Turning Down the Heat: Active Electrode Monitoring and the Fight Against Stray Energy Injury

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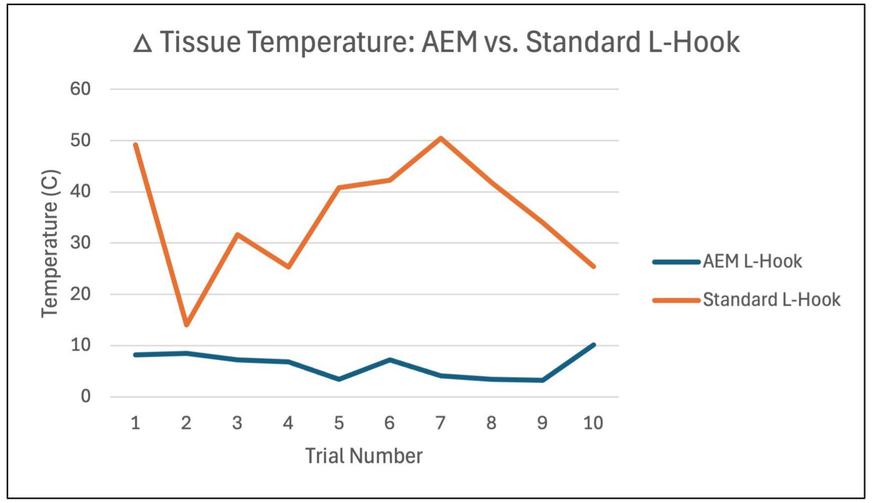
Background

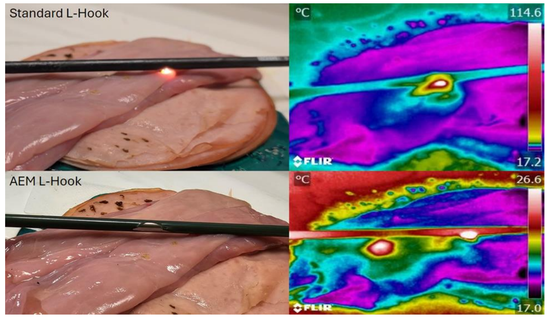
- Stray energy transfer from electrosurgical instruments during laparoscopic surgery can cause unintended thermal injury to tissue
- Active electrode monitoring (AEM) incorporates a conductive shield and real-time monitoring to minimize unintended energy transfer
- Previous studies have shown a reduction in unintended energy transfer, but few have assessed the risk of thermal injury to tissue

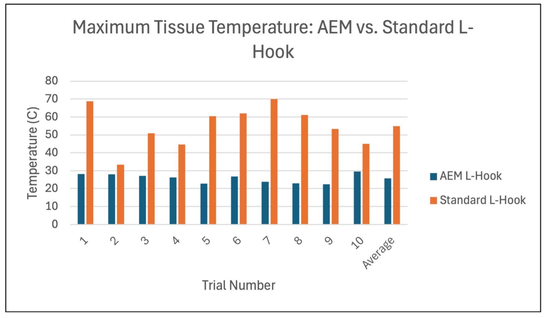
Methods

- A benchtop model was constructed using porcine intestine, a Maryland Grasper, an electrosurgical generator and either a standard L-hook or an AEM shielded L-Hook
- A single surgeon positioned the grasper in direct contact with tissue and the variable instrument 4cm away without contact
- Instrument was activated in open-air at 30W (coagulation) for 4 seconds
- Thermal camera measured the change in tissue temperature from baseline ($°C$)

Results







Conclusions

- AEM technology significantly reduced both maximum tissue temperature and overall temperature increase compared to the standard L-Hook
- Tissue temperature increased nearly six times less with AEM technology, demonstrating improved mitigation of unintended energy transfer
- The maximum tissue temperature was more than twice as high with the standard L-hook, indicating a greater potential for thermal tissue injury
- Surgeons should consider AEM instruments to reduce the risk of stray energy burns to patients during minimally invasive surgery

Implications

- Integrating AEM technology into laparoscopic surgery may reduce the risk of stray energy burns and improve patient safety
- Decreased rates of thermal injury may lower postoperative complications and lead to improved surgical outcomes

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