The initial learning curve of Near Infrared Spectroscopy for the evaluation of periwound perfusion after revascularization

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BACKGROUND

In limb salvage operations, the assessment of adequate reperfusion is a key ingredient. This reperfusion assessment usually occurs in an outpatient setting several days after the procedure. Development of an assessment tool that could be used more immediately and without requiring a vascular lab study could be valuable to the proceduralist and the wound care specialist. Near infrared spectroscopy (NIRS) offers the ability to assess the oxygen delivery to the tissue by imaging various components of the patient's hemoglobin.

METHODS

An IRB protocol was developed including patients undergoing endovascular and open revascularization procedures for limb salvage. Imaging of four views of the patient's feet with a NIRS camera is performed preoperatively, immediately post-procedure, then at 1 week and 1 month post-procedure to evaluate the changes in oxygenated hemoglobin delivery and oxygen take up in the surrounding tissue and wounds.

RESULTS

So far, all patients had significant improvement in oxygen delivery by 1 week, however, most did not have immediate improvement seen with NIRS camera. Post-procedural evaluation is becoming better, but is not immediate.

SpO2	Pre-op	Post-op	1 week	1 month
Mean ± SD	65.8% ± 14	65.6% ± 14.1	72.2% ± 11.6	74.0% ± 11.4
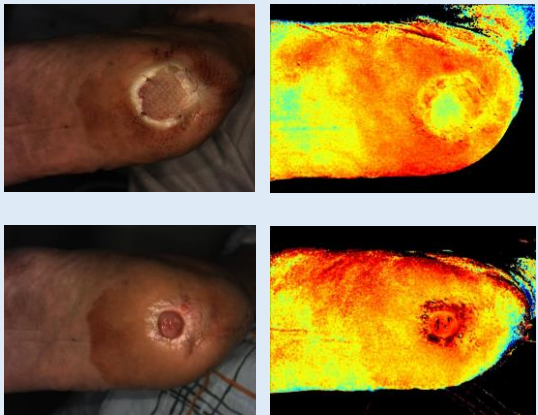
Wounds that were immediately debrided appeared to have a different reperfusion pattern than those that were not. Additionally, melanin continues to be a challenge in patients with pigmented skin, and thus NIRS is best utilized from a plantar position for those patients, which is not always where wounds present.

INTERFACE

CONCLUSIONS

This interesting technology continues to improve and in the long run will most likely be a good adjunct to assess adequacy of revascularization status post procedures. At the moment the amount of data that is available from the images is significant and could make it easier for practitioners to assess the periwound perfusion. We intend to follow the 30 patients that will be in this a cohort eventually, and follow their long-term wound closure to get better data in regards to the correlation between the near infrared spectroscopy findings and the actual clinical outcome of the wounds.