

SnapshotNIR Monitors a Complete Healing of a Lower Leg Ulceration to Avoid Lower Limb Amputation

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PATIENT DETAILS:

An 86-year-old male patient was admitted to Mercy South Wound and Hyperbaric Center on December 28, 2022, with an anterior lower leg ulceration.

He has a history of coronary bypass grafting, an aortic valve replacement, a percutaneous transluminal coronary angioplasty, and a hernia repair. His comorbidities include coronary arterial disease, congestive heart failure, peripheral arterial disease, hyperlipidemia, hypertension, neuropathy, and stage 3 chronic kidney disease. He had no history of smoking and consumed alcohol 5-7 times a week.



Fig 1. July 5, 2022, baseline image of right anterior lower leg ulceration.



Fig 2. December 28, 2022, image of right anterior lower leg ulceration.

CASE DETAILS:

During the patient's visit in December 2022, a full chart review was completed, and his treatment history was as follows:

- April 2022 - the patient was evaluated by an OSH vascular group and diagnosed with acute chronic limb-threatening ischemia (CLTI), there were no plans for an intervention at this time.
- July 2022 - the patient presented to Mercy Wound Center for an ulceration of the lower limb, at this time the wound was suspected to be venous in nature.
- October 2022 - confirmation of the diagnosis of severe bilateral stenosis and a lower limb ulceration.
- November 2022 - the patient was evaluated by an interventional cardiology specialist, and it was noted that the wounds were improving, with a similar suspicion that the wound was related to venous insufficiency rather than peripheral arterial disease.

He presented to the Mercy Wound Center on December 28, 2022, wheelchair bound, with the right anterior lower leg ulceration significantly deteriorated. He was able to complete stand-and-pivot transfers at the clinic but reported numerous falls when attempting this transfer previously. He expressed that he was experiencing progressive weakness, significant pain at rest, claudication pain and limited mobility.

The patient was immediately sent from the wound clinic to the emergency department for CLTI. On assessment, there was suspicion of an anterior tibial artery occlusion, with complete necrosis of the tibialis anterior tendon, extending almost to the anterior ankle, with a small portion exposed distally.

On January 3, 2023, the patient underwent an endovascular revascularization as he was not a suitable candidate for surgery, and a femoral-to-mid dorsalis pedis bypass was not going to be effective for his case. The vascular surgeon recommended an amputation, which appeared to be the only viable option, however, the patient was reluctant to undergo this procedure.



Fig 3. January 2, 2023, image of lower leg ulceration in the emergency department.



Fig 4. March 27, 2023, 89 days post-endovascular interventions.

"SnapshotNIR has been able to show us throughout the healing process that our thinking was correct regarding the intervention of posterior flow being ample enough to promote anterior tissue healing with adequate collateral and retrograde flow."

Anish Thomas, MD
Interventionalist at Mercy South Heart & Vascular

The patient's endovascular revascularization assessment and intervention was completed, including:

- In-patient AIF revealed a subtotal occlusion of the right popliteal artery. This was treated with drug-coated balloon (DCB) angioplasty.
- Further assessment revealed the entire anterior tibial artery was occluded. This was treated by a crossed retrograde and PELA/PTA (peripheral excimer laser angioplasty/percutaneous transluminal angioplasty).
- A 3x 48mm Synergy DES was stented to establish flow down the popliteal, posterior tibial, and into the foot. The peroneal artery was filled with collaterals.

After the endovascular interventions, the patient completed his wound care at Mercy South Wound and Hyperbaric Center. At the clinic, he was continually monitored using SnapshotNIR to assess the S_iO_2 of the superficial tissues to ensure the posterior flow into the lower leg was adequate to promote healing of the anterior ulceration. His progress was monitored with Ankle-Brachial Index measures (ABIs) which improved from 0.57 to 1.10, and SnapshotNIR microcirculation measures of tissue oxygen saturation, which continued to improve during the interventions. He was imaged using SnapshotNIR on each follow-up appointment. The increasing S_iO_2 values over time indicated that there was enough collateral and retrograde flow to promote healing to the anterior leg.



Fig 5. July 17, 2023, 203 days post-endovascular interventions.



Fig 6. September 25, 2023, 271 days post-endovascular interventions.



Fig 7. October 16, 2023, fully healed right anterior lower leg ulceration.

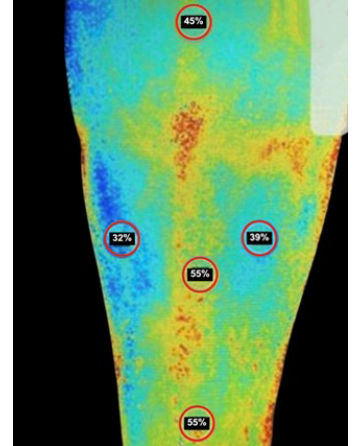


Fig 8. S_iO_2 of the right anterior lower limb, monitoring the effectiveness of the endovascular intervention.

The patient significantly improved over the course of his treatment and was able to regain his independence and strength. Through the continual monitoring of his blood tissue oxygenation, the patient was able to avoid a limb amputation and achieved full ambulation with the assistance of a walker, and later, with a cane.

IMPACT OF SNAPSHOTNIR:

SnapshotNIR was able to help clinicians see the angiosomal healing process. Despite no anterior flow to the anterior tibial artery, the patient was able to progress his healing through endovascular intervention with retrograde and collateral flow. NIRS imaging was able to show and document the ongoing progress without the need for invasive testing due to the patient's underlying renal disease. Further invasive interventions were prevented, and the patient was able to regain his ambulatory ability.

Dr. Amy Couch & Kelly Roberts

Amy Couch, MD, is a Wound Care Physician at Mercy South Wound and Hyperbaric Center in St. Louis, MO. She has been a physician for over 14 years, specializing in wound care since 2021. Kelly Roberts is a Certified Family Nurse Practitioner and a Certified Wound Specialist at Mercy South Wound and Hyperbaric Center in St. Louis, MO. She has been working in advanced wound care since 2007.

