



G132 Vertebral-Medullary Trauma Death: When, Where, and How Was the Trauma?

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After attending this presentation, attendees will receive information on how to manage cases with minimal signs at autopsy and hospital information on how to reconstruct a traumatic event in order to clearly assign the responsibility of trauma. A careful evaluation of all the medical documents is the cornerstone to understanding the traumatic mechanism and timing of vertebral injury, especially when autopsy findings are minimalized because of a post-traumatic surviving interval.

This presentation will impact the forensic science community by understanding how the clinical information can be of relevant importance in cases of a trauma death with minimal autopsy signs.

A 45-year-old man died of sepsis secondary to quadriplegia due to complex multiple fractures of the lower cervical column (C4 - C7) after a three-week hospitalization in the intensive care unit.

The family, interviewed before performing the autopsy, declared that the man had been arrested for an alleged fight with a neighbor the day before. They reported that when the statement was taken in the police station, the police officer noticed a strange, irascible behavior and a neuropsychiatric consultation was requested.

The medical documentation shows that the man was hospitalized in the psychiatric unit and suddenly some neurological signs appeared. Then the patient was moved to the orthopedic unit and checked radiologically with a positive result of an instable C5 fracture, and a Philadelphia collar stabilizer was applied.

His condition rapidly worsened and he was transferred to the intensive care unit with respiratory arrest, peripheral and central cyanosis, and fixed and unreactive pupils (GCS=3). The blood pressure and oxygen's saturation were undetectable and the pulse was 40bpm. He was reanimated, intubated and a cardiotoxic was administered; the patient recovered cardiorespiratory function (pulse 120 – 130bpm). Complex monitoring, sedation, and aliotherapy with morphine followed.

After some days, an extensive CT scan of the head and neck was performed and no pathological or traumatic signs were found in the head, but multiple fractures from C4 to C7 (fractures of the spinous process of C4 and C5; fractures of the vertebral bodies of C5 (type III), C6 (type I), C7 (type I) were detected. After ten days of admission in the intensive care unit, the patient presented convulsion and fever (BT: 38.7°C).

During hospitalization the patient received fluid supply, human albumin 20%, mannitol 20%, antibiotic therapy according to antibiogram, antiaggregant, barbituric, analgesics, sedatives, antacid and vitamins. Despite this intensive treatment his hemodynamic state was unstable and his fever rose to 40.9°C and biochemical signs of multiple organ failure appeared (leukocytosis $15 \times 10^9/L$, AST 249 IU/L, ALT 580 IU/L, hypoalbuminemia, urea 11.2mmol/L, glucose 36mmol/L). The patient died after 23 days of intensive care with diagnose of sepsis.

At autopsy, the external examination revealed two decubitus areas, in the occipital and sacral area with skin necrosis, marks of defibrillation and no signs of trauma. The classical autopsy opening procedure was completed with a complete posterior neck dissection discovering a minimal, insignificant paravertebral blood infiltration on the C4 - C5 area, and the cervical column was taken away for further bone and spinal cord evaluation. The internal organs showed macroscopical signs of failure and sepsis. The spinal cord, fixed in formalin, presented macroscopically an external, light brownish discoloration investigated microscopically. The cervical vertebrae were prepared in order to observe the localization, type, and state of the fracture's repair process.

The forensic evaluation of the case confirmed a linear correlation between the vertebral-medullary injuries and the death. The CT images revealed clear, multiple complex fractures in the cervical area that could only be the result of a relevant neck trauma.

The localization of the multiple vertebral fractures in the lower cervical spine allows the existence of a free interval of neurological signs, and the instability due to the complexity of the fractures (C5) can explain the sudden deterioration of the neurological condition as the result of small, ordinary neck movements.

The big forensic questions to answer concern the moment and the mechanism of the vertebral trauma, because many different situations and persons could be involved in this case (the discussion/fight with the neighbor, abuse of force by the police, the event which occurred in the psychiatric unit, fall, use of restraints, altercation with another person) or a traumatic event before the arrest.

Spinal Cord Trauma, Forensic Pathology, Cervical Fractures