

The Hibernating Cortex: An Innovative Area for Neuro-Rehabilitation

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Background: In serious brain injury, after 90 days, acute and sub-acute neuro-rehabilitation are diminished. However, there are dormant idling neurons in many long-term brain insults that may be reactivated with hyperbaric oxygenation. Often times, the family is advised to take the patient home since nothing more could be done and insurance coverage is at the limit. Certain families are unwilling to give up and turn to our center.

Materials and Methods: Between 1988 and 2003, 850 patients with long term brain insults of various etiologies including stroke, traumatic brain injury, anoxic ischemic encephalopathy, and toxic encephalopathy were studied with sequential functional brain imaging, SPECT (single photon emission computerized tomography), and hyperbaric oxygenation. Vicker's and Seacrest mono-place hyperbaric chambers were used with pressures of 1.1- 1.75 atmospheres (ATA), one hour, one to two times per day for 20 to 1200 treatments. All modalities of physical therapy, occupational therapy, speech therapy along with nutritional counseling and certain herbal medications were utilized.

Results: In about 70-percent of the cases, there was an increase in blood flow metabolism as noted on SPECT scanning. There is an 85-percent correlation between these changes and clinical improvement ranging from complete rehabilitation to a substantial reduction in cost of the care of the persistent vegetative state in which there is a return of person with rare reentry into society.

Conclusion: There are thousands of warehoused patients with some degree of hibernating, dormant idling neurons that could possibly be reactivated with hyperbaric oxygenation. The ultimate clinical status and degree of recovery in long term brain injury depends upon: a) the size and location of the irreversible epicenter core of destruction, b) the surrounding zone of the ischemic penumbra or hibernating cortex, fanning from the center core, c) the asymmetry involved, d) the organization and reorganization and plasticity of altered and non-impaired neurons, and e) the meshing of the sensory and motor fibers at brainstem cord junction.

It is hoped that this presentation would stimulate further investigation in field of the hibernating cortex.



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