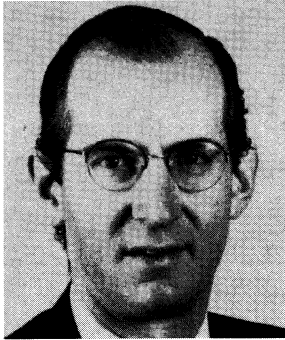


招聘講演 1

HBO and Wound Healing 創傷治癒と高気圧酸素治療

Thomas A. Mustoe

Wound Healing Research Laboratory, Division of Plastic and Reconstructive Surgery, Northwestern University



Thomas A. Mustoe, M.D.

Harvard Medical School, graduated 1978

INTERNSHIP: Massachusetts General Hospital

Boston, Massachusetts, 1978-1979

Brigham and Women's Hospital and Children's Hospital 1983-1985, Plastic Surgery

Washington University School of Medicine

St. Louis, Missouri

Assistant Professor of Surgery (Plastic and Reconstructive), 1985-1989

Associate Professor of Surgery (Plastic and Reconstructive), 1989-1991

Northwestern University Medical School

Professor of Surgery, July 1991 to present

Chief, Division of Plastic and Reconstructive Surgery, July 1991 to present

Most chronic wounds (pressure sores, venous ulcers, diabetic ulcers) have local tissue ischemia or ischemia reperfusion injury as perhaps the most important aspect of their pathogenesis. The major effect of tissue ischemia is tissue hypoxia, and although oxygen is essential for normal cellular metabolism, a great deal of information has accumulated about hypoxia, as well as reactive oxygen species acting as cellular signals resulting in signal transduction. Hyperbaric oxygen (HBO) is a rational therapeutic strategy to address the underlying ischemia that is present in many chronic wounds. However, the selection of appropriate patients, timing and duration of treatment have largely been empiric. A large amount remains to be understood regarding the mechanism of action for hyperbaric oxygen, but a great deal of information has been gained in recent years.

In our laboratory, with the use of clinically relevant animal models we have demonstrated the efficacy of hyperbaric oxygen therapy in the treatment of ischemic wounds. There is an increased responsiveness to oxygen challenges over 1-2 weeks in those animals that respond to HBO suggesting a clinical paradigm for selecting patients who will successfully respond. We have seen a synergistic effect of growth factor therapy and HBO which has been confirmed in other laboratories. Conceptually, the generation of reactive oxygen species as cell signals resulting in signal transduction generated by HBO therapy has provided a rationale for the benefits of HBO.

Evidence from animal models supported by clinical observations suggests that the aged are particularly sensitive to the impairment of wound healing secondary to ischemia, which may in part be counteracted by oxygen therapy.

Clinical implications of new insights into the mechanisms of action of HBO will be discussed.

多くの慢性、難治創（褥創、静脈性潰瘍、糖尿病性潰瘍）では組織の虚血または虚血再灌流障害が最も重要な病態因子である。虚血の結果は、組織低酸素状態として発現する。酸素は通常の細胞内代謝にもっとも重要であり、細胞における低酸素に対する反応や活性酸素が細胞内情報伝達因子として作用する事実が解明されている。

高気圧酸素治療（HBO）は虚血に起因する多くの慢性創傷に対する治療として重要な手段の一つと考えられている。しかし、HBOに際し患者の選択、治療時期、実施期間に関しては経験的に決められていることが多い。近年、HBOの作用機序に関して解明が進んでいるが、なお不明な点も少なくない。

われわれの研究室では臨床に応用できる虚血動物実験モデルを開発し、虚血による組織損傷の修復に対してHBOが有効であることを証明してきた。1-2週間のHBOで軽快する動物モデルの成績は、HBOは患者を選択すれば十分効果が期待できることを示唆している。さらにHBOと増殖因子の相乗効果は私たちの施設ならびに他施設でも確認されている。HBOによって生成される活性酸素が細胞内情報伝達因子として作用することが、HBOの有効性を理論的に証明する可能性が考えられる。

臨床を模した動物実験モデルのデータから、高齢者はとりわけ虚血により創傷治癒障害が発生しやすいことが判明したが、これは酸素療法で軽快する可能性がある。

本講演では、HBO効果のメカニズムに関して新しい視点から論じたいと考えている。