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Pain Relief Following Spinal Surgeries: A Challenging Task

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Description

By virtue of their nature involving extensive dissection of muscles, ligaments and bones, spinal surgery inherently produce a high severity of postoperative pain. The pronounced inflammatory response following tissue damage is the primary mechanism of generation of post spinal surgery pain. Additionally, patients subjected to spinal surgery may have suffered a significant degree of preexisting chronic pain treated previously with high doses of narcotics or other analgesics necessitating massive doses in the postoperative period. Higher baseline opioid requirements, high anxiety levels and the need for a conscious and cooperative patient facilitating frequent neurological examination complicates post spinal surgery pain management, for the treating anesthesiologist. In the face of these concerns, multi modal analgesia is often necessary to obtain adequate relief from pain. Mechanoreceptors or nociceptors and free nerve endings present in the different tissues (vertebrae, disc, ligaments, and nerve root sleeves) signal other neurons within the central nervous system which influences the appreciation of pain sensation. The pain sensations are carried by posterior rami of spinal nerves linked to sympathetic, parasympathetic, motor and somatic nerves [1]. This widespread interconnectivity increases the possibility of referred pain which surpasses local and diffuse pain following surgery [2]. The Visual Analogue Scale (VAS) scores tend to be higher in patients with continuing referred pain [1]. The neuropathic nature of referred pain makes it amenable to treatment with anticonvulsants and antidepressants [3,4].The site of spinal surgery (cervical, thoracic or lumbar) does not have any bearing on the severity of postoperative pain [2,5]. However psychological profile, social profile and preoperative pain severity do influence the degree of postoperative pain as has been observed in our daily practice.

Amongst the various modalities for pain control following spinal surgery, opioids are the frontline agents. Administration can be intramuscular, intravenous (including Patient Controlled Analgesia), via the intrathecal or epidural route. Cautious use is advocated because of the risk of over sedation, respiratory depression and even death. Opioids are advantageous where motor and sensory function has to be closely monitored postoperatively [1]. NSAIDs (especially ketorolac) have questionable efficacy as a sole agent or in acute severe pain but have been seen to produce improved analgesia in conjunction with opioids [1]. Moreover, the influences of PGE2 in early stages of bone healing have raised apprehensions regarding the use of high dose ketorolac postoperatively as it can affect spinal fusions [6]. Paracetamol provides analgesia presumably by its central or peripheral actions, inhibition of prostaglandin synthesis or by inhibition of descending inhibitory serotoninergic pathways. In patients where NSAID's are contraindicated or in those with risk of postoperative bleeding, paracetamol provides a viable option [1]. Similar situations can merit the use of COX-2 inhibitors, since they do not affect platelet functions. However given their activity against COX-2 dependant PGE2, which is essential for efficient bone repair [7] in association with their hosts of other adverse effects, advocating widespread utilization of this class of drugs is controversial. Local anaesthetics, employed intrathecally or epidurally (continuous infusions or PCA) in combination with opioids confer the advantages of better analgesia, reduced need of parenteral opioids and consequently fewer adverse effects [8]. In this regard, ropivacaine is advantageous in terms of its safety and sensory selectivity compared to bupivacaine. However these drugs exhibit similar profiles like onset of sensory block, quality of analgesia, maximum level of sensory block and satisfaction in certain populations [9]. The growing clinical use of alpha 2 agonists to supplement routine post-operative care represents an emerging trend under study at this time. Clonidine, tizanidine and dexmeditomidine have shown initial promise but require further trials are needed to determine whether these drugs impart a distinct advantage over more conventional approaches of pain relief.

In spite of a vast array of therapeutic options available for control of post spinal surgery pain, none of them can be individually labeled as the most effective form of treatment. A multimodal approach using different agents and routes seems the best alternative of offering a comprehensive control of pain with simultaneous reduction in side effects associated with analgesic agents. It can be reasonably suggested that the focus of investigation of providing analgesia using opioids incorporating adjuvants should be shifted to a more rational approach of using multimodal therapies to provide post surgical pain relief. The comparative efficacies of various multimodal therapies with multiple adjuncts should be projected as the future avenues of research. With the advent of minimally invasive techniques for spinal surgery, the severity of post operative pain is likely to decline. However extensive employment of minimally invasive techniques is limited by factors like surgeon preferences for non-minimally invasive procedures, lack of training, and patients who are unsuitable for minimally invasive surgery. Therefore, the use of traditional techniques is still common. Consequently for patients undergoing spinal surgery (both traditional and minimally invasive), high degree of awareness and sensitization towards post spinal surgery pain is expected out of anaesthesiologists, for effective amelioration of the same. It is universally agreed that control of pain at rest and during ambulation is crucial for successful surgical outcomes and chronicity prevention following spinal surgeries, pain control in this group of patients should be individualized and titrated accordingly.

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