

Perioperative Regional Anesthesia Does Not Increase Risk of Missed Acute Compartment Syndrome following Tibia Fractures

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INTRODUCTION: Regional anesthesia improves postoperative pain control and decreases postoperative opioid requirements. It remains controversial to utilize regional anesthesia on patients at high risk for compartment syndrome due to concern that the local anesthetic will mask the cardinal symptom of pain out of proportion, thereby preventing or delaying diagnosis. This study evaluates the incidence of missed compartment syndrome in tibia fractures treated with and without regional anesthesia.

METHODS: This is a retrospective chart review of patients with operative tibia shaft or plateau fractures at a level-one trauma hospital between January 2015 and April 2022 with a minimum of three-month follow up. Patients under 18 at the time of surgery, those with an ipsilateral knee dislocation, known neurologic injury at presentation, or prophylactic fasciotomy following a revascularization procedure were excluded. We defined missed acute compartment syndrome (ACS) as a post-injury motor deficit still present at the 3-month postoperative appointment. For patients that received a peripheral nerve block, we recorded whether a continuous catheter or one-time bolus was performed, and the number of nerves blocked. Incidence rates for ACS were calculated with exact binomial 95% confidence intervals for the entire sample and between subgroups of interest. Morphine milligram equivalents (MME) consumed 24 hours post-surgery, use of nerve block, nerve block timing, and type of block were compared using Mann-Whitney and Kruskal-Wallis non-parametric tests. Statistical significance was defined as $p < 0.05$.

RESULTS: The sample consisted of $n = 791$ patients. The average age was 47.6 years ($SD=17.5$) and 47.6% were women. The incidence of compartment syndrome diagnosed and treated during index hospitalization was 2.15% (17/791, 95%CI: 1.26% - 3.42%). The incidence of missed ACS was 0.9% (7/791, 95%CI: 0.4%, 1.8%). Interestingly, the incidence of missed ACS was lower in patients receiving a nerve block (0.7% [4/610]) compared to those without a nerve block (1.7% [3/176]) Within patients receiving a nerve block, all patients with missed ACS ($n=4$) received a catheter nerve block. Similar missed ACS rates were observed between tibia shaft and plateau fractures. Patients receiving a nerve block had lower MME (median: 49, IQR:15, 85.3) compared to those that did not receive a nerve block (median: 113.5, IQR: 75, 178.3), $p<0.001$).

DISCUSSION AND CONCLUSION:

Regional anesthesia does not increase the rate of missed ACS in patients with operative tibial shaft or plateau injuries but does decrease postoperative opioid requirements. Heightened awareness should be used in patients receiving catheters as this remains a challenging diagnosis.