



## Pathology & Biology Section – 2005

### G58 Clinically Stable Skull Fracture and Fatal Acute Pneumonia: An Unexpected Combination

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After attending this presentation, the forensic pathologist and treating clinician will be aware of an unexpected and rare complication of head injuries.

This presentation will impact the forensic community and/or humanity by educating the pathologist and the treating clinician about a rare but serious complication of clinically mild head injuries, and stimulating more studies in the area of possible treatments for this complication.

Aspiration pneumonia and acute meningitis are well-recognized complications in head-injured patients.<sup>1-3</sup> Most commonly, the pneumonia results from aspiration of gastric and oropharyngeal material into the lungs because of unconsciousness and/or altered gag and swallowing reflexes from the head injuries. Acute meningitis most often occurs in the presence of basilar skull fractures, which result in communication between the underlying sinuses and the CSF. Very little information is available in the medical literature addressing the issue of blood aspiration in head-injured patients, particularly those with maxillofacial injuries. The following case report will illustrate an unexpected complication of such an injury.

The patient was a 13-year-old female involved in a single car motor vehicle accident. She had epistaxis and abrasions and contusions of the face, but suffered no loss of consciousness or neurological symptoms. A CT scan showed non-displaced facial fractures, a small basilar skull fracture, and a right temporal cephalohematoma. She was admitted for observation and released the following day. Two days after discharge she returned to the emergency room with complaints of pain, dizziness, and weakness. Repeat CT scan of the head showed no acute changes. Chest x-ray was normal. She was afebrile, but mildly hypotensive (98/50) and tachycardic. This resolved with a fluid bolus. She was discharged home with pain medications. She was found semi-responsive the following morning and arrested shortly after. She was pronounced dead at the scene. An autopsy was performed the following day.

The postmortem examination revealed a normally developed adolescent female with soft tissue swelling and resolving contusions and abrasions of the face. Reflection of the scalp showed purulence of the right temporal soft tissues. Pertinent intracranial findings included hairline skull fractures across the orbital and ethmoid plates and the anterolateral left petrous ridge up into the left temporal bone. Grossly, the lungs were heavy, mottled red/tan, and slightly firm and edematous. Microscopic examination showed acute pneumonia, edema, and frank blood within the alveolar spaces. Cultures of lung tissue, CSF, and right temporal soft tissue were positive for  $\beta$ -hemolytic Group A *Streptococcus*. The final autopsy diagnosis was acute bacterial pneumonia due to blood aspiration from blunt force craniocerebral injuries. The facial sinuses were thought to be the source of infection.

Review of the literature reveals no data or case reports specifically addressing the issue of blood aspiration and pneumonia in the head-injured patient, though several studies address the increased risk of pneumonia, and one explores the increased risk of pneumonia in head-injured patients who were carriers of *Staphylococcus aureus*.<sup>4,5</sup> The method of inoculation was felt to be aspiration at the time of injury and/or from intubation. The patients in this and other studies suffered from severe head injuries and had been intubated, some requiring prolonged ventilator support. This case differs, in that the head injury was not severe. The patient experienced no loss of consciousness, neurological symptoms, or airway compromise. No information was found regarding studies of the use of prophylactic antibiotics in this patient population. Prior to this case, the standard of care at the treating medical center for patients with clinically stable maxillofacial and skull fractures did not include prophylactic antibiotic therapy. This case suggests that further study in this area is warranted.

<sup>1</sup>Marion, DW. Complications of head injury and their therapy.

*Neurosurgery Clinics of North America* 2:April 1991, 411-24.

<sup>2</sup>Severyn FA, Fenn J. Overwhelming S. pneumonia meningitis after basilar skull fracture: A Case Report. *Air Medical Journal* 19:3, 2000, 102-4.

<sup>3</sup>Kingsland RC, Guss DA. *Actinobacillus urea* meningitis: Case report and review of the literature. *The Journal of Emergency Medicine* 13:5:1995, 623-627.

<sup>4</sup>Campbell W, Hendrix E, Schwalbe R, et.al. Head-injured patients who are nasal carriers of *Staphylococcus aureus* are at high risk for *Staphylococcus aureus* pneumonia. *Critical Care Medicine* 27:4:1999, 798-801.

<sup>5</sup>Bronchard R, Albaladejo P, Brezac G, et.al. Early onset pneumonia: Risk factors and consequences in head trauma patients. *Anesthesiology* 100:2004, 234-9.

#### Skull Fractures, Pneumonia, Head Injuries