

Apparent Life Threatening Events

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Definition

National Institutes of Health 1986

"An episode that is frightening to the observer and that is characterized by some combination of apnea, color change, marked change in muscle tone, choking or gagging"

Unique Challenging Features

- ◆ ALTE is a constellation of differing symptoms rather than one diagnosis
- ◆ Often asymptomatic, well-appearing at presentation
- ◆ Diagnosis based on symptomatology rather than pathophysiology
- ◆ Differing literature on diagnostic testing, need for admission
- ◆ Large differential diagnosis

Eventual Diagnoses

- ◆ GERD - 26%
- ◆ Seizures – 9%
- ◆ Lower Respiratory Tract Infection – 9%
- ◆ Pertussis – 9%
- ◆ UTI – 8%
- ◆ **Idiopathic – 23%**

Recent Literature

Focused on four main areas:

1. Risk factors for ALTE
2. Testing/Evaluation
3. Need for admission
4. SIDS and ALTE

ALTE Risk Factors

Post-Conceptual Age

- ◆ Premature Infants (<37 weeks gestation)
 - ◆ Immature respiratory centers
 - ◆ Diminished airway reflexes
 - ◆ Poor arousal

ALTE Risk Factors

Post-Conceptual Age (PCA)

◆ PCA <43 weeks associated with 5.2 increased relative risk of subsequent extreme events (bradycardia, apnea) (1)

◆ PCA <44 weeks, preterm infants, and previous ALTE were at higher risk for extreme events (2)

ALTE Risk Factors

- ◆ **Prematurity and multiple ALTE's** increase the risk of reoccurrence and/or occult condition
- ◆ Tieder et al. *J Pediatrics*. 2008. (3)
 - ◆ Odds of an occult condition or adverse outcome were 3-14x higher in these patients

ALTE Risk Factors

Perinatal Period

- ◆ Risk of severe ALTE (& SIDS) greatest in first 24 hours of life
- ◆ Rate of severe ALTE (requiring resuscitation) 2.6 per 100,000 live births (first 24 hours). Majority in first 2 hours of life. (4)
- ◆ Higher rates of ALTE noted among primiparous women, during early skin-to-skin contact or breastfeeding and when not observed hospital staff

Diagnostic Testing/Evaluation

Brand et al (10) reviewed >3776 tests ordered on 243 consecutive patients with ALTEs:

- ◆ Diagnosis made by H&P alone in 21% cases
- ◆ Confirmed with testing in an additional 49%
- ◆ 18% of tests ordered were positive
 - ◆ 6% of those contributed to the diagnosis

Diagnostic Testing/Evaluation

UpToDate:

“If the history and physical examination suggest that the event was not life-threatening, or if a probable explanation for the event is identified (eg, transient laryngospasm after an episode of gastroesophageal reflux), then no laboratory evaluation may be required”

Diagnostic Testing/Evaluation

- ◆ Most common tests done in U.S. (*Teider et al, J Peds 2008*)
 - ◆ CBC (70%)
 - ◆ Electrolytes (65%)
 - ◆ CXR (69%)
 - ◆ ECG (36%)
 - ◆ Upper GI fluoroscopy (26%)

Diagnostic Testing/Evaluation

Proposed Algorithms for evaluation (idiopathic cases):

2009 Dutch Pediatric Association	McGovern and Smith 2004
<ul style="list-style-type: none">- CBC with diff- CRP- Serum glucose- ABG- UA- ECG- Pertussis, RSV (in season)	<ul style="list-style-type: none">- CBC with diff- CRP- Serum glucose- ABG- UA- ECG- Pertussis, RSV (in season)- Serum metabolic studies (CMP, urea, pyruvate, Mg, Ca, ammonia, lactate)- Urine toxicology- Investigations for GERD- EEG, Head Imaging

Diagnostic Testing/Evaluation

EEG

- ◆ Bonkowsky et al. *Pediatrics*. 2008 (5)
 - ◆ 3.6% infants with ALTE diagnosed with chronic epilepsy
 - ◆ 71% of those had recurrent ALTE within 1 month
 - ◆ 47% diagnosed with seizures within 1 week
 - ◆ EEG had 15% sensitivity

EEG testing on initial admission does not improve outcomes (Tieder et al) (3)

Diagnostic Testing/Evaluation

Head Imaging

- ◆ Bonkowsky et al. *Pediatrics*. 2008
 - ◆ 6.7% (all imaging) sensitivity for predicting chronic epilepsy
- ◆ Head CT abnormal in 63% - 70% closed head trauma
- ◆ Risk factors for head injury/NAT (11,12)
 - ◆ Multiple ER visits, discrepancy in history, delay in seeking medical attention, irritability, vomiting

Diagnostic Testing/Evaluation

Serum Metabolic Studies

- ◆ Unlikely to reveal a definitive cause
- ◆ Reasonable to get first line BMP to rule out hypernatremia, hyponatremia, hyperkalemia, hypokalemia
- ◆ Metabolic disorders represent ~2-5% of all causes
- ◆ Inexpensive and may help to identify a disorder requiring prompt treatment to avoid long term sequelae

Diagnostic Testing/Evaluation

Urine Toxicology

- ◆ Pitetti, Whitmen. *Pediatrics*. 2008. (6)
 - ◆ Of 274 screened, 8.4% positive for apnea-potential medication
 - ◆ 4.7% screened positive for OTC cough and cold preparations

Diagnostic Testing/Evaluation

Testing for GERD

- ◆ Upper GI/Swallow poor at proving GERD
- ◆ Five studies failed to show a relationship between apnea or recurrent ALTE's and the frequency, duration, or acidity of GER episodes. (Tieder et al) (3)
- ◆ pH probe + cardiorespiratory monitoring better at correlating events

Admission vs. Discharge

Santiago et al. *Eur J Emerg Med.* 2008. (7)

- ◆ 66 infants admitted with ALTE for at least 24 hours
- ◆ 12% had recurrent episodes
- ◆ 9% required moderate stimulation
- ◆ 3% required moderate resuscitation
- ◆ ~50% of those requiring medical interventions born premature

Admission vs. Discharge

Al-Kindy et al. *J Pediatrics*. 2009. (1)

- ◆ Retrospective study of 625 infants
- ◆ 13.6% had subsequent extreme cardiorespiratory event
- ◆ 85% of those occurred within first 24 hours
- ◆ Most extreme events noted among premature infants, <43 weeks PCA, and those with URI symptoms

Admission vs. Discharge

Claudius, Keens. *Pediatrics*. 2007. (8)

- ◆ Prospective study of 59 infants
- ◆ Higher risk of requiring acute medical attention
 - ◆ Age <1 month
 - ◆ Previous ALTE

Admission vs. Discharge

Children who may be discharged:

- ◆ No significant PMH (including prematurity)
- ◆ Well appearing, normal physical and vital signs
- ◆ First time ALTE, age >1 month
- ◆ Episode brief, non-severe, self-resolving
- ◆ Probable cause that is non-progressive

ALTE & SIDS

- ◆ No evidence that ALTE is a precursor to SIDS
- ◆ No decrease in the incidence of ALTE since the Back to Sleep Campaign
- ◆ 0-7% of SIDS cases preceded by ALTE
 - ◆ Common risk factor: maternal smoking

ALTE Summary

- ◆ **Risk Factors:** Prematurity, infants <1 month, perinatal period (1st 24 hours), multiple ALTE's
- ◆ Most common causes of ALTE are gastroesophageal reflux, lower respiratory tract infection and seizure.

ALTE Summary

- ◆ **Pediatrics in Review August 2012 - Recommendations for diagnostic testing:**
 - ◆ CBC, CRP, Na, K, Ca, Mg, urea, NH₃, lactate, pyruvate, ABG, UA, toxicology, ECG, pertussis and RSV (in season)
 - ◆ Most infants should be hospitalized for cardiorespiratory monitoring for 23 hours after an ALTE
- ◆ **Well appearing infants >1 month after thorough H&P**
 1. Discharge home **without** work up
 2. 24 hours observation **without** work up



Questions?

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