

Optimization of Treatment: Pharmacist's Role in Managing Post Operative Pain

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ABSTRACT

Postoperative pain is a form of acute pain occurred due to tissue injury in the surgical procedure. Pain is unbearable for postoperative patients and it has been reported that adequate postoperative pain management reduces complications, while also improving the quality of daily activities and shortening the length of hospital stays. Suboptimal pain management leads to suffering of patients. Pain assessment at specific intervals helps the healthcare team to provide sufficient analgesia to the patient. Pain assessment should be done by the patient's own verbal report as it as possible. Post operative pain management can be done by both pharmacological and non-pharmacological methods. Multimodal analgesia and procedure specific analgesia are the mostly used techniques. Rehabilitation after surgery also an integral part of the pain management. Pharmacists as the integral part of the post operative pain management team that makes them to help patients to achieve safer and effective treatment. Pharmacist by providing services as medication reconciliation, inpatient services, drug monitoring and assessment, patient and healthcare provider education, discharge counselling, and post discharge follow-up and planning helps to reduce the adverse events. Pharmacists and interdisciplinary team of health professionals helps the patients to achieve rational treatment and improve post operative pain score.

I. INTRODUCTION

Acute pain occurs following tissue injury due to surgical procedures. Surgery is considered as the indispensable part of healthcare system. The acute post operative pain expected to subside as the tissue healing process progresses. Acute post operative pain begins immediately after surgery and if not treated well it may become chronic pain. There for acute post operative pain management is very important.⁽¹⁾Pain is considered as the fifth vital sign, and it can be measured bedside during routine postoperative care and reported at frequent interval

so that all members of the health care staff have a better view of the pain. Post-surgical pain is initially of acute it may be nociceptive, inflammatory, or neuropathic in nature. Acute post operative pain resolves during healing process it usually needs one to three months, after which pain is considered as chronic in nature. Irrational post operative pain management leads to many post-surgical consequences such as deep vein thrombosis, pulmonary embolus, and pneumonia, which have a negative impact on patient safety, hospital performance and the cost of treatment⁽¹⁻⁴⁾.

Sub optimal post operative pain management leads to worsening humanistic and economical outcome, including development of chronic pain, effects the patient's physical functioning, psychological state and may lead to opioid dependence. The newly proposed criteria to determine chronic post operative pain are as follows: 1) the pain develops after a surgical procedure or increases in intensity after the surgical procedure, 2) the pain is of at least 3–6 months' duration and significantly affects quality of life, 3) the pain is a continuation of acute post-surgery pain or develops after an asymptomatic period, 4) the pain is localized to the surgical field, projected to the innervation territory of a nerve situated in the surgical field, or referred to a dermatome, and 5) other causes of the pain should be excluded⁽⁵⁾. Pharmacotherapy is only one modality for pain management; physical, psychological, spiritual, and other treatment approaches also have important roles. As pain is unavoidable companion of surgery, effective pain medications control post operative pain. Good pain control increases the comfort, recovery and prevent post operative complications.⁽⁶⁾

ASSESSMENT OF PAIN

Pain is considered as the "fifth vital sign" and it can be measured bedside during routine postoperative care and reported at frequent interval so that all members of the health care staff have a

better view of the pain. Repeated pain scoring in the postoperative period is an integral part of lowering the incidence and severity of acute postoperative pain, as well as improving patient comfort and satisfaction. The most intense postoperative pain occurs within the first 24 hours after surgery and normally subsides within 48 hours. It is considered that, the patient's own verbal report and the use of a pain scale that can establish a shared language between patients and healthcare providers is the simplest and most reliable index of pain⁽¹⁾.

There are multiple tools used to help assess a patient's pain. These tools can be used to assess multiple types of pain, ranging from nociceptive pain to neuropathic. This activity outlines and reviews the pain assessment, and highlights the role of the interprofessional team in evaluating and treating patients who are experiencing pain. Pain assessment scales were- Numerical rating scale (NRS), visual analog scale (VAS), defence and veterans pain rating scale (DVPRS), Adult nonverbal pain scale (NVPS), pain assessment in advanced dementia scale (PAINAD), Behavioural pain scale (BPS) and critical-care pain observation tool (CPOT). Commonly used to evaluate pain intensity, the visual analogue scale, verbal rating scale and numerical rating scale are valid, reliable, and appropriate for use in monitoring postoperative pain in patients who can self-report. Numerical rating scale-Pain assessment scale where 0 is considered no pain to 10 which is considered as worst imaginable pain^(7,8).

The Numeric Rating Scale (NRS-11) has been widely used clinically for the assessment of pain. Its use for clinical research is controversial. Reports differ as to whether the NRS-11 should be treated as a ratio pain measurement tool. Zero usually represents 'no pain at all' whereas the upper limit represents 'the worst pain ever possible.' In contrast to the VAS/GRS, only the numbers themselves are valuable answers, meaning that there are only 11 possible answers in a 0–10, 21 in a 0–20 and 101 in a 0–100 point NRS. It thus allows only a less-subtle distinction of pain levels compared to VAS/GRS, where there are theoretically unlimited number of possible answers. Numerical Rating Scales have shown high correlations with other pain-assessment tools in several studies. The feasibility of its use and good compliance have also been proven. As it is easily possible to administer NRS verbally, it can be used in telephone interviews. On the other hand, results cannot necessarily be treated as ratio data as in

VAS/GRS. As in VAS/GRS, a change on the NRS of 20% between two time-points of an assessment is regarded as being clinically significant⁽⁸⁾.

PAIN MANAGEMENT TECHNIQUES

Pain relief after surgery is important for the well-being and comfort of the patient because it contributes to faster and better recovery. Scientific evidence has accumulated to guide the selection of appropriate medications and strategies according to the needs of each patient and each type of operation. This evidence supports three essential strategic components:

- Multimodal analgesia
- Procedure-specific analgesia
- Acute rehabilitation after surgery

Multimodal Analgesia: - Evidence-based guidelines now recommend the use of combinations of two or more analgesic medications or techniques with different sites or mechanisms of action ("multimodal" or "balanced") analgesia. Advantages of multimodal analgesia include:

- Improved analgesia
- Reduced opioid requirements ("opioid sparing")
- Reduced adverse effects of opioids

Current evidence supports the use, when feasible, of local anaesthesia and peripheral or neuraxial regional analgesia as important techniques within a multimodal approach. Systemic analgesics with proven or potential efficacy as components of multimodal analgesia used to treat postsurgical pain⁽⁹⁾.

Procedure-Specific Analgesia: - different surgical procedures cause

- Pain resulting from different mechanisms (musculoskeletal pain after orthopaedic surgery or visceral pain after abdominal surgery, for example)
- Pain of different severity and different functional consequences
- Pain in different locations

These circumstances require analgesic approaches specific to each type of surgery and population⁽⁹⁾.

Acute Rehabilitation after Surgery: - It is now clear that provision of good postsurgical analgesia by itself is insufficient to improve postoperative outcome and recovery. However, multimodal protocols for enhanced recovery after surgery have been developed and address multiple dimensions of the recovery from surgery⁽⁹⁾.

Perioperative techniques for postoperative pain management include but are not limited to the following single modalities:

- (1) central regional (i.e., neuraxial) opioid analgesia;
- (2) PCA with systemic opioids; and
- (3) peripheral regional analgesic techniques, including but not limited to intercostal blocks, plexus blocks, and local anaesthetic infiltration of incisions⁽¹⁰⁾.

For relieving post-surgical pain, many patients and clinicians do not only rely on drugs yet also use nonpharmacological methods (NPMs). There is a large variety of NPMs that are supposed to help reduce pain. Nonpharmacological related therapies are now widely accepted as appropriate for pain care and have demonstrated impact on patient outcomes and satisfaction. In one study, approximately 40% of people used some form of nonpharmacological techniques consistent with the biopsychosocial model of pain and experienced a greater degree of relief of symptoms. Non-Pharmacological Methods can be divided to four main groups: 1. Passively applied physical approaches, such as acupuncture, massage, transcutaneous electrical nerve stimulation (TENS), heat or cold packs. 2. Physical activities like walking, deep breathing or light to moderate sportive activities. 3. Psychological/spiritual approaches, such as praying, imagery, visualization, relaxation, or meditation. 4. Distractions, like watching TV, listening to music, or talking to people^(11,12).

PRE-EMPTIVE ANALGESIA

Pre-emptive Analgesia: - The idea of pre-emptive analgesia is based on the observation that if afferent pain signals are prevented from reaching the central nociceptive neurons by preinjury administration of analgesics, sensitization of the central neurons will not take place or will be reduced. Pre-emptive analgesia is an analgesic treatment method which is applied before surgical trauma and tissue damage. It is a preoperative technique used to prevent central sensitization due to surgical and inflammatory injuries in the postoperative period. The main objectives of this method are prevention of central sensitization before surgical trauma, reduction of postoperative pain and prevention of chronic pain development. In the pre-emptive analgesia technique central sensitization is prevented by preoperative analgesic methods, and

in this way postoperative hyperesthesia development is prevented^(13,14).

The concept arises from the demonstration of neuroplasticity in the central nervous system, in which amplification, or 'wind up', of painful sensory input occurs leading to hyperalgesia, which may persist after the original stimulus has ended. Therefore, it has been postulated that 'wind up' may be minimised by decreasing the amount of painful sensory input to the central nervous system using an analgesic technique prior to the painful stimulus, with a resulting decrease in the requirements for postoperative analgesia. The analgesic can provide reductions in intraoperative nociception to the central nervous system and therefore provide superior pain relief compared with the same analgesic given post incision (after the surgeon has cut the skin)⁽¹⁵⁾.

INTRAVENOUS PATIENT-CONTROLLED ANALGESIA (PCA)

Evidence suggests that almost half of the patients report inadequate postoperative pain relief, with high level of dissatisfaction with their pain management⁽¹⁶⁾. Inadequate treatment which cannot achieve demands of patient leads to dissatisfaction and it may be due to delay in administration of analgesics, suboptimal prescribing, or both. The solution is to allow patients to self-control their pain by self-administering their pain medication as needed. Therefore patient controlled analgesic techniques are evolved. The patient-controlled analgesia (PCA) technique is a validated and frequently used delivery method providing self-administered and predetermined doses of analgesic medication to relieve acute pain. PCA can minimize the occurrence of gaps in analgesic administration, providing more uniform analgesia and eliminating painful waiting periods between requesting and receiving the medication. Patients who received PCA experienced less acute pain and had a shorter hospital stay. PCA has become a standard of care in postoperative acute pain management in the hospital setting as it can provide better pain control and greater patient satisfaction⁽¹⁶⁾.

This technique is based on, PCA allows the patient to control the delivery of analgesic and provides superior pain relief by administration of continuous background infusion superimposed on boluses by using a small microprocessor-controlled pump to maintain the plasma level of the analgesic in a relative constant state and to eliminate the undesirable effects caused by fluctuations in



plasma levels of the analgesic. PCA has several modes of administration. The two most common are demand dosing (a fixed-size dose is self-administered intermittently) and continuous infusion plus demand dosing (a constant-rate fixed background infusion is supplemented by patient demand dosing). Nearly all modern PCA devices offer both modes. When choosing a drug for PCA administration, the ideal drug should be highly efficacious, have a rapid onset of action, and a moderate duration of effect. The ideal drug should not accumulate or change pharmacokinetic properties with repeated administrations and should have a large therapeutic window. Paediatric patients especially have pain severity that is underestimated by nursing personnel, and these patients benefit greatly from the use of PCA⁽¹⁶⁻¹⁸⁾.

Different modalities of PCA have been developed. The most common PCA routes are the intravenous (IV) PCA and epidural PCA. However, these PCA modalities are invasive, and they restrict patient mobility and require extensive staff time and resources. In addition, IV-PCA is prone to human dosing errors as well as mechanical malfunctions, causing harm to patients and adding a significant cost burden to the healthcare systems. Cost analysis of a 72-hour treatment of postoperative pain in patients undergoing major surgical procedures had shown that IV-PCA is the most expensive treatment, requiring massive involvement of the clinical team, whereas the oral analgesic is associated with the lowest cost. This explains the relatively low uptake of the IV-PCA treatment modality, despite it being included in many treatment guidelines⁽¹⁶⁾.

RESCUE ANALGESIA

Postoperative pain is a common consequence of surgery that affects around 80% of patients. The severity of postoperative pain is variable, with 18% to 25% of patients suffering extreme pain. For those patients, may need to provide rescue analgesics to prevent from extreme pain. Rescue analgesic agents are medications prescribed in addition to regularly scheduled analgesic medications, which are intended to be taken during episodes of pain not controlled by a patient's scheduled analgesic regimen. Reduced use of rescue medication can indicate improved pain relief and can also limit patient use of secondary medications that may have harmful side effects⁽¹⁹⁻²¹⁾.

PHARMACIST AS AN INTEGRAL PART OF POST OPERATIVE PAIN MANAGEMENT INTERPROFESSIONAL TEAM

The mainstay of treatment for post operative pain is pharmacological therapy with analgesics. Pharmacist as the medication therapy experts who have a thorough understanding of the polypharmacy regimens involved in chronic pain management, pharmacists prescribing for pain could drastically improve outcomes for chronic non-cancer pain (CNCP) patients. Suboptimal prescribing may account for the poor pain control and adverse patient outcomes seen commonly in pain therapy. Pharmacists and other members of the interprofessional team collaborate to achieve positive patient outcomes. Pharmacists are accessible members of the team who partner with patients to optimize safe use of medications for chronic pain and comorbidities. They are also well positioned to support pain self-management and pain education, collaborate with other health and wellness care providers, and reduce stigma experienced by the patient^(22,23).

A variety of barriers to effective pain management have been identified, including inadequate pain assessments, lack of interdisciplinary collaboration, limited time, poor physician—nurse communication, and unrealistic pain goals established by patients. Amid the opioid abuse epidemic, pressures continue to rise for the use of multi-modal regimens to minimize opioid use. Pharmacists' specialized training in pharmacotherapy makes them uniquely suited to effectively manage a patient's pain, which often requires a combination of adjuvant therapy and opioids. The ability of the pharmacist to serve as a communication bridge between the patient and health care team can help ensure that patient analgesia is maximized while preventing adverse events (AEs) through appropriate medication selection. Pharmacists collaborate with providers to drive guideline-based treatment. Their role in developing multi-modal pain regimens while mitigating AEs, as well as educating patients about appropriate medication use at discharge, is essential to improving long-term pain-related patient outcomes. Combining patient history through the prescription drug monitoring program with the pharmacist's knowledge of pharmacotherapy makes the pharmacist the ideal practitioner for a consultation for perioperative multi-modal therapy recommendations. The American Pain Society guidelines on the management of postoperative pain and the practice guidelines for acute pain

management in the perioperative setting support the use of multi-modal analgesia to improve patient pain outcomes. Specifically, use of this tool allows pharmacists to provide guidance to clinicians for appropriate initial opioid requirements while the patient is hospitalized, curbing inappropriate prescribing, and reducing diversion. Multi-modal therapy includes the administration of or more medications that act through different mechanisms to provide analgesia. This approach may be achieved through interventional methods, parenteral pain medications, oral analgesics and co-analgesics, transdermal applications, and transmucosal agents. When providing multi-modal analgesia, clinicians and patients must be aware of the AE profiles and appropriate monitoring for each analgesic agent used in order to reduce potential AEs⁽²²⁾.

The daily review by pharmacists of patients' medication administration reports creates an avenue for the pharmacist to collaborate with the health care team to reduce the number of days of intravenous opioid therapy, increase the use of appropriate multi-modal analgesia, and equip the team with a medication discharge plan. Pharmacists' ability to provide education to providers and patients regarding appropriate pain management, conduct drug monitoring, and prevent and manage AEs make them well positioned to improve patient care⁽²²⁾.

Patient's physical capacity and overall behaviour can be taken into consideration while pharmacist assessing patient's self-reported pain score. Equipped with pharmacokinetic and pharmacodynamic knowledge, clinical pharmacists can play a critical role in guiding pharmacotherapy to minimize drug abuse and optimize pain control, which leads to pharmacists in a position to aid in the prevention of opioid abuse, misuse, and diversion, and help guide appropriate therapeutic selection. Opioids are the primary analgesic treatment for patients experiencing mild to severe acute postoperative surgical pain. One study demonstrated that patients who receive an opioid prescription within 7 days of surgery are 44% more likely to still be using the medication 1 year after surgery than patients who do not receive an opioid prescription. Which is a dangerous scenario that may lead into serious adverse events and even death to the patient. Serious adverse events due to misuse of opioids can be prevented by pharmacists interventions like monitoring the medication chart, discharge medication and patient counselling⁽²⁴⁾.

Before discharge, the pharmacist or student pharmacists obtain the list of planned outpatient prescriptions and perform a counselling session on how to control postoperative pain safely and effectively. A discontinuation plan for opioids is provided to the patient, which specifies a tentative daily schedule with which opioids should be gradually tapered until the patient is finished or until the next follow-up appointment. In addition to the withdrawal symptoms that may occur, patients are educated on the effects of staying on opioids for an unwarranted period. They can also educate about using opioids safely, proper disposal, and the common side effects they may experience. Also based on the medications at discharge, personalized education materials can provide to explain the most important points for the patient to quickly reference at home, including indicated use, helpful hints, disposal of unused medication, and side effects⁽²⁴⁾.

II. CONCLUSION

Pain is an inevitable part of the postoperative experience. Controlling acute pain after surgery is important not only in the immediate postoperative phase but also to prevent chronic postsurgical pain. Patient specific and multimodal analgesia techniques can help the patients to improve from acute pain occurred due to surgery. Preventing the post-surgical consequences are also a key objective of the post operative pain management. Pain assessment is an integral part of post-surgical treatment, which helps the physician to prescribe most effective analgesics to the patients with lowered adverse events. Pharmacists as an integral part of post operative pain management team can contribute safe and effective treatment to the patient, and reduces the work load of physicians and other health care professionals. Pharmacist as the medication expert helps patients to achieve safe treatment, improved pain scores, and by their interventions and inter professional communication skills. Pharmacists act as a bridge between patients and healthcare team. By taking patient history and monitoring the prescribing programs pharmacists can help to provide maximum analgesia to the patients with reduced adverse events, drug interactions and medication errors. By providing opioid stewardship programme pharmacists can reduce the misuse of opioids and prevent harmful adverse effects due to opioids. Which all makes the pharmacist as the integral part of post operative pain management team.

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