# Continuous Monitoring of Ischemic Biomarkers Augments Diagnosis of Peripheral Compartment Syndrome in a Porcine Model

- **Current guidelines for the diagnosis of peripheral compartment syndrome (PCS) are lacking in timely and accurate diagnosis and intervention**
- **Utilizing multiple biomarkers can improve accuracy in detecting PCS thus preventing limb morbidities and unnecessary fasciotomies**

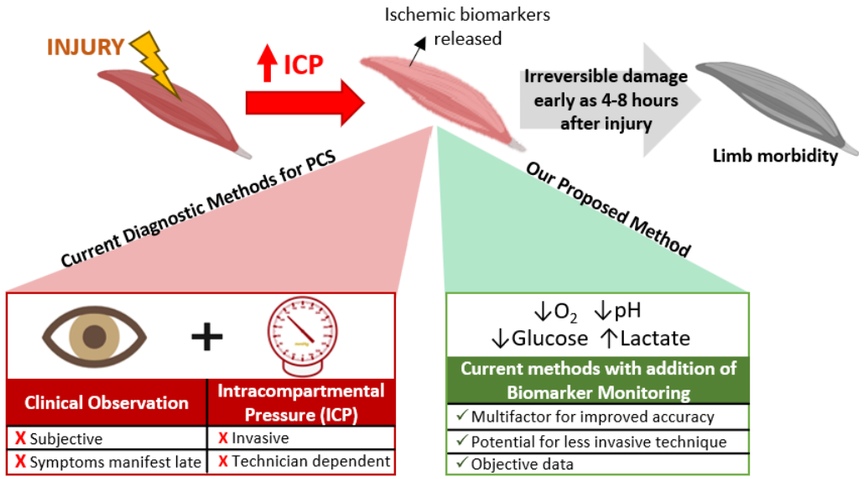


**Figure 1**: Acute ischemia secondary to PCS causes derangement of certain biomarkers which can be measured to improve diagnostic accuracy

## Inducing PCS in the porcine hindlimb via inflatable tourniquet to collect biomarkers

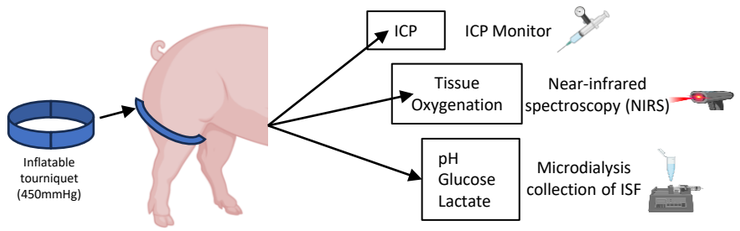


**Figure 2**: Application of an automatic inflatable tourniquet to induce PCS in a porcine hindlimb from which ISF biomarkers are directly measured.

## PCS is induced and biomarkers are collected at intervals over 6 hours

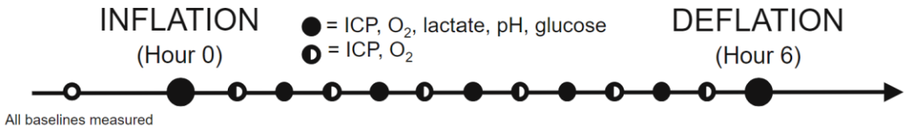


**Figure 3**: Time course of study. Baseline measurements of all 5 biomarkers taken pre-inflation, and at designated intervals during 6-hour experiment.

## Observed trends in biomarkers are consistent with PCS-associated ischemia

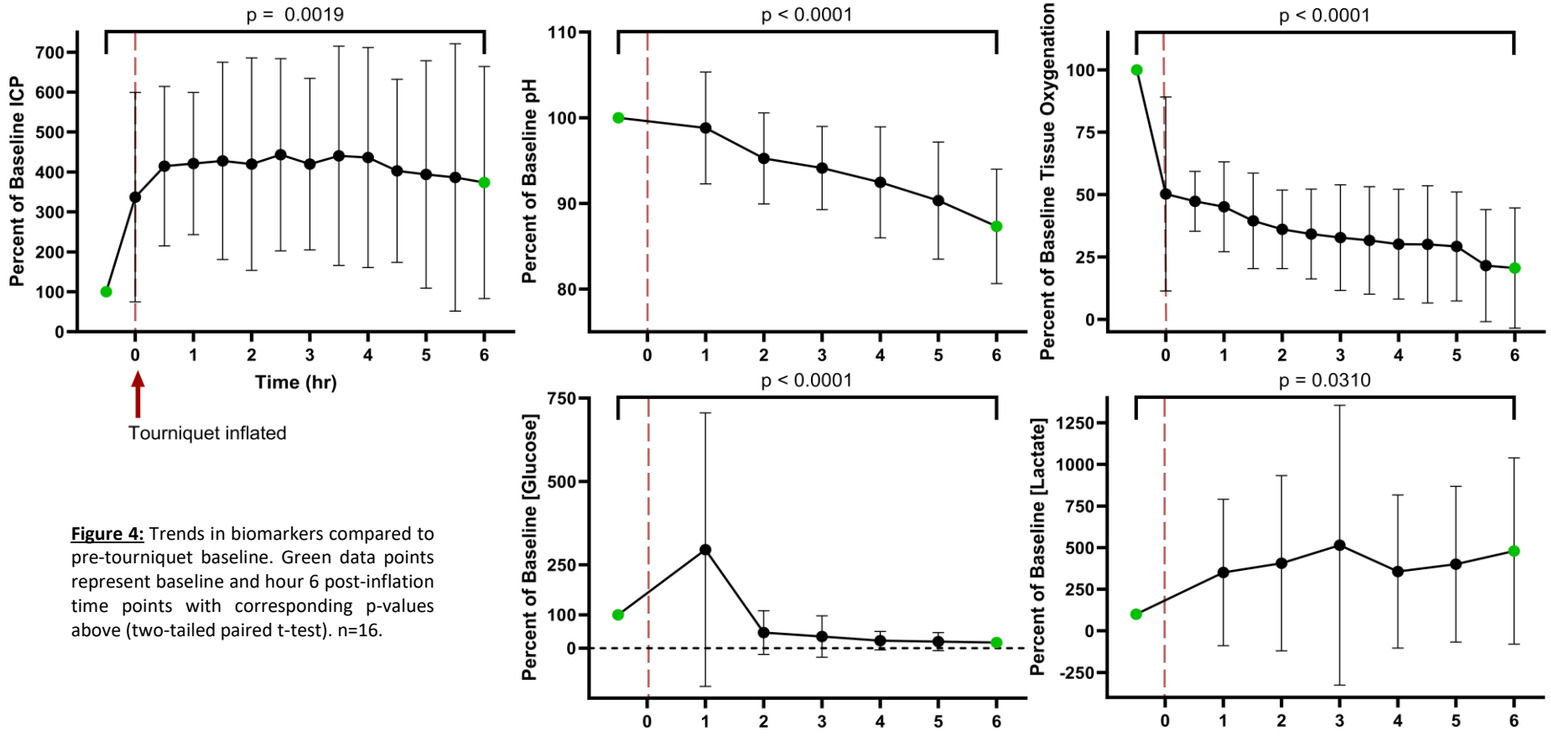


**Figure 4:** Trends in biomarkers compared to pre-tourniquet baseline. Green data points represent baseline and hour 6 post-inflation time points with corresponding p-values above (two-tailed paired t-test). n=16.

## Biomarkers could be used in adjunction to ICP for improved diagnostic certainty

✓ ↑ ICP leads to expected ischemic trends
- ↓ $O_2$
- ↓ pH
- ↓Glucose
- ↑Lactate

✓ Wide variability in normalized data due to fluctuations in ICP within each 6-hour experiment

## Study limitation provides opportunity for future studies to assess timing of biomarker trends

❑ Timing between ↑ICP and the other measured ischemic biomarkers could not be determined as model causes immediate ↑ICP above diagnostic threshold.

✓ **The use of additional diagnostic markers for detection of PCS in an animal model is viable and warrants further exploration into its potential for future clinical practice.**

*Division of Plastic Surgery, Department of Surgery at the University of Massachusetts Chan Medical School)*

*Funding through DoD -CDMRP Orthopaedic Research Program Applied Research Award*

Jenna R Lambert B.S.; Jaeyoung Lee B.S.; Katharine P Playter B.S.; Aviv Liani B.S.; Daniah ALNafisee, MD, B.S.; Hiroshi Fujimaki, MD, Ph.D.; Giorgio Giatsidis, MD, Ph.D
**Contacts:** Jenna.Lambert@umassmed.edu; Jaeyoung.Lee18@umassmed.edu