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Peri-operative Strategies to Reduce Pain Post Total Knee Arthroplasty

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Commentary

Pain after a total knee arthroplasty (TKA) is of great concern to both patients and clinicians. Poorly controlled post-operative pain has detrimental effects on early re-mobilisation, increases associated complications such as DVTs and reduces longer-term functional recovery [1].

The concept of combined peri-operative strategies to manage analgesia after TKA has been discussed in the literature for more than two decades. The femoral nerve block (FNB) has long been considered the gold standard in post-TKA pain management by many, although other analgesic options have shown promise [1]. This year several significant articles have been released challenging this notion, investigating the efficacy of varied pain-management strategies.

Two recent systematic reviews with meta-analyses looked specifically at analgesic options [1,2]. Firstly, Albrecht and colleagues compared FNB with local infiltration analgesia (LIA), incorporating fourteen randomised controlled trials (RCTs) and 1122 patients. This analysis found each technique to be equivalent in relation to post-operative pain and function; morphine consumption and pain scores in the first 24 hours were equivalent in both groups with no difference in complications such as falls, infections. Whilst the average dose of local anaesthetic was significantly higher with LIA, this did not translate into elevated plasma concentrations or systemic toxicity.

Albrecth et al. hypothesised that LIA may be considered preferable by some given its ease of implementation, availability and theoretical reduction in motor-blocking side effects. They also highlighted the substantial variability in the mix of pharmaceuticals used for LIA, an area in which there is clearly great scope for further research.

The second review by Dong et al. compared FNB with an adductor canal block (ACB), which included six RCTs and two non-RCTs [2]. They found no difference in pain over the first 48 hours, complications or length of stay. There was also no difference in motor blockade of the quadriceps with each technique; intriguing given the theoretical benefit of the more selective ACB, and the authors do suggest we treat this result with caution given the small sample size and heterogeneity of interventions used.

These meta-analyses suggest that several methods of local anaesthetic delivery are equally effective in reducing post-operative pain after TKA. The vast majority of papers included in the meta-analyses mentioned here were published within the past 3 years; research in this area is current and ongoing in many centres. As previous reviews have noted, approaches to analgesia are often influenced by personal and institutional factors including experience and skill mix; [3] for many centres it will be reassuring to know that high quality analgesia can be provided by relatively simple local infiltration. The current evidence of non-inferiority certainly warrants investigation into the relative cost effectiveness of these analgesic modalities.

Other non-pharmacological strategies to reduce peri-operative pain and improve long-term satisfaction after TKA should also be further examined. Alteration to surgical technique has reaped significant benefits in other areas, such as laparoscopic surgery, trans-vaginal hysterectomy or anterior-approach hip arthroplasty.

In relation to TKA, our recent review investigated the effect of infrapatellar fat pad preservation on pain and function [4]. Commonly the pad has been removed during TKA, however there are several theories that suggest its preservation may be beneficial. It is well known fat has endocrine and exocrine functions that may contribute to elevated early post-operative pain. There are also a significant number of sensory nerves residing in the fat pad and the severing of these nerves may result in a chronic neuropathic-type pain. The study showed no difference in early post-operative pain (less than six months), but moderate level evidence that pain beyond six months is significantly reduced; the incidence of anterior knee pain at five years maybe almost halved by fat pad preservation.

It would seem to us that some of the current questions to aid evidence-based practice in this area include: How cost effective are the common treatments we are utilising? When we use local infiltration what combination of pharmaceuticals should we be using? Is the theoretical motor benefit of more distal peripheral nerve blocks, demonstrable in practice? And which aspects of operative technique might give us improvements in perioperative pain or long-term satisfaction after TKA? These questions will hopefully provide benefit for both the patients undergoing and health systems performing this common operation.

Demand for TKAs is predicted to increase up to six fold by 2030 [5]. It will only become more important to implement evidence based, cost effective analgesic strategies to optimise patient outcomes and facilitate the continued sustainability of these operations.

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