Medicolegal Death Investigation of Sudden Unexpected Infant Deaths

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ABSTRACT

This review article describes the role of the medicolegal death investigator and medical examiner or coroner (MEC) in the investigations of a sudden unexpected infant death (SUID) beginning with an introduction into the case types that should be investigated and how infant deaths fit into that legal framework. The article also provides an overview of the history of the Centers for Disease Control and Prevention SUID investigation guidelines and process. The article concludes with a description of how the MEC correlates the scene investigation with autopsy findings, as well as the role of the MEC in cause of death determinations. There is also a brief discussion on how infant mortality data are captured and subsequently used to decrease infant mortality. [Pediatr Ann. 2017;46(8):e297-e302.]

According to the most recent data from the Centers for Disease Control and Prevention (CDC) as many as 3,700 sudden unexpected infant deaths (SUID) occurred in the United States in 2015.1 When an infant dies unexpectedly in the home or in the hospital emergency department, it is optimal for a trained medicolegal death investigator (MDI) to conduct a SUID investigation.2 An MDI is employed by a medical examiner or coroner (MEC) and is responsible for gathering pertinent information about the nature of each death reported to the office. To determine jurisdiction over a case, the MDI refers to state or local statutes that prescribe the types of deaths to be investigated by the MEC.3 Federal law does not govern the practice of medicolegal death investigation, yet the language used in most statutes draws from the Model Postmortem Examinations Act of 1954, which was a product of the National Commission on Uniform State Laws (Table 1).4 The legal requirement to investigate an infant death may not be specifically referenced in all states’ statutes, but an infant who dies suddenly with no readily recognizable disease must be investigated by the MEC.

In the US, there are no national standards for the practice of medicolegal death investigation;5 however, there are national guidelines regarding the performance of death scene investigation.2,6 In an effort to develop a protocol for the scene investigation of a SUID, an interagency panel on sudden infant death syndrome (SIDS) was convened in 1993. From this meeting, the Sudden, Unexplained Infant Death Investigation Reporting Form (SUIDIRF) was drafted.7 The SUIDIRF was officially published by the CDC in 1996 and later revised in 2006.8 As part of the revision, the CDC developed training academies in a train-the-trainer format, which were delivered to people from all 50 states and the District of Columbia from 2006 through 2008.8 A training manual consisting of nine chapters was created to facilitate these training academies.9

REVIEW/DISCUSSION

Timely Notification is Critical

The investigative response to an infant death involves the coordination of personnel from multiple agencies and relies upon a timely notification of a death. In general, when an infant is found unresponsive, law enforcement and emergency medical services are simultaneously dispatched to the incident location. Occasionally, the caregiver will transport the infant to the hospital in a private vehicle. When an infant presents in this fashion, the hospital must notify law enforcement immediately so that an officer can respond to the incident location to se-
TABLE 1.

Language from the Model Postmortem Examinations Act of 1954

- Violent deaths, whether apparently homicidal, suicidal, or accidental, including but not limited to deaths due to thermal, chemical, electrical or radiation injury, and deaths due to criminal abortion, whether apparently self-induced or not
- Sudden deaths not caused by readily recognizable disease
- Deaths under suspicious circumstances
- Deaths of persons whose bodies are to be cremated, dissected, buried at sea, or otherwise disposed of to be thereafter unavalaible for examination
- Deaths of inmates of public institutions not hospitalized therein for organic disease
- Deaths related to disease resulting from employment or to accident while employed
- Deaths related to disease that might constitute a threat to public health

Adapted from Hanzlick.

SPECIAL ISSUE ARTICLE

secure the scene and identify additional witnesses. The MDI will respond to the hospital after notification from the medical facility or the law enforcement agency.

Medicolegal Objectives

The MDI has a series of objectives to accomplish in the emergency department, beginning with a prompt physical examination of the body. In a possible sleep-related death, livor mortis needs to be documented as soon as possible as the original distribution and pattern of livor mortis becomes difficult to detect over time because the infant is placed in a supine position for the entirety of resuscitation. Timely notation of postmortem changes can be complicated when the MDI arrives at the hospital and finds the parents holding the infant. When this occurs, the investigator must balance the objectives of the medicolegal investigation with the emotional needs of the grieving parents. This may be the last opportunity for the parents to hold their baby. Adequate time should be given for the parents to say goodbye.

Another primary objective is to complete most of the SUIDIRF by interviewing the parent(s) or caregiver at the hospital before responding to the incident scene. The MDI begins the interview with a formal self-introduction and explanation of the SUID investigative process, in an effort to establish rapport. The first section of the SUIDIRF asks for the decedent’s demographics and contact information for the persons being interviewed. These simple questions help the MDI continue building rapport. Next, the MDI determines who placed the infant to sleep and who found the infant unresponsive. In many cases, this is the same person. If the “placer” and “finder” are different, it is best to interview each party separately. One of the authors (D. M.) once interviewed the placer (father) and finder (mother) at the same time, which proved to be distracting as the father continuously interjected and questioned the mother’s recollection of events.

After the placer and finder are separated, the MDI may choose to interview the decedent’s mother first as she is likely to be the most knowledgeable of the decedent’s history. The next section of the SUIDIRF, the Witness Interview, is used to gather specific incident details including the date, time, and location in which the decedent was last known to be alive. The same information is also obtained for the placed and found positions. The section often produces strong emotional responses from the placer or finder as he or she begins to appreciate that the infant may have died as a result of the position in which they were placed. MDIs should consider concluding the interview with the Witness Interview section to reduce disruptions.

The subsequent sections of the SUIDIRF deal with the decedent’s medical and dietary histories as well as the mother’s pregnancy history. The MDI focuses on the 72 hours preceding the death and whether the infant demonstrated any specific symptoms. In a nonaccusatory tone, the MDI makes inquiries about any injuries sustained by the infant. If the caregiver reports an injury, it should be described and later demonstrated during the investigation of the incident location. The medical history section continues with questions about vaccinations, medication administration, including herbal remedies, known allergies, recent encounters with health care providers, and birth history. The dietary history captures whether the infant was breast-fed or bottle fed, date and time of last feeding, who fed the infant, and whether new food was recently introduced. The pregnancy history section is used to identify potential SUID risk factors. The MDI concludes the SUIDIRF interview with the Witness Interview section. This is a natural segue into returning to the incident location to perform the doll reenactment.

Incident Scene Investigation

On rare occasions, the infant is pronounced and left in the home. If this happens, the MDI performs the physical examination immediately while being sensitive to the grieving family. If the parents have had time to say good-
The Doll Reenactment

The doll reenactment or recreation is used to visualize the position of the decedent, especially regarding the head and neck as placed and as found. In situations with a shared sleep surface, using the doll and individual(s) or proxy is important to further identify the potential for suffocation, wedging, or overlay.12 The placer is asked to recreate the scene as she or he remembers, including the layout of bedding, pillows, and toys. Once these items are replaced, the placer is asked to position the doll as she or he placed the infant, putting the “placed” placard next to the doll. Photographs are taken by the MDI with a “placed” placard, photographing from different angles to capture the position of the nose and mouth as well as the position of other occupants and bedding, if applicable (Figure 1). The finder is then asked to position the doll as found. The “found” placard is placed as noted above, and the MDI will photograph these images from multiple angles to capture the needed information (Figure 2). At this time, if the MDI notices stains on the bedding or clothing, these stains should be photographed and compared to the position of the doll.

After demonstrating the placed and found positions, the MDI asks the finder to “walk through” his or her actions after discovering the infant unresponsive. This may include a demonstration of resuscitative efforts as well as the MDI observing how the doll was handled and moved from the found position.

Completion of the Scene Investigation

Once the reenactment is completed, the scene investigation is nearly done. At this time, the MDI provides the family with a timeline of what will happen from the time the infant is transported from the hospital or scene through until the completion of the autopsy report. The family is afforded adequate time to ask questions about the autopsy and disposition of the body. Upon return to the office, the MDI requests prenatal, birth, pediatric, and other medical records. Police, rescue, and/or child protective service records should also be requested. From beginning to end, the medicolegal investigation takes about 4 to 8 hours to complete. Ideally, the SUIDIRF should be completed and given to the forensic pathologist prior to the beginning of the examination; at minimum, the Summary for Pathologist should be completed.

Role of the Medical Examiner/Coroner

There is no uniform system of MEC offices in the US; therefore, there is no uniform approach to investigating infant deaths.6,12 The definition of SIDS and SUID includes the performance of a complete autopsy, examination of the death scene, and review of the clinical history.13-15 A thorough scene investigation will provide information about potential types of SUID (SIDS [diagnosis of exclusion], natural, unintentional, and intentional injury) and can help the MEC determine cause and manner of death.16

A thorough scene investigation includes use of a doll to reenact the sleep position and environment including how the infant was placed to sleep and how the infant was found unresponsive. Personal or photographic review and discussion with the investigator about the position of the infant, the sleep surface, possible occlusion of the nose and mouth, partial or complete overlay, and/or possible wedging is critical to understanding the infant’s death. The scene investigation also provides information about living conditions (shelter, temperature, safety, etc.).
environmental exposures, occupants, and cleanliness) and access to food, prescription drugs, illicit substances, proper sleep environment, and medical care.

Completion of the SUIDIRF helps the investigator gather this important information. This information along with complete autopsy (including gross pathology, toxicology, radiology, histology, microbiology, and pathology tests), review of clinical and other records (prenatal, birth, postnatal, police, child protective services, rescue, and hospital records), and correlation with infant’s developmental stage is the basis for the MEC cause of death and manner of death.

Such investigations have led to a diagnostic shift away from SIDS and toward SUID, unknown causes, and accidental suffocation and strangulation. An “undetermined” manner of death includes cases that, despite a complete autopsy and thorough investigation, remain uncertain about the true cause of death. This might include suspected metabolic disease or asphyxiation. An unintentional or intentional asphyxia or unexplained natural death may look the same at autopsy, and there are many risk factors that are shared between SIDS and suffocation. Unexplained and undetermined cause and manner of death may be justified if the scene investigation or autopsy is incomplete.

Capturing Data to Decrease Infant Mortality

Cause of death is an opinion rendered by the MEC. Training, experience, and philosophy all play a role in the integration and interpretation of the investigative and autopsy findings. Lack of standardized and comprehensive scene investigation and autopsy practices hinder determination of cause of death as well as infant mortality surveillance and SUID prevention. It is incumbent upon the MEC office to develop protocols for a thorough death investigation and autopsy performed by a forensic pathologist. The National Association of Medical Examiners supports the CDC SUID initiatives, which include the SUIDIRF, guidelines, training curriculum, and Train-
ing Academies as well as the SUID Case Registry (SUID-CR). Child Death Review systems that participate in the SUID-CR have improved data collection and review for all childhood deaths, which in turn should improve SUID prevention strategies.12

CONCLUSIONS

The CDC has developed guidelines for thorough death investigation but these have not been uniformly adopted across the more than 2,000 MEC jurisdictions.19 For infants from age 1 month to 1 year, SIDS is the leading cause of death.9,20 Three types of SUID are most frequently reported: SIDS, unknown cause, and accidental suffocation and strangulation in bed. Even after a thorough investigation and complete autopsy, these deaths are often unobserved and there are no tests to differentiate SIDS from suffocation.20 The CJ Foundation for SIDS correctly reflects that MECs are increasingly reluctant to use SIDS,21 SIDS is not caused by suffocation, choking, or smothering, or by child abuse or neglect.22 It is not contagious or caused by “baby shots.” SIDS occurs unexpectedly and quickly to apparently healthy infants, usually during periods of sleep; it is not caused by “cribs.”22 SIDS is not completely preventable but the risk can be reduced.16 Babies who have parents that smoke or are exposed to second-hand smoke, and infants of male gender, African American ancestry, low birth weight, and whose families are at or below the poverty line are at greater risk of death.16,17 Those who are in an unsafe sleep environment (prone or stomach position, adult bed, soft bedding, shared sleep surface) have a 5 to 40 times increase in sudden death with international and national reviews showing that up to 90% of sudden infant deaths occurred in unsafe sleep environments.12,17,20,21 A Triple-Risk Model postulates that sudden infant death can occur when there is a vulnerable infant exposed to outside stressor(s) or trigger(s) during a critical development period23 with failure of protective responses.20 The CDC and American Academy of Pediatrics have put forth recommendations for a safe sleep environment and other factors to reduce an infant’s risk of death.13,16 In addition to standardizing death investigation and autopsy protocols, infant and child death review teams should be established and consist of professionals from multiple disciplines.17,24 These teams can provide death investigation and autopsy protocol quality assurance as well as systematic death reviews and promulgation of death prevention measures.

REFERENCES


