

Narcotic Requirement Is Not a Predictor of Adult Upper Extremity Compartment Syndrome in the Trauma Patient

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Background/Purpose: The diagnosis of compartment syndrome is often difficult to establish, especially in the non-verbal or obtunded patient. In the pediatric trauma population, increased narcotic requirement has been thought to be a predictor of upper extremity compartment syndrome. We sought to assess the presence of classic physical examination findings, pain medication requirements prior to fasciotomy, and changes in vital signs to determine predictors of compartment syndrome following upper extremity trauma in the adult population. We sought to assess if narcotic requirement is a predictor of adult upper extremity compartment syndrome in the trauma patient and hypothesized that it is not.

Methods: Patients admitted to a Level I trauma center between 2007 and 2012 who were diagnosed with compartment syndrome in the upper extremity and underwent fasciotomy were retrospectively reviewed. A control group of trauma patients matched for age, extremity affected, and mechanism of injury was obtained. Objective data including heart rate, systolic blood pressure (SBP), pain score (based on visual analog scale), narcotic requirement prior to surgery, time from injury to fasciotomy (cases), or open reduction and internal fixation (controls) were obtained from the medical record. In addition, the presence of the "6 Ps" (pain, paresthesia, pallor, paralysis, pulselessness, and poikilothermia) were recorded for cases and controls. Differences in these parameters were compared between the groups.

Results: "Pain with passive stretch" was present in 50% of the cases versus 0% in the controls ($P < 0.05$). A significant difference in the average heart rate was also present between the cases and controls (103 vs 87) ($P < 0.05$). There was no statistically significant difference in the average pain score in the last 4 hours prior to operative intervention or during the entire period prior to surgery in cases versus controls (6.9 vs 8.2 and 7.2 vs 8.3, respectively; $P = 0.281, 0.384$). There was also no significant difference in the percentage of cases who exhibited any one of the "6 Ps" as compared to the controls. The average SBP was not different between cases and controls (140 vs 133, $P = 0.411$). The average narcotic requirement in the cases versus controls overall or in last 4 hours prior to surgery was not significantly different.

Conclusion: Average heart rate and pain with "passive stretch" were significant predictors of compartment syndrome. However, the "6 Ps", SBP, narcotic requirements, and patient-reported pain scores were not. In an adult upper extremity trauma population, the pulse rate may be a useful indicator of developing compartment syndrome and should be closely monitored in the at-risk patient.