Distinguishing Sudden Infant Death Syndrome From Child Abuse Fatalities

Committee on Child Abuse and Neglect

Public and professional awareness of sudden infant death syndrome (SIDS) has increased in the 28 years since the establishment of the National Sudden Infant Death Foundation, now called the National SIDS Alliance.[1] Similarly, awareness of child abuse has increased in the 30 years since the publication of the first article on the battered child.[2] In the majority of cases, when an infant younger than 1 year dies suddenly and unexpectedly, the cause is SIDS. Sudden infant death syndrome is far more common than infanticide. In a few difficult cases, legitimate investigations for possible child abuse have resulted in an insensitive approach to grieving parents or caretakers. This statement provides professionals with information and guidelines to avoid distressing or stigmatizing families of SIDS victims while allowing accumulation of appropriate evidence in the uncommon case of death by infanticide.

INCIDENCE AND EPIDEMIOLOGY

Sudden infant death syndrome, also called crib or cot death, is "the sudden death of an infant under 1 year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and a review of the clinical history."[3] Sudden infant death is the most common cause of death between 1 and 12 months of age. Eighty percent of cases occur before age 5 months, with a peak incidence between 2 and 4 months of age. Sudden infant death syndrome occurs in 1.5 to 2 per 1000 live births, resulting in 6000 to 7000 infant deaths each year in the United States.[4] While rates of infant mortality from other causes have declined over the past decade in the United States, the incidence of SIDS has not changed appreciably.

Death due to SIDS is much more common than death due to recognized child abuse. It is uncommon for death due to child abuse to be confused with SIDS. Although precise data are lacking, authors of a recent article estimate that less than 5% of apparent SIDS deaths are actually due to abuse.[5] In one recent study 170 infants dying suddenly and unexpectedly were given full postmortem evaluations including autopsy, full-body radiographs, and viral and bacterial cultures. Of the 170 deaths, 101 (59.4%) were classified as SIDS and 61 (35.9%) were attributed to natural causes other than SIDS. Six infants (3.5%) died as a result of abuse or neglect, and two other infants (1.2%) died under questionable circumstances.[6] To comfort a family whose infant has died unexpectedly, in the absence of evidence of injury, an immediate diagnosis of "probable SIDS" can be given. This diagnosis conveys to the family that they could not have prevented their infant's death, and is correct about 95% to 98% of the time.

ETIOLOGY

Despite nearly 3 decades of intensive study, the etiology of SIDS is unknown. There is no diagnostic test for SIDS. Recent research has focused on such diverse causes as sleep apnea, arousal mechanisms, sleep-state organization, cardiac arrhythmias, thermoregulation abnormalities, occult viral infection, infant medications, sleeping position, allergy, metabolic disease, chronic hypoxia, and autonomic instability.[4,7–10] In the past, many causes of SIDS have been postulated and have either remained unconfirmed or have been disproved.

Risk factors associated with a higher incidence of SIDS include the following[4,8]:

- low socioeconomic status;
- an unmarried mother;
- maternal age younger than 20 years at first pregnancy or younger than 25 years during subsequent pregnancies;
- maternal smoking during pregnancy;
- illicit drug use during pregnancy;
- inadequate prenatal care;
- an interval of less than 12 months since the preceding pregnancy;
- prematurity;
- low birth weight;
- low APGAR scores;
- prone sleeping position.[9]

Unfortunately, many factors associated with a higher risk of sudden infant death are also associated with an increased risk of child abuse and other causes of infant mortality.

CLINICAL PRESENTATION

The typical presentation in SIDS is the sudden unexpected death of a seemingly healthy infant. SIDS deaths are more common during winter months. The infant may have been suffering from a mild upper respiratory or gastrointestinal infection,

The recommendations in this statement do not indicate an exclusive course of treatment or procedure to be followed. Variations, taking into account individual circumstances, may be appropriate.

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and fed before taking a nap or sleeping at night. After some hours unobserved, the infant is found dead. Death is silent and occurs during apparent sleep. A review of the medical history, scene investigation, radiographs, and autopsy are unrevealing.

PATHOLOGY

Pathologists establish the diagnosis of SIDS by exclusion when they are unable to identify other specific causes for a child's death.[11] The pathologic feature considered characteristic, but not pathognomonic, of SIDS is intrathoracic petechiae.[8]

The autopsy finding of intrathoracic petechiae (on the thymus, heart, lungs, parietal pleura, pericardium, and diaphragmatic pleura) is suggestive, but not diagnostic, of SIDS. Research on animals indicates that intrathoracic petechiae can be caused by induced airway obstruction or by oxygen deficit in inspired air without obstruction. Petechiae are more common after repeated tracheal occlusion and vigorous efforts to breathe. In humans, petechiae are seen following suffocation and more commonly in suffocated neonates than suffocated adults. Intrathoracic petechiae are found in known cases of infant suffocation, carbon monoxide asphyxia, and drowning, but seem to be more common in SIDS.[12]

THE IMPORTANCE OF AUTOPSY, SCENE INVESTIGATION, AND CASE REVIEW

Without a complete autopsy, a careful scene investigation, and a review of the medical history a diagnosis of SIDS cannot be made. Without these measures, progress in the understanding of SIDS is inhibited, cases of child abuse and neglect may be missed, familial genetic diseases may go unrecognized, public health threats may be overlooked, inadequate medical care may go undetected, and product safety issues will not be identified. Through thorough investigation of apparent SIDS deaths, the potential hazards of products including defective infant furniture, water beds, and bean bag mattresses have been identified and remedied.[13,14]

A death should be ruled as due to SIDS when:

- a complete autopsy is done, including cranium and cranial contents, and autopsy findings are compatible with SIDS;
- there is no gross or microscopic evidence of head trauma, intracranial injury, cerebral edema, cervical cord injury, retinal hemorrhage, or mechanical asphyxia;
- there is no evidence of trauma on skeletal survey;[15]
- other causes of death are adequately ruled out, including meningitis, sepsis, aspiration, pneumonia, myocarditis, abdominal trauma, dehydration, fluid and electrolyte imbalance, significant congenital lesions, inborn metabolic disorders, carbon monoxide asphyxia, drowning, or burns; and
- there is no evidence of current alcohol, drug, or toxic exposure.

A group of experts assembled by the National Institutes of Health has stated that infant deaths "without postmortem examination should not be diagnosed as SIDS. Cases that are autopsied and carefully investigated but which remain unresolved may be designated as undetermined, unexplained, or the like."[3]

There is a small subset of infants who die unexpectedly, whose deaths are attributed to SIDS, but who may have been smothered or poisoned. Autopsy cannot distinguish death by SIDS from death by suffocation.[8,11] A study of infants suffocated by their parents indicates that certain features should raise the possibility of suffocation. These include previous episodes of apnea in the presence of the same person, previous unexplained medical disorders such as seizures, age at death older than 6 months, and previous unexpected or unexplained deaths of one or more siblings or the previous death of infants under the care of the same, unrelated person.[16]

If appropriate toxicological tests are not done, the few deaths due to accidental or deliberate poisoning will be missed.[6,11] Two recent studies indicate that occult cocaine exposure is widespread and potentially lethal. One reviewer found that 17 (40%) of 43 infants who died before 2 days of age without an obvious cause of death at autopsy had toxicologic evidence of cocaine exposure.[17] A second review of 600 infant deaths revealed evidence of cocaine exposure in 16 infants (2.7%) younger than 8 months who died suddenly and unexpectedly.[18] The relationship between cocaine exposure and infant death found in these studies is not clear.

MANAGEMENT

The appropriate professional response to any child death is compassionate, empathic, supportive, and nonaccusatory. At the same time it is vital to discover the cause of death if possible. Unless there is a history of significant antecedent illness or there are obvious injuries, the parents can be told that death appears to be due to SIDS, but that only with a thorough scene investigation, postmortem examination, and review of records can other causes be excluded. It can be explained to the parents that these procedures will enable them and their physician to understand why their infant died and how other children in the family, including children born later, might be affected.

The family is entitled to an opportunity to see and hold the infant once death has been pronounced. A protocol may help in planning how and when to address the many issues that require attention, including baptism, grief counseling, funeral arrangements and religious support, cessation of breastfeeding, reactions of surviving siblings,[19,20] and the risk of SIDS in subsequent siblings. All parents should be provided with information about SIDS[21] and the telephone number of the local SIDS support group.

The majority of sudden infant deaths occur at home. Parents are shocked, bewildered, distressed, and often feel responsible. Parents innocent of blame in their child's death feel guilty nonetheless, imagining ways in which they might have contributed to or prevented the tragedy.[11,19] When it is appropriate,

parents should be reassured that neither they nor a physician could have prevented their infant's death. Inadvertent comments as well as necessary questioning by medical personnel and investigators are likely to cause additional stress.

It is important for those in contact with parents during this time to be supportive while at the same time conducting a thorough investigation. Personnel in first response teams should be trained to make observations at the scene such as the position of the infant, marks on the body, body temperature and rigor, type of bed or crib and any defects, amount and position of clothing and bedclothes, room temperature, type of ventilation and heating, and reaction of the caretakers. Paramedics and emergency room personnel should be trained to distinguish normal findings such as postmortem anal dilation and lividity from trauma due to abuse.[11,22,23]

A family's anxiety can be further increased if there is a delay in notification of the autopsy results. In most cases parents can be informed promptly of the results of the gross autopsy without waiting for the microscopic examination results.

In many states multidisciplinary teams have been established to review child fatalities.[24] Sharing data among agencies helps ensure that deaths due to child abuse are not missed and that surviving and subsequent siblings are protected. Some child fatality teams routinely review deaths due to apparent SIDS. These teams should include physicians or other professionals with expertise in SIDS.

The American Academy of Pediatrics endorses the following management scheme for evaluating sudden and unexpected infant deaths:

- universal performance of autopsies on infants dying suddenly and unexpectedly;[25]
- a standardized protocol for child deaths;[19,26]
- prompt notification to the family of the autopsy results;
- use of the term SIDS when appropriate;
- training of first response teams;
- counseling for parents of SIDS victims; and
- follow-up through the pediatrician's office or the public health department.

If all professionals involved in handling infant deaths are well trained and cooperate in a multidisciplinary approach, most deaths due to child abuse can be distinguished from sudden infant deaths and grieving families treated with compassion. If we are able to alter the risk factors common to child abuse and SIDS, we may be able to decrease the incidence of both.

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