MRI Evaluation of Changes in Deep Tissue Thickness for a Novel Alternating Pressure Overlay (APO)

Presented at Fall SAWC, Las Vegas, NV, October 16-18, 2014. Poster Number: IR-024

BACKGROUND:
Moderate to long duration (3 hours and longer) surgeries significantly increase the risk for developing Pressure Ulcers post-surgery. Commonly used PU prevention strategies, such as repositioning patients and use of active support surfaces cannot be employed during most surgical procedures. Active surfaces such as alternating pressure (AP) mattresses are typically not used for pressure relief in operating rooms (ORs) as they may cause body movements during surgery. Understanding the interaction between the various types of support surfaces and the physiological changes taking place in the deep tissues is important to effectively evaluate support surfaces.

OBJECTIVE:
To evaluate the effects of covered foam OR Pad and a novel alternating pressure (AP) overlay on deep tissue structure using magnetic resonance imaging (MRI).
METHODS:

One healthy male and one female participated in this pilot study. A two-inch thick OR pad with highly resilient foam was used. Magnetic resonance imaging (MRI) was performed to quantify anatomical changes taking place in the deep tissues. Subjects were asked to lie supine over OR pad alone and with the AP overlay placed on top of the OR pad. Changes in thickness of deep tissues under bony prominences due to compression and deformation were analyzed.

RESULTS:

The AP overlay provided adequate decompression of the tissues during the deflation phase despite the low profile design. The average tissue thickness between the ischial tuberosities (IT) and the skin-support surface interface for the male subject (BMI of 25.1) was 5cm and 4.8cm (female subject: BMI of 18.9, 4.65 cm and 4.4 cm) at time 0 minutes and 60 minutes respectively for the OR Pad. The tissue thickness under the ITs during the inflation and deflation cycles of the AP overlay at time 0 minutes was 5.1cms and 5.9cms (female: 4.25 cm and 4.8 cm) respectively and at time 60 minutes 4.95cms and 5.8cms (female: 4.2 cm and 4.8 cm) respectively.

CONCLUSION:

The tissue decompression observed during the deflation cycles may allow enhanced perfusion thus limiting risk for developing PUs.

REFERENCES: