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Effects of hyperbaric oxygen therapy on long-tract neuronal conduction in the acute phase of spinal cord injury.

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Abstract

To study the acute effects of hyperbaric oxygen ventilation (HBO) on long-tract function following spinal cord trauma, the authors employed a technique for monitoring spinal cord evoked potentials (SCEP) as an objective measure of translesion neuronal conduction in cats subjected to transdural impact injuries of the spinal cord. Control animals subjected to injuries of a magnitude of 400 or 500 gm-cm occasionally demonstrated spontaneous return of translesion SCEP within 2 hours of injury when maintained by pentobarbital anesthesia and by ventilation with ambient room air at 1 atmosphere absolute pressure (1 ATA). Animals sustaining corresponding injuries but receiving immediate treatment with HBO at 2 ATA for a period of 3 hours following impact demonstrated variable responses to this treatment modality. Animals sustaining injuries of 400 gm-cm magnitude showed recovery of translesion SCEP in four of five cases, while animals sustaining injuries of 500 gm-cm magnitude responded to HBO treatment by recovery of SCEP no more frequently than did control animals. When the onset of HBO therapy was delayed by 2 hours following impact, there appeared to be no demonstrable protective effect on long-tract neuronal conduction mediated by HBO alone. The observations suggest that HBO treatments can mediate preservation of marginally injured neuronal elements of the spinal cord long tracts during the early phases of traumatic spinal cord injury. These protective effects may be based upon the reversal of focal tissue hypoxia, or by reduction of tissue edema. HBO treatment markedly diminished the protective effects of HBO on long-tract neuronal conduction following traumatic spinal cord injury.