Does Widespread or Selective Invasive Monitoring Increase the Rate of Fasciotomies for Acute Compartment Syndrome?

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Purpose: Missed acute compartment syndrome (ACS) can lead to devastating sequalae. The gold standard for ACS diagnosis is clinical examination in the alert patient, while invasive monitoring (IM) is utilized widely at some centers and selectively at others. Our center used IM frequently (pre-2010), then selectively (2011-2015), and subsequently discontinued its use (2016-present) and now relies solely on clinical examination and high index of suspicion by fellowship-trained orthopaedic traumatologists (CES). We aim to report the incidence of lower leg fasciotomies for ACS in tibial shaft and plateau fractures during these time periods at our center and explore the incidence of potential missed ACS.

Methods: This is a retrospective review of adult patients with operative tibial shaft (OTA 42A-C), and plateau fractures (OTA 41A-C) at a Level I trauma center from 2001-2020. Those with ACS who underwent fasciotomy were identified. For the past decade with complete electronic medical records available, a random sample of non-ACS patients was selected based on a calculation of the population proportion, using 2% margin of error and a 95% confidence interval (P = 0.05 cut-off). Patients with >3 months of follow-up were included. We identified possible missed ACS as those with abnormal neurovascular examination, sensory changes, chronic pain, claw toes, or late amputation.

Results: Fasciotomy rates decreased from 4.97% (93/1873) in 2001-2010 (widespread IM) down to 2.61% (32/1226) in 2011-2015 (selective IM) and further down to 1.11% (16/1438) in 2016-2020 (CES), P = 0.005. Random samples of 304 patients from 2011-2015 (selective IM), and 285 patients from 2016-2020 (CES) found that 98.4% had a normal neurovascular examination in the selective IM group and 96.8% in the CES group, P = 0.287. There were no differences in sensory changes (1.5% vs 0.4%, P = 0.218) or chronic pain (0.3% vs 0.7%, P = 0.287). No patients had late amputation or claw toes in either group. There was no difference in combined complications between the groups (2.0% vs 2.8%, P = 0.507).

Conclusion: The rate of fasciotomy for ACS in tibial plateau and shaft fractures at our center has decreased over time, coinciding with the diminished use of IM with no apparent increase in missed ACS. Further study is warranted on widespread or selective IM versus CES-only protocols for diagnosis and management of ACS.