Extracorporeal Shock Wave Therapy for the treatment of venous ulcers in the lower limbs

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Chronic venous ulcers are one of the most common medical problems today. The treatment has always been challenging and over the years many conservative and surgical alternatives have been proposed. During the past three decades, extracorporeal shock wave therapy (ESWT) has been introduced in several medical specialties. According to the clinical findings, the ESWT appears to significantly improve the healing process of chronic wounds, increasing the release of endogenous angiogenic factor from endothelial cells and fibroblasts, consequently fastening the healing process of chronic wounds. The present report describes the application of ESWT for the treatment of chronic venous ulcers in the lower limbs and compared the results with those obtained by conventional treatment on the contralateral leg.

KEY WORDS: Difficult wounds, Extracorporeal Shock Wave Therapy (ESWT), Lower limbs, Venous ulcers

Introduction

Venous ulcers are complex wounds caused by chronic venous insufficiency in the lower extremities. Considering the dramatic increase of this pathology among the population, these wounds are becoming a major social and economic issue. Many studies in recent years, have focused on the treatment of chronic ulcers and a remarkable variety of conservative and surgical options have been proposed.

Advanced dressings have recently generated considerable research interest, but a number of alternative approaches may be also taken into account, especially in the field of physical therapies, i.e. shockwaves. Over the past three decades, extracorporeal shock waves (ESW) were introduced to treat several pathologies. Notwithstanding the increasing clinical use, the exact mechanism of action for ESW remains uncertain. They seem to increase the release of endogenous angiogenic factor from endothelial cells and fibroblasts, stimulate revascularization, release of local growth factors and recruitment of appropriate stem cells to the target area, consequently fastening the healing process of chronic wounds.

Case report

A 63 year-old patient affected by chronic venous insufficiency of the lower limbs presented two ulcers on the
right leg (1.5 x 2 cm ulcer on the external malleolar region and 4 x 2 cm ulcer on the medial pretibial region) (Fig. 1) and one on the left leg (4 x 1.5 cm ulcer on the medial pretibial region) (Fig. 2).

The right leg ulcers have been treated with extracorporeal shock wave therapy (ESWT) that consisted of 100 impulses at 0.037 mJ/mm² each per cm² (Evotron, High Medical Technologies, Lengwil, Switzerland). The focal volume of the hand-held probes (Trodex) was 10-15 mm in diameter and the total energy applied for each impulse was 3.5 mJ, with a frequency of 4 Hz or 240 impulses/min.

The patient underwent single sessions of ESWT once a week for six weeks, for a total of six sessions. After six weeks, a complete healing of the wounds on the right leg had been achieved. The left leg ulcer has been treated with conventional dressings consisting of disinfection and application of medicated gauze every week for six weeks. At the end of the study period, the healing was still incomplete (Fig. 3-4).

Discussion

Chronic ulcers represent a challenging area because the healing process is altered by local or systemic factors, which prevent the closure of the skin defect and scar

Fig. 1: Female patient (63 yrs) with two venous ulcers on the right leg (1.5 x 2 cm ulcer on the external malleolar region and 4 x 2 cm ulcer on the medial pretibial aspect).

Fig. 2: The same patient presented also with one 4 x 1.5 cm ulcer on the medial pretibial aspect of the left lower leg.

Fig. 3: Incomplete closure of the wound on the left leg after six weeks of conventional dressings.

Fig. 4: Final clinical result after six sessions (6 weeks) of ESWT. Complete closure of the wounds on the right leg treated with ESWT and incomplete closure of the wound on the left leg treated with conventional dressings.
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Conclusion

The present report describes the application of ESWT for the treatment of chronic venous ulcers in the lower limbs and compared the results with those obtained by conventional treatment on the contralateral leg. According to the clinical findings, the ESWT appears to significantly improve the healing process of chronic wounds. Furthermore, the ESWT presents a remarkable advantage as it can be performed in association with advanced dressings. Advanced dressings are currently considered gold standard for the treatment of chronic ulcers, so much that the therapeutic approach to complex wounds often contemplate only the use of such dressings. As for the shock waves, they not only can be used in association with advanced dressings, but also enhance their therapeutic effect.

In conclusion, ESWT seems a profitable technology and may be proposed as a safe, feasible and cost-effective support in the treatment of chronic wounds.

