

Control of Wound Oxygen Free Radicals During Elastic Compression of Refractory Venous Leg Ulcer Dramatically Speeds Healing: Pain Control, Compliance and Cost Effectiveness are Advantages.

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Problem:

Refractory venous leg ulcers (VLU) treatment still remains one of the most difficult challenges for healthcare professional. They can be painful and debilitating, seriously impacting a patient's physical and emotional quality of life. Insufficient elastic compression of painful peri wound dermatitis can result in more than 9 weeks of clinical therapy to aid healing. Inadequate compression often results from pain leading to poor patient compliance. Topical hydrophilic gels consisting of a 2-hydroxyethyl methacrylate polymer with active ingredient sterically hindered amine that binds oxygen free radicals (*) palliate VLU pain, and increasing compliance with elastic compression. (1) Oxygen free radical activity is a major cause of tissue damage in VLU. Topical polymer based gel (*) has the advantage of unfilled electron orbital's that absorbs the single electron present in oxygen free radical present in high concentration in VLU's. (2,3) The pathophysiology of venous hypertension generates high levels of VLU oxygen free radicals from two inflammatory sources: exuberant enzymes remodeling injured substrate (matrix metalloproteinases) and the immune response to the ever present bacterial biofilms. (4,5)

Methods:

A series of three refractive VLU patients were treated with Longitudinal Yarn Compression (**) elastic textile in a three layered dressing in tandem with topical polymer based gel with oxygen free radicals scavenging agent (*). Biofilm was controlled with ultrasonic powered debridement (***) and hypochlorous acid (****) washes. The combination of therapies proved to be effective and lowered costs of venous ulcer treatment.

Results:

The photos document the healing experienced by patient. Costs, pain palliation and compliance are discussed.

Conclusion:

Topical polymer based gel (*) can be used to control VLU oxygen free radical injury in tandem with LYC (**) stockinet compression to control skin edema and venous hypertension appears to dramatically enhance VLU healing, decrease VLU's wound pain, increase elastic therapy compliance and decrease cost.

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RECURRENT PAINFUL STASIS ULCER



Patient self referred from another wound clinic because of slow progress over three months of weekly treatments.



NOV 16, 2010



NOV 30, 2010



DEC 8, 2010



DEC 21, 2010

The wound is the size of patient's hand (which equals to 1% of body surface area). Stasis ulcers of this size cause considerable suffering, depression and disability. VLU was weeping and painful, standard compression dressing was not tolerated by the patient

Treatment:

Weekly dressing changes and debridement were conducted. Dressing included a topical polymer based gel with oxygen free radicals binding capability (*), hypochlorous acid wash (****) to control biofilm, and four layer dressing with longitudinal yarn compression elastic textile (**) as the first layer.

Weekly Soft Debridement was done with terry cloth after soaking in 250ppm HOCl (****). Observe improvement of peri wound stasis dermatitis; skin is less red, less edematous, and no longer weeping serum. VLU is healing. There is no pain reported.

Outcome:

VLU 98% healed in 5 weeks
 Patient pain free
 Patient discharged from wound clinic

Cost of 5 g topical gel (*) - is
\$25.95 MRSP

RECURRENT VLU DUE TO INCOMPETENT DEEP SYSTEM PERFORATING VEIN



58 year old female, has history of recurrent painful VLUs on right ankle. Patient spent 11 months working with wound clinic to heal ulcer. After successful treatment, the ulcer recurred 8 weeks later.



NOV 1, 2010



NOV 16, 2010



Wound shows extensive stasis pigmentation, suggesting significant venous insufficiency and history of recurring VLUs in the area. The current wound is located in the area fed by the greater saphenous incompetent perforating vein.

Treatment:

Weekly dressing changes and debridement were conducted. Dressing included a topical polymer based gel with oxygen free radicals binding capability(*), hypochlorous acid wash (****) to control biofilm, and four layer dressing with longitudinal yarn compression elastic textile (**) as the first layer. Weekly Soft Debridement was done with terry cloth after soaking in 250ppm HOCl (****).

Outcome:

Topical polymer based gel with oxygen free radicals binding capability (*) on VLU at weekly debridement / dressing change.

Cost of the(*) and compression is less than cost of "advanced dressings" often used for treating VLUs. Gel (*) is placed on wound after wound is covered by Longitudinal Yarn Compression stockinet. Stockinet is laundered and reused which decreased cost.

Healing continues but is not complete. This ulcer, by virtue of its location proximal to the medial malleolus, is due to the presence of an incompetent distal deep vein perforator. Patient referred to vascular specialist for outpatient ultrasound controlled radio frequency (electric cautery) ablation of the deep perforating vein beneath this classic ulcer.

Photo illustrates parallel skin furrows due to longitudinal yarn compression textile (**) used as the first layer of a four layer dressing

COMPUTER PROGRAMMER WITH VLU'S PRESENT FOR 4 YEARS



Therapeutic nihilism resulted from years of ineffective treatment with elastic compression. Patient reckoned the ulcers had been present for 4 years and now were weeping yellow serum. At presentation, he used 6 inch ACE wraps on the ulcers.



INITIAL TREATMENT



AFTER 11 WEEKS

Observe light refracting off water logged "glassy" edematous skin. The dermatitis results in inadequate venous emptying in the subcutaneous fat. This "venous stasis" results in "stagnant blood" with high levels of CO2 and Lactic acid, and low levels of oxyhemoglobin at the skin surface, resulting in inflammation and cell death. Note the presence of old scars from prior ulcers that healed. Note loss of fat beneath the inflamed dermatitis. Ulcers are painful and have a heavy bioburden.

Treatment:

Weekly dressing changes and debridement were conducted. Dressing included a topical polymer based gel with oxygen free radicals binding capability (*), hypochlorous acid wash (****) to control biofilm, and four layer dressing with longitudinal yarn compression elastic textile (**) as the first layer.

Modified Robert Jones dressing, cotton batting and elastic wraps used for compression. Topical polymer based gel with oxygen free radicals binding capability (*) used over wound and inflamed skin to absorb oxygen free radical (singlet oxygen) in the wound.

Outcome:

VLU's present for 4 years heal 70% at 11 weeks using topical polymer based gel with oxygen free radicals binding capability (*).

