Objectives and Goals

- Understand the contemporary definition of “ALTE”
- Explore the relationship between SIDS, ALTE and other historical terms
- Become more adept at creating a case-specific differential diagnosis and evaluation strategy
- Incorporate appropriate management options into practice
- Obtain comprehensive literature references and resources
- Improve knowledge of SIDS counseling

Outline

- Speaker perspective and experience
- Background/History
- Studying ALTE
- Epidemiology
- Differential Diagnosis
- Evaluation—focused, specific and economical
- Management options (hospitalization, monitors, caffeine, CPR classes)
- SIDS counseling
- References
Speaker perspective and experience

- Critical care background (attending in PICU for 12 years) and Pediatric Hospitalist since 1987
- Direct involvement in workup and management of 8–12 cases of ALTE per year
- Regular comprehensive review of the literature
- Presenting as “experienced” rather than “expert”

Background/History

- ALTE are always concerning AND consterning, to varying degrees!
- Standardized definition of ALTE offered by the NIH Consensus Development Conference 1987
- Frightening to the observer, some combination of:
  - Apnea (central or obstructive)
  - Color change (cyanotic>pallor>red>palethoric)
  - Muscle tone change (limp)
  - Choking or gagging

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Studying ALTE

- Definition too broad?—some exclude obvious choking or include only “major” episodes
- Definition too narrow?—some include altered Mental Status
- Descriptions often quite subjective by frightened, inexperienced caregiver—“objective” and “measurable” criteria elusive
- No ICD–9 code—ALTE is NOT a diagnosis, rather a symptom complex, “chief complaint” or presenting problem—hard to track or include in studies

Studying ALTE (cont.)

- Study design is complex:
  - Retrospectively, selection bias based on variable inclusion/exclusion criteria as noted above make Multi-Center study problematic—dyspnea, apnea vs. cyanosis, choking/gagging.
  - Discharge diagnoses are often determined by “coders” which may further complicate the selection of appropriate patients. Are causes of ALTE then excluded?
  - Prospectively how to capture patients—general vs. specialty services within an institution
  - # needed to draw meaningful conclusions?
1 mo boy, brief choking and gagging episode. ED evaluation is well, normal exam. Observe for a while—no spells. Discharge him directly to home from the ED if his ONLY risk factor for having another spell is that:

A. Nasal swab RSV +
B. Frequent spit ups
C. Delivered at 32 weeks post conception
D. One previous similar episode
E. Mother smoked cigarettes throughout the pregnancy

Almost half of monitored healthy children had at least one apnea > 20 seconds

Estimates are that 1–2% of infants in the general population will have an ALTE and 0.2–0.8% will have an apneic event leading to admission

Maternal smoking and single parent households seem to be risk factors

Median age 8 weeks, male=female

Post conception age < 44 weeks of age at higher risk (immature respiratory center); preemies; prior ALTE also higher risk

SIDS ≠ ALTE—no causal relationship has ever been found, despite the obvious “frightening” nature of the event.

SIDS ≠ ALTE—only ~5% of SIDS victims had a prior ALTE (consider recall bias).

SIDS ≠ ALTE—risk of subsequent death among all infants with ALTE is estimated at most 1–2%, but is increased in the (rare) subgroup of infants who have ALTE while asleep and who require CPR when discovered (“severe”) ALTE.

SIDS ≠ ALTE—recurrent, severe ALTE is the highest risk group and therefore get the most extensive workups and monitoring.
Previously healthy 1 mo runny nose, cough x 2 days. 3rd day—brief apnea, pale motionless—gentle stimulation and he is back to normal. Likely cause:

A. Seizure  
B. Organic acid disorder  
C. RSV  
D. Cardiac dysrhythmia  
E. Intentional poisoning

Based on first presentation (ESTIMATES)

- GI (up to 33%)—GERD (beware of the extraordinarily high prevalence even in normal children and be wary of assigning "cause" of ALTE), AGE, esophageal dysfunction
- Neurological (15%)—seizure, central apnea, head injury, infections
- Respiratory (11%)—RSV, pertussis, FB
- Airway (4%)—malacias, stenoses, OSA

- Cardiovascular (1%)—arrhythmia
- Metabolic/Endocrine—electrolyte/glucose alterations, IEM (rare)
- Infections (5–30% with seasonal variability)
- Other—SBS, abuse, Munchausen, breath-holding, choking, temperature, "exaggerated laryngeal chemoreceptor reflex apnea” associated with reflux? OR
- Idiopathic (20–60%)
6 week old to the ED after 3 bouts of choking/gagging previous evening—turned dusky. Kind of a spitty baby, but no episodes like this before. 3 caregivers at home, each with some variation on the story. Appears a little sleepy, otherwise normal exam. Cause of ALTE provided by:

A. Cardiac event monitor
B. CT scan of head
C. EEG
D. pH probe
E. Metabolic screening

Evaluation/Investigation

• History—most important component. Caregiver witness issues: presence, overlook or distort due to distressing event. History is particularly focused on ALTE causes, and include specifics like lighting, proximity and clothes/blankets covering. Details of apnea, choking and feeding also critical.
• Physical examination—extremely detailed, thorough and particularly focused on ALTE causes, caretaker interaction, feeding observation, e.g.

Eval/Investigation (cont.)

• Evaluation: determine frequency, severity, nature of the events as well as underlying cause.
• No standard investigative protocol has been tested, only suggested—recent Dutch recommendations
• Challenging number and array of tests available—cost, risk, convenience, pain, sensitivity and specificity play a role
Beyond SIDS: ALTE

Advances & Controversies in Clinical Pediatrics 2006

Eval/Investigation (cont.)

- Hospitalization for cardiorespiratory monitoring and evaluation is extremely common, although readily identifiable (and preventable) causes may be excepted. ALTE can cluster or repeat and may be "captured" in hospital occasionally. LOS = 23–72 hrs.
- Workups should be thoughtful, directed and case-specific, logical
- Screening tests may be indicated ("no clue"): CBC, chemistry panel, venous blood gas, EKG

Eval/Investigation (cont.)

- Polysomnography with or without EEG; echocardiogram; airway or brain imaging; pH probe each may occasionally be indicated but rarely if ever are ALL such tests performed initially.
- Study published concluded “for many tests used in the evaluation of ALTE, the likelihood of a positive result is low and the likelihood of a contributory result is even lower”.
- Recurrent and/or severe apnea = high priority

Management

- Strong consideration for hospitalization for monitoring, evaluation and counseling
- Specifically treat any identified cause (anticonvulsants, GERD, infections, caffeine, etc.)
- "Back to Sleep" reinforcement
- Modify other risk factors such as smoking, unsafe sleep practices
- Strongly consider infant CPR certification course (American Red Cross, e.g.): greatly enhances parental confidence in preparedness in "what to do" IF...

Management (cont.)

- Home monitoring is generally unwarranted
- Obstructive apnea is not identified until the terminal event (decreased HR)
- No proven efficacy to prevent SIDS
- Adverse effects: false alarms, increased anxiety, depression and hostility, developmental implications
- IF monitoring, strongly consider event recorders that can download data for analysis
Previously healthy 3 week old has an event of floppiness and cyanosis. Occasionally a spitter. In the ED, lethargic and pale. ABG = mixed acidosis. Your Dx is "extreme ALTE", but no other findings on exam. Admitted to hospital and recovers fully. All other tests including CT scan are normal. Which (statistically) elevates her subsequent risk of SIDS?:

A. Delivered at 44 weeks
B. Her mother is Asian
C. Her mother just turned 30
D. Her mother smoked throughout the pregnancy
E. The baby sleeps on her side

The Unthinkable: SIDS

- There are 2 very different roles that pediatricians play (advocate for or delegate): the investigation into the death AND that of counselor and informant for the bereaved family.
- The sense of loss and other emotions associated with SIDS affects BOTH the family AND the pediatrician.
- “Did I miss something?” and fear of blame may overwhelm and frighten.

The Unthinkable: SIDS (cont.)

- A thorough post-mortem examination MUST include a “scene investigation” as well as an autopsy that is carefully geared toward the uniqueness of SIDS: look for metabolic errors on liver samples, thorough evaluation for trauma, etc.
- The greatest contribution of the pediatrician is “non-abandonment”—parents fear the loss of the relationship with their regular care provider the most in the grieving process.
Beyond SIDS: ALTE

**The Unthinkable: SIDS (cont.)**

- Enlist professional counseling support for direct therapy, but **STAY INVOLVED** and talk about the “hard issues” as needed. Basic grief counseling is listening empathetically while the family does their grieving, perhaps guided by another.
- Families may not be able to talk to friends and family in the same way, and the pediatrician can validate the family’s response in a powerful way.
- Review autopsy with family to help translate and interpret findings.
- Screen for “pathological grief”

**Summary**

- ALTE are not infrequent, nonspecific and generally benign presenting problems, NOT a diagnosis unto itself.
- Studying ALTE is challenged by variations in definitions, observer-dependence and methodological flaws.
- No true relationship between ALTE and SIDS.
- Broad differential diagnosis mandates extraordinarily careful H & P to direct thoughtful, limited workup.

**Summary (cont.)**

- A definitive cause of the ALTE is often not found, contributing to caretaker and physician anxiety. GERD, LRI, SZ top 3 Dx.
- CBC w/diff, CRP, chem panel including NH3, lactate and pyruvate, VBG, U/A, tox screen EKG; RSV & pertussis (in season) are potentially useful; admit for 23–72 hrs.
- Consider infant CPR training certification.
- Home monitoring is generally unwarranted and may inadvertently contribute to morbidity in the household.

**ALTE References**

Beyond SIDS: ALTE

ALTE References (cont.)


ALTE References (cont.)


ALTE References (cont.)


SIDS References