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Anticipatory Analgesic Effects of Tramadol and Ibuprofen in Impacted Mandibular Third Molar Extraction a Comparative Study

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Abstract:- Aim: to assess the effectiveness of analgesia brought about by preoperative tramadol and ibuprofen on surgically removed mandibular third molars. Materials and Methods: Thirty individuals had their lower third molar surgically removed; they were split into three groups of 10 patients each.

Group I had an intraoperative 100 mg tramadol injection; Group II received an oral 800 mg Ibuprofen injection; and Group III was a control group that received no prior care. The visual analogue scale (VAS), verbal pain scale (VPS), patient satisfaction (PS), amount of analgesic utilized, time elapsed before starting intake, and patient satisfaction (PS) were used to quantify analgesia after a 24-hour period. Result: On every kind of pain measure, there were notable differences between the tramadol and control groups, with the tramadol group scoring higher. The visual analogue scale (VAS), quantity, and duration of pills required over the course of a 24-hour period were significantly different between the Ibuprofen and control groups. Both the VAS and the VPS showed a substantial difference in favour of the Tramadol group compared to the Ibuprofen group. Conclusions: When impacted lower third molar surgery is performed, preventive usage of tramadol or ibuprofen is an excellent way to manage postoperative discomfort.

Keywords:- *Impacted 3rd Molar, Wisdom Teeth, Mandibular 3rd Molar, Preventive Analgesic.*

I. INTRODUCTION

An impacted lower third molar extraction is the most common oral surgical treatment, and recuperation from surgery can be difficult.[1] Although swelling, bruising, and restricted mouth opening are possible post-operative risks, patients are often most concerned about the possibility of significant discomfort following surgery.[2]

The type of operation may help predict the degree of post-operative discomfort. Patients who need to have bones removed will be in excruciating pain. The patient should be informed about the anticipated postoperative pain and the planned management method prior to surgery. Thus, planning for post-operative pain management is necessary. Post-operative pain is still a clinical issue, even with significant advancements in pain treatment.[2,3] It can prolong the healing process and put patients at risk for costly, time-consuming complications. Patients' discontent with their

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surgical experience is partly caused by poorly treated post-operative pain, yet pain treatment is often not up to par.

Crile first proposed the idea of preventive analgesia at the start of the previous century. Preventing pain transmission prior to surgical incision has been shown to lower post-operative mortality.[3]

Preemptive analgesia is the administration of an analgesic before to a painful stimulus resulting from tissue injury during surgery in an attempt to offer more pain relief than when the same analgesic is administered after the painful stimulus.[4]

After oral surgery, tramadol has been shown to be an effective analgesic for moderate pain. A centrally acting opioid analgesic, tramadol is an agonist of the μ opioid receptor. Considering its strength, tramadol has very minimal side effects compared to other opiates, including respiratory depression, cardiovascular responses, and physical dependence.[3,4,5]

An opioid, or narcotic, called tramadol is used to treat moderate to severe pain. There have been reports of vertigo, headaches, nausea, vomiting, and xerostomia as adverse effects of this medication. In patients experiencing acute pain following surgery, non-steroidal anti-inflammatory medications (NSAIDs) offer efficient analgesia, either in place of or in addition to opioid analgesia.[5,6]

The main benefit of NSAIDs for short-term postoperative analgesia is that they are generally well tolerated in a subset of individuals. As an NSAIDS medication, ibuprofen has been shown to reduce pain and is more bearable than other medications in the class.[3,7]

The purpose of this study was to assess the preventive analgesic effects of tramadol, an opioid, and ibuprofen, a non-opioid, in patients having surgery to remove an impacted lower third molar.

II. MATERIALS & METHOD

This study performed in a private clinic in Purba Medinipur, west bengal, India. The study's inclusion criteria include being over the age of eighteen, in good health, having an impacted mandibular third tooth that has to be surgically removed, and having no history of mental illness or medication allergies.

Patients with gastritis or peptic ulcers were excluded, as was the use of analgesics or anti-inflammatory medications 24 hours prior to the surgical procedure.

For the purpose of this research, a total of thirty patients were involved in a double blind randomized trial. An other surgeon carried out the randomization.

There are three groups in the trial, each with ten patients. Patients in one group (the control group) received nothing before surgery, then 500 mg of paracetamol pills as necessary (i.e., when pain became unbearable) for a full day after the procedure.

In the second group, the patient received 800 mg of Ibuprofen an hour before surgery and 500 mg of paracetamol pills as needed after the procedure. The third group of patients includes those who get an intraoperative 100 mg tramadol injection one hour before to surgery and postoperative paracetamol as needed.

All of the patients' impacted teeth were surgically removed by the same surgeon. Under local anaesthetic, a maximum of 3 millilitres of 2% lignocain mixed with 1:180,000 adrenalin were used for the surgical procedure. The lower third tooth was accessible from the buccal aspect thanks to an elevated mucoperiosteal flap that was placed distally to the second molar.

A new spherical bur with a rotating hand piece and sufficient amounts of continuous sterile saline irrigation were used to remove the bone.

When necessary, a fissure bur hand piece was used to separate the crown and roots. Following tooth extraction, the socket was examined and filled with sterile normal saline irrigation.

Black silk sutures with a single thread were used to accomplish the stitching. To avoid post-operative infection, all patients were given 500 mg of amoxicillin every 8 hours for 5 days or 500 mg of azithromycin orally daily for 5 days after surgery.

Patients completed a four-part questionnaire and were given standard post-operative instructions:1) assessment of pain intensity using a 100 mm visual analogue scale (VAS) 24 hours after surgery, where 0 represents no pain and 100 represents extremely strong pain; 2) assessment of pain intensity using a 5-point verbal pain scale, with 0 representing no pain. One can indicate the level of pain as light, moderate, severe, or extremely severe; three can indicate the amount of analgesic used and the time passed until initial intake; and four can indicate if the patient is satisfied (yes) or not.

The data was loaded into an ASUS (Intel core i5) computer, and the statistical package for social sciences (SPSS) software, version 13.0, was utilized for analysis. The analysis includes descriptive statistics (mean and standard deviation for parametric data, and frequency and percentages for non-parametric data) and analytical statistics (Mann-Whitney Test for non-parametric data, and Duncan's Multiple Range Test for parametric data). Differences between groups were considered statistically significant when $p < 0.05$.

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III. RESULT

A. Comparing Tramadol and Control Group

The visual analogue scale (VAS), verbal pain scale (VPS), and patient satisfaction showed significant differences between the tramadol and control groups using the Mann- Whitney test, all of which were in favour of the tramadol group as shown in table 1.

Table 1: Tramadol Versus Control Group

	VAS	VPS	Satisfaction
Mann-Whitney U	2.500	3.500	30.000
Z value	-3.853	-3.696	-2.179
p–value	0.000*	0.000*	0.029*

Table 2 shows the number of pills required for the tramadol and control groups, and Table 3 shows the total number of tablets needed over the course of a day. These differences were statistically significant.

Table 2: No. of Tablets

Group	No.	Duncan's Grouping	
		A	B
Tramadol	10	1.50	
Ibuprofen	10	2.30	
Control	10		3.60

Table 3: Time for Tablets to be Taken

Group	No.	Duncan's Grouping	
		A	B
Control	10	2.20	
Ibuprofen	10		4.70
Tramadol	10		4.88

B. Comparing Ibuprofen and Control Groups

The visual analogue scale (VAS) between the Ibuprofen and control groups showed a significant difference using the Mann-Whitney test, although the verbal pain scale (VPS) and patient satisfaction scores in Table 4 did not show any significant changes.

Table: 4 Ibuprofen vs Control

	VAS	VPS	Satisfaction
Mann-Whitney U	27.500	27.500	45.000
Z	-2.033	-1.849	-0.457
p-value	0.042	0.064	0.648

The number of pills required in a 24-hour period (Table 2) and the duration of tablet use (Table 3) showed statistically significant differences between the Ibuprofen and control groups when analyzed using Duncan's Multiple Range Test.

C. 2 Comparing Groups Taking Tramadol and Ibuprofen

Table 5 shows that there was no significant difference in patient satisfaction between the Tramadol and Ibuprofen groups, although there was a significant difference in both the VAS and VPS for the Tramadol group.

Table: 5 Tramadol vs Ibuprofen

	VAS	VPS	Satisfaction
Mann-Whitney U	9.500	21.500	35.000
Z value	-3.454	-2.374	-1.831
p-value	0.001	0.018	0.067

The number of pills taken by the tramadol and Ibuprofen groups (Table 2) and the total number of tablets needed in a 24-hour period (Table 3) did not differ significantly between the groups, according to the Duncan's Multiple Range Test.

D. Operation Time of all the Groups:

Table 6 illustrates that there were no statistically significant changes in the operation's length (measured in minutes from the beginning of the incision to the last suture) according to Duncan's Multiple Range Test.

Table: 6 Operation Time

Group	No.	Duncan's grouping
		A
Control	10	16.80
Ibuprofen	10	19.00
Tramadol	10	19.50

IV. DISCUSSION

An established paradigm for forecasting the clinical effectiveness of analgesics is third molar extraction. The tooth's depth and extraction difficulties were associated to both ordinary and severe pain. It has been proposed that preventing pain rather than treating it after it has occurred is a superior management approach for third molar surgical pain since the pain is so predictable.

Guidelines to evaluate the calibre of reports of randomized clinical trials in pain research have been devised since anticipatory analgesia is a contentious issue with publications supporting and refuting it. Sensitization of the peripheral and central pain pathways results from the transmission of pain signals triggered by tissue injury.[3,8]

One therapy that is started before to surgery to lessen this sensitivity is called preemptive analgesia. As a result, both the onset of chronic pain and its immediate postoperative suffering may be avoided.

Mechanical injury, high or low temperatures, or irritant chemicals can all activate pain receptors. Two different types of neurons send nociceptive pain impulses to the spinal cord in the dorsal horn when pain receptors in peripheral tissues (like the mucosa) are triggered.[9] From the dorsal horn, second order neurons emerge and travel along the spinothalamic tract before ending in the thalamus, from whence neuronal relays are sent to the sensory cortex and other CNS regions. These higher centres are in charge of both the emotional aspects of pain and its perception. The sensory route consists of four unique processes: transduction, transmission, modulation, and perception. Analgesic treatment may be directed towards any one of these processes. As a preventive analgesia, Ibuprofen, a

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peripherally acting analgesic, and Tramadol, a centrally acting analgesic, were evaluated and contrasted in this study.[10,11,12]

Conceptually speaking, when local anaesthetic blocks the nerve impulse prior to initiating the surgical incision, it functions as a preemptive analgesia in and of itself. It is imperative that we take into account the fact that a local anaesthetic blocks pain perception during and in the initial hours following surgery.[13] Therefore, in this trial, the control group did not receive a placebo.

This study demonstrates that injectable tramadol is more effective than oral ibuprofen or local anaesthetic alone in preventing post-operative pain; yet, ibuprofen still offers rather decent analgesia. This is consistent with the findings of Ong et al.'s trial, which showed that intravenous tramadol provided superior post-operative analgesia compared to oral tramadol.[14,15] Using ibuprofen, paracetamol, codeine, diclofenac, and placebo as a preemptive analgesia, Josh et al. came to the intriguing conclusion that individuals taking the placebo reported outcomes that were comparable to those of the preemptive analgesic groups.[16]

It should be noted that VAS ratings and other pain measures may not be accurate when used as the only measure in a research of anticipatory analgesia due to the possibility of bias from pharmacological side effects and other confounding factors. Because it's easy to use and gives a reliable indicator of pain level, the visual analogue scale is frequently used to quantify both acute and chronic pain. Consequently, this investigation relied on many scales.[17]

In this study, the mean duration before the initial requirement or consumption of an analgesic was 4.88 hours for the tramadol group, 4.7 hours for the Ibuprofen group, and 2.2 hours for the control group (local anaesthetic).

The duration of effect of xylocain, tramadol, and ibuprofen was synchronized with this outcome. According to previous research, most patients would need analgesics 1-3 hours after third molar surgery utilizing a traditional local anaesthetic; this pattern was further supported by the control group's noticeably higher paracetamol intake during rescue analgesic use.

It should be mentioned, nevertheless, that discomfort following third-molar surgery often peaks 6–8 hours following the procedure.

Therefore, extra rescue analgesics are needed for effective postoperative pain management since the analgesic effects of ibuprofen and injectable tramadol would be diminishing precisely when postoperative pain should be predicted to peak.[16,17]

In this study, the control group needed 3.6 painkiller pills on average, the ibuprofen group needed 2.3, and the tramadol group needed 1.5 analgesic tablets on average during the 24-hour period following surgery. This suggested that the preventive groups' analgesic intake was considerably lower.[18]

According to research done in 2010 by Kaczmarzyk et al., ketoprofen administered after third-molar surgery provided better pain control than ketoprofen administered beforehand. Shaik MM came to the conclusion that tramadol is a suitable and safe analgesic for the relief of post-operative pain and is more effective than ketorolac with prolonged analgesia and minimal side effects. Close BR concluded that tramadol does not provide any unique benefits over existing analgesics and is only recommended when NSAIDs are not allowed to be administered for a patient.[19,20]

To determine if the time of administration and the manner of application—local anaesthetic alone, NSADs alone, opioid or combination—will be more effective while taking into account the potential infrequent side effects, more thorough research is required.

V. CONCLUSION

The study's key finding is that, when compared to an 800 mg ibuprofen tablet, preemptive treatment with intramuscular tramadol did not predictably reduce postoperative pain in patients having surgery to remove impacted mandibular third molars. However, both preemptive groups showed significantly better pain reduction than the control group. For impacted lower third molar surgery, tramadol or ibuprofen beforehand is an affordable, efficient, simple, and safe way to manage postoperative pain.

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