



E93 The Role of Postmortem Computed Tomography (PMCT) and Immunohistochemical Techniques in a Case of Aspiration Pneumonia in Suspected Sudden Infant Death Syndrome (SIDS)

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Learning Overview: The goal of this study is to analyze the way in which the combined use of instrumental and immunohistochemical methods allows a correct diagnosis of aspiration pneumonia in a case of suspected SIDS.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing how, in SIDS cases, autopsy findings can be non-specific. The PMCT can direct the forensic pathologist toward a certain etiology. In cases of asphyxia by aspiration, immunohistochemistry is an essential technique to clarify the nature of the aspirated material, as well as its presence within inflammatory cells. The combination of these two techniques can provide a valid diagnostic aid in complex cases, such as SIDS.

SIDS is defined as the sudden and unexpected death of an infant without any apparent cause. It has major prevalence in the male sex. Etiology of SIDS is still unknown. According to numerous authors, SIDS may be due to different causes, as neurological, endocrine, metabolic, pulmonary, immune, or cardiac, and 30%–40% of cases are due to pulmonary disorders and the aspiration of gastric contents is recognized as a cause, with the consequent development of aspiration pneumonia.

Aspiration pneumonia is an inflammatory process that develops from the entry of foreign materials into the bronchial tree, often coming from the oral or gastric route, such as food or saliva. Risk factors for aspiration pneumonia include all those pathological conditions that alter the state of consciousness or create dysfunction of swallowing. Usually, aspiration pneumonia is manifested by the sudden appearance of respiratory difficulties and cough, associated with the ingestion of solid or liquid food or the regurgitation of gastric contents. Regarding SIDS, the use of PMCT in cases of sudden neonatal death is explained by the fact that SIDS never presents a certain cause of death nor possesses characteristic findings in autopsy; moreover, CT is a useful method of screening for unnatural death.

In the present case, a 2-day-old male baby (born of a diabetic mother) was pronounced dead after suffering an acute lung failure and a cardiopulmonary arrest. The previous day, the baby was in a state of hypotonia due to persistent hypoglycemia and he experienced an episode of vomiting. A total body PMCT was performed. Pulmonary scan revealed the presence of hypodense material of indeterminate nature in the main airways, from the oropharynx to the subsegmental bronchi of both lungs, with areas of pulmonary parenchyma with a “ground-glass” pattern. The remaining sectors explored appeared to be free from alterations. At autopsy, the respiratory tract revealed the presence of an edematous mucosa, which was painted with a whitish filamentous material.

Histology samples of lungs were taken and processed in Hematoxylin-Eosin (H&E) staining. A pulmonary histological study showed strong congestion of the alveolar septa capillaries, which were stacked by white blood cells. There was a widespread reduction of airspace due to collapse of the lung texture. Macrophages with cytoplasm occupied by abundant amorphous material were visualized. The same amorphous material was found in the alveolar spaces and in the bronchi, together with a great amount of white blood cells. Furthermore, an immunohistochemical study was carried out on lung samples, using antibody reaction with CD15, CD68, and alpha-lacto-globulin antibody. The study with CD15 (neutrophil cell marker) and CD68 (macrophage marker) showed clear positivity in the lung parenchyma and alveolar cavities. This finding is decisive for an inflammatory pulmonary process prior to the death, confirmed by immunohistochemical tests.

Finally, this study proceeded to the immunohistochemical research of alpha-lactoglobulin (milk protein). In this case, alpha-lactoglobulin antibody reaction showed a marked positivity in the alveolar cavity site but particularly in the macrophage cytoplasm. This latter finding attributed the development of pneumonia to an inhalation of milk.

In SIDS, autopsy findings can be non-specific. The PMCT can direct the forensic pathologist toward a certain etiology. In cases of asphyxia by aspiration, immunohistochemistry is an essential technique to clarify the nature of the aspirated material, as well as its presence within inflammatory cells. The combination of these two techniques can provide a valid diagnostic aid in complex cases, such as SIDS.

SIDS, Aspiration Pneumonia, PMCT