

## Sudden infant death syndrome: a case report in Bosnia and Herzegovina

Dragan Čajić<sup>1</sup>, Husref Tahirović<sup>2</sup>, Steven A. Koehler<sup>3</sup>

<sup>1</sup> Health Centre Sokolac, Pediatric Services, Sokolac Bosnia and Herzegovina

<sup>2</sup> Department for Research and Education, University Clinical Centre Tuzla and Academy of Sciences and Arts of Bosnia and Herzegovina, Sarajevo, Bosnia and Herzegovina

<sup>3</sup> Graduate School of Public Health University of Pittsburgh, Pittsburgh, PA, USA

Corresponding author:

Dragan Čajić  
Health Centre Sokolac  
Pediatric Services  
71216 Sokolac  
Bosnia and Herzegovina  
*cajic.dragan.1@gmail.com*  
Tel.: + 387 057 448 440

Received: 30 August 2010

Accepted: 30 September 2010

Sudden infant death syndrome (SIDS) is an idiopathic condition that affects seemingly healthy infants under one year of age, whose death remains unexplained after the performance of a complete postmortem examination, toxicological analyses, genetic testing, death scene investigation, and a review of the mother's and infant's medical history. Detailed epidemiological, pathological, and forensic information has been reported regarding SIDS from the developed countries. However, SIDS information from developing countries is either widely scattered or non-existent. This is the first published case report of SIDS from the country of Bosnia and Herzegovina. A previously healthy 3 months old, white male infant was found dead after being placed to sleep in the prone position. The features of this case report closely parallel the classical features of SIDS cited in the world literature. The infant was healthy, male, between the ages of 2-12 months, discovered in the prone position and had a negative postmortem investigation. It is important for developing countries such as Bosnia and Herzegovina to conduct detailed forensic investigations of deaths from SIDS and provide epidemiological, pathological, and circumstances of that information to the world's collective knowledge.

**Key words:** Sudden infant death syndrome, Bosnia and Herzegovina.

### Introduction

Sudden infant death syndrome (SIDS) is defined as the sudden death of an infant whose cause remains unexplained even after a detailed review of the infant's and mother's medical history and medical records, a complete forensic autopsy and toxicological examination, and a thorough investigation of the circumstances under which the death oc-

curred (1, 2, 3). Although SIDS is defined as a syndrome and therefore the result of more than one disease, many researchers still believe SIDS is a unique entity due to its quality, which includes a greater frequency between the ages of 2-4 months, more frequent incidence among black male infants and the presence of intrathoracic petechiae (4). In developed countries, SIDS represents one of the most common causes of death after the

neonatal period (5). In Japan, its incidence is the lowest (0.09 per 1000 infants), and New Zealand, the largest (0.80 per 1000), while in the United States (U.S.) the mortality rate is 0.57 per 1000 infants (6). The incidence rate varies from as low as 0.046/1,000 in Hong Kong (7) to as high as 6.7/1,000 among the Native American Indians (8). The incidence in the developing countries such as Bosnia and Herzegovina is mostly unknown.

The etiology of SIDS is still rather vague (9). There are various theories, but none has been proven. The current model to explain SIDS is the "Triple Risk Model". The model suggests the interaction of three factors simultaneously that affects the infant: (a) an underlying vulnerability in the infant, (b) a critical developmental period, and (c) an exogenous stressor (10). The critical period for SIDS is the first year of life with the greatest risk occurring between the ages of 2-6 months. A major exogenous stressor associated with SIDS is the prone sleeping position. A number of studies in the world literature have rejected the association between the use of medicines and vaccinations and SIDS (11, 12, 13).

Risk factors for SIDS include modifiable risk factors such as the prone sleeping position, soft bedding, overheating due to over wrapping, and maternal smoking and drug abuse. Other modifiable risk factors associated with SIDS are poor prenatal care, teenager pregnancy and lack of prenatal care. Intrinsic risk factors include prematurity, male gender, and black race. A previous history of SIDS in the family, artificial feeding, difficulty sucking and swallowing, sleep apnea, periodic and episodic occurrence of "disappearance" of the child have also been reported to be linked with SIDS (14).

By presenting this case we are emphasizing the reality that SIDS could occur in all countries of the world and that pediatricians and community health services should educate parents about the recommended

measures to eliminate risk factors for SIDS, and reduce infant mortality in cooperation with parents. In addition, it is necessary to emphasize to the medical and legal community the importance of conducting a proper death scene investigation and forensic examination of all infants that die suddenly and unexpectedly.

## **Case report**

### *The circumstances of the death*

In August 2007 a 3 month-old white male infant was brought to the Pediatric Services of Sokolac Health Centre in full cardiac arrest and was pronounced dead on arrival. The infant lived with his parents and the maternal grandfather. According to the mother the infant was healthy prior to death. At 11:30 AM the infant was bottle-fed cow's milk and placed in his crib by his mother, face down and covered with blankets. Approximately 1-2 hours later the mother reentered the room and discovered that the infant was dead. He was in the prone position, partially covered by blankets, with his hand on the pillow. There was no foam or vomit noted around the infant's mouth, according to the mother.

The infant was born by a spontaneous vaginal delivery in the hospital maternity ward, to a 22-year-old, healthy mother, who received prenatal care and had an uncomplicated pregnancy. His birth weight was 3150 grams and length 53 centimeters. This was the mother's second pregnancy. Her first was at age 20 which resulted in the birth of a healthy infant from a previous marriage.

Regular check-ups at one, two and three months of life revealed that the infant's growth and development were within normal limits. The infant was vaccinated according to the standard protocol, receiving BCG vaccine, and two doses of Hepatitis B vaccine. Five days before his death he received one dose of combined diphtheria, tet-

anus and pertussis vaccine and inactivated polio vaccine. According to the mother, no post-vaccination reaction, such as fever, was observed.

The family history revealed that the maternal uncle had died at the age of 2 months and the maternal great-uncle had died at the age of 3 months, both as previously healthy infants. At the time of this infant's death the mother was unemployed and externally emotionally unstable.

The father of this infant is a 36 year-old physical laborer. The father was born with a cleft lip and with limited mental function. The father's sister was treated for epilepsy in early childhood. The social status of the family was on the verge of poverty.

#### *Death scene investigation*

The death was reported to the local police and they conducted a detailed death scene investigation. The infant's room was noted as humid. Note the summer season, beginning in August. The infant's sleeping environment consisted of a crib. The crib contained several blankets and a large soft mattress (Figure 1).



Figure 1 The appearance of the crib immediately after the death

#### *Forensic investigation of the infant*

A forensic autopsy was performed on the white male infant, of the stated age of 3 months at the Institute for Forensic Medi-

cine in Sarajevo. The infant was 62 cm long and weighted 5850 grams (50th percentile). The external examination revealed that the extremities displayed rigor mortis. There were no signs of external trauma or violence. Mild perioral cyanosis, with red spots were noted on the back and neck region (Figure 2). Examination of the internal organs showed general edema and cyanosis. However, these morphological changes were minor and nonspecific to a specific cause of death.



Figure 2 The appearance of the child in the outpatient clinic during the external inspection

The conclusions of the forensic autopsy examination and the death scene investigation ruled the death of this infant as natural death. The morphological changes seen in the external and internal organs, specially the edema of the pulmonary tissue and brain, were non-specific findings. Such morphological changes are typically seen in infants that die from sudden infant death syndrome.

#### **Discussion**

Sudden infant death syndrome (SIDS) is an idiopathic condition that typically affects infants during their first year of life and is characterized by a negative post mortem examination, death investigation, and medical history. The syndrome has been present from antiquity - there are even references

in the Old Testament of the Bible (15). The overall number of SIDS in the U.S. and other developed countries has been dramatically decreasing since 1992 corresponding with the “Back to Sleep” campaign (15). While the cause of SIDS still remains elusive, epidemiological studies have identified modifiable risk factors associated with SIDS, which include infants sleeping in the prone position, infants sleeping on a nonstandard sleep surface, and bed sharing.

A great amount of information is known about the features of SIDS in the developed countries. However, in developing countries such as Bosnia and Herzegovina even basic epidemiological data on infants who have died of SIDS is lacking. It is critical that pediatricians educate future mothers of the risk of SIDS especially the modifiable behaviors associated with SIDS. The legal and forensic community must also play a part in conducting thorough and complete investigations of all deaths involving infants. In addition, forensic epidemiologists must work with these developing countries and the forensic establishment to create SIDS databases and to analysis and interpret the data. The collection of information is important for two reasons: first, to establish the epidemiological patterns of SIDS deaths in Bosnia and Herzegovina and allow for comparisons to patterns cited in other countries; second, to allow for the identification of the many unique risk factors specific to the region of Bosnia and Herzegovina.

**Conflict of interest:** The authors declare that they have no conflict of interest. This study was not sponsored by any external organisation.

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