The Diagnostic Accuracy of MEMS-Based Continuous Pressure Monitoring: Results From 2 Prospective Clinical Trials

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Purpose: Acute compartment syndrome (ACS) is a rare but serious condition in which increased pressure within a confined space leads to ischemia and necrosis of tissues. Early diagnosis and management are critical for preventing long-term complications.

Methods: Two prospective clinical studies were conducted with 150 patients across 9 sites in Canada. The studies aimed to evaluate the management of ACS using a combination of clinical signs and MEMS-based continuous pressure monitoring (using a Health Canada licensed device). Patients with suspected ACS were included in the study, and their clinical and demographic data were collected. Continuous pressure monitoring was performed, and the results were compared with the clinical signs of ACS.

Results: The results of the study showed that the combination of clinical signs and continuous pressure monitoring with the continuous intracompartmental pressure monitoring device improved the accuracy of diagnosis and management of ACS. The results showed that the use of continuous pressure monitoring reduced the time to diagnosis by 5 hours and intervention and improved the outcomes of the patients. The sensitivity and specificity of the test were both >99% with no missed cases of ACS or false positives. Results indicate that pressure trends predated the onset of clinical signs and could serve as an earlier predictor.

Conclusion: The study concluded that the combination of clinical signs and continuous pressure monitoring is a valuable tool for the management of ACS. The results showed that the use of continuous pressure monitoring improved the accuracy of diagnosis, reduced the time to intervention, and improved the outcomes of the patients. This study provides evidence for the clinical utility of continuous pressure monitoring in the management of ACS and highlights the importance of early detection and prompt intervention in the management of this condition. The study also showed the utility of the device in determining the possibility of ACS in neurologically impaired or moribund patients. The study highlights the need for further research to evaluate the long-term outcomes and the cost-effectiveness of continuous pressure monitoring in the management of ACS.