APPARENT LIFE-THREATENING EVENT (ALTE)

Introduction

1986 National Institutes of Health and Consensus Development Conference on Infantile Apnea and Home Monitoring defined an Apparent Life-Threatening Event (ALTE) as:

"An episode that is frightening to the observer and that is characterized by some combination of apnea (central or occasionally obstructive), color 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."

- Incidence:
  - 0.05 – 6% in a variety of studies
  - 0.6 – 0.8% in larger studies
  - Peak time of event: 10-12 weeks of age
  - Considered in children under 1yo

- Etiology: approximately 50% of all ALTE will be idiopathic

- Sudden Infant Death Syndrome:
  - "sudden death in a child without historical, physical, laboratory, or thorough postmortem findings that explain the cause of death
  - SIDS peaks at 3-5 months of postnatal age; 90% occur in less than 6mo
  - 7% of all children who die from SIDS have history of ALTE
  - risk of SIDS increases with h/o ALTE linked to central hypoventilation syndrome, seizures, or arrythmias (prolonged QT, WPW)

- Vocabulary to Know:
  - Apnea: cessation of respiratory airflow for any reason: central, obstructive, mixed
  - Pathologic apnea: apnea lasting 20 seconds or more and accompanied by bradycardia, cyanosis, hypotonia, or other signs of compromise
  - Apnea of infancy: pathologic apnea with no identifiable plausible etiology
  - Apnea of prematurity: pathologic apnea associated with preterm delivery; normally resolves by 37wks gestation
  - Periodic breathing: pattern of breathing in which three or more pauses occur, each lasting more than 3 seconds, with less than 20 seconds of normal respiration between pauses

Etiologies

An explainable cause for an ALTE is found in approximately 50% of cases. It is worth noting that there may be coexistence of pathology, and thus a positive work-up does not necessarily determine the cause of ALTE (e.g. GERD). The following is a list of common etiologies for ALTE with the percentage of all *explainable* cases of ALTE that it represents.

- Gastrointestinal (appox. 50%)
    - GERD
    - Gastric volvulus
    - Intussusception
    - Swallowing abnormalities
- Neurologic (approx. 30%)
    - Seizure disorder
    - Febrile seizure
    - Intracranial hemorrhage
    - Brain malformations (Budd-Chiari, brainstem malformation)
    - Hydrocephalus
    - CNS infection (meningitis, encephalitis)
    - Malignancy
- Respiratory (approx. 20%)
    - Infection (RSV, Pertussis, Mycoplasma, Croup, pneumonias)
    - Obstructive sleep apnea
    - Breath-holding spells
    - Laryngotracheomalacia
    - Foreign body aspiration
    - Central hypoventilation
- Cardiovascular (up to 5%)
    - Arrhythmia (prolonged QT, WPW)
    - Congenital heart disease
    - Myocarditis
    - Cardiomyopathy
- Metabolic (up to 5%)
    - Inborn errors of metabolism
    - Endocrine, electrolyte abnormalities
    - UTI/Sepsis
- Child Abuse (3%)
    - Munchausen syndrome by proxy
    - Smothering
- Other
    - Food allergy
    - Anaphylaxis
    - Medication (OTC, prescription, herbal)

Recurrences occur in 0-24% of patients, depending on the study.
Patients who have serious underlying disorders or recurrence are more likely to be greater than 2mo.

Evaluation and Hospitalization

Almost all ALTE patients require hospitalization for observation and/or further work-up. Some studies have indicated that patients may be discharged home if they have a history that is consistent with a benign episode, have a normal physical exam, and have good follow-up. Any patient with an abnormal physical exam or that required resuscitation should definitely be admitted.

- History and Physical Examination
    - Each patient requires an extensive history that investigates all aspects of the episode and any aspects that lead to a likely diagnosis
    - Physical examination must include a growth chart (wt, ht, hc) as well as focus on dysmorphic features, neurologic exam, and signs of trauma (bleeding from nose or mouth, bruising)
    - In one study of 243 patients, 49% had an etiology that was suggested on history or physical examination and was confirmed by specific testing

Description of Event	Interventions	HPI	Medical History	Family History
Condition of child: *awake/asleep, position, location of child, bedclothes, blankets, pillows*	None	Ill prior to event	Prenatal hx: *drugs, tobacco, or alcohol during pregnancy*	Congenital problems
Activity at the time: *feeding, coughing, gagging, choking, vomiting*	Gentle Stimulation	Fever	SGA, prematurity	Smoking in home
Breathing efforts: *none, shallow, gasping, increased*	Blowing Air in Face	Poor feeding	Birth hx: *birth trauma, hypoxia, presumed sepsis*	Cardiac arrhythmia
Color: *pallor, red, purple, blue, peripheral, whole body, circumoral*	Vigorous Stimulation	Weight loss	Feeding hx: *gagging, coughing, poort weight gain*	SIDS
Movement and tone: *rigid, tonic-clonic, decreased, floppy*	Mouth-to-Mouth	Rash	Developmental hx: *appropriate milestones*	
Observations: *mucus, blood, or noise (stridor, wheeze, gag)*	CPR by medical professional	Irritability	Previous admits: *surgery, ALTE*	
Duration: *time to reinstate breathing and normal behavior or tone*		Sick contact, medication, vaccine	Accidents: *being dropped or tossed, possibility of trauma*	

- Evaluation
    - Large variability in recommended testing for ALTE; European consensus statement stated there is “no standard minimal work-up in the evaluation of ALTE”
    - Several studies have agreed that at minimum a CBC, electrolytes (esp. bicarbonate), lactate, chest x-ray and EKG are good initial screening tests
    - Other frequently used tests that have some yield include UA, urine cx, RSV and pertussis, and tests for GERD
    - Variability is secondary to know strong data and controlled protocols with large numbers of patients
    - In 2005, one study indicated that the with a noncontributory history and physical, the highest yield came from UGI/ph probe for GERD, urine analysis and culture, brain neuroimaging (head CT/MRI), white blood cell count (infection), and pneumogram for periodic breathing
    - **Most studies recommend not doing extensive, non-focused laboratory and imaging work-ups in patients without suggestive history**

Monitoring

The National Institutes of Health Consensus Development Conference on Infantile Apnea and Home Monitoring, in 1986, recommended that home monitoring be used in “infants with one or more severe ALTE requiring mouth-to-

mouth resuscitation or vigorous stimulation, symptomatic preterm infants, siblings of two or more SIDS victims, and infants with certain diseases or conditions such as central hypoventilation."

- There is no evidence to support the use of home monitoring in children with less severe ALTEs, or asymptomatic premature infants
- Home monitoring in other premature infants is usually no longer necessary after 43 weeks gestational age

References

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