Case series on effect of Transcranial Magnetic Stimulation (TMS) on motor recovery after spinal insult

Authors:
LO Sze Fai Jackie¹, YUEN Ming Hin¹, CHEUNG Fung Ching¹, CHEE Bryan², LUK Helen²

Institution(s):
¹Department of Neurosurgery, Queen Elizabeth Hospital, Hong Kong
²Department of Physiotherapy
Background

• Transcranial magnetic stimulation (TMS)
  – Modulate activity in cortical region via magnetic field induced by passing alternating current through metal coil
  – Established effect for motor rehabilitation for stroke
  – How about application of spinal cord insult?

• Traditionally peripheral stimulation is advocated in spinal insult cases.
  – Can transcranial stimulation induce similar motor rehabilitation effect as peripheral stimulation?

• The aim of this case series is to explore effect of intermittent theta burst (iTBS) of TMS on motor recovery after spinal insult.
Methodology

• Retrospective single center case series for spinal insult in Queen Elizabeth Hospital

• 3 cases of spinal insult, without significant neurological recovery for at least 2 months of intense physiotherapy, received iTBS with intermittent theta burst pattern in 2019.

• Total 10 sessions of iTBS were performed for each cases followed by physiotherapy.

• Limb power and functional level were analyzed before treatment, immediate post-treatment, 3 months post-treatment and 6 months post-treatment.
Result

- All 3 cases had clinical and functional improvement after TMS and the effect could be sustained at 6 months

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<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
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| • Cervical spinal tumor  
  • Improvement of his right hand-grip power from 9.6 kg/f to 10.4 kg/f  
  • Limb power remain 4/5. | • Thoracic spinal tumor  
  • Present with left LL weakness  
  • improve left LL power from 0 to 4/5  
  • functionally improve from unable to walk to walk with stick. | • Thoracic spinal tumor  
  • Present with left LL weakness  
  • Improve left LL power from 4 to 5/5  
  • functionally improve from not able to run to being able to run on treadmill. |
Discussion

• Improvement due to natural recovery from operation and traditional physiotherapy?
  – All 3 cases selected had already reached a plateau of motor rehabilitation with traditional physiotherapy for at least 2 months to unmask the effect of natural recovery or pure physiotherapy.

• Any major side effect?
  – In our cases, all 3 cases did not have any major side effects

• Sustainability of improvement?
  – Latest follow up within this half year
  – Sustainable from post 6 month status
Conclusion

• Clinical and functional improvement achieved
• No major side effects in this case series
• Sustainable improvement both clinically and functionally.
• TMS in spinal insult cases appeared to be safe and effective yet large scale randomized controlled trials are required for confirmation.