Fifth Annual International Symposium for Hyperbaric Oxygen Therapy and the Recoverable Brain
July 18-22, 2006

SPECT Brain Scan Shows Brain Function and Has Documented Clinical Response to Hyperbaric Oxygen Therapy

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The field of hyperbaric oxygen therapy (HBOT) touches on almost all segments of modern medicine. In my opinion, HBOT will significantly impact stem cell therapy, because it has improved results for skin and pedicle grafts. See attached diagram. It is unfortunate that in the United States HBOT has been predominately limited to the small number of applications approved by CMS. In Russia, there are 73 indications for HBOT.

The physical examination has been the usual method for documentation of response to neurological and other medical problems. For brain abnormality, CT and MRI show the anatomy. The SPECT brain scan shows both blood flow and function. The SPECT brain scan has been used to document the pattern of brain function before and after HBOT. The SPECT brain scan has also been used to determine whether or not HBOT would benefit the patient by obtaining a baseline SPECT scan followed by a second short-term SPECT brain scan after one or two sessions of HBOT. If there is improvement on the second SPECT brain scan, there is high probability that the patient will show a significant response to a full course of HBOT.

It is unfortunate that SPECT brain scanning in the United States has had limited utilization. As a result, many nuclear medicine physicians are unfamiliar with interpreting the SPECT brain scan. There have been a number of instances where a significantly abnormal SPECT scan has been interpreted as normal. The SPECT brain scan has the advantage that in addition to perfusion of brain necessary to take the tracer to the brain, there is a functional component for localization, which permits evaluation of function and response to therapy. Cases showing the change in SPECT brain scan obtained before and after HBOT will be presented along with clinical correlation of the response of the patients.

Positron Emission Tomography (PET) scanning has been approved to stage and follow response to therapy for many types of cancer. PET brain scans are now being used to evaluate neurological problems other than seizures where it has been the gold standard. A tracer for PET scanning that may permit early diagnosis of Alzheimer's disease is being developed, and research is in process to evaluate the PET to demonstrate hypoxia.

The technique of MRI spectroscopy (MRIS) is being used to diagnose multiple sclerosis (MS) and monitor response and/or progression. MRIS appears to provide a significant improvement over standard MRI for MS evaluation and may be applied to

other neurological conditions. In addition, there is research to show MRIS with the 3T units can diagnose and monitor response of malignancy without biopsy. A spin-off of this MRIS technology is MRJS guided high frequency ultrasound ablation. This technology is currently approved for treatment of uterine fibroids. In the near future, breast and prostate cancer may be treated with this technology as well.

The data above shows the rapid progress in imaging that is under way. It is still unfortunate that the value of SPECT brain scans has not been appreciated and used routinely in clinical medicine.