

A COMPARATIVE STUDY OF A TAPENTADOL NASAL SPRAY AND INTRAMUSCULAR DICLOFENAC SODIUM IN THE POST OPERATIVE PAIN MANAGEMENT

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Abstract

Background: Postoperative pain increases morbidity, delays discharge of the patient from the hospital and reduces patient satisfaction. Tapentadol Nasal Spray is a newer centrally acting analgesic and it generates a synergistic action in terms of analgesic efficacy. It has dual mode of action. It is a μ - opioid receptor (MOR) agonist and inhibitor of norepinephrine (NRI) reuptake. **Objectives:** We conducted this study to compare the efficacy of Tapentadol Nasal Spray and Intramuscular injection diclofenac sodium as an analgesic for post-operative patients undergoing various elective and emergency surgeries. **Methods:** Using randomized controlled trial, sequentially numbered, opaque sealed envelopes (SNOSE) technique, half set of post-operative cases were prescribed tapentadol nasal spray and were assigned as Group A. Rest half of postoperative cases were prescribed intramuscular diclofenac sodium and were assigned as Group B. Scheduled dose of tapentadol nasal spray was 22.5 mg in each nostril and for intramuscular diclofenac dose was 75 mg. **Results:** The mean pain score was found less in the tapentadol nasal spray group compared to the intramuscular diclofenac sodium group at all intervals by VAS. ($p < 0.05$). **Conclusion:** The results of the study show that patients who were given tapentadol nasal spray post operatively were found to have ease in administration of medication, early onset of analgesia and significantly better VAS and VPIS scores. Tapentadol Nasal Spray provides effective and better analgesia in the post operative pain management than intramuscular diclofenac with no major adverse effects. It also has early onset of analgesia and has ease in administration to patient.

Key words- Tapentadol, diclofenac, pain relief.

Introduction

Pain is described by International Association for study of pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.”^[1] Pain is the major symptom of many medical and surgical comorbidities. It is a multi-dimensional experience. Post-operative pain causes distress to the patient. It delays the discharge of patient from the hospital. It also results in increasing morbidity and reduces patient's satisfaction. Pain can be Acute (lasts few days), Sub acute (lasts few weeks) and Chronic (lasts to months). Acute Pain is of sudden onset and short duration. Once the inflammation subsides and wound heals pain ceases and the condition of patient improves. The severity of pain can be assessed by various scales such as visual analogue scale and verbal pain intensity scale. Chronic Pain is long standing pain that persists beyond the usual recovery period. It commonly persists for long duration. ^[2] Post-operative pain management is a major concern following surgery. ^[3] There are different classes of analgesics used for post operative pain relief which exert their effect through different mechanisms. Opioids and NSAIDs are usually used for the management of postoperative pain ^[4]

This study was conducted using randomized controlled trial using sequentially numbered, opaque sealed envelopes (SNOSE) technique after obtaining approval from the Institutional Ethics Committee (IEC) along with the written and informed consent of 200 post operative cases . Procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional) and with the Helsinki Declaration of 1975, as revised in 2000. Confidentiality of patients was maintained.

These cases were enrolled in this prospective, randomized controlled study, conducted in tertiary health care centre. Half set of post-operative cases were prescribed tapentadol nasal spray and were assigned as Group A. Rest half of postoperative cases were prescribed intramuscular diclofenac sodium after taking informed consent from the set of selected patients and were assigned as Group B. Scheduled dose of tapentadol nasal spray was 22.5 mg in each nostril and for intramuscular diclofenac dose was 75 mg. Both drugs were administered three times daily on POD 1,2,3. On POD 0 drugs were given at 2 pm, 10 pm and assessment was done at 4 pm and 11 pm. On POD 1, 2, 3 drugs were given at 6 am, 2 pm, 10 pm and assessment was done at 8 am, 4 pm and 11 pm.

Assessment of pain was done using Visual Analogue Scale (VAS) score and VPIS (Verbal Pain Intensity scale) scores 0 to 10 where 0 indicates no pain, 1-3 Mild pain ,4-7 moderate pain ,whereas more than 7 indicates severe pain. The score was assessed postoperatively on POD 0,1,2 and 3.

Statistical analysis

The data thus collected were tabulated and subjected to chi square test and independent student t-test and analysed . The confidence limit of the study was kept at 95%, hence a "p" value less than 0.05 indicated a statistically significant association.

Table 1: Visual Analogue Score found at different Post Operative days(POD) and time.

Visual Analogue Score	p value
POD 0 4 PM and 11 PM	0.517 and 0.000
POD 1 8 AM , 4 PM and 11 PM	0.006,0.001 and 0.001
POD 2 8 AM , 4 PM and 11 PM	0.014, 0.001 and 0.001
POD 3 8 AM , 4 PM and 11 PM	0.000, 0.000 and 0.000

Management of postoperative pain relieves suffering of patients and leads to earlier mobilization, shortens hospital stay, reduces hospital cost and patient's satisfaction. An effective postoperative management is implemented according to the needs of the individual patient, taking into account medical and physical condition such as age, level

of fear or anxiety, surgical procedure, personal preference. The major goal in the management of postoperative pain is to reduce the dose of medication and its side effects. It should provide adequate analgesia.^[5] The effective relief of pain is of utmost importance for patients undergoing surgery. Pain relief has significant physiological benefits; hence, monitoring of pain relief is increasingly becoming an important postoperative quality measure.^[6] Various types of opioids and non opioids drugs with different routes of administration (oral, intravenous, intramuscular, intranasal and regional) are available for post operative pain relief.^[7] Enhanced recovery protocols to reduce length of stay in hospital are becoming more prevalent.

Pain assessment is required to provide adequate postoperative pain care. Pain assessment helps to determine whether change of dose or drug is required or additional interventions is required. In the case of difficulty in management of pain specialists consultation or other measures are needed. Pain scales are useful for the assessment of postoperative pain and for monitoring the effectiveness of treatment. Most are based on self-reporting scales aiming to represent subjective pain intensity. The 10 cm visual analog scale (VAS) is most commonly used. The VAS is frequently used as a measure of pain intensity, and a statistically significant difference in the VAS score equates to reduction in pain.^[8] VAS score indicates a real change in a patient's pain intensity. Advances in the knowledge of molecular mechanisms have led to the development of multimodal analgesia and new pharmaceutical products to treat postoperative pain.^[9,10] Newer postoperative patient-controlled analgesia in modes such as intranasal, regional, transdermal, and pulmonary presents another interesting avenue of development. Administration of opioids remains the most commonly used medication for treatment of patients with moderate to severe postoperative pain.^[11] A variety of opioids are available for treatment of postoperative pain. These drugs can be divided into two categories: opioid agonists and mixed opioid agonist/antagonists. Tapentadol is a centrally acting analgesic and it generates a synergistic action in terms of analgesic efficacy. It has a dual mechanism of analgesic activity. It is a μ - opioid receptor (MOR) agonist and inhibitor of norepinephrine (NRI) reuptake. Therefore, tapentadol can be defined as the first "MOR-NRI" drug. It has only weak effect on the reuptake of serotonin and is a significantly more potent opioid.

This study was mainly focused on the unique mechanism of action of tapentadol provides a key role in its analgesic efficacy in a number of pain states and with a favorable safety profile. Recently the concept of postoperative pain relief is regarded as a time-dependent maximization of patient's comfort with safer and cheaper analgesics. This study was a randomized controlled trial conducted in department of surgery at Guru Nanak Dev Hospital, Amritsar. It was a comparative study of a tapentadol nasal spray and intramuscular diclofenac sodium in post operative pain management. In our study there were 100 patients in each group. Group A received Tapentadol nasal spray dose of 22.5 mg in each nostril and Group B received 61 intramuscular diclofenac dose of 75 mg. Both drugs were administered three times daily on POD 1,2,3. Rescue analgesia was given if patient still complained of pain. On Post operative Day 0 drugs were given at 2 pm, 10 pm and assessment was done at 4 pm and 11 pm. On Post operative Day POD 1, 2, 3 drugs were given at 6 am, 2 pm, 10 pm and assessment was done at 8 am, 4 pm and 11 pm. The pain scores were evaluated by Visual Analogue Scale and Verbal Pain Intensity Scale. The data was compiled, tabulated and statistically analysed. The analgesic efficacy of tapentadol nasal spray in post operative pain management was better in comparison to intramuscular diclofenac sodium. VAS scores were assessed post operatively on POD 0 at 4 pm and 11 pm, 1,2 and 3 subsequently at 8 am, 4 pm and 11 pm. The mean VAS scores for Group A on POD 0 were observed to be 7.53 and 5.54, on POD 1 it were 6.94, 5.20 and 4.25, on POD 2 it were 6.19, 3.88 and 2.39, on POD 3 it were 3.40, 1.82 and 0.79. For Group B mean VAS scores on POD 0 were observed to be 7.62 and 6.47, on POD 1 it were 7.38, 6.22 and 5.24, on POD 2 it were 6.57, 5.53 and 4.64, on POD 3 it were 5.87, 4.43 and 3.03. The post operative pain scores were different in both the groups which has been proved statistically. On comparing the VAS Score significant difference were observed on POD 0, 1, 2 and 3 with mean VAS scores of Group B being significantly more than Group A, thus showing that Tapentadol nasal spray is a better analgesic in post operative pain management than intramuscular diclofenac sodium.

In our study, we observed, tapentadol nasal spray was more efficacious postoperatively in terms of both Visual Analogue Scale and the Verbal Pain Intensity Scale. The patients in tapentadol nasal spray group experienced a

decrease in pain intensity more effectively compared to Intramuscular diclofenac sodium. The Randomized controlled Study conducted by Soundharya Moorthy et al on the comparison of the efficacy and safety of tramadol versus tapentadol also found tapentadol to be more efficacious compared to tramadol.^[12]

A Retrospective study conducted In 2020 by Shoichiro Sazuka et al on Tapentadol effectiveness in the management of moderate-to-severe cancer-related pain and found that Tapentadol is effective and well tolerated in opioid-naïve and opioid-tolerant patients with cancer pain of varying patho physiology. They also concluded that Tapentadol may be considered for first-line use in moderate-to-severe pain.^[13]

Tapentadol nasal spray was associated with early onset of analgesia, Ease of administration and more Patient friendliness compared to Intramuscular diclofenac sodium. The probable reason for the significant pain relief caused by tapentadol is due to dual nature of mechanism of action caused by μ opoid agonist and nor epinephrine reuptake inhibition. Hence we concluded that tapentadol nasal spray was more efficacious postoperatively and it can be considered as an effective alternative to traditional NSAIDs in the treatment of post operative pain.

The results of the study show that patients who were given tapentadol nasal spray post operatively were found to have ease in administration of medication, early onset of analgesia and significantly better VAS and VPIS scores . Tapentadol Nasal Spray provides effective and better analgesia in the post operative pain management than intramuscular diclofenac with no major adverse effects .In view of this study results we recommend that, intramuscular diclofenac may be replaced by a efficacious and patient friendly Tapentadol Nasal Spray for post-operative pain management.

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Criteria of inclusion in author list – Dr Sumitj Singh and Dr Amarbir Singh helped in concept and design of the study , revised the article critically for important intellectual content and gave final approval of the manuscript. Dr Raghav Sawal collected ,compiled and analyzed the data drafted and revised the article critically for important intellectual content . This manuscript has been read and approved by all the authors, that the requirements for authorship have been met, and that each author believes that the manuscript represents honest work.

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ETHICAL CLEARANCE CERTIFICATE

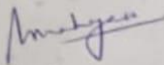
Subject: Thesis Protocol submitted by Dr. Raghav Sawal for MS Surgery

The Sub Committee for Thesis Protocols constituted by the Institutional Ethics Committee, Govt. Medical College, Amritsar has reviewed and discussed your protocol entitled,

“A COMPARATIVE STUDY OF A TAPENTADOL NASAL SPRAY AND INTRAMUSCULAR DICLOFENAC SODIUM IN POST OPERATIVE PAIN MANAGEMENT.”

After due consideration the committee has decided to approve the study subject to the following conditions:

- It is understood that the study is being conducted at Govt. Medical College, Amritsar or its associated hospitals.
- Any serious Adverse Event/s that occur during the conduct of the study should be reported without delay to the Ethics Committee.
- The study will be conducted by obtaining the informed consent of the patients.
- The Committee will call upon the investigator from time to time for monitoring the study.


Member Secretary,
Institutional Ethics Committee-
(Sub Committee for Thesis Protocols)

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