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Pain in patients with osteoarthritis treated with total knee arthroplasty

AKADEMISK AVHANDLING

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ABSTRACT

Background: The pathogenesis and mechanisms of pain in osteoarthritis (OA) are virtually unknown. In the absence of specific and effective pharmacological treatment, joint replacement often remains the only option. Total knee arthroplasty (TKA) has a significant effect in terms of pain relief. However, in one out of 5 cases TKA does not offer satisfactory pain relief. Inflammation, tissue damage and intense pain in conjunction with surgery have been suggested to cause neuroplastic changes in the central nervous system leading to hypersensitivity. In some patients this central sensitization is sustained and is believed to be responsible for pain persisting after TKA. The search for analgesics with a potential of preventing acute and persistent pain, has been directed not only to agents mitigating pain in conjunction with surgery, but also to agents that may block the mechanisms of central sensitization. Tramadol, a weak opioid drug, and also an inhibitor of the reuptake of serotonin and norepinephrine, has been suggested for prevention of persistent pain.

Aims: The aim of the present study was to explore preoperative clinical features associated with persistent pain after TKA. In particular, the aim was to test the predictive value of separating pain at rest from pain with movement with regard to pain relief after TKA. Also an analysis of radiological and histological changes in relation to pain at rest and pain with movement was conducted. Finally, the effect of intravenous tramadol 100 mg x 4, given during 24 hours after TKA, on acute postoperative pain and persistent pain 18 months after surgery was evaluated.

Results: Preoperatively, a low pain threshold to electrical stimulation and a high Visual analogue scale (VAS) score for pain at rest, but not with movement, was found to predict a worse outcome in terms of pain at rest 18 months after TKA. The grade of radiographic OA was significantly related to relief of pain with movement from preoperatively to 18 months postoperatively. Best pain relief by TKA was achieved in patients with severe radiographic changes. The combination of intravenous tramadol 100mg x 4 and morphine via patient controlled analgesia (PCA) pump did not offer better pain relief after TKA than morphine alone. Nor did tramadol prevent persistent pain 18 months after surgery.

Conclusions: Pain at rest should not be a prerequisite for TKA. Instead, a high preoperative score for pain at rest and a low pain threshold may be signs of central sensitization and indicate an increased risk of persistent postsurgical pain. Patients scheduled for TKA should be informed that the main gain to expect is relief of pain with movement. The evaluation of the outcome after TKA should be based on changes in pain from preoperatively to postoperatively, instead of merely considering postoperative pain. Most importantly, follow up studies on pain relief by joint replacement should separately consider pain at rest and pain with movement. Tramadol 100mg x 4 given intravenously as an add-on to morphine during 24 hours postoperatively does not prevent acute or persistent postoperative pain after TKA. In clinical practice, the use of already well-established diagnostic tools should be expanded for the purpose of identifying patients at high risk of persistent pain after TKA. Hopefully this could provide guidelines on when to offer pharmacological prevention of persistent postsurgical pain or even avoid surgery.

Key words: Pain, osteoarthritis, total knee arthroplasty, radiography, histology, pain threshold, sensitization, VAS, tramadol