

Muscle Pressure Trends in Patients With Extremity Fractures Indicate Compartment Syndrome Risk

Ross Kenneth Leighton, MD, FIOTA; Yasser Bouklouch, PharmD MPH; Justin Matta, Bsc MS; William T Obremskey, MD, MPH, FIOTA; Mitchell Bernstein, MD; Edward J Harvey, MD, FIOTA, FAAOS, FRCSC

Purpose: Acute compartment syndrome (ACS) is a serious condition resulting from increased intracompartmental pressure (ICP) within a closed muscle compartment. There is a lack of understanding of continuous pressure trends despite their being an accepted method for tracking disease. This study examined a prospective cohort of trauma patients with extremity fractures for which ICPs were tracked.

Methods: ICP pressures from 147 trauma patients with extremity fractures were gathered. Statistical and observational analyses were carried out to examine trends in patients with and without resultant ACS.

Results: Patients in whom ACS developed did not always have significantly higher absolute ICPs that exceed the theoretical critical 30 mmHg threshold for fasciotomy. Patients with ACS showed a consistent upward trend over time (average increase of 0.674 mmHg/hour). In contrast, non-ACS patients, even those who exceeded the previous postulated 30 mmHg threshold, exhibited a natural and gradual decline in ICP over time (average decline of 0.285 mmHg/hour) (see figure).

Conclusion: Continuous pressure data enable better clinical decision-making, reducing the risk of both unnecessary and delayed fasciotomies. This study emphasizes the need for integrating continuous pressure monitoring into standard practice to improve the management and outcomes of patients at risk for ACS.

