Infrared Imaging of Trauma Patients for Detection of Acute Compartment Syndrome of the Leg

Reference:

Podiatric Relevance:
This study evaluates the use of infrared imaging as a quick and non-invasive method to determine the presence of acute compartment syndrome in the lower extremity following trauma.

Methods:
In this observational study, 164 trauma patients presenting to the emergency department for resuscitation were screened by an infrared camera to determine anterior thigh and foot temperatures. Temperature analysis was performed by assistants who were blinded to the patients’ clinical presentation, injuries and condition. Absolute thigh and foot temperatures, as well as the difference between them (thigh - foot index, TFI), were recorded. Patients who then went on to develop compartment syndrome were diagnosed intraoperatively and identified via chart review.

Results:
153 patients during the study period did not develop compartment syndrome and comprised the control group. 15 lower extremities in 11 patients during the study period were diagnosed with compartment syndrome and comprised the study group. Physiologic variables, such as the mean arterial pressure and body temperature, did not confound the leg temperature readings between the control and compartment syndrome groups. The average anterior surface temperature of legs without compartment syndrome was 31.86 ± 1.99°C, while an average of 28.70 ± 2.03°C was measured in legs with compartment syndrome. The average TFI measured was greater in legs in which compartment syndrome developed, 8.80 ± 2.05°C, than in the control group, 1.22 ± .88°C. Additionally, in patients with unilateral compartment syndrome, the affected leg measured a TFI of 8.57 ± 2.37°C, while the contralateral leg measured 1.80 ± 1.60°C. The TFI of bilateral compartment syndrome legs averaged 9.01 ± 1.52°C.

Conclusions:
Infrared imaging provided a fast and non-invasive method to identify lower extremities with acute compartment syndrome. Additional research and evaluation is required in a prospective study to further evaluate the use of infrared imaging on compartment syndrome diagnosis.