A Novel Alternating Pressure Overlay (APO) for Preventing Pressure Ulcers during Surgeries.

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BACKGROUND:

Pressure ulcers (PUs) are localized skin or underlying tissue injury resulting from pressure or from pressure combined with shear or friction. Almost 23% of hospital acquired pressure ulcers (HAPUs) are acquired intra-operatively during surgeries that last more than three hours, and the average estimated cost of treatment is $750 million ~ $1.5 billion per year. Many strategies, such as repositioning patients and use of various specialized support surfaces to effectively redistribute pressure are employed to prevent and treat HAPUs. However, these strategies cannot be used during most surgical procedures. A novel overlay has been developed to provide periodic pressure relief during surgeries for PU prevention.

OBJECTIVE:

To evaluate the effectiveness of an alternating pressure (AP) overlay in off-loading body areas at high risk for pressure ulcer during surgeries using interface pressure (IP) mapping.

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METHODS:

One healthy male and one female participated in this pilot study. A two-inch thick OR pad with highly resilient foam was used. Subjects lay supine on the AP overlay (placed on top of OR pad) and IP data was collected every 5 minutes (for each inflation cycle of zones 1 and 2). Subjects were asked to lay with minimal body movements during the one-hour data collection period. The interface pressures (IP) were measured with and without the AP overlay. The peak and average IP under the Ischial Tuberosities (ITs) and entire pelvis was measured.

RESULTS:

The AP overlay had higher peak pressures for inflated zones compared to the OR Pad. However, the deflated zones in the overlay had significantly lower pressures (20-30 mm Hg) than the OR Pad. For the OR pad, the high pressures experienced under the bony prominences was constant, increased over the 60-minute period and pressure relief was not provided.

Periodic offloading allows tissues to reperfuse and reduces risk for development of pressure injuries.

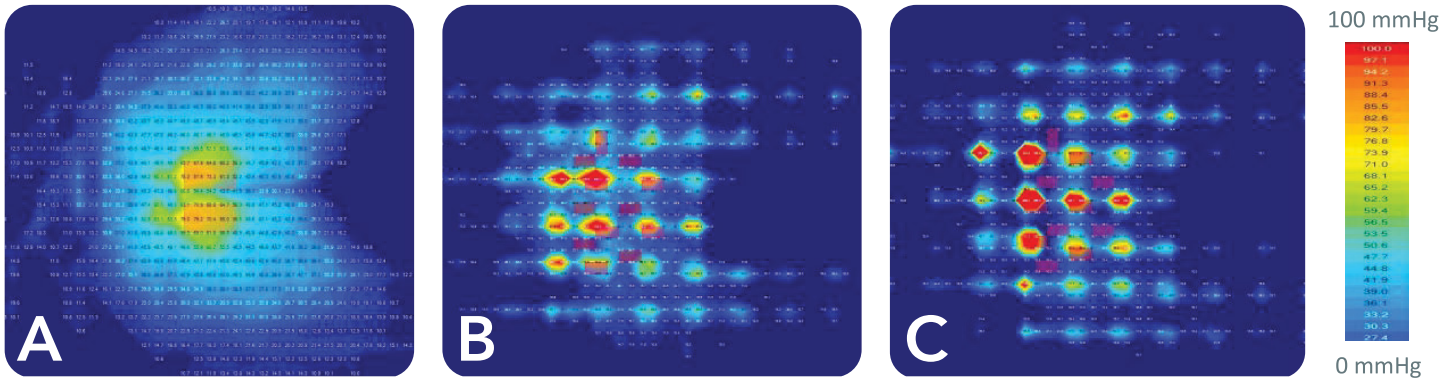
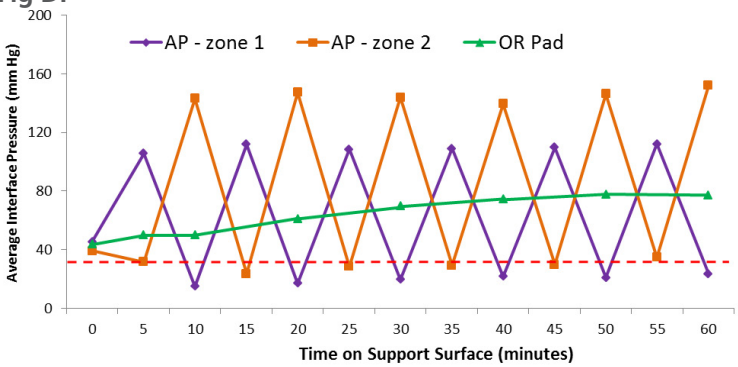


Fig A: Interface pressure (IP) map of male subject's pelvic area, lying on OR pad alone. **Fig B and C** are IP maps of pelvic area with subject lying on the overlay placed on top of the OR pad while Zone 1 **(Fig B)** and Zone 2 **(Fig C)** are inflated. Red colors indicate IP of 100 mm Hg or higher.

Fig D:



CONCLUSION:

The peak and average interface pressures observed during the deflation cycles of the AP overlay were significantly below the constant interface pressure experienced over the OR pad alone. **The periodic offloading allows tissues to reperfuse and reduces risk for development of pressure ulcers.**

Fig D: Average IP under the sacrum over a one-hour period. Note that the IP for the OR pad increases from 40 mmHg at 0 minutes to almost 80mmHg at the end of 60 minutes (green line). The IP of the AP overlay for Zones 1 and 2 was below 32 mmHg during the deflation cycles, thus providing periodic pressure relief.

REFERENCES:
1. Reddy M, Gill SS, Rochon PA: Preventing pressure ulcers: A systematic review. JAMA 2006; 296:974–984
2. Beckrich K, Aronovitch SA: Hospital-acquired pressure ulcers: A comparison of costs in medical vs. surgical patients. Nurs Econ 1999; 17:263–271.

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