

Intraoperative neuromonitoring in experimentally-induced spinal cord injuries

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Introduction

Patients with acute spinal cord injury (SCI) often require immediate surgery.

In these cases, the surgical treatment without intraoperative neurophysiologic monitoring may produce unnoticed additional medullar damage or aggravate pre-existing SCI.

Objective

The aim of the study was to verify the feasibility of the intraoperative neuromonitoring in experimental animals with Spinal Cord Injury, analyzing its sensitivity and the rationale for its use.

Experimental Design I

Two groups of 5 industrial pigs were used.

In the **first group**, the spinal cord was exposed at T7-T11 levels, placing sublaminar epidural catheters cranially and caudally.

Between the T8-T9 pedicles, the spinal cord underwent a progressive spinal compression using a specially-design compression device with two adjustable parallel bars placed on both sides of the spinal cord.

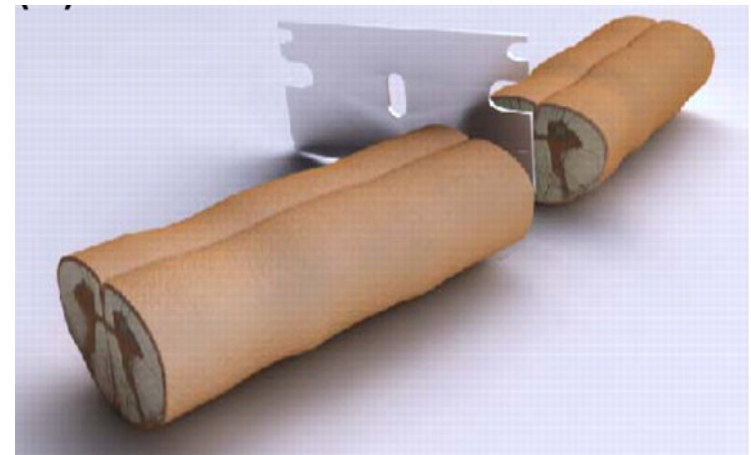
The spinal cord was compressed at a rate of 0.5 mm every 2 minutes.

Motor evoked potentials were recorded at the caudal epidural catheter after proximal cord stimulation until complete disappearance of potentials

Experimental Design II

In the **second group**, the spinal cord was exposed at T4-T5 and T12-T13 levels.

The T8 level was also exposed for sectioning of the spinal cord at that level.



In these animals, the spinal cord compression was performed simultaneously at T5 and T12 levels (above and below the lesion), placing 4 epidural catheters (proximal and distal compression to each site).

Results

First group (spinal cord compression at T8-T9)

A complete disappearance of potentials occurred after a mean cord compression of 4.6 ± 1.2 mm. That means at a reduction of more than 50% of the diameter of the spinal cord.

Results

Second group (Spinal cord section)

The loss of potentials occurred after a mean compression of 5 ± 0.8 mm at T5.

The cord compression at T12 induced loss of the potentials after a mean compression of 3 ± 0.7 mm.

Conclusions

1. Neurophysiologic monitoring is possible in patients with acute SCI both above and below the lesion.
2. The spinal cord located distal to the level of injury is much more susceptible to compression than that located proximally.
3. This study suggests the importance of performing intraoperative neuromonitoring in paraplegic patients requiring surgery.