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Bassinet Use and Sudden Unexpected Death in Infancy

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Abstract

Objective—To analyze risk factors of infants who die suddenly and unexpectedly in bassinets.

Study design—Retrospective review of all deaths of infants involving bassinets reported to the Consumer Product Safety Commission (CPSC) in 1990–2004.

Results—Of 53 deaths, the mean age at death was 84 days. The cause of death in 85% was anoxia, asphyxiation, or suffocation; SIDS was the cause of death in 9.4%. 37% were placed prone for sleep, and half were found prone. Additional items, including soft bedding, were noted in 74%. In 17%, specific mechanical problems with the bassinets were noted.

Conclusions—The risk of sudden unexpected death in infancy in bassinets can be reduced by following American Academy of Pediatrics (AAP) guidelines, including use of supine positioning and avoidance of soft bedding within the bassinet. Additionally, parents must assure that the bassinet is mechanically sound, and that objects that can lead to suffocation are not in or near the bassinet.

Keywords

SIDS; sudden infant death syndrome; suffocation; asphyxia; entrapment; strangulation

In its 2005 policy statement, the American Academy of Pediatrics (AAP) expanded its recommendations for a safe infant sleep environment to further reduce the risk of sudden infant death syndrome (SIDS) and other causes of sudden unexpected death in infancy (SUDI), such as accidental suffocation and asphyxiation. These included supine positioning for every sleep, a firm sleep surface, avoidance of soft objects and loose bedding, and “a separate but proximate sleeping environment...a crib, bassinet or cradle that conforms to the safety standards of the Consumer Product Safety Commission.”(1)

Young infants have limited developmental skills and physical strength that place them at higher risk for hypoxia or hypercarbia if the sleeping infant's face becomes obscured by blankets or stuffed animals, or wedged between the mattress and the crib side, or the infant becomes trapped face down in the bedding.(2,3)

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Little is known about the safety of bassinets, particularly with regards to SIDS risk. This is somewhat surprising, as 90% of SIDS occurs before 6 months of age and bassinets are more likely to be used in these early months. In fact, the percentage of infants sleeping in bassinets doubled to almost 20% between 1992 and 2006. Bassinet use is highest in the first 2 months, when >45% of infants routinely sleep in bassinets. Use declines with age, and by 5–6 months, <10% of infants are in bassinets (NISP, unpublished data, 2007).

Despite the high frequency of bassinet use, there are no government safety standards for bassinets or cradles; however, the CPSC guidelines stipulate: 1) a sturdy bottom and wide base; 2) smooth surfaces without protruding hardware; 3) legs with locks to prevent folding while in use; 4) a firm, snugly fitting mattress; and 5) adherence to the manufacturer's guidelines regarding maximum weight and size of the infant.(4) In this study, data collected by the CPSC on individual infant deaths while in bassinets were reviewed to elucidate risks involved in placing young infants in bassinets, and to determine strategies for minimizing those risks.

Methods

We performed a retrospective review and analysis of deaths in bassinets occurring between June 1990 and November 2004 that were reported to the CPSC. Reporting to the CPSC is voluntary, and can be done by police, fire, and insurance investigators, coroners, medical examiners, health care personnel, manufacturers, retailers, and consumers. Cases were obtained via a search of three CPSC databases: Death Certificate, Injury and Potential Injury Incidents, and In-Depth Investigations. These databases have information about deaths and duplicate reports of cases that may provide more details concerning the deaths. Information was obtained from death certificates from the 50 states, the District of Columbia, and New York City, medical examiner and coroner reports, police and fire department reports, and media articles.(5) In addition, the CPSC conducts its own investigations into specific cases, which includes interviews with family members and other witnesses.

After removing duplicate cases, searches of the three databases provided 53 cases of deaths involving bassinets. From those records, demographic information, medical history, location of death, cause of death, and details about the death scene, including the position of the infant when placed to sleep and when discovered and the presence of soft bedding, were abstracted. This study received exemption from review by the institutional review board of Children's National Medical Center.

Results

Demographic information

Of the 53 cases, the mean age at death was 84 days (range, 9– 277 days), with 90% of deaths occurring between 30 and 180 days of age. Thirty-two (60.3%) were male, and 21 (39.6%) were female. Thirty-four (64.2%) were Caucasian, 11 (20.8%) African American, 3 (5.7%) Hispanic, and 5 (9.4%) unspecified. Twenty-one (39.6%) infants had recent illness; 15 had upper respiratory symptoms, 4 had vomiting or diarrhea, one had thrush, and one had recently had varicella. Eight infants had documented prior medical problems. Six of the children were born prematurely, one had congenital syphilis, and one had congenital myotonic dystrophy. Parental tobacco use was noted for 7 (13.2%) infants. There was maternal tobacco use in 4 cases, paternal use in one, both maternal and paternal use in one, and one with unspecified parental tobacco use. Two of the infants who had maternal tobacco exposure were noted to have prenatal exposure as well.

The cause of death in 45 (84.9%) was determined as anoxia, asphyxiation, or suffocation; SIDS was the cause of death in 5 (9.4%). In the 3 remaining infants, the causes of death were "thermal

burns,” “anoxia and heat stress,” and unspecified. Forty-four (83.0%) infants died in their homes, 6 (11.3%) in a child care setting (child care center or babysitter’s home), and 3 in homeless shelters.

Sleep Positioning

Of the 53 infants, 20 (37.7%) were placed for sleep in the prone position, 5 (9.4%) were placed on their sides, and 9 (17%) were placed supine. There was no data about position placed for 17 (32%) of the infants, and in one case discrepant information was found in different parts of the report. Additionally, 28 (52.8%) infants were found prone, 3 (5.7%) on the side, and 2 (3.8%) supine. There were no data about position found for 14 (26.4%) of the infants, and in one case discrepant information was found in different parts of the report. However, in 4 additional cases, other specific positions were noted that resulted from a mechanical problem with the bassinet. These included the child being found face down in the blanket on the floor, the bassinet laying on its side, the child hanging from the bassinet, and the infant partially out of a tipped over bassinet.

There was information regarding both the position placed and the position found in 26 cases. Of the 14 placed prone, 13 were found prone and one was found on his side. All 5 of the infants placed on their sides were found prone. Of the 7 infants placed supine, 5 were found prone, one supine, and one in the side position.

In 30 (56.6%) of the cases, a specific mode for asphyxiation was noted, ie “child’s face wedged into depression formed by mattress and the edge of the bassinet wall,” or “child’s head became entangled in plastic garbage bag.” Six infants were found with their face wedged against the side of the bassinet.

Only two infants were found in the supine position. In both of these cases, there were additional safety concerns. In one instance, a broken bassinet leg led to bassinet collapse, and the infant slid into the corner. In addition, that child and bassinet had been placed in a bedroom closet with a closed door because the child was crying. In another case, the infant was found with his face covered by a small beanbag pillow which had fallen from a shelf located above the bassinet.

In the 31 cases in which the infant was found in a non-supine position, 27 had other identifiable risk factors, including additional items in the bassinet, parental cigarette use, or a mechanical problem with the bassinet. However, 4 of the infants had no identifiable risk factor except being found in the prone position.

Additional Items in bassinet

In 39 (73.6%) of the deaths, additional items (anything other than the mattress, fitted sheet, pacifier, or rattle) were noted to be in the bassinet. These additional items included blankets, stuffed animals, bottles, plastic bags, and adult-sized pillows. In 35 (66%) cases, there was soft bedding found in the bassinet, in 2 cases a plastic bag was in the bassinet, and in 3 cases soft bedding and additional items were found. In most cases, these items were intentionally left in the bassinet with the children, but as noted above, in one case, a beanbag pillow fell from a shelf above the bassinet and was found covering the face of the infant.

Additional Information about Bassinet

Four (7.6%) infants were in bassinets that had mechanical swings or pendulums, to perhaps promote movement of the infant once placed to sleep. There were specific mechanical problems with the bassinets in 9 (17%) cases. These included broken legs, broken wooden slats, or shifting of mattress due to bending of metal clips meant to stabilize the bassinet’s frame.

Discussion

The demographics of the infants in this case series are similar to those seen in SIDS as a whole. There was a male predominance (60.3%), the mean age at death was almost 3 months, and a relatively large (11.3%) proportion of children died while in child care. However, the cause of death was determined to be SIDS in only 5 of these cases; the majority of the deaths were determined to be other causes of SUDI, such as anoxia, suffocation, and asphyxia. In recent years (and during the years when these deaths occurred), there has been a tendency among medical examiners to use SIDS as a cause of death less frequently, and to use asphyxia, suffocation, or undetermined more frequently.⁽⁶⁾ Indeed, many of the cases in this cohort where cause of death was determined to be anoxia, asphyxia, and suffocation had no obvious mechanism of death other than prone position and perhaps the presence of soft bedding, and the death scene description in these cases were indistinguishable from that in the SIDS cases.

More than half (52.8%) of all of the infants in this cohort, and 73.7% of those for which the position found was known were found in the prone position. Infants placed prone generally were found in the prone position. However, it is notable that all of the infants placed on their side and many of those placed supine were found in the prone position. Infants who roll into the prone position are at exceedingly high risk for SIDS.⁽⁷⁾ The side position is unstable, and a high proportion of infants placed on the side will roll into the prone position. It is for this reason that the AAP no longer recommends side as an acceptable sleep position for healthy term infants.⁽¹⁾

Soft or loose bedding, such as pillows and loose blankets, was a contributing factor in more than 70% of the deaths in this series. Soft or loose bedding is an established risk factor for asphyxiation and SUDI.^(3,8,9) It is important that bassinet mattresses be well-fitting, and that pillows, cushions, or loose blankets not be used.

Several of the deaths were associated with risks that are unique to bassinets: bassinet collapse, broken wooden slats, and malfunction of stabilizing clips. Such mechanical problems could lead to movement of the child either within or outside of the bassinet, placing the infant in a more vulnerable sleeping position. In addition, six infants were found with their faces wedged against the bassinet side. If parents are to use a bassinet, they must ensure that it is in good repair and conforms to CPSC guidelines.⁽⁴⁾ Bassinets with sides made of mesh or similar material that allows access to free air may prevent deaths from wedging of the face against the side. Furthermore, in four cases, the bassinets had mechanical swings or pendulums. This could allow for significant movement of the sleeping infant, perhaps allowing him or her to migrate to a corner of the bassinet where suffocation is more likely.

We acknowledge limitations to this study, largely due to the source of the data. The CPSC investigations are in response to specific complaints by consumers, which immediately biases the data being reviewed. The CPSC does not provide definitions or guidance for defining a bassinet, as compared with a cradle, portable crib, or other infant sleep area. The individuals filing CPSC reports determine that the item involved is a bassinet. Therefore, it is likely that these data encompass a variety of designs and models. In addition, the reviewed cases do not represent a complete accounting of bassinet-related deaths among infants, nor do they represent a specific sample of such deaths, as reporting to the CPSC is voluntary. Furthermore, because there is no way to determine the actual number of infants placed for sleep in bassinets, and this database represents an unknown percentage of bassinet-related deaths, there is no way to use these data to calculate relative risk of SUDI and bassinet use. However, these data should be considered an underestimate of the number of deaths occurring in bassinets. Finally, there is much variability in the amount of information available on each specific infant, with some reports being completed from documents alone and some with contribution from witnesses

and/or law enforcement officers. This is largely due to the lack of standardization of death scene investigation and autopsy protocols in the U.S. There is also inconsistency in how coroners and medical examiners may define cause of death, such that similar cases may be coded differently by different authorities;(6) in this series, asphyxia, anoxia, suffocation, undetermined, and SIDS were all diagnoses. Future, more uniform and comprehensive data collection is important to confirm these findings. The CDC has established new guidelines for standardized data collection and reporting protocols for the investigation of sudden unexplained infant deaths.(10) Although it is yet unclear how universally they will be adopted, it is hoped that these new guidelines will provide more uniformity in the data collected and allow for better study design and analysis.

Despite the above limitations, it is possible to draw some preliminary conclusions regarding infant safety in bassinets. First, it is important to adhere to the AAP guidelines regarding infant sleep, including using the supine position for every sleep, a firm sleep surface, and keeping soft objects and loose bedding out of the sleep environment,(1) when a bassinet is used. The small size of the bassinet might, in fact, make it easier for parents to maintain a “separate but proximate” sleep environment, as recommended by the AAP(1); that is, roomsharing, with the infant on a separate sleep surface from the parents. Indeed, the new AAP recommendations may in part explain the recent increase in popularity of bassinets. Secondly, it is important that, as with any products that are used for infants and small children, parents are vigilant with regards to the mechanical safety and stability of the bassinets they use. Bassinets with vertical sides made with air-permeable material, such as mesh, may be preferable to those with air-impermeable sides. Likewise, the bassinet should only be used for children whose height and weight fall within the manufacturers’ recommendations. Care should also be taken so that items that may cause accidental suffocation or asphyxia are not in the bassinet or located where they can fall into the bassinet. Finally, health care professionals and other professionals working with families of young infants must be aware of the need for guidance regarding the unique risks of bassinets.

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Abbreviations

AAP, American Academy of Pediatrics; CDC, Centers for Disease Control and Prevention; CPSC, Consumer Product Safety Commission; SIDS, Sudden infant death syndrome; SUDI, Sudden unexpected death in infancy.

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