



The Importance of Somatotopy to Achieve Clinical Benefit in Motor Cortex Stimulation for Pain Relief

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Introduction

The aim of this study was to search the relationship between the anatomical location and the eventual analgesic effect of each contact.

Methods

22 patients (14 men and 8 women) suffering from central and / or peripheral neuropathic pain were implanted with stimulation of the precentral cortex.

The implantation of the electrodes was performed using intraoperative: 1) Anatomical identification by Neuronavigation with 3D MRI, 2) Somesthetic evoked potentials monitoring to check the potential reverse over the central sulcus, 3) Electrical stimulations through the dura to identify the motor responses and its somatotopy.

In order to locate postoperatively the electrodes, a 3D-CT was performed in each case and fused with the preoperative MRI. The clinical analgesic effects of cortical stimulation were collected on a regular basis (VAS reduction > 50%, drugs consumption). Data were analyzed to search a correlation between the anatomical position of contacts and analgesic effects.

Results

Post implantation analgesic effects were obtained in 18 (81.81 %) patients out of 22. The analgesic effect was companied with reduction of the drugs consumption in 15 patients (68.18 %). The post-operative 3D CT analysis shows a correspondence between the effective contacts localization and the motor cerebral cortex somatotopy in the patients with post-operative good analgesic effects. No correspondence was found between the contacts localization and the motor cerebral cortex somatotopy in the 4 patients with no analgesic effects. In three out of these four patients, analgesic effects were obtained after a new surgery allowing a replacement of the electrode position over the motor cortex somatotopy corresponding to the painful area.

Learning Objectives

To search the relationship between the anatomical location and the eventual analgesic effect of each contact.

Conclusions

This study shows the correlation between position of the contact over the precentral cortex and the analgesia obtained when the somatotopy of the stimulated cortex correspond to the painful area.