Liste-43

SPINAL CORD STIMULATION COUNTERACTS ISCHEMIA IN EXPERIMENTAL SKIN FLAPS: Animal Studies.

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Purpose: Spinal cord stimulation (SCS) is favourable in limb ischemia and ischemic pain. The best results are observed in vasospastic cases, e.g. Raynaud's syndrome. It has earlier been demonstrated that SCS may attenuate experimentally induced vasospasm in ischemic neurovascular skin flaps in the rat. In these studies it was observed the application of SCS before ischemia induction was more effective than if used only when ischemia was apparent. The present study was designed to investigate whether pre-emptive SCS can increase long-term flap survival after severe ischemia and to elucidate the neurohumoral mediation of the effect.

Methods: Rats were implanted with chronic monopolar SCS systems. Three days later a groin flap based on the superficial epigastric vessels was harvested and the single feeding artery occluded by a detachable microvascular clip. After 12 hours the clip was removed. Flap survival was evaluated after seven days. Immediately before flap surgery three groups of animals received 30 min. SCS with clinical current parameters and with stimulation amplitudes of 70 or 90% of that evoking muscular contractions in the abdomen. The outcomes in these groups were compared to those in two control groups. In one group a calcitonin gene-related peptide (CGRP)- receptor antagonist was injected i.v. prior to SCS.

Results: In the control groups without stimulation virtually all flaps had necrotized after one week. In SCS treated groups flap survival rate was 60% at the lower intensity and almost 90% at the higher. The administration of a CGRP-antagonist before SCS reduced treatment efficacy to below 40% survival. The differences between the untreated and treated groups were significant. The decrease in survival after CGRP receptor blockage was significant in one out of two statistical tests.

Conclusions: Pre-emptive spinal cord stimulation significantly enhances survival of skin flaps with critical ischemia. This effects seem to be dependent on the stimulation intensity and it may be mediated by the release of CGRP in the periphery. These findings may have practical implications in surgery of skin flaps with critical ischemia in humans.