CORRELATION BETWEEN SIIC AND POSTOP MUSCLE STRENGTH AFTER ROLANDIC BRAIN TUMOR SURGERY

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Background

Preoperative mapping: critical for resection of brain tumors located on eloquent areas

Transcranial Magnetic Stimulation (TMS):
- well tolerated and safe;
- noninvasive;
- accurate;

8 studies showing that nTMS motor mapping:
- reduced the risk of postop new permanent motor deficit);
- increased the GTR rate;¹

Objective

To evaluate Cortical Excitability (CE) of patients with rolandic brain tumors and to correlate its parameters with motor outcome after surgery.

Methods

ONGOING PROSPECTIVE STUDY - 26 patients with a single rolandic brain tumor, Motor score and KPS: upper + lower extremity: preop, 5, 30 and 90-day postops.

TMS: simple and paired pulses on M1 one week before surgery.

Cortical Excitability parameters:
- Resting Motor Threshold (RMT),
- Motor Evoked Potential (MEP),
- Short-Interval Intracortical Inhibition (SIICI),
- Intracortical Facilitation (ICF).

Low x normal x high (normative values obtained by Cueva et al.)

Statistical analysis: to compare patients according to TMS classification (normal x low x high): Kruskal Wallis; correlations with motor score: Spearman. (SPSS 24.0 - IBM Statistics, Armonk, NY, USA).

Results

Study Population

- 26 patients: 53.8% of males.
- 51.08 ± 13.26 years.
Ill hemisphere > healthy hemisphere, although not significant:

RMT \( p = 0.137; \)
MEP \( p = 0.543; \)
SIIC \( p = 0.122; \)
ICF \( p = 0.088. \)
Results

Healthy hemisphere’s SIIC was correlated with motor score:
- 5-day postop (p = 0.023, r = -0.471),
- 30-day postop (p = 0.042, r = -0.447),
- 90-day postop (p = 0.047, r = -0.474),
- delta between 90-day postop and preop (p = 0.034, r = -0.517)
Patients with MS <8 presented higher healthy hemisphere SIICI than patients with MS 8-10:

- preop $p = 0.022$;
- 5-day postop $p = 0.003$;
- 90-day postop $p = 0.015$. 
Discussion

Rosenstock (2017)\(^1\) found:
✓ 7-days postop: RMT ratio > 110 associated with higher probability of worsening
✓ 3-months postop: RMT ratio not significantly associated.

This study is the first to find association of a pathological neurophysiological factor with late motor outcome.

Summary points

In patients with brain tumors:

- RMT, MEP, SIIC, and ICF: Ill hemisphere > healthy hemisphere.
- Preop healthy hemisphere’s SIIC was correlated with early and late motor outcome.
- Patients with lower motor scores presented higher healthy hemisphere’s SIIC.

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