

## **Comparative Efficacy and Economic Impact of Continuous Compartment Pressure Monitoring in Acute Compartment Syndrome Management**

*Milan K. Sen, MD, FIOTA; Yasser Bouklouch*

**Purpose:** The primary objective of this comprehensive study is to rigorously evaluate the economic and clinical impacts of implementing continuous compartment pressure monitoring (CCPM) in the diagnosis of acute compartment syndrome (ACS), particularly focusing on its application in cases involving tibial fractures. This study aims to provide a detailed comparison between CCPM and conventional diagnostic approaches, highlighting potential improvements in patient outcomes and health-care resource utilization.

**Methods:** Employing a sophisticated decision-tree economic model, this research projects the associated costs and quality-adjusted life years (QALYs) over various time frames, comparing the outcomes of CCPM with traditional, non-continuous monitoring methods. The model specifically targets ACS treatments resulting from tibial shaft and plateau fractures. A thorough analysis of patient records, coupled with a review of relevant clinical guidelines and expert consultations, forms the basis of this model. The study also integrates cost-effectiveness analysis, considering various health system perspectives.

**Results:** The use of CCPM demonstrated a significant reduction in unnecessary fasciotomies, with a reduction rate of 94%. This intervention correlated with an average cost reduction of \$1,541 per patient (\$4,573 over the lifetime of the patient), alongside an enhancement in QALYs, suggestive of improved post-treatment life quality. Over a 60-day time period, the model showed a decrease in length of stay of 2.73 days on average per patient.

Long-term benefits were particularly substantial, suggesting that the upfront investment in CCPM could be offset by the reductions in unnecessary surgical interventions and improved patient outcomes.

**Conclusion:** The adoption of CCPM for the diagnosis of ACS in tibial fractures presents substantial health and economic benefits. Its superior specificity in diagnosis significantly minimizes the rate of unnecessary surgical interventions, leading to cost savings for health-care systems and improved patient care. These findings strongly suggest that CCPM represents a valuable advancement in the field of trauma and orthopaedic surgery, with potential implications for broader health-care policy and practice.