NEUROLOGIC OUTCOMES FOLLOWING ENDOSCOPIC THIRD VENTRICULOSTOMY

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Introduction:

Endoscopic third ventriculostomy (ETV) is a common initial surgical treatment for management of obstructive hydrocephalus. Reported complications include arrhythmias, hemodynamic instability, electrolyte abnormalities, fever, and CNS complications including seizure and delayed awakening. Proposed etiologies for these neurologic sequelae include sodium abnormalities, elevated endoscopic pressure, and cold saline irrigation. We hypothesize a fourth possible etiology, namely the alteration of CSF chemistry due to surgical irrigation resulting in irritation and neurologic excitability in the immediate (<8 hr) post-operative period. This process has informally been referred to as the "saline washout" phenomena at our institution though clear evidence of this association is lacking in the literature.

Methods:

Following IRB approval we conducted a retrospective review of 56 patients ages 0-17 years who underwent 60 ETV procedures at our institution between 2010 and 2015. Medical records were reviewed with identification of patient demographics (age, BMI, ASA status, anti-epileptic drug therapy), procedure duration, temperature change, and incidence of clinically evident seizure activity in the intra or immediate post-operative period. Seizure was defined as witnessed convulsive movement, gaze deviation, and/or neurogenic breathing without alternate etiology as suggested by available laboratory (e.g. serum lactate) and imaging (CT, EEG) results. Relationships of seizure activity to length of ICU vs hospital stay, exposure to CT imaging, and need for subsequent airway management were assessed. Multiple variables between the seizure and non-seizure groups were analyzed to identify predictors of post-operative seizure activity and subsequent sequelae following ETV. Numerical measures were compared using t-tests. Categorical measures were compared using odds ratios.

Results:

The incidence of clinical seizures was 15% (9/60). Younger age was found to be predictive of seizure activity (p<0.05) while gender, ASA status, pre or intra-operative AEDs, BMI percentile, procedure duration, temperature change and ICU stay were not (Table 1). Post-operative head CT occurred more frequently in patients with suspected seizure (p<0.05, table 2). Airway management was required in one patient with presumed seizure activity but did not require re-intubation.

Discussion:

The incidence of clinical seizure was relatively high following ETV. While current literature emphasizes delayed seizure activity following ETV we observed acute transient seizure activity. Younger children are at higher risk and seizure activity increased the exposure to post-operative CT scan. We suspected that increased amount of irrigation solution used would increase the risk of seizures. Since the amount of irrigation used was unavailable in our chart review procedure duration was used as a surrogate measure. Although procedure duration was not found to influence seizures, younger age did, possibly due to a larger volume of irrigation used on a ml/kg basis. Clinical seizures are a common post-operative complication of ETV at our institution and we propose a prospective study of risk factors including type of irrigation fluid, volume, and temperature.

References: