Liste-44

NEUROPHYSIOLOGICAL AND BIOCHEMICAL CORRELATES TO THE PAIN RELIEVING EFFECT OF SPINAL CORD STIMULATION: Experimental studies in neuropathic rats.

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Purpose: Neuropathic pain is often difficult to manage with pharmacotherapy but may be effectively alleviated by electric stimulation of the spinal cord (SCS). Though this mode of treatment has been extensively practised since more than two decades, little is known about the mechanisms involved in the pain relieving effect.
Methods: In a serie of experimental studies performed on rat models of mononeuropathy we have explored various biochemical and neurophysiological correlates to the effect of SCS on tactile hypersensitivity ("allodynia"). In most cases the experiments have been performed on awake, freely moving animals. SCS was applied with stimulus parameters similar to those used clinically.

Results: 1. SCS may effectively suppress tactile allodynia. This is in agreement with observations in patients where SCS may attenuate allodynia. Furthermore, SCS may normalize the abnormally low threshold of the first, Aß-mediated component of the flexor reflex.
2. In rats which do not respond to SCS with normalization of the withdrawal threshold to tactile stimuli, intrathecal administration of low-dose GABA, baclofen, mucimol or adenosine may markedly potentiate the effect of SCS. Conversely, intrathecal administration of receptor antagonists to GABA and adenosine counteracts the allodynia-suppressive effect of SCS.
3. In rats which respond to SCS with suppression of tactile allodynia there is a significantly increased release of GABA and a decrease of the release of excitatory amino acids in the dorsal horn as demonstrated by microdialysis.
4. In rats exhibiting tactile allodynia WDR-neurons in the dorsal horn exhibit hyperexcitability in response to peripheral innocuous stimuli. SCS applied in lightly anaesthetized animals markedly attenuates the hyperexcitability of most of these neurons.
All behavioural, biochemical and electrophysiological effects of SCS outlasted the stimulation period (10-30 min) with 10-50 minutes.

Conclusions: Our data supply a clue to the understanding of the mode of action of SCS when applied as treatment of pain due to peripheral nerve injury. Moreover, the results indicate that the therapeutic effect of SCS can be enhanced by adjuvant pharmacotherapy with baclofen and/or adenosine.