- **Respiratory:** URTI, LRTI, RSV/paraflu/Influenza, Aspiration. (CxR, NPA, throat swab for viruses)
- **Cardiac:** CHD, Arrhythmia, Cardiomyopathy. (ECG, Echo, cardiology opinion)
- **Metabolic:** MCAD, Inborn Errors, CAH, hypoglycaemia. (Organic and amino acids, blood gas, ‘hypoglycaemia workup’, metabolic opinion)
- **CNS:** Seizures, meningitis, encephalitis, neuromuscular disease, head injury, intracranial haemorrhage or thrombosis, hydrocephalus, central apnoea syndrome. (EEG, head scan, neurology opinion)
- **Toxicology.** (paired urine and blood to lab, discuss with toxicologist)
- **ENT:** laryngomalacia, anatomical airway obstruction, infection, foreign body. (ENT opinion)
- **Infection:** UTI, pertussis, respiratory viruses. (Urinalysis, pernasal swab, NPA, throat swab for viruses)
- **Child maltreatment:** FII, NAHI, poisoning, suffocation. (Review chronology, re-examine carefully, head scan, radiology, ophthalmology examination, gather social information. If concerns discuss internally and REFER)
- **Chromosomal and genetic disorders.** (Karyotype, DNA studies, medical genetic opinion)
- **Hypocalcaemia** (Blood Calcium)
- **Cyanotic Breath-holding spells, RAS, apnoea of prematurity** (History).

If there are no pointers to any specific disease but the infant has further ALTE’s then review the history in detail and obtain history from anybody who has seen the episodes.

**‘Next stage’ investigations** should include:
- Specialist opinions: cardiology, respiratory, metabolic, neurology, gastroenterology, ENT.
- Social enquiries.

If there are concerns about child maltreatment a referral must be made in line with local safeguarding procedures, discuss with consultant and Lead Nurse for safeguarding.

**References:**


4. Howarth M. Medical student senior clinical project. An audit of children admitted with ALTE to the Children's Hospital for Wales 2006-2007

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Further suggested reading:


Department of Health Guidance; Safeguarding Children in Whom Illness is Fabricated or Induced, August 2002


The Foundation for the Study of Infant Deaths, Report on 5000 babies using the CONI (Care of Next Infant) Programme, October 1998


Hall, K and Zalman, B. Evaluation and Management of Apparent Life-Threatening Events in Children. American Family Physician, Volume 17, Number 12, pp 2301-8, 2005


Light, M and Sheridan, M. Psychosocial impact of emergency apnea. Archives of Paediatrics and Adolescent Medicine. Volume 141, Number 6, June 1987

McClure, RJ, Davis, PM, Meadow, RS and Sibert, JR. Epidemiology of Munchausen syndrome by proxy, non-accidental poisoning, and non-accidental suffocation. Archives of Disease in Childhood, Volume 75, Number 1, pp57-61, July 1996

McIntosh, N, Mok, J, Margerison, A. Epidemiology of Oronasal Haemorrhage in the First 2 Years of Life: Implications for Child Protection. Pediatrics, Volume 120, Number 5, pp1-5, 2007


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