



# Regional Analgesia in Acute Pain Management in Orthopaedic Trauma Patients

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**Abbreviations:** AAOS: American Academy of Orthopedic Surgeons; EAST: Eastern Association for the Surgery of Trauma; WHO: World Health Organization; LOS: Length of Stay

## Editorial

In recent years, there has been dramatic increase in attention towards quality and patient's satisfaction, during hospital care. And pain, as leading complains in acute trauma patients, its ineffective management has been identified to have an adverse effect on patient's satisfaction, as well as on clinical outcomes [1]. For these reasons, regulatory agencies like American Academy of Orthopedic Surgeons (AAOS), Eastern Association for the Surgery of Trauma (EAST), World Health Organization (WHO) etc, have given great importance to the evaluation and treatment of acute pain [2]. During this same time, the number of reliable acute pain management strategies, techniques, and applications has also grown significantly.

Despite our greatest capacity to improve the treatment of acute pain and the increased awareness of the negative financial and physiologic consequences of inadequately treated acute pain, many patients continue to suffer from moderate, severe, or excruciating acute pain following trauma and surgery [3]. The World Organization (WHO) estimates that 5.5 billion people (83% of the world's population) live in countries with low to non-existent access to controlled medicines and have inadequate access to treatment for moderate to severe pain [4]. Ineffective pain management has been associated with increased length of stay (LOS), delayed ambulation, long-term effects like functional impairment and emotional & psychological distress [1-5].

Patients with orthopedic trauma comprise the full range and extremes of injury severity, age, and health status. It is well known fact that orthopedic injuries are among most pain full [3]. Despite being at comparatively increased risk for experiencing severe acute pain, unlike many elective surgeries, most of these patients have already experienced some degree of peripheral and central sensitization before surgical interventions, and may be at an

increased risk of developing chronic pain because of an increased exposure to severe pain.

## Timeline of Acute Pain Management

Traditional reliance on opioids for acute pain management has been a part of management for decades. Although opioids relieve pain in multiple areas of the body simultaneously, often helpful in trauma-related injury, they are not effective analgesics for sources of "dynamic" pain (precipitated with cough, ambulation etc) compared with other modalities [6-8]. Further, they do not mitigate central sensitization, a key determinant in the development of chronic pain [9]. Studies report patients with greater signs of post-traumatic psychological stress (those who scored higher for catastrophic thinking, anxiety, post-traumatic stress disorder, and depression) were significantly more likely ( $p < 0.001$ ) to be taking opioid pain medications 1-2 months after surgery, regardless of injury severity, fracture site, or treating surgeon. Their postsurgical disability severity magnitude was significantly higher ( $p < 0.001$ ) than patients not using opioids [10]. Additionally, the preference for alert mental status to fully evaluate the extent and severity of injury is often difficult to accomplish, and analgesia is often delayed due to priorities given to more life-threatening injuries or the need for serial neurologic or other provocative examinations. These all suggest for search of parallel acute pain management modalities besides conventional reliance to opioids.

Alternatives to high dose opioids, including the use of NSAIDs, such as ketotolac, and regional anaesthesia can be effective in reducing total IV opioids administration. Newer strategies, such as pre-emptive and multimodal analgesic techniques, have been demonstrated to have better analgesic effects, opioid-sparing (and associated adverse effects), decreased acuity of postoperative care, decreased length of stay, improved early range of motion, improved

mobility and recovery, decreased persistent pain, and increased patient satisfaction [11, 12].

### Regional Analgesia

In many centres, regional anaesthetic techniques (like neuroaxial analgesia, peripheral nerve blocks, and wound infiltration) are used extensively for pain management in the polytrauma patients. Regional analgesia can provide improved analgesia, improved outcomes, and lead to higher patient satisfaction [13]. Ideally, regional analgesia by covering the entire phase of initial inflammatory response lasting days or perhaps weeks in the case of poly trauma, have shown to have added benefits, especially in chronic or long term effects like functional impairment & psychological distress.

Many studies report, improved postoperative analgesia with fewer adverse side effects in comparison to opioids and other pain management modalities, with regional analgesia. Incidences of nausea and vomiting were found significantly lower when opioids used locally compared to intravenous forms [14]. Patients treated with regional analgesia also required less supplemental oxygen, and had less postoperative ileus resulting from minimizing opioid use and the sympathectomy that accompanies epidural analgesia [15,16]. Peripheral nerve blocks were also found to decrease incidences of pruritus, urinary retention, hypotension, difficulty with ambulation, and respiratory depression [17].

Both epidural and peripheral nerve blocks have shown to decrease pain scores, increase of motion exercises, decreased hospital stay, and decrease rehabilitation time compared with intravenous patient controlled analgesia, although continued peripheral nerve block had fewer side effects compared with epidural analgesia [18,19]. And several trials and meta-analyses have shown improved inpatient satisfaction when regional analgesia was used [20,21]. Although regional analgesia offers many benefits, it also introduces risks. The major risks associated with regional analgesia are local anaesthetic toxicity (including devastating complications like seizures and/or cardiac arrest) and nerve injury [22]. Pneumothorax, phrenic nerve blockade, inadvertent epidural or subarachnoid spread, hematoma, and infections are other risks associated. These risks are largely been described in outpatient surgery population, and may be greater in critically ill patients [23]. In addition, there has been concerns about regional analgesia over masking compartment syndrome, in polytrauma patients.

### Summary

Regional and neuraxial anaesthesia have become increasingly popular as intra operative anaesthetic techniques in recent years, but when compared to general pain management modalities they are still not aggressively used. With provided add-on benefits which support endpoints of recovery, time to discharge, analgesia, patient satisfaction, and relatively low risk profile compared to conventional pain management protocols, it is suggestive that regional analgesia should be used more frequently as mainstream technique in acute pain management in orthopedic trauma patients.

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