Study overview – the role of buprenorphine in the treatment of neuropathic pain

The effectiveness and safety of buprenorphine in patient with neuropathic pain symptoms has been shown in several clinical studies:

- An experimental human pain model using a randomized, double-blind, placebo controlled, cross-over design investigated the time course of analgesic and antihyperalgesic effects of s.l. and i.v. buprenorphine. It was shown that for both applications of buprenorphine, the anti-hyperalgesic effects were more pronounced and longer lasting compared to the analgesic effects. This was in contrast to the behaviour of pure μ-receptor agonists (Koppert et al, 2005).

- A study of 21 patients with chronic neuropathic pain following thoracic surgery found intravenous buprenorphine reduced both nociceptive pain immediately after surgery and neuropathic pain that was present one month later. The results indicated that the management of neuropathic pain with buprenorphine was dose-related, but although a higher dose led to more pronounced analgesia, the occurrence of side effects was not increased (Benedetti et al. 1998).

- Three large randomized controlled trials on 445 patients with chronic pain of cancer and noncancer origin, 52 of whom had neuropathic pain, concluded that transdermal buprenorphine was effective in a wide range of pain conditions including neuropathic pain. The need for rescue medication for breakthrough pain was reduced and quality of sleep was improved (Böhme et al. 3003, Sittl et al. 2003; Sorge et al. 2004). A retrospective study of the use of transdermal buprenorphine over a period of 8 weeks by 237 patients with nonmalignant neuropathic pain showed significant improvement in pain relief, with a 55% reduction in pain scores being achieved by week 8. Quality of sleep was significantly improved (p<0.001). Transdermal buprenorphine had a good safety and high user compliance profile (Rodriguez-Lopez 2004).

- Two cases of neuropathic pain and two cases of nociceptive pain with a significant neuropathic component have been treated with transdermal buprenorphine. In each case, sufficient pain relief was obtained and the patients encountered no problems in switching from their previous therapy. Compared to the previous opioids used, dose reductions of up to 30% were achieved without limitation in analgesic efficacy. (Likar and Sittl, 2005).

- A post marketing surveillance study of 13,179 patients with moderate-to-severe pain, some of whom were suffering from neuropathic pain, indicated that using transdermal buprenorphine good or very good pain relief was reported by 84% of
the cancer patients and 80% of noncancer patients. Overall, the study found that incidence of side effects (systemic and local) was lower in clinical practice compared with clinical studies (Griessinger et al. 2005). The incidence of CNS side effects was lower compared with a similar study using transdermal fentanyl (Radbruch et al. 2001).

Several animal tests have also indicated buprenorphine’s effectiveness in neuropathic pain:

- A study comparing the antinociceptive and anti-hyperalgesic effect of buprenorphine found that in normal rats buprenorphine had a significant (p=0.01) antinociceptive effect both on mechanical and cold hyperalgesia in the sciatic nerve model. In rats with spinal cord injury, increasing doses of buprenorphine increased the threshold to mechanical stimuli, normalized sensitivity to cold and significantly decreased mechanical and thermal hyperalgesia. Pain relief was complete and prolonged in both cases with no sedative effect being seen in either model (Kouya et al., 2002).
- Administration of buprenorphine resulted in a strong and dose-dependent alleviation of tactile allodynia in a rodent spinal ligation model. It also caused a dose-dependent inhibition of both mechanical hyperalgesia and cold allodynia in streptozocine and vincriatine treated animals. It was concluded that buprenorphine is fully effective both in mononeuropathic and polyneuropathic pain models in animals (Christoph et al. 2005).

References


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