

Can major amputation rates be decreased in diabetic foot ulcers with hyperbaric oxygen therapy?

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Abstract Although hyperbaric oxygen therapy has been used for diabetic foot ulcer since the 1980s, there is little information on its efficacy. The aim of this study is to evaluate whether hyperbaric oxygen can decrease major amputation rates and to determine the predictive factors. A total of 184 consecutive patients were treated with hyperbaric oxygen therapy as an adjunct to standard treatment modalities for their diabetic foot ulcer. Of these patients, 115 were completely healed, 31 showed no improvement and 38 underwent amputation. Of the amputations, nine (4.9%) were major amputations (below knee) and 29 were minor. Major amputations were associated with the Wagner grade ($p < 0.0001$), with the age of the patients ($p = 0.028$) and with the age of the wounds ($p = 0.018$). Hyperbaric oxygen therapy can help to reduce the major amputation rates in diabetic foot ulcer. However, further large, multicentre, randomised controlled studies are needed to make more accurate conclusions.

Résumé Dès 1980, le traitement par oxygène hyperbare a été utilisé pour les lésions des pieds diabétiques avec ulcérations. Les données de la littérature sur l'efficacité de ce traitement semble limitées. Le but de cette étude est d'évaluer si

l'utilisation de l'oxygène hyperbare peut diminuer le taux d'amputation et permettre de faire une prédiction concernant l'évolution. Matériel et méthode: 184 patients consécutifs ont été traités par oxygène hyperbare pour leurs lésions sur pieds diabétiques. 115 cas ont complètement guéris, 31 cas n'ont pas du tout été améliorés, 38 ont été amputés. Sur ces amputations 9 (4,9%) ont été des amputations majeures (sous le genou) et 29 mineures. Les amputations majeures sont associées au grade de Wagner ($p < 0,0001$) à l'âge des patients ($p = 0,028$) et la durée d'évolution des lésions. Conclusions: l'oxygène hyperbar peut permettre de réduire le taux d'amputations majeures dans les pieds diabétiques avec ulcères. Cependant une étude plus large, multicentrique, randomisée est nécessaire pour conclure de façon plus stricte.

Introduction

Diabetic foot ulcers occur in 1.9% of adults with diabetes annually, resulting in amputation in 15–20% of patients within five years. Loss of nociceptive and autonomic nerves results in a dry, hyperkeratotic surface that is subject to mechanical cracking, infection and tissue destruction; local ischaemia and tissue injury result in chronic, nonhealing wounds that remain a portal of entry for deep tissue infection [3].

Because the infection and tissue hypoxia are the major factors for the nonhealing diabetic foot ulcers, hyperbaric oxygen therapy (HBOT) is thought to carry potential benefits for treating infected diabetic wounds [17, 19]. Increased tissue oxygen levels instigate wound healing in hypoxic tissues by a mechanism of angiogenesis, fibroblast replication, collagen synthesis, revascularisation and epithelialisation and increased leukocyte bactericidal activity [9, 14, 16].

HBOT has been in use for the treatment of diabetic foot ulcers as an adjunct to standard multidisciplinary therapies

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