Our panel of experts highlight the most important research articles across the spectrum of topics relevant to the field of pain management

Expert panel: Nanna B Finnerup, Aarhus University Hospital, Denmark; Michael Erdek, Johns Hopkins University, MD, USA

Mazzola L, Isnard J, Peyron R, Mauguière F. Stimulation of the human cortex and the experience of pain: Wilder Penfield's observations revisited. *Brain* 135, 631–640 (2012).

The work by Wilder Graves Penfield from 1968 describing the functional organization of the sensory and motor areas of the human cerebral cortex is well known. However, during the electrical stimulation with intracerebral microelectrodes, painful sensations were not obtained. In this study by Mazzola *et al.*, behavioral responses to 4160 intracortical stimulations in 164 patients during presurgical evaluation of epilepsy were analyzed. Pain responses were rare and arising from a deep region of the cortex in the medial part of the parietal operculum and neighboring posterior insula, regions that were not reached during the recordings of Penfield and colleagues. Mazzola *et al.* also found that stimulation in these areas could evoke thermal sensations, while pain and thermal sensations were not detected in other cortical areas.

– Written by Nanna B Finnerup

Drdla-Schutting R, Benrath J, Wunderbaldinger G, Sandkühler J. Erasure of a spinal memory trace of pain by a brief, high-dose opioid administration. *Science* 335, 235–238 (2012).

In this study, the μ -opioid agonist remifentanyl reversed activity-dependent long-term potentiation induced by painful stimuli

activating nociceptive C fibers. In addition, remifentanyl reversed hyperalgesia. If these findings can be translated into humans, transient high-dose opioids could theoretically be used to prevent the development of chronic pain. The side effects of opioids and the risk of opioid-induced hyperalgesia are still concerns, but the present study suggests that this is an area that should be further studied.

– Written by Nanna B Finnerup

Papnastassiou ID, Phillips FM, Van Meirhaeghe J *et al.* Comparing effects of kyphoplasty, vertebroplasty, and non-surgical management in a systematic review of randomized and non-randomized controlled studies. *Eur. Spine J.* doi:10.1007/s00586-012-2314-z (2012) (Epub ahead of print).

A systematic review and meta-analysis was undertaken of 1587 vertebroplasty (VP) and kyphoplasty (KP) studies published up to February 2011. Of these, 27 met inclusion criteria of being prospective multiple-arm studies and including at least 20 patients (class I and class II evidence). Outcomes assessed were pain reduction, subsequent fracture rate, kyphosis angle reduction, quality of life and procedural cement extravasation. Pain reduction appreciated for VP (-4.55 points) and KP (-5.07 points) was significantly superior to nonsurgical management (NSM; -2.7 points; $p < 0.01$ for both). Subsequent fracture rate was also significantly better for the two interventions when comparing

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NSM (22%) to VP (11%; $p = 0.04$) and KP (11%; $p = 0.01$). When comparing disability reduction using the Oswestry Disability Index and the Roland Morris Disability Questionnaire, KP (-3.93) showed a trend of superiority to VP (-1.95; $p = 0.08$), and significant improvement over NSM (-0.77; $p = 0.008$). Comparisons were also made between VP and KP. Reduction of kyphosis angle was superior in KP versus VP (4.8 vs 1.7°; $p < 0.01$). Quality of life was assessed with a combination of the SF-36 and the SF-12 scales. KP (7.13 unit improvement) was significantly better than that seen with VP (2.70; $p = 0.043$). KP (18.1%) was also superior to VP (41.1%) when examining number of cases with observed cement extravasation ($p = 0.01$). There was a significant difference in reduction in pain based on fracture age. VP or KP performed on fractures less than 7 weeks of age showed an average reduction in pain of 5.0–7.0 points. Procedures performed on fractures between 7 weeks and 4 months

of age, however, showed pain reduction in the range of 3.8–4.5 points for KP and 2.3–3.5 points for VP. The authors admit study limitation due to bias secondary to heterogeneity amongst included studies in randomization and outcome reporting methods.

– Written by Michael Erdek

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