G4 Fatal Waterhouse-Friderichsen Syndrome: Crime Scene, Autopsy, Pathology, Bacteriology Microscopic, and Toxicology Features

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The goal of this presentation is to educate the attendees about the differential diagnosis between infectious disease syndrome and battered child syndrome.

This presentation will impact the forensic science community by the collection of information before performing an external examination or an autopsy.

Introduction: Waterhouse-Friderichsen syndrome is adrenal gland failure due to bleeding into the adrenal gland. It is caused by severe meningococcal infection or other severe bacterial infection. Symptoms include acute adrenal gland insufficiency and profound shock. It is deadly if not treated immediately. However, the infection leads to massive hemorrhage into one or (usually) both adrenal glands. It is characterized by overwhelming bacterial infection meningococcemia, low blood pressure, and shock, disseminated intravascular coagulation (DIC) with widespread purpura, and rapidly developing adrenocortical insufficiency.

Materials and Methods: A fatal case of Waterhouse-Friderichsen syndrome resulting from bacterial infection in a 4-year-old boy is reported. The course is rapid and the clinical symptoms are serious (hyperthermia, *purpura fulminans*, dyspnea). The clinical symptoms are not known by the forensic pathologist during the external examination. The presence of purpura (numerous skins' petechial haemorrhages) evoked a potential "battered child syndrome."

Results: External examination: numerous ecchymosis are observed, principally located on thoracic and abdominal area. The anamnesis is incomplete and an autopsy is performed. Autopsy findings: included numerous petechial haemorrhages on the heart, the pancreas, the thymus gland, and the bowel. Macroscopic examination showed encephalic edematous, hemorrhagic and edematous lungs, and mainly a bilateral acute hemorrhagic necrosis of the adrenal glands. Toxicology: negative results. Pathology: showed fragments of pulmonary parenchyma with alveolar necrosis. Adrenal glands presented parenchyma complete apoplexy. Bacteriology: the origin of the WFS is pneumococcal meningitis.

Discussion: The autopsy findings (a bilateral acute haemorrhagic necrosis of the adrenal glands) are typical of Waterhouse-Friderichsen syndrome (WFS). Without complete anamnesis (hyperthermia, dyspnea, no traumatic lesions), an error of diagnosis is possible. Indeed, a "battered child syndrome" could be evoked. With numerous petechial hemorrhages on the body and infectious context, the forensic pathologist has to think about the WFS and rapidly perform a lumbar puncture to lead to the good diagnosis. The diagnosis of WFS as the cause of death will be established postmortem based on autopsy findings and additional tests (pathology, bacteriologic cultures). The death of a child with numerous ecchymosis has to be considered as suspicious and an autopsy should be systematically required and performed to confirm or invalidate the diagnosis of WFS. Moreover, the largest number of information must be collected by police (infectious context) before the external examination and the autopsy. Indeed, these important elements of context and anamnesis guide to the best diagnosis and avoid legal implications for the parents if "battered child syndrome" is kept.

Waterhouse-Fiderichsen Syndrome, Adrenal Glands, Autopsy

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