Improving Diabetic Foot Ulcer Outcomes With Hyperbaric Oxygen And Ionic Silver Powder*

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Hyperbaric Oxygen Therapy (HBOT) for Treatment of Diabetic Foot Ulcers

Diabetic foot ulcers are associated with significant healthcare costs as well as considerable morbidity and mortality. Wound healing complications, sepsis, and amputation are common for the diabetic patient. The prognosis is poor for ischemic ulcers due to altered healing mechanisms and inability of the compromised immune system to fight infection. Ulcers often become chronic and the treatment course is prolonged or the limb is amputated.

Case Study #1

History: 63-year-old female with history of NIDDM presented to the ER with Left foot medial wounds. Wounds were severely limb threatening. Wound to dorsal and plantar aspects of the right foot were extremely deep, probes through to bone and tendon. There was a large amount of foul smelling, purulent exudate draining from the foot. A bone scan was positive for osteomyelitis. Vascular studies revealed adequate flow. Transcutaneous oximetry shows the wound to be hypoxic at the level of the dorsal foot and at the ankle level. Multiple debridements done to remove necrotic tissue. Albumin 2.7 mg/dL. Protein 6.7 g/dL. and Hgb A1C 7.4.

Management Challenges: Patient noncompliant with wound care and diabetic management. Recent HgbA1C has elevated to 8.9. Patient followed by hematology for a high platelet count.

Plan: 5-14-04 patient began daily treatment with HBOT, combined with daily aggressive wound care and application of ionic silver powder and bidulc gauze dressing.

Outcome: After 15 weeks of treatment there is full granulation over the bone and tendon. No additional antibiotics were necessary. Patient is now ready for autologous skin grafting.

Case Study #2

History: 62-year-old male developed small ulcers on his right foot. The ulcers were treated with calcium alginate dressings but continued to increase in size. He presented with multiple deep ulcers and full thickness tissue destruction on the plantar and dorsal aspects of the foot. The foot was dusky in color and extremely edematous. There is full bone and tendon exposure to the wounds, both on the plantar and dorsal aspects. Medical history includes IDDM, HTN, anemia, and CHF. Current medications: Colace, Zosyn, Flomax, Norvasc, Istridil, Lisin, Accupril, Humalog, Augmentin, Tramatol, Aggenom, and Epogen.

Assessment: These wounds were severely limb threatening. Wound to dorsal and plantar aspects of the right foot were extremely deep, probes through to bone and tendon. There was a large amount of foul smelling, purulent exudate draining from the foot. A bone scan was positive for osteomyelitis. Vascular studies revealed adequate flow. Transcutaneous oximetry shows the wound to be hypoxic at the level of the dorsal foot and at the ankle level. Multiple debridements done to remove necrotic tissue. Albumin 2.7 mg/dL. Protein 6.7 g/dL. and Hgb A1C 7.4.

Management Challenges: Patient noncompliant with wound care and diabetic management. Recent HgbA1C has elevated to 8.9. Patient followed by hematology for a high platelet count.

Plan: 5-14-04 patient began daily treatment with HBOT, combined with daily aggressive wound care and application of ionic silver powder and bidulc gauze dressing.

Outcome: After 15 weeks of treatment there is full granulation over the bone and tendon. No additional antibiotics were necessary. Patient is now ready for autologous skin grafting.

Case Study #3

History: A 45y/o male presented with a large circular blister on the dorsal aspect of the foot. The foot was dusky in color and extremely edematous. There is full bone and tendon exposure to the wounds, both on the plantar and dorsal aspects. Medical history includes IDDM, HTN, anemia, and CHF. Current medications: Colace, Zosyn, Flomax, Norvasc, Istridil, Lisin, Accupril, Humalog, Augmentin, Tramatol, Aggenom, and Epogen.

Assessment: Taken to the OR for aggressive debridement. Patient discharged from the hospital and was to be followed at the wound care center. Significant lab values are albumin 3.4 g/dL, protein 6.5 g/dL and Hgb A1C 11.5. Nutritional and blood sugar issues were addressed and counseling provided. Additional IV antibiotics and debridement were required. Transcutaneous oximetry hypoxic at less than 20. The wound has visible muscle, tendon and bone exposed, classified as Wagner III. X-ray for osteomyelitis was positive. It was determined that the patient may benefit from HBOT.

Management Challenges: Patient needed aggressive wound care to keep infection from spreading and preventing necrosis throughout toes to avoid transmetatarsal amputation. Aggressive blood glucose management needed as glucose levels were elevated during the first 10 treatments, possibly a response to infection.

Plan: On 4-26 patient began 40 HBOT (Monday – Friday) treatments. Apply ionic silver powder and gauze daily to the wound beds following HBOT treatments.

Outcomes: No additional antibiotics were needed after the initiation of ionic silver powder. Wound completely closed in 16 weeks and remains closed.

REFERENCES: