Sudden infant death syndrome: revealing this mystery is possible

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Dear Editor,

The sudden and unexpected loss of an infant in the first months of life is a heartbreaking and devastating experience for any parent. Understandably, it can be an extremely distressing time for the mother, who may often find herself unfairly burdened with guilt. When this tragic event occurs, a thorough investigation becomes necessary to determine the cause of death and also absolve the mother of any responsibility.

Autopsies, scene investigations, medical history reviews, toxicology screenings, and genetic analyses are some of the tests that must be conducted in Italy according to the "Protocol of investigations and autopsy guidelines in sudden infant death" published by the Italian Ministry of Health on 7th October 2014 related to the application of the National Law n. 31 of 2nd February 2006 "Regulations for diagnostic post mortem investigation in victims of the sudden infant death syndrome (SIDS) and unexpected fetal death".[1,2]

The autopsy is one of the first steps performed to determine the cause of death. The medical examiner or forensic pathologist conducts a detailed examination of the infant's body, with deep macroscopic and microscopic analysis of all internal organs to identify any abnormalities or signs of trauma. This process, which also makes use of molecular tests, helps rule out other potential causes of death, such as infections, genetic disorders, or physical injuries. When a possible cause of death cannot be found, a diagnosis of SIDS is made. It is crucial to recognize that SIDS is a complex and largely unexplained phenomenon. In these cases, a thorough examination of the brain is essential.

Numerous studies have in fact highlighted minute developmental alterations, both morphological, especially of the respiratory centers in the brainstem, and of the expression of various neurotransmitters (serotonin, nicotine, somatostatin, orexin, *etc*.) in SIDS.[3-6] These anomalies can provide a plausible explanation of the pathogenetic mechanism of the deaths that remain unexplained after routine investigations. However, a thorough neuropathological analysis is not contemplated in the aforementioned protocol. Precisely, as regards the examination of the brain, only the search for any macroscopic malformations, hemorrhages, and cerebral infarctions and, through histological examination, for degenerative or inflammatory conditions is indicated.

Advancements in scientific knowledge make it essential to include in the existing guidelines for the anatomopathological examination of the brain, the in-depth study of the main structures located above all in the brainstem. Among these, the components of the respiratory network are important to examine, as they often show developmental alterations in SIDS (Figure 1).[6]

Therefore, it's essential to consult current medical literature or contact relevant medical professionals for the most up-to-date information on the modalities of examination of the nervous centers that control the vital activities, above all the respiratory activity, whose normal development is essential for life.

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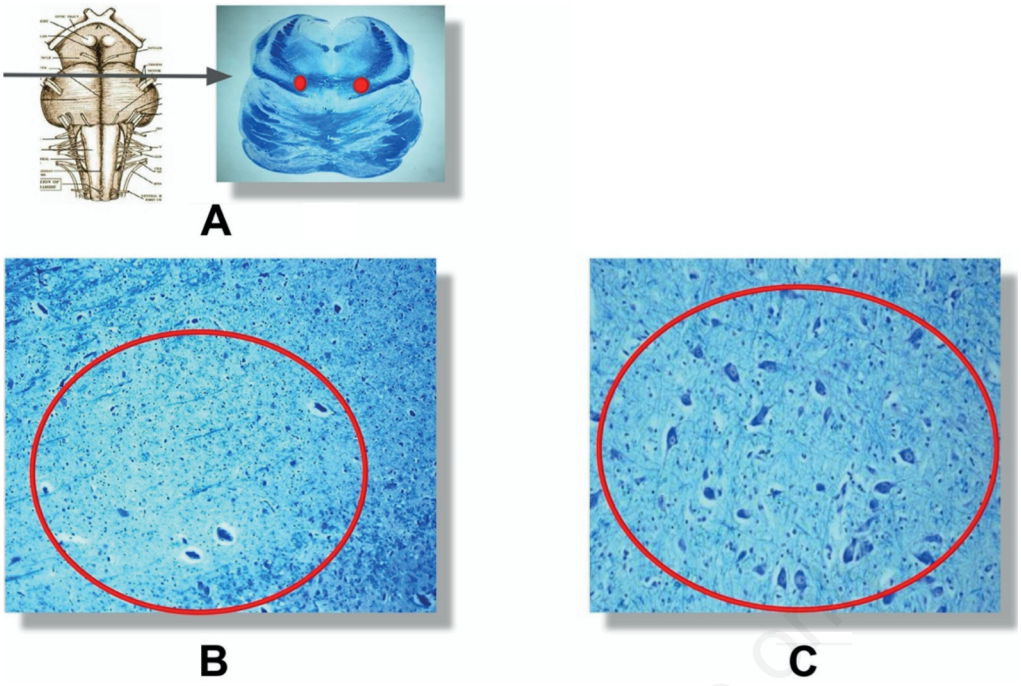

Figure 1. Kölliker-Fuse nucleus, coordinator of respiratory activity. A) On the left schematic representation of the brainstem; on the right section obtained at the level indicated by the arrow showing the localization of the nucleus; B) Kölliker-Fuse nucleus hypoplasia; C) normal Kölliker-Fuse nucleus.

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