

Venous leg ulcers: Other treatments

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ELECTRIC STIMULATION

Electrical stimulation therapy is believed to simulate the electric current that is generated at the time of injury or breaking down of the skin, thereby stimulating the healing response in the skin and underlying tissues.^[1] Electric current has also been shown to increase the migration of neutrophils and macrophages, increase the local blood flow and stimulate the fibroblasts as well.^[2,3]

Various methods of electrical stimulation have been reported in the literature until date for the treatment of venous ulcers or chronic wounds. Electrical stimulation treatment methods range from high voltage to low voltage currents, pulsed to nonpulsed, and alternating to direct currents.^[4-6] Until date, there are no clinical studies to compare the efficacy of these different types of electrical stimulating devices and methods in wound healing.

A number of randomized controlled trials (RCTs) have been conducted on the subject of electrical stimulation therapy in chronic wounds.^[7,8] Majority of these studies have demonstrated a positive effect of the electrical stimulation in the healing of chronic wounds.

As far as venous ulcers are concerned there are a few double-blind randomized trials that have shown a beneficial effect with electrical stimulation therapy (Level B).^[9-11]

Electrical stimulation therapy is generally contraindicated in patients with cardiac arrhythmias such as ventricular arrhythmias or atrial fibrillation, deep venous thrombosis or thrombophlebitis, pregnancy, active osteomyelitis, and patients on pacemakers.^[11]

CONCLUSIONS

Electrical stimulation therapy can be used as an adjunctive treatment of venous ulcers (Level B).

HYPERBARIC OXYGEN THERAPY

The proposed mechanism of action of hyperbaric oxygen in management of leg ulcers is through its anti-inflammatory as well as antibacterial effects^[12] (Level C). Increase in the oxygen concentration during this treatment is supposed to help in neutrophil dependent microbial killing, collagen cross-linking as well as neovascularization.^[13]

Hyperbaric oxygen therapy can be administered in two different ways. One of these is to make the patient breathe 100% oxygen, while exposed to increased atmospheric pressure. The treatment is carried out in chambers meant for single or multiple persons. Exposure is continued for about 1.5-2 h, depending on the indication and the treatment is performed 1-3 times a day. Another method of administering hyperbaric oxygen therapy is by exposing only the affected limb to high oxygen concentration under pressure.

Most of the clinical studies on the efficacy of hyperbaric oxygen therapy in venous ulcers are retrospective and uncontrolled studies. No properly conducted RCT has been conducted on the subject until now except one study involving 16 patients with venous ulcers. The study reported a significant reduction in wound area at 6 weeks after hyperbaric oxygen therapy, but this effect could not be maintained at 18 weeks. Moreover, the study had a high drop-out rate (Level C).^[14]

The most important adverse effect that can result from hyperbaric oxygen therapy is central nervous system toxicity that manifests in the form of seizures.^[15,16] Other adverse effects that have been reported include progressive, reversible myopia and irreversible nuclear cataracts.^[17,18]

CONCLUSIONS

The efficacy of hyperbaric oxygen therapy in venous ulcers is still not proven beyond

Access this article online

Website: www.idoj.in

DOI: 10.4103/2229-5178.137823

Quick Response Code:



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doubt. Thus, the therapy can only be recommended as an adjunctive treatment in selected refractory cases of venous leg ulcers (Level C).

VACUUM ASSISTED CLOSURE

Vacuum assisted closure (VAC) therapy, also known as negative pressure wound therapy, employs negative pressure to improve the blood flow, decrease local tissue edema, and remove the excessive fluid from the ulcer bed. This is supposed to assist the formation of healthy granulation tissue and also remove the bacterial load from the wound bed (Level C).^[19] Another hypothesis proposed is that negative pressure, when used cyclically, alters the cytoskeleton of the cells in the ulcer bed and this triggers the formation of healthy granulation tissue.^[20,21]

Vacuum assisted closure therapy is administered by means of special devices that generate a negative or sub-atmospheric pressure gradient over the area to be treated.^[22] Negative pressure is applied either in a continuous or intermittent fashion and the optimal negative pressure employed is in the range of 75-125 mmHg (Level C). Depending upon the size of the ulcer to be treated negative pressure can be applied in a continuous fashion for the first 48 h to remove larger amounts of fluid.^[23,24]

A Cochrane-based review on the efficacy of VAC therapy in chronic wounds listed seven RCTs that were devoid of any bias and other confounding factors. The majority of these studies did mention a positive effect of VAC therapy on chronic wounds, but the review found methodological flaws in most of the studies. Therefore, the review proposed that while trials do demonstrate a beneficial effect of VAC therapy on wound healing, more, better quality research was needed to recommend the treatment option.^[25]

Vacuum assisted closure therapy has been associated with an increased risk of thromboembolism and is thus contraindicated in patients with such a tendency.^[26]

CONCLUSIONS

Although, VAC therapy has been anecdotally used in the management of venous ulcers, there are no definite evidences to support its use in treating this condition (Level C). More research is needed to confirm the positive therapeutic effect of VAC therapy in venous ulcers.

LASER THERAPY

The mechanism of action of lasers in the management of venous ulcers is not known. The hypothesis that have been postulated are improved metabolism of the affected tissue,^[27]

stimulation of the tissue repair^[28] and increased collagen synthesis.^[29] In addition, if the laser is used endovenously, it can lead to occlusion of the treated vein via direct endothelial damage resulting in collagen contraction and fibrosis.^[30]

Lasers in venous ulcers are used in two different ways. One-way is to use the laser beam externally over the affected area on the leg and the other way is to pass the laser fiber into the lumen of the affected vein and use the laser beam endovenously.

The efficacy of lasers in management of venous ulcers has not been proven till date. There are a few RCTs on this subject but the data obtained from these trials has not been convincing^[31-34] (Level C). Some other isolated case series and nonrandomized trials have also been conducted with similar results.^[35-37]

CONCLUSIONS

While there are reports of a beneficial effect of using lasers in the management of venous ulcers, the evidence is not convincing enough to recommend the treatment modality routinely in venous ulcers (Evidence Level C).

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Cite this article as: Majid I. Venous leg ulcers: Other treatments. *Indian Dermatol Online J* 2014;5:383-5.

Source of Support: Nil, **Conflict of Interest:** Nil.