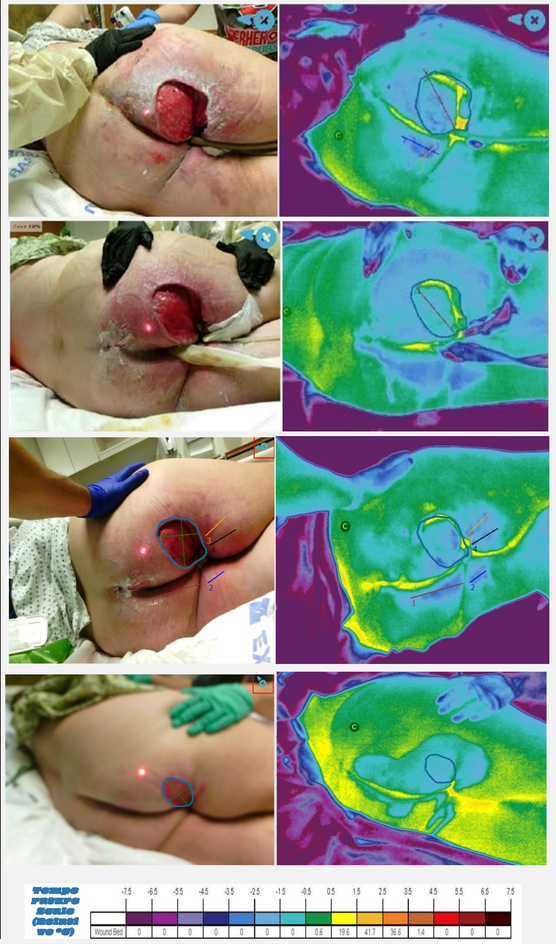
Time Doesn't Heal All Wounds, Quality Patient Care Does: Driving Treatment Measures and Tracking Progression with Long Wave Infrared Thermography

ContinueCARE Hospital at Hendrick Medical Center

Mindy M. Holster, AAS, RCP, RRT

Director of Quality Management

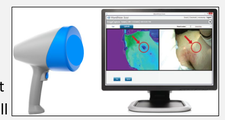
BACKGROUND: As a long-term acute care hospital (LTACH) serving more than a 100-mile radius, complex wounds and pressure injuries (PI) on admission are prevalent. Unfortunately, whether the wound or PI develops in the hospital or community, the outcome for the patient is the same. For stage 3, stage 4, and/or unstageable PIs this often includes extensive wound care/treatment, long-term antibiotics, and a lengthy and costly hospital stay. Over the past 12 months ContinueCARE Hospital (CCH), a 223-bed LTACH, implemented the use of long wave infrared thermography (LWIT) into their PI/Wound treatment and prevention program. Data collected over 12 months showed that stage 3 and 4 PIs and complex wounds accounted for more than 30% of those present on admission. By implementing this new technology CCH was able to guide treatment measures and follow the progression of healing, resulting in superior patient outcomes.



MATERIALS:

Hand-held, photographic and LWIT device and software solution:

- Non-radiating, non-invasive, and non-contact
- Provides photographic documentation as well as accurate and repeatable wound size measurements
- LWIT reveals pathophysiologic markers invisible to the naked eye and objectively visualizes and quantitatively measures relative temperature change associated with physiologic activity.



PURPOSE:

Initially to help reduce hospital acquired pressure injury (HAPI) rates, CCH implemented the use of long wave infrared thermography (LWIT) into the existing HAPI prevention protocol. The team saw additional benefits of LWIT for patients with extensive open wounds including stages 3, 4, and unstageable. LWIT quickly became the standard of care for all patients with wounds/pressure injuries.

METHODS:

As part of the admission skin assessment, LWIT images were captured of open wounds to provide photographic and thermographic images of the wound bed and surrounding tissue. Upon reviewing images, the wound care team obtained wound measurements and evaluated thermographic findings, which assisted with treatment validation. Treatment included a pressure redistribution surface in combination with cleansing and advanced wound care.

DISCUSSION:

- 59-year-old female was admitted from short-term acute care (STAC). Diagnoses: Sepsis, necrotizing fasciitis, respiratory failure, renal failure. Advanced wound care required for large groin abscess which progressed into a full-thickness wound that tracked to the right gluteal region. Prior to admission, patient had multiple surgical debridements, however, the patient's respiratory status declined, and was no longer a surgical candidate. This patient was also not a candidate for hyperbaric oxygen treatment (HBOT) due to morbid obesity. The patient was on multiple vasopressors and high ventilator settings upon admission. She decompensated when turned and assessments needed to be quick and efficient. Images were captured with LWIT device during routine patient care such as turning, bathing, and wound care to ensure efficient workflow.
- Upon admission assessment thermographic images showed diffuse decreased temperatures on the right gluteal region/ischium and elevated temperatures extending beyond right groin wound, which were not consistent with the visual presentation. These significant findings prompted further diagnostic testing. Wound cultures revealed Enterococcus faecalis sensitive to Vancomycin. The patient continued the Vancomycin, was placed on a pressure redistributing specialty bed and wound care was consulted. Patient was not a candidate for negative pressure wound therapy (NPWT). Treatment modalities included cleansing wound and periwound with hypochlorous acid and normal saline, 0.125% sodium hypochlorite washouts/moistened dressings, application of hydrophilic paste for autolytic debridement, and reassessment based on clinical and thermographic findings. Thermal advocacy for this critically ill patient with a poor prognosis progressed to wound healing and overall an improvement in quality of life for the patient.

Results:

During the patient's 37 day stay at ContinueCARE Hospital, by using LWIT to help drive and validate treatment measures, the following outcomes were achieved:

Full Thickness Gluteal Wound:

Wound size:
Admission: 136 sq cm
Discharge (37 days later): 49.5 sq cm
63.6% reduction in wound size

Thermography:
Admission minimum temperature: -3.8°C
Discharge (day 37) minimum temperature: -1.9°C
50% increase in temperature to normal range (+1.1 C to -1.1 C)

Full Thickness Groin Surgical Wound:

On admission wound bed with 25% slough with exposed necrosed muscle and adipose tissue. On discharge, wound was >75% granulation tissue, spongy and bright red

Wound size:
Admission: 64.5 sq cm; 9 cm depth
Discharge (Day 37): 41.9 sq cm; 5 cm depth
35.1% reduction in size and 44.4% reduction in depth

Thermography:
Admission max temperature: 4.1°C
Discharge (day 37) max temperature: 2.3°C
43.9% decrease in temperature to normal range (+1.1 C to -1.1 C)

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ACKNOWLEDGEMENT

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