

Department of Rehabilitation Medicine

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General Summary

Research topics of our department have focused on the following: 1) repetitive transcranial magnetic stimulation (rTMS) for stroke; 2) dysphagia after stroke; 3) development of the Kinder Infant Development Scale (KIDS); 4) diffusion tensor imaging in mild traumatic brain injury; and 5) effects of botulinum toxin injection for the upper limb after stroke.

Research Activities

rTMS for stroke

1. A multicenter study of low-frequency rTMS combined with intensive occupational therapy for upper limb hemiparesis after stroke

The 15-day protocol of inpatient rTMS plus occupational therapy (OT) was confirmed as a safe, feasible, and clinically useful intervention for the affected upper limb after stroke in a large number of patients from different institutions. The response to treatment was not affected by age or time after stroke onset.

2. Outpatient application of rTMS and OT for upper-limb hemiparesis after stroke: A pilot study

Daily application of rTMS and intensive OT at an outpatient clinic is a novel treatment for patients with mild upper-limb hemiparesis after stroke.

3. Application of combined 6-Hz primed low-frequency rTMS and intensive OT for upper-limb hemiparesis after stroke

The 15-day protocol of 6-Hz-primed low-frequency rTMS combined with intensive OT seems to be a safe and useful treatment for upper-limb hemiparesis after stroke.

4. Therapeutic application of 6-Hz-primed low-frequency rTMS combined with intensive speech therapy for poststroke aphasia

The protocol of 6-Hz-primed low-frequency rTMS and intensive speech therapy for poststroke aphasia was safe and feasible, suggesting its usefulness in the treatment of this condition.

5. Combination treatment of low-frequency rTMS and OT with levodopa administration: An intensive neurorehabilitative approach for upper-limb hemiparesis after stroke

The combination treatment of low-frequency rTMS, intensive OT, and oral administration of levodopa could provide a safe and feasible intervention for upper-limb hemiparesis after stroke.

6. Antispastic effect of low-frequency rTMS and OT for patients with upper-limb hemi-

paresis after stroke

The 15-day inpatient protocol of low-frequency rTMS and intensive OT is potentially suitable for reducing spasticity and for improving the motor function of the affected upper limb after stroke.

7. Baseline severity of upper-limb hemiparesis affects the outcome of low-frequency rTMS and intensive OT in patients after stroke

The 15-day protocol of low-frequency rTMS and intensive OT is a promising treatment for improving the motor function of the affected upper limb. The extent of motor improvement seemed to be affected by the severity of upper limb hemiparesis at study entry.

8. A comparison of the effects of high- and low-frequency rTMS on upper-limb hemiparesis in the early phase of stroke

High-frequency rTMS applied to the lesional hemisphere in the early phase of stroke was more beneficial for motor improvement of the affected upper limb than was low-frequency rTMS.

Dysphagia after stroke

1. Swallowing analysis for semisolid food texture in patients with dysphagia after stroke
The textures of different semisolid foods were identified. Adhesiveness and gumminess seemed to be related to residue deposition and aspiration.

2. Which cortical area is related to the development of dysphagia after stroke? A single photon emission computed tomography study using novel analytic methods

With single photon emission computed tomography and a novel method of analysis, regional cerebral blood flow in Brodmann areas 4 and 24 were found to be significantly lower in patients with dysphagia. In area 4, 80% sensitivity and 60% specificity for discriminating dysphagia were achieved with an optimal cutoff value.

Development of the family-rated KIDS

1. Evaluation of the family-rated KIDS for disabled children

We tested the validity and reliability of the KIDS rated by families for assessing disabled children. The results showed good validity and almost perfect reliability.

Diffusion tensor imaging in mild traumatic brain injury

1. Voxel- and atlas-based analyses of diffusion tensor imaging may reveal focal axonal injuries in mild traumatic brain injury: Comparison with diffuse axonal injury

Voxel- and atlas-based analyses of diffusion tensor imaging suggest that patients with mild traumatic brain injury have focal axonal injury and that the pathophysiology is significantly different from that of diffuse axonal injury. These findings will aid the diagnosis of patients with mild traumatic brain injury.

Effects of botulinum toxin injection for the upper limb after stroke

1. Injection of botulinum toxin type A followed by home-based functional training for upper limb hemiparesis after stroke

Our proposed protocol of injection of botulinum toxin type A followed by home-based

functional training might improve the active motor function of the affected upper limb after stroke.

Publications

Kakuda W, Abo M, Kobayashi K, Momosaki R, Yokoi A, Fukuda A, Umemori T. Application of combined 6-Hz primed low-frequency rTMS and intensive occupational therapy for upper limb hemiparesis after stroke. *NeuroRehabilitation*. 2011; **29**: 365-71.

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Hashimoto K, Mastui N, Yukawa H, Miyamura K. Evaluation of the family-rated Kinder Infant Development Scale (KIDS) for disabled children. *Jikeikai Med J*. 2012; **59**: 5-10.

Reviews and Books

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