CASE STUDY

Snapshot NIR

The Use of SnapshotNIR to Document the Effectiveness of HBOT on an Atypical Scalp Wound

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PATIENT HISTORY:
83-year-old white male diagnosed with squamous cell carcinoma of the scalp requiring Mohs surgery and grafting.

CASE DETAILS:
The patient initially presented to the dermatology clinic for evaluation of a scalp lesion. A biopsy confirmed the presence of squamous cell carcinoma. Options for management were discussed with the patient and he elected to undergo Mohs surgery for the removal of cancer. Following the procedure, the patient was left with a 6cm x 6cm full-thickness dermal insult, and the decision was made for full-thickness skin grafting to cover the defect. On postoperative day 5 (POD#5), early ischemic changes were identified which involved the entire graft. A week later the graft was essentially necrotic. The patient was diagnosed with graft failure and hyperbaric oxygen therapy (HBOT) was offered.

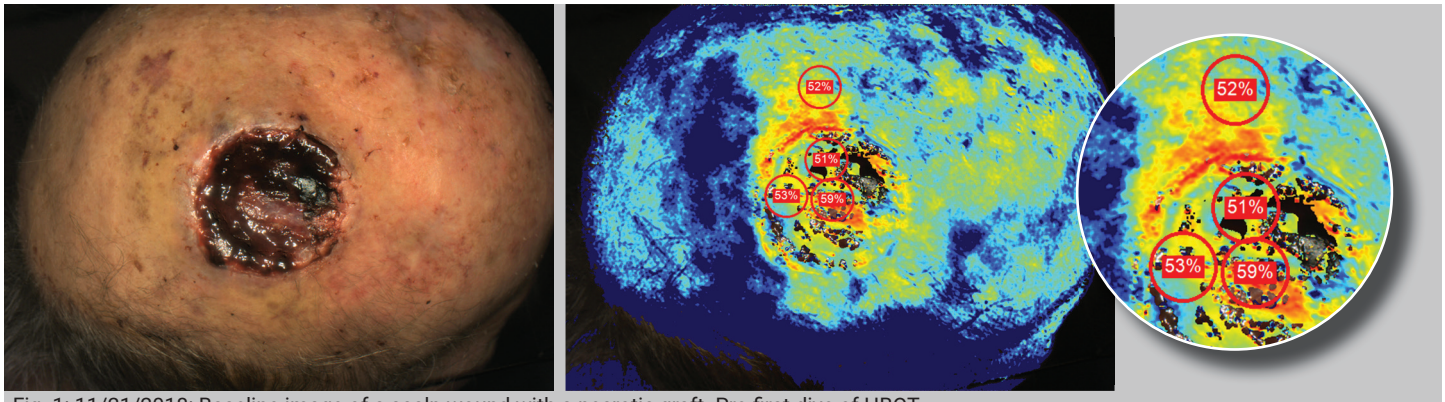

Fig. 1: 11/21/2018: Baseline image of a scalp wound with a necrotic graft. Pre-first dive of HBOT.

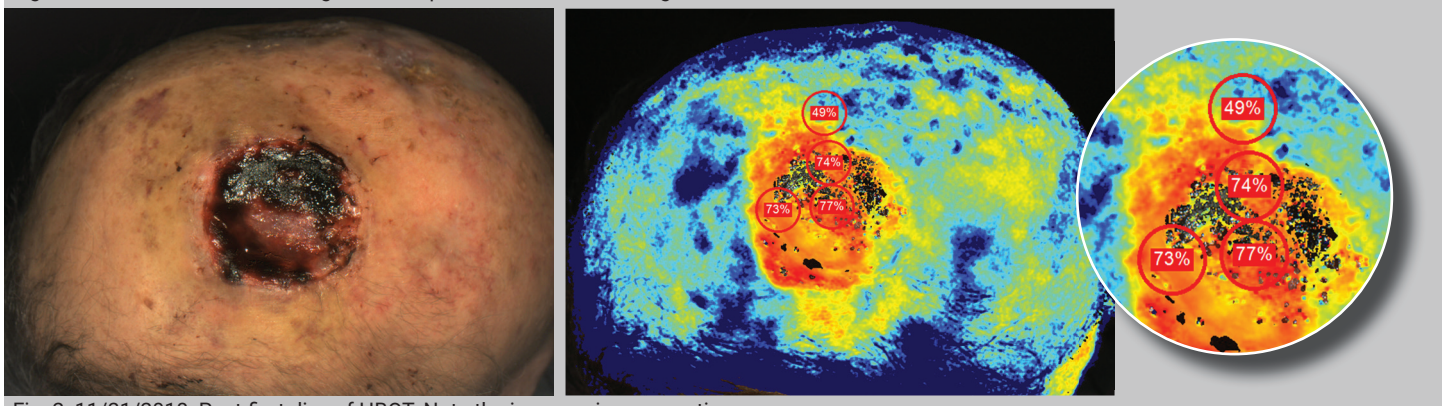

Fig. 2: 11/21/2018: Post-first dive of HBOT. Note the increase in oxygenation.

"Significant improvement in tissue oxygenation based on near-infrared spectroscopy imaging pre-and post-hyperbaric treatment session #1 appears to identify patients that will have a beneficial response and may predict positive outcomes with HBOT. This predictability of SnapshotNIR in the management of patients receiving hyperbaric oxygen therapy may be revolutionary."

- Jeffrey Niezgoda, MD

OBSERVATIONS:
Near-infrared spectroscopy imaging using SnapshotNIR was performed pre-and immediately post- the first hyperbaric treatment. The patient was able to see a significant and impressive improvement in tissue oxygenation from Snapshot's S_tO_2 values. Serial Snapshot images were utilized to track the progress of tissue response to the daily HBOT dives.

Continued improvements in tissue oxygenation were noted over time which correlated to the positive clinical findings of wound granulation from the epithelialization. It was observed that the intense hyperperfusion initially noted at the site normalized over time by comparing the wound's S_tO_2 values to those of the peri-wound area. This finding correlated with an excellent wound appearance and the decision was made to suspend hyperbaric oxygen. The patient required a total of 18 hyperbaric sessions. Two months following the suspension of hyperbaric oxygen, the wound was completely epithelialized.

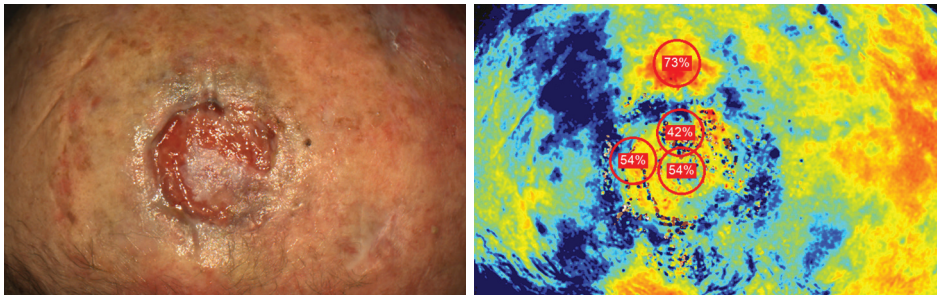

Fig. 3: 12/18/2018: Pre-HBOT image of the healing scalp wound after twenty-seven (27) days of continuous HBOT dives.

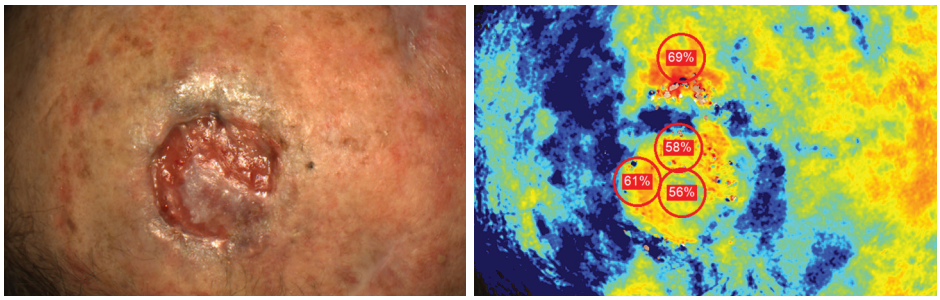

Fig. 4: 12/18/2018: Post-HBOT image of the healing scalp wound after twenty-seven (27) days of continuous HBOT dives.

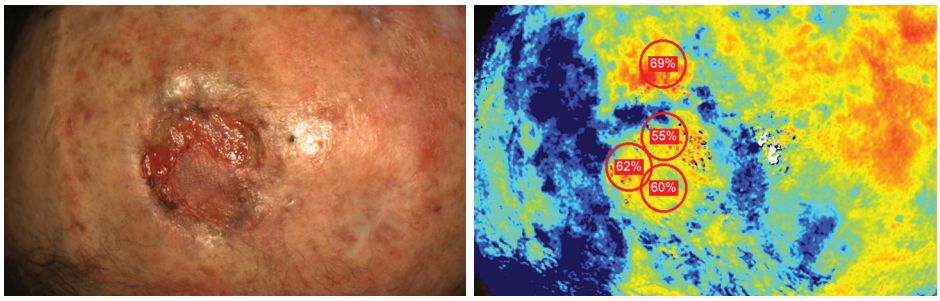

Fig. 5: 12/19/2018: Post-HBOT image of the healing scalp wound after twenty-eight (28) days of continuous HBOT dives.

DR. JEFFREY NIEZGODA

Dr. Jeffrey Niezgoda has dedicated his professional life to optimizing outcomes and promoting excellence in the care of patients with compromised wound healing. He is the President of the American Professional Wound Care Association and former President of the American College of Hyperbaric Medicine.

IMPACT:
The significant improvement in tissue oxygen saturation (S_tO_2) pre-and post-hyperbaric treatment of session one suggested that the patient would have an excellent response to hyperbaric oxygen treatment. Continued improvement over time in tissue oxygenation also correlated well with the clinical findings of excellent wound healing. The intense early tissue oxygen signal correlating with significant tissue inflammation and perfusion eventually normalized to those of the surrounding tissue. This observation noted on the NIRS imaging matched with the timing of the clinical decision to suspend hyperbaric treatment. The significant Delta noted on dive one correlated with the positive outcome. The serial images allowed the clinician to demonstrate to the patient and his family the positive response and forward progress achieved with hyperbaric oxygen therapy.

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