



## Service Priorities and Programmes Electronic Presentations

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### **Targeting a new strategy to augment recovery after acute stroke**

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### **Introduction**

Upper limb (UL) impairment after stroke remains a clinical challenge in rehabilitation. Nearly three quarters of stroke survivors show initial UL dysfunction after stroke and persist in first six months. Only 20% of them achieve some functional recovery. Poor recovery of the UL leads to limitations in ADL and quality of life.

Advances in knowledge of motor relearning and technology have led to the clinical application of a novel strategy targeting the augmentation of upper limb motor recovery after stroke. It combines physiotherapy with navigated repetitive transcranial magnetic stimulation (n-rTMS).

Physiotherapy department pioneered this cutting-edge therapy in Acute Stroke Unit since Aug 2015. We have this golden opportunity to offer stroke patients the best potential and augmentation in recovery.

In stroke patients, the non-lesioned side of the brain becomes hyperactive to compensate and sending inhibitory signals to the lesioned side. n-rTMS inhibits the hyperactive side, so that the lesioned side have a better chance of recovery.

Adding navigation to rTMS is the key to finding the exact location of the motor area that should be inhibited by stimulation. The device creates a 3-D model of the brain, pinpointing the target site for stimulation in real time similar to mapping the globe with a GPS. The stimulation is then accurately repeated in every session, assuring the dose is applied to the correct site.

### **Objectives**

To investigate the efficacy of this new, non-invasive therapy to promote UL recovery after stroke.

### **Methodology**

Indicated acute stroke patients received low frequency (1Hz)n- rTMS to non-lesioned hemisphere for 1200 pulses, followed by 30- to 45-minute UL functional training for a

total of 5 to 10 sessions. The UL function was evaluated by Fugl-Meyer Assessment (FMA) arm score at baseline (D0), day 5 (D5), day 10 (D10) and 3 months post-treatment (3M). Patients were monitored during and after treatment for any harmful effects, particularly seizures. All of them received a course of rehabilitation and home program was prescribed upon discharge.

### **Result**

40 patients were recruited from Aug 2015 to Dec 2016. When compared with baseline values, significant improvements with paired-t test were found in FMA score from D0 to D5 (n=40,  $32.43 \pm 15.68$  to  $46.03 \pm 16.09$ ,  $p < 0.000$ ), D0 to D10 (n=24,  $27.71 \pm 14.23$  to  $45.46 \pm 13.8$ ,  $p < 0.000$ ). On-going data collection with follow-up evaluation after 3 months showed further improvement of UL functions, from D10 to 3M (n=10,  $45.9 \pm 16.66$  to  $54.1 \pm 14.22$ ,  $p < 0.001$ )

A total of 70% of patients suffered from severe impairment (FMA < 44/66) at initial but 90% of patients achieved good recovery (FMA  $\geq$  44/66) after 3 months.

No adverse effect including seizure was reported.

This combination of n-rTMS and physiotherapy provides significant functional recovery and lasting improvements in stroke patients. Our protocol is safe and promising in neuro-rehabilitation, although its efficacy should be confirmed in randomized controlled study.