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"Evaluating CSF leak risk in traumatic frontal sinus fracture based on degree and morphology of radiographic pneumocephalus"

Skull fractures as a result of blunt or penetrating trauma can lead to potentially life threatening sequelae including bleeding, contusion, infection, or cerebrospinal fluid leak (CSF leak). Skull fractures that establish a passageway between the intracranial space and the external environment, such as a fracture through pneumatized bone or through greatly displaced fractures with open wounds, offer an additional risk. A longstanding school of thought with these skull fractures is that if air can get into the intradural space, then CSF is escaping through that same entry point, leading to the development of CSF leak that may require surgical repair. There is limited research, however, on pneumocephalus as an indicator of development of impending CSF leak in the trauma population. Furthermore, there is little data that describes morphology and degree of pneumocephalus as predictors of CSF leak in patients with traumatic frontal sinus fractures. A retrospective chart review of patients with skull fractures through the frontal sinuses and their incidence of developing a CSF leak hopes to evaluate the validity of the existing notion that these two conditions are correlated.

A database of 3690 patients who presented to a level I trauma center (University Medical Center trauma registry) with traumatic skull fractures confirmed by CT imaging will be analyzed in order to identify eligible patients. Inclusion criteria will include patients >/= 18yo who have suffered traumatic frontal sinus fractures that violate the calvarium and communicate with the intracranial space. Data will be collected describing presence of pneumocephalus, categorization of pneumocephalus by a class system previously described in literature characterizing postoperative pneumocephalus following endoscopic endonasal surgery[1], progression of pneumocephalus, development of a CSF leak, and if the patient required surgical or procedural intervention to repair the leak. When the data collection and statistical analysis are complete, we hope to determine if there is a relationship between presence, degree, and morphology of pneumocephalus and risk of developing a post traumatic CSF leak in this population.

1: Banu MA, Szentirmaj O, Mascarenhas L, Salem AA< Anand VK, Schwartz TH. Pneumocephalus patterns following endonasal endoscopic skull base surgery as predictors of postoperative CSF leaks. Clinical article, Journal of Neurosurgery, JNS. 2014;121(4):961-975. Doi:10.3171/2014.5.JNS132028