Setting of MEP stim needle using Stealth DTI®

Suzuki Takanori, Sanpei Tomoya, Izawa Kazuhiro, Yomo Shoji, Hirasawa Ken-ichi, Obara Takuma, Ino Hiromichi, Watayou Teruhisa
San-ai Hospital
Intraoperative tractography and motor evoked potential (MEP) monitoring in surgery for gliomas around the corticospinal tract. (Maesawa S, etc. Nagoya University, 2010)

White Matter Mapping by DTI-based Tractography for Neurosurgery. (Kamada K, etc. Tokyo University, 2009)

The motor-evoked potential threshold evaluated by tractography and electrical stimulation. (2009, Tokyo University)

Fibers from the dorsal premotor cortex elicit motor-evoked potential in a cortical dysplasia. (2007, Kyoto University)

Corticospinal Tract Localization: Integration of Diffusion-Tensor Tractography at 3-T MR Imaging with Intraoperative White Matter Stimulation Mapping—Preliminary Results. (2006, Kyoto University)

There is a little number of reports which refer to tractography and motor evoked potential (MEP) by Trans-Cranial Stimulation (TCS)
(You already know) MEP with tractography is more effective monitoring

Routine TCS-MEP, some unsatisfied cases

For more satisfying TCS-MEP
Devices

- Neuropack S1
- Multipulse D185
- Stealth DTI®
- Stealth Station TRIA®
Stealth DTI

- A specialized workstation to visualize tractography and to be able to link with neuro navigation system.

- We thought that Stealth DTI enables to improve the efficiency of TCS stimulation.
Our Method

1. Describe PT using Stealth DTI

2. Transfer it to navigation

3. Set stim needle by using tractography (A) and routinely (B)

4. MEP measuring and compare (A) waves with (B) waves
Case Report: PT pressed Anterior

- Cavernous Angioma  43y Male
- Gait dist(+)  Speech dist(+)

[Images of brain scans]
So I did …

Setting of Stim Needle
Comparison of Waves

(A) Pre Operation | Post Operation
--- | ---
Stim Setting | 600V 2msec Single stim
Analysis Time | 10msec
A1-D1 Upper | A3-D3 Lower

(B)

Stim Setting
600V
2msec
Single stim
Analysis Time
10msec
A1-D1 Upper
A3-D3 Lower
Post operative progress

- No new deficit
- Gait dist was improved

Our Method produced more reliable results.
### Result

<table>
<thead>
<tr>
<th>Our method</th>
<th>Routine method</th>
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<tbody>
<tr>
<td>Very good</td>
<td>good</td>
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It’s indicated that our method is more effective one than routine method.
## Discussion 1

- We tried total 8 cases.

<table>
<thead>
<tr>
<th>Good Result</th>
<th>Not so Good</th>
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<tbody>
<tr>
<td>7</td>
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“Good Result” means results of MEP and post operative paralysis do not have difference and wave width of our method is bigger more than 25% than normal method.
Discussion 2

- We have not to raise voltage of stimulus extra in order to get efficient result.

- When pyramidal tract is pressed and moved by tumor, it’s more effective to use tractography for intraoperative TCS-MEP rather than to do routinely.
Conclusion

- Our method indicated the availability of using tractography at setting TCS-MEP stim needle.
- Further examination will be necessary in future, because there are a little number of the cases.

Thank you for your attention!