Continuous Diffusion of Oxygen for the Treatment of a Chronic Recalcitrant Venous Stasis Ulcer

W. Brent Gillespie, DPM San Antonio, TX; Cassie Gray, RN, BSN-WCN, Mark Niederauer, PhD, and Shelly Monnens, APRN-BC, FNP, MSN, RN, CWOCN, CWS, FACCWS, EO Concepts®

Objective

Demonstrate the efficacy of utilizing Continuous Diffusion of Oxygen (CDO) for the treatment of recalcitrant venous stasis ulcers, in a comparison to topical wound dressings that are utilized to maintain adequate moisture balance to the wound bed.

Background

Lower extremity venous disease (LEVD) is synonymous with chronic venous disease. Chronic Venous Insufficiency (CVI) refers to long-term related manifestations of venous hypertension and functional abnormalities of the venous system, skin changes, ulceration. Venous ulcers are the most common lower extremity wounds accounting for 70% to 90% of all leg ulcers. These lesions develop as a result of skin and tissue changes caused by CVI and the associated obliteration artery hypertension. Management of patients with venous disease focuses on wound care, compression therapy, ulcer care, and appropriate therapy to promote healing. Once the wound is properly dressed, the focus shifts to long-term disease management and prevention of recurrence. The current treatment is the application of compression, either in the form of compression bandages or hose. Dressings are usually applied daily until the compression is adequate to the wound, control the infection and promote wound healing. Wound care is major in wound management and is an important component of treatment for chronic venous ulcers. The wound healing process is complex and involves the delivery of the therapy is easily portable and capable of delivering oxygen continuously to the wound site. To achieve continuous treatment, the device which delivers the therapy is unique to the market.

Method

Multiple subjects therapies were applied to the wound over a seven period including negative pressure wound therapy, compression, hyperbaric therapy and advanced dressing modalities of chronic wound (stalled) wound. CDO Therapy at 8 ml/hr was added along with a moisture balancing dressing (consisting of cadmium alginate and/or foam dressing) depending on amount of exudate, compression was attempted but patient was not adhered and did not tolerate consistency. The dressing was placed on the wound bed and covered with cadmium alginate or foam dressing. The patient had severe pain symptoms with dressing changes and delayed wound healing. The dressing was changed approximately three times a week.

Case Study

A 68 year old male with chronic venous stasis ulcer for approximately seven weeks. Past medical history revealed years of wound care with significant progress. Venous duplex ultrasound revealed severe reflux in the great saphenous and the great saphenous vein.日出式al graft (left side) was performed in part. He was referred to our service for continuous oxygen therapy.

Results and Discussion

The patient responded well to the CDO therapy, especially considering the high age of the wound (seven years). The wound bed showed signs of improvement and the appearance of the wound and surrounding tissue improved over time. The wound healed (269 days) after being open for over seven years.

The use of oxygen to treat wounds has recently undergone significant changes which enable the efficacious and early delivery of oxygen directly to the wound bed. The presence of oxygen inside wounds which were previously considered oxygen therapy have shown the following significantly positive effects of using oxygen in wound therapy (1).

1. Faster wound closure
2. Improved wound closure rate
3. Pain reduction
4. Reduction in MPA infections
5. Decreased infection and infections
6. Reduced Venous Stasis recurrence

Our results using Continuous Diffusion of Oxygen therapy are similar to those for intermittent diffusion of oxygen therapy and are in line with efficacy. CDO therapy has significant advantages over intermittent oxygen therapies such as HBO or TO, including ease of application (can be applied in any setting), continuous treatment, and mild patient mobility during treatment. There were no reported adverse events with the use of CDO therapy in the literature.

Conclusions

Advances continue to be made in many areas of wound care, including technology, development of new healing agents, and patient care options. After multiple attempts to heal this wound with a variety of adjunctive therapies including: surgery, compression, hyperbaric oxygen, and non-steroidal anti-inflammatory, the patient was referred to our service for continuous oxygen therapy. HBO was administered and the wound healed in 269 days. There are currently three types of therapies being used clinically for treating venous leg ulcers: topical Oxygen HBO, TransCu Oxygen and Continuous Diffusion of Oxygen (CDO). Each of these technologies uses a unique method to deliver oxygen; HBO depends on the oxygen used in the body to carry oxygen to the wound site. TransCu Oxygen and Continuous Diffusion of Oxygen deliver oxygen directly into the wound site. HBO is used in many hospitals as it is approved by the FDA, and it is considered the gold standard in advanced wound therapy. HBO is a very expensive treatment modality and is used in limited hospitals. HBO is considered the gold standard in advanced wound therapy. HBO is a very expensive treatment modality and is used in limited hospitals. HBO is considered the gold standard in advanced wound therapy. HBO is a very expensive treatment modality and is used in limited hospitals. HBO is considered the gold standard in advanced wound therapy. HBO is a very expensive treatment modality and is used in limited hospitals.

CDO therapy has been shown to be safe and efficacious on a wide variety of wounds. Overall, our findings are in line with a significant body of experimental data suggesting that increasing oxygen supply to chronic wounds improves wound healing.

References