Post-traumatic swelling characterization to reduce uncertainty in ACS risk stratification and surgical decision-making

Preliminary data – shared prior to publication with allowance by Prof. Dr. med. R. Sellei, Germany

INTRODUCTION

A 28-year-old male patient presented with lower-leg swelling and hematoma after a direct impact during a soccer game. These findings raised concern for evolving Acute Compartment Syndrome (ACS), prompting urgent clarification of whether the swelling reflected critical compartment pressure requiring imminent intervention or if the swelling could be managed conservatively. To support decision-making, non-invasive soft-tissue assessment was performed using Compremium Quantis ST on the injured and healthy leg.

COMPRESSIBILITY MEASUREMENTS

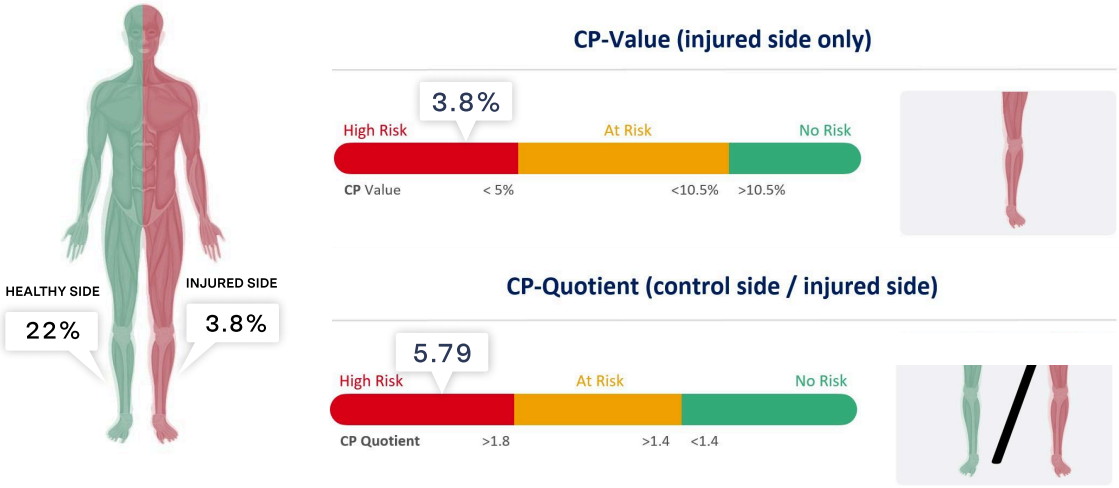

Figure 1. CP-Value & CP-Quotient as Quantitative Indicators of Soft Tissue Compressibility and Risk Stratification.

CP-Value provides a real-time measurement of tissue compressibility, while CP-Quotient compares readings from the injured and uninjured limbs to establish a personalized baseline. These measurements can be tracked over time to support more informed clinical decisions. The above illustration is for information purposes only.

A CP-Value of 3.8% on the injured side indicated critically reduced muscle compressibility, suggesting that the patient is in the high-risk zone for ACS. The calculated CP-Quotient of 5.79 confirmed the elevated risk.

OUTCOME & CONCLUSION

The medical team used Compremium Quantis ST to visualize and target the affected tissue within the compartment at risk, confirming that the elevated pressure originated from soft-tissue compromise rather than adjacent hematoma.

The CP-Value on the injured side (3.8%) and CP-Quotient (5.79) correlated with the clinical findings.

The integration of imaging and quantitative assessment supported the classification of the patient as high risk of ACS and informed the decision to perform immediate fasciotomy.

Compremium Quantis ST provided objective evidence to support ACS risk stratification and timely surgical decompression definitive fixation.

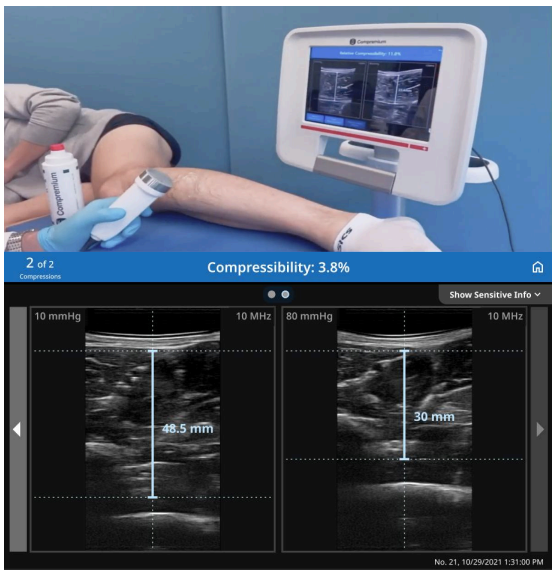

Figure 2. Muscle compressibility measurements performed with the Compremium Quantis ST device.

Figure 3. Lower leg fasciotomy after decompression and fixation.

REFERENCES

1. Sellei RM, Wollnitz J, Reinhardt N, de la Fuente M, Radermacher K, Weber C, Kobbe P, Hildebrand F. Non-invasive measurement of muscle compartment elasticity in lower limbs to determine acute compartment syndrome: Clinical results with pressure related ultrasound. Injury. 2020 Feb;51(2):301-306. doi: 10.1016/j.injury.2019.11.027. Epub 2019 Nov 21. PMID: 31784057.
2. Marmor M, Charlu J, Knox R, Curtis W, Hoogervorst P, Herfat S. Use of standard musculoskeletal ultrasound to determine the need for fasciotomy in an elevated muscle compartment pressure cadaver leg model. Injury. 2019 Mar;50(3):627-632. doi: 10.1016/j.injury.2019.01.015. Epub 2019 Jan 14. PMID: 30745127.

CE-approved intended use

The CPMX1 Software is intended for real-time and intermittent measurement and monitoring of relative compartment compressibility.

FDA-cleared intended use

The Compartmental Compressibility Monitoring System (CPM#1) is intended for real-time and intermittent monitoring of relative compartment compressibility. The relative compartment compressibility (CP Value) is not meant for trend analysis.
510(k) Number: K223509.