Sudden Unexpected Child Deaths: Forensic Autopsy Results in Cases of Sudden Deaths During a 5-year Period

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Summary

The aim of the present study was to determine the incidence of various causes of sudden unexpected child deaths (SUCD) and to assess the importance of an autopsy in predicting the likelihood of finding a cause of death. A retrospective analysis of autopsy findings in 97 cases of SUCD between the ages of 0–11 years was undertaken at the Council of Forensic Medicine, Ankara during a 5-year period (1995–2000). Cases were classified as explained causes (80.42 per cent) and sudden infant death syndrome (SIDS) (19.58 per cent). A total of 25.77 per cent of the deaths occurred in the neonatal period, 45.31 per cent of them in the first year of life and the remaining 28.86 per cent after 1 year of life. The causes of neonatal deaths were respiratory pathology (five cases), birth complications (four cases), gastrointestinal pathology (one case), homicide (10 cases), and SIDS (five cases). The incidence of SIDS in the newborn period was 33 per cent. The incidence of unexplained causes of deaths in the postneonatal period was 31 per cent and the causes of deaths were respiratory pathology (15 cases), aspiration (five cases), gastrointestinal pathology (four cases), SIDS (14 cases), and other causes (four cases). The study of an entire population provides more reliable data regarding causes of sudden unexpected child deaths than does the study of small groups and it is also recommended that in addition to a through evaluation, a detailed autopsy must be performed for each case in experienced centers.

Introduction

Sudden unexpected death in apparently healthy children and adolescents is a rare event but when it occurs, it is always tragic. Many studies have focused on sudden death in infants, especially on sudden infant death syndrome[1–5] but sudden death in children has attracted little attention in the literature.[6–8] Sudden death in childhood is most often non-natural and is either accidental or due to homicide but some of the natural causes may be diagnosed early and, if treated, prevention of sudden death is possible. The aim of this study is to determine the incidence of various causes of sudden unexpected child deaths (SUCD) and to assess the importance of an autopsy in predicting the likelihood of a cause of death.

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Materials and Methods

A retrospective analysis of autopsy findings of SCUD between the ages of 0 and 11 years was undertaken at the Council of Forensic Medicine, Ankara during a 5-year period (1996–2000). All sudden unexpected non-violent deaths occurring between 1 day and 11 years of age were included. In all of them a scene investigation and an inquiry had been performed by the police and the decision whether or not to perform an autopsy had been based upon the police report and a medico-legal investigation. The medico-legal autopsy had been performed by a specialist in forensic medicine.

Information concerning the circumstances of death and clinical history was obtained from the autopsy protocol. A database was compiled including date of birth, date of death, sex, details of medical history, circumstances of death, autopsy findings, and final diagnosis (Fig. 1).

With information obtained from the provincial statistics office concerning the total number of reported childhood deaths in Ankara city, we calculated mortality rates for each year of interest.

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Name, surname :

Date of birth:

Age :

Sex :

Presumed diagnosis :

Final diagnosis:

1. Review of circumstances:

Sleeping conditions;

Suspicion of compression by the parent

2. Recent medical history

Suspicion of infection;

Other;

3. Awake deaths

During feeding;

During vomiting;

During a cry spell;

Rapid unexplained deterioration;

4. Child abuse

Autopsy

Macroscopic;

Congenital defectsi:

Child abuse:

Other:

Microscopic:

Infection:Pneumonia, Sepsis, Meningitis, other

Metabolic causes:

Other:

Cause undetermined

FIG. 1. Example of the database.

To examine the influence of age we divided all our study cases into the following subgroups: neonatal period (0–30 days), postneonatal period (1–12 months), and after 1 year of life.

Results

During 5 years, 165 cases of death in children between 1 day and 11 years old were investigated at the Council of Forensic Medicine, Ankara. A total of 36 (21.8 per cent) were a result of violent causes and 129 (78.1 per cent) non-violent causes. Thirty-two cases of non-violent deaths were excluded as they had previous severe medical causes.

Autopsy results and police reports of 97 cases of SUCD were reviewed retrospectively. The male/female ratio of the 97 cases was 1.48. Of the 97 children, 25.77 per cent were neonates, 45.31 per cent were between 1 and 12 months of age, and 43.75 per cent were between 1 and 11 years of age (Fig. 2).

Causes of death

The causes of neonatal deaths according to autopsy reports were respiratory pathology (five cases), birth

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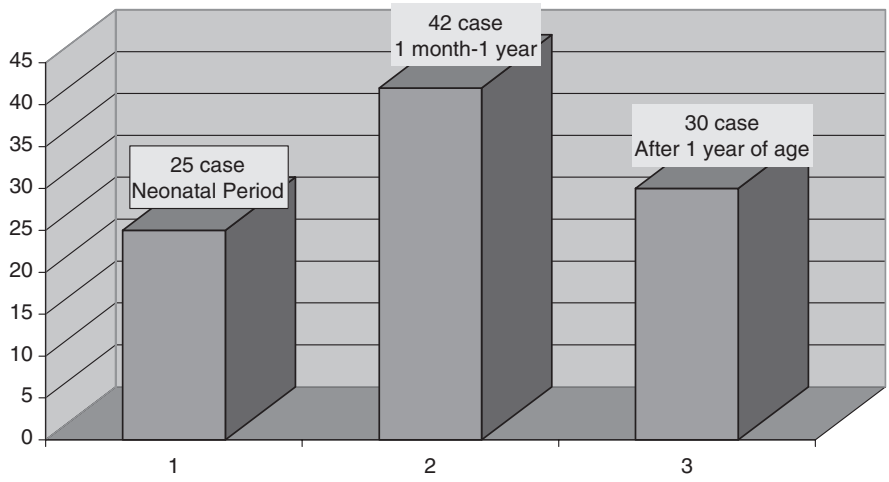


FIG. 2. Distribution of deaths according to age groups.

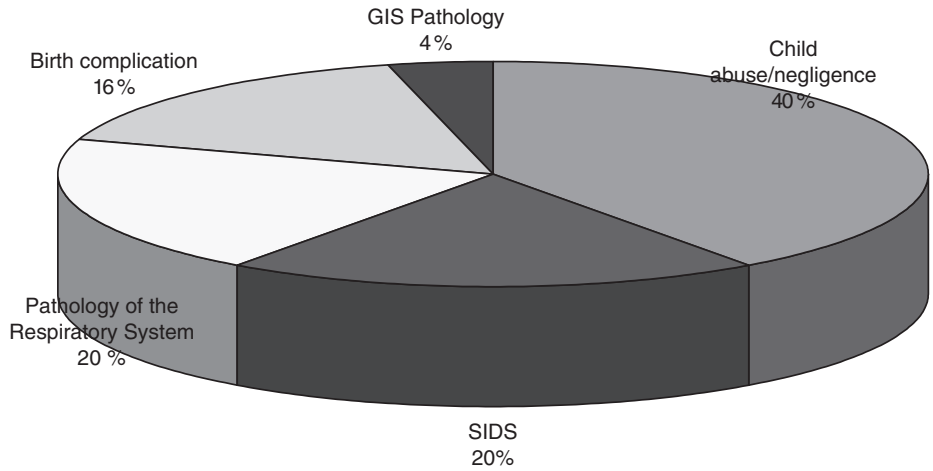


FIG. 3. Causes of neonatal deaths.

complications (four cases), gastrointestinal pathology (one case), homicide (10 cases) and SIDS (five cases) (Fig. 3). The incidence of SIDS, defined as the sudden death of an infant, unexpected by history, and for which a thorough autopsy examination fails to demonstrate an adequate cause of death, was 20 per cent in the newborn period.

The causes of deaths between 1 and 12 months of age (Fig. 4) were respiratory pathology (nine cases), gastrointestinal pathology (four cases), aspiration (five cases), brain injury (two cases), SIDS (10 cases), and other causes (six cases). The incidence of SIDS was 23.8 per cent.

The causes of deaths after 1 year of age (Fig. 5) were respiratory pathology (nine cases), gastrointestinal pathology (three cases), brain injury (three cases), aspiration (four cases), mechanic asphixia (three cases), anapyhlaxis (one case), congenital heart disorder (one case), and other causes (six cases). In six cases no cause could be identified with autopsy (16.6 per cent).

In 15 cases signs of abuse/negligence were found in autopsy and investigation of the circumstances of death.

Discussion

This study is based upon the necropsy population of a forensic institute and comprises only cases of sudden death. The material differs from other studies including both hospital and forensic autopsies.[7,8]

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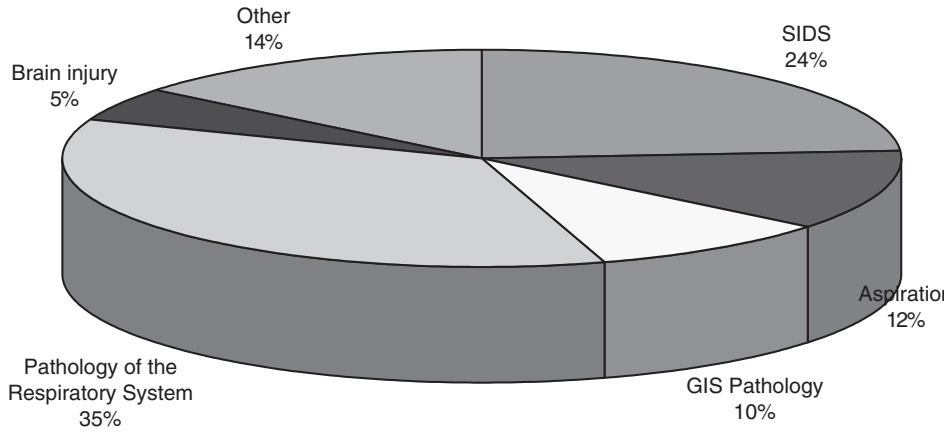


FIG. 4. Causes of death between 1 and 12 months of age.

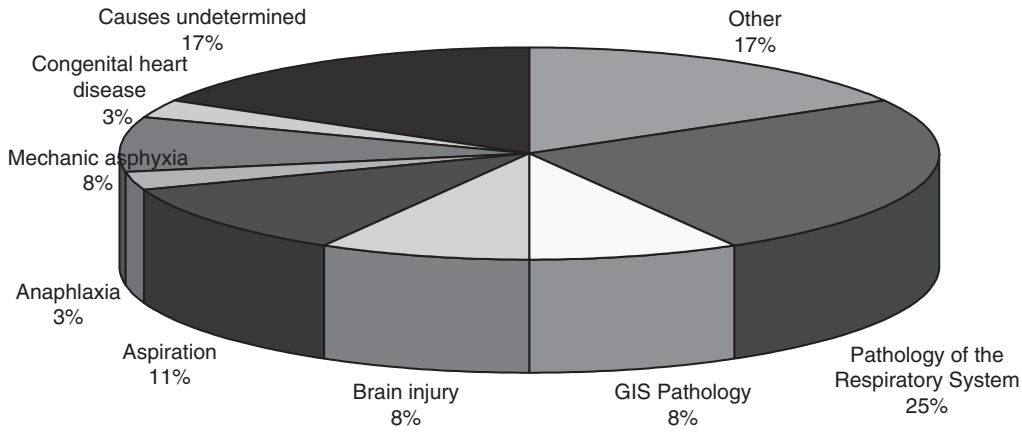


FIG. 5. Causes of deaths after 1 year of age.

One of our main findings is the high percentage (22 per cent) of unexplained sudden deaths higher than that reported in other series.[2,3,5,9] This discrepancy might be a result of inadequate laboratory investigation and performing autopsy by forensic medicine specialists without pediatric expertise.

In contrast to sudden death in adults, which is predominantly as a result of atherosclerotic coronary heart disease, sudden death in children is the result of many causes.[6] Our results showed a similar diversity. Among the 97 cases we found 20 different pathologies. In our series, respiratory pathology constituted the most frequent group (23.7 per cent of the total). The other causes of sudden death in our series are well-known causes of sudden death in children.

Another striking finding was the high incidence of homicide (10 cases) in the neonatal period, and aspiration (nine cases) and mechanical asphyxia (three cases) in the postneonatal period, as possible results of fatal child abuse and negligence. Incidence of child abuse and negligence represented 15.4 per cent of SUCD in our study. Although child abuse and negligence as a cause of sudden death is not new, only a few studies highlighted the actual underestimation of them.[10,11] We want to emphasise that abuse and negligence should be viewed with some concern.

In conclusion we believe that the study of an entire population provides more reliable data regarding causes of sudden unexpected child deaths than does the study of small groups. In addition to a thorough clinical, laboratory, and forensic evaluation, a detailed autopsy must be performed for each case in experienced centers by experienced pediatric specialists.

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