

Prevalence and pattern of electrocardiogram changes in patients with mild to moderate head injury

Student Proposer: Katherine Chadurjian

Student Advisor: Kalev Freeman, MD, PhD

Department of Surgery

Importance: Cardiac dysfunction can occur as a result of traumatic brain injury (TBI). Although cardiovascular complications such as hypertension, arrhythmia, and ischemia, have been associated with TBI, the prevalence and pattern of these complications have not been fully described.

Objectives: Our objective is to investigate cardiac function and cognitive changes in patients with mild to moderate head injury and concussive symptoms. We suspect that head injury-induced release of catecholamines will cause myocardial stunning with regional wall motion abnormalities, electrocardiogram (ECG) changes or arrhythmia. **Methods:** We performed a prospective, observational study of adult patients who presented with a concussion to the ED within 24 hours of injury and were discharged home. We obtained ECGs and performed ImpACT testing on enrolled patients on presentation and again at a one month follow-up. The ImpACT test results were analyzed and the ECGs were interpreted to identify cognitive and cardiac outcomes and changes in these patients. **Results:** We have enrolled fifty-one patients between May 2008 and January 2010. Twenty four patients presented after a sports injury, sixteen from a fall, the remainder having a variety of mechanisms. 23% of these patients had transient ECG changes. The ImpACT test revealed that 38% of the follow-up patients had persistent symptoms. **Conclusions:** Our results to date suggest that head injury-induced sympathetic nervous system release of catecholamines may be of sufficient significance to induce cardiac abnormalities. Our investigation into the prevalence of cardiac abnormalities as a result of mild to moderate head injury is ongoing, with a focus on exploring correlations between the data from future enrollees and our findings to-date. We continue to enroll patients in this study and predict that we will see more ECG changes as the research progresses.