



Transcutaneous Oxygen Pressure (TcpO2) Monitoring

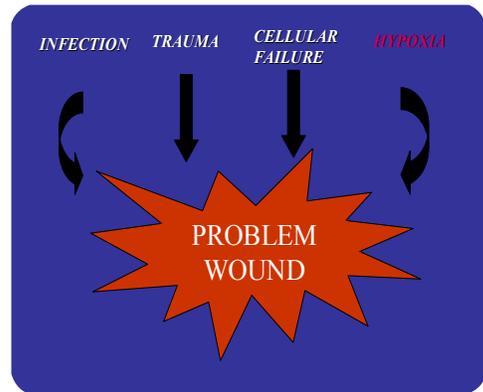
Charles D. Rice, MD, FACS, UHM

Volume - 6
Case Report - 2

Tissue Hypoxia

Tissue Hypoxia is one of the four (4) causes of a non-healing wound (hypoxia, infection, cellular failure and trauma). To diagnose this problem, usually angiography or MRA is required.

Tissue Hypoxia



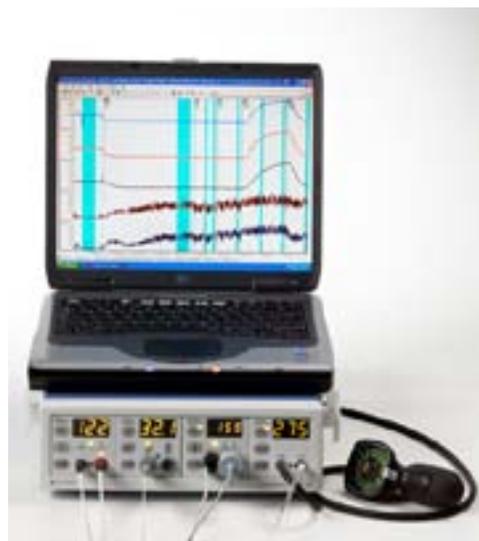
TcpO2 Applications

Transcutaneous monitoring of oxygen and carbon dioxide, originally developed for neonatal use, is now used in a number of different applications, including wound care, vascular and plastic surgery, hyperbaric medicine and orthopedic surgery. The technique is easy to use and gives accurate, reliable measurements for tissue evaluation. In order for TcpO2 measurement to provide reliable and useful information, at least two (2) sites adjacent to the wound as well as one (1) reference electrode on the chest are required. This combination will allow the calculation of a Regional Perfusion Index (RPI) to quantify the degree of local tissue hypoxia.

TcpO2 Monitor

The Transcutaneous Oxygen Pressure Monitor (TcpO2) is an inexpensive screening test that can be utilized to identify tissue hypoxia. TcpO2 Monitoring is a diagnostic tool that gives physicians a prognostic indication of whether or not hyperbaric oxygen therapy (HBOT) can be effective. TcpO2 is a non-invasive measurement of dermal oxygen values using heated polarographic electrodes. By monitoring the varying dermal oxygen tensions at different levels of a compromised extremity, the hyperbaric physician can determine if sufficient oxygen transport exists to support healing in the hyperbaric environment.

TcpO2 Monitoring



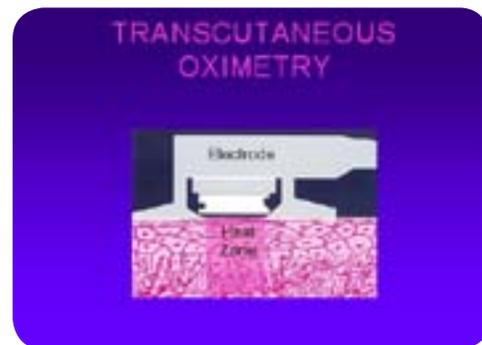
TcpO2 Monitoring



TcpO2 Process

The Transcutaneous Oxygen Pressure Monitor (TcpO2) is used to monitor oxygen tension (pO2) in the skin. Sensors are placed on the skin. They are warmed to cause dilatation of the capillaries under the skin to maximize the release of O2. The O2 diffuses from these capillaries through the skin to the sensor. The sensor delivers a constant polarizing voltage which reduces molecular O2 as it arrives at the skin surface. The current generated is equivalent to the O2 released from the skin capillaries. This is measured and recorded by the monitor.

TcpO2 Process



During Treatment

Level of Amputation

Knowing the tissue O₂ pressure identifies a tissue's ability to heal at an operative site and therefore will help determine the level of amputation.

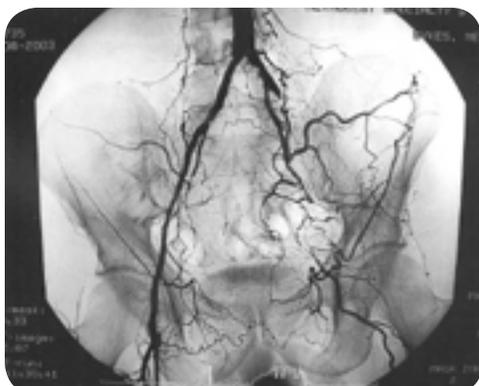
TcpO₂ Monitoring Addresses these Basic Questions:

1. Is wound healing complicated by hypoxia?
2. When tissue hypoxia is present, is it reversible with administration of 100% O₂? (If tissue TcpO₂ rises with 100% O₂ challenge, the wound will likely benefit from HBOT.)

Hyperbaric Chamber



3. Is the hypoxia due to small or large blood vessel disease?
4. Is the patient responding to HBOT?
5. Has the patient reached a therapeutic end point?



The wound on the medial aspect of his foot required an additional 2 weeks of treatment due to the exposed tendon.

About Precision Health Care

Precision Health Care is a comprehensive wound healing and hyperbaric medicine service organization dedicated to the development of state-of-the-art hyperbaric and wound healing centers through partnership and collaboration with our affiliate hospitals.

Community-based and patient-focused, we are driven by this mission philosophy: To provide select hospitals safe, comprehensive, compassionate wound healing and hyperbaric services for patients in need.

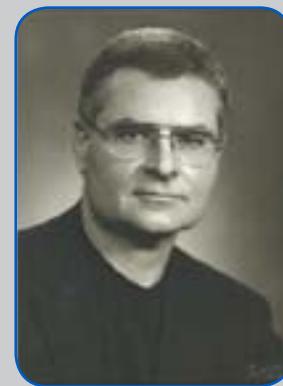
Questions or Comments?

Contact us:

at Precision Health Care:

1-888-HyperHeal (497-3743)

About the Author



Charles D. Rice, M.D., F.A.C.S., U.H.M. is the Medical Director of the Center for Wound Healing & Hyperbaric Medicine at Mount St. Mary's Hospital in Lewiston, N.Y., with Board Certifications in Surgery and Hyperbaric Medicine. He has over 20 years experience in General and Vascular Surgery. Since 2003, his practice has been devoted solely to Wound Healing and Hyperbaric Medicine.

THE PRIMARY CARE PHYSICIAN SHOULD REFER THE PATIENT FOR ADVANCED WOUND CARE IN A WOUND HEALING CENTER IF THE PATIENT:

- Has a wound that persists for more than 30 days after treatment
- Has a wound and Reynaud's phenomenon
- Has purpura
- Has a wound and hypertension
- Has gangrene or necrotic tissue in a wound
- Has a wound and diabetes