52% for the acute stroke group. The majority of deaths were from cardiovascular causes; recurrent status epilepticus was not documented as the cause of death in any patient (although cause of death was unknown in many cases). Although patient group did not significantly affect survival in univariate analysis, multivariate analysis showed a more than twofold increased risk of death in the status epilepticus group after ≥6 months ($P = 0.0392$). One possible explanation for the increased risk could be that status epilepticus is a manifestation of severe (cerebro)vascular disease, leading to an increased risk of cardiovascular death.

Further well-designed, prospective studies are, say the authors, needed to clarify these findings. To improve on their own study, they advise matching patients for lesion size, lesion localizations and stroke type, and collecting data on concomitant diseases, especially cardiovascular disease.

Original article Knake S *et al.* (2006) Status epilepticus after stroke is associated with increased long-term case fatality. *Epilepsia* **47:** 2020–2026

Transcranial magnetic stimulation for the relief of chronic pain

Current treatments for chronic pain are often ineffective, or their usefulness is limited by adverse effects. Repetitive transcranial magnetic stimulation (rTMS) has emerged as a new approach in this therapeutic area. The mechanisms responsible for the analgesic effect of rTMS are unknown, however, and the optimal parameters of rTMS for pain relief also remain to be determined. Two recent studies by French researchers have shed more light on these issues.

In the first study, Lefaucheur and colleagues looked at the effect of rTMS on cortical excitability. The trial included 22 patients with unilateral hand pain of neuropathic origin and 22 controls; all participants received active or sham rTMS at 1 Hz or 10 Hz as the study intervention. Single-pulse and paired-pulse TMS was used to evaluate cortical responses before and after rTMS. At baseline, patients with neuropathic pain had a normal motor threshold measured at rest and normal motor evoked potential amplitudes; intracortical facilitation tended to be reduced, but the reduction was not significant. There was, however, a significant reduction in intracortical inhibition in the motor cortex corresponding to the painful hand, compared with the motor cortex corresponding to the patient's painless hand ($P < 0.01$) and compared with the motor cortex of controls ($P < 0.001$). The cortical silent period after TMS in either hemisphere of patients with hand pain was also significantly shorter than that in controls ($P < 0.01$). These findings indicate that chronic neuropathic pain might be associated with a reduction in intracortical and corticospinal motor inhibition. Administering 10 Hz rTMS restored the intracortical inhibition in the cortical region corresponding to the painful hand, and the effect correlated with pain relief. Other parameters of cortical excitability were not affected by the intervention.

In a separate study, the investigators aimed to clarify the optimum site of stimulation with rTMS. They enrolled 36 patients with unilateral chronic neuropathic pain that occurred in the face or hand, and applied 10 Hz rTMS over cortical areas that corresponded to the face, hand or arm of the side of the body affected by the pain. A patient's pain was rated on a visual analog scale ranging from 0 to 100. All rTMS sessions significantly relieved pain (P values in the range 0.01–0.001 for all comparisons with baseline), but the analgesic effects were greatest if the stimulation was applied to an area adjacent to the cortical zone representing the painful site. For example, in patients with hand pain, the averaged pain scores improved by 37% after rTMS of the face area, 22% after rTMS of the arm area and 18% after rTMS of the hand area. The findings indicate that rTMS, unlike chronic motor cortex stimulation with implanted epidural electrodes, should not target the cortical area corresponding to the site of pain, but an adjacent one, to achieve optimum pain control.

In conclusion, both studies confirmed that 10 Hz rTMS, delivered over the primary motor cortex, is able to relieve chronic neuropathic pain. rTMS seems to work by restoring defective intracortical inhibitory processes. The optimal strategies were hand area stimulation for patients with facial pain and face area stimulation for patients with hand pain.

Original articles Lefaucheur JP *et al.* (2006) Motor cortex rTMS restores defective intracortical inhibition in chronic neuropathic pain. *Neurology* **67:** 1568–1574
Lefaucheur FP *et al.* (2006) Somatotopic organization of the analgesic effects of motor cortex rTMS in neuropathic pain. *Neurology* **67**: 1998–2004