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Original Article

Estimation and Evaluation of Clinical Efficacy of Ketamine on Post-Operative Symptoms in Impacted Mandibular Third Molar Surgery- An in-Vivo Study

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ABSTRACT:

Background and Aim: Surgical removal of mandibular third molar is a routine procedure in surgery department. Painless removal of third molar is desired by patients. The present study was conducted to determine efficacy of ketamine on post-operative symptoms occurring on impacted mandibular third molar surgery. **Materials & Methods:** The present study was conducted on 30 patients with bilateral impacted mandibular third molars. They were divided into 2 groups. Group I (15) received lignocaine and group II received lignocaine along with ketamine. 5ml of 2% lignocaine with 1:150, 000 adrenaline was given in group I and 5ml of 2% lignocaine with 1:150, 000 adrenaline and 0.2mg/kg of ketamine was inserted in group II. Patients were recalled 1st postoperative day, 4th day and 7th day for assessment of symptoms such as pain and mouth opening. **Statistical Analysis and Results:** All the results were assessed and analyzed by SPSS software. On day one, VAS pain score in group I was 5.8± 1.4 and in group II was 4.2± 1.5. On day four, it was 4.0± 1.6 and 2.9± 1.8 respectively in both groups and on day &, it was 2.1± 1.2 in group I and 0.6± 1.3 in group II. The difference was significant (P< 0.05). All other data and results were correlated clinically and evaluated for levels of significances. **Conclusion:** Ketamine found to be a useful agent in management of post- operative pain in surgical extraction of impacted mandibular third molars. However, there was no difference in mouth opening in both groups.

Key Words: Ketamine, Lignocaine, Mandibular.

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INTRODUCTION

Tooth pain is the most common complaint of the patient for which emergency dentist consultation becomes mandatory. The pain is intolerable and patient wants immediate relief. Pain of pulpal origin makes patient uncomfortable and routine activities are hindered because of the intensity of pain. Among all impacted teeth, the mandibular third molar impaction is quite common. Impaction can be of various types such as mesio- angular, disto- angular, vertical and horizontal. Disto- angular and horizontal is difficult to treat and the amount of bone covering the tooth plays an important role.[1] Surgical removal of mandibular third molar is a routine procedure in surgery department. Painless removal of third molar is desired by patients. But sometimes even after following all precautionary steps, the pain and post- operative complications are not uncommon. The tooth is removed after anesthetizing it with various local anesthetist (LA) solutions. Among all, 2% lignocaine with 1:50, 000 or 1:80, 000 adrenaline is widely used. Nerve block is given such as long buccal and inferior alveolar nerve block.[2] Management of pain is a crucial step before planning surgical removal of mandibular third molar.

Sometimes, there is need of giving higher amount of local anesthesia. Some authors have advised use of general anesthesia, NSAIDS, opoid analgesics as a adjuvant to LA. Ketamine is one of the adjuvant used with LA and has been documented as a safe general anesthetic which has properties of anti inflammation also.[3] It provides protection from C- fibres associated injury which in turns leads to post operative pain. Thus administering general anesthetics may be beneficial for central sensitization.[4] The present study was conducted to determine efficacy of ketamine on post-operative symptoms occurring on impacted mandibular third molar surgery.

MATERIALS & METHODS

The present study comprised of 30 patients with bilateral impacted mandibular third molars (Figure 1). All the patients were planned for surgical extraction of teeth. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained prior to the study. General information such as name, age, gender etc. was recorded. They were divided into 2 groups. Group I (15) received lignocaine and group II received lignocaine along with ketamine. 5ml of 2% lignocaine with 1:150, 000 adrenaline was given in group I and 5ml of 2% lignocaine with 1:150, 000 adrenaline and 0.2mg/kg of ketamine was inserted in group II. After removal of tooth, wound was closed with 3- 0 silk sutures which were removed after 7 days. All were advised cap. Amoxicillin 500 mg TDS for 5 days and tab. diclofenc sodium 50 mg TDS for 3 days. Patients were recalled 1st postoperative day, 4th day and 7th day for assessment of symptoms such as pain and mouth opening. For assessment of pain visual analog scale (VAS) was used in which patients were instructed to respond to the 10 items scale in which score 0 was for no pain and 10 was for maximum pain. Inter- incisal distance with the help of vernier caliper was used to measure mouth opening. Results thus obtained were subjected to statistical analysis using chi- square test. P value < 0.05 was considered significant.

STATISTICAL ANALYSIS AND RESULTS

All the observational findings were compiled and sent for statistical evaluation using statistical software Statistical Package for the Social Sciences version 21 (IBM Inc., Armonk, New York, USA). Graph I shows that group I had 8 males and 7 females and group I had 6 males and 9 females. The difference was non- significant (P> 0.05). Table I shows that on day 1, (mean± S.D) VAS pain score in group I was 5.8± 1.4 and in group II was 4.2± 1.5. On day 4, it was 4.0± 1.6 and 2.9± 1.8 respectively in both groups and on day &, it was 2.1± 1.2 in group I and 0.6± 1.3 in group II. The difference was significant (P< 0.05). Table II shows that on day 1, the mouth opening was 45.8± 4.4 in group I and 47.2± 3.5 in group II. On day 4, it 42.0± 5.8 in group I and 44.5± 7.6 in group II and on day 7, it was 40.1± 6.2 in group I and 41.8± 6.9 in group II. The difference was non- significant (P>0.05). Data and observations thus obtained were correlated clinically to relate with postoperative symptoms.

Graph I: Distribution of patients

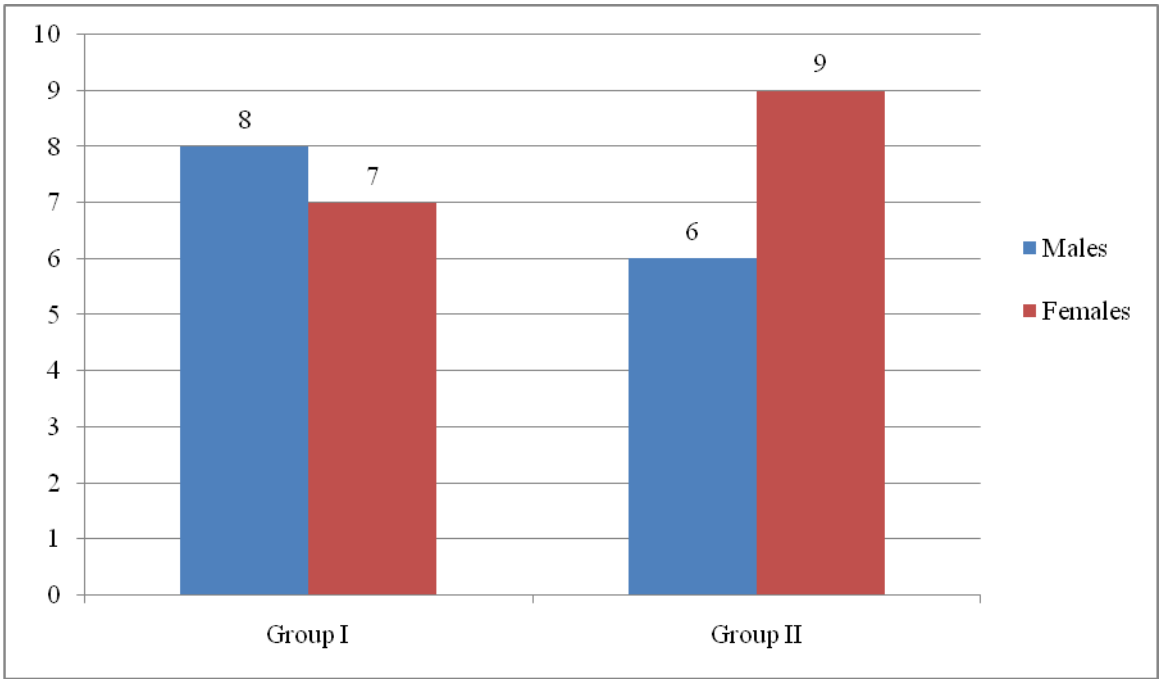

Table I: Comparison of pain in both groups

Day	Group I	Group II	P value
1	5.8± 1.4	4.2± 1.5	0.01
4	4.0± 1.6	2.9± 1.8	0.02
7	2.1± 1.2	0.6± 1.3	0.001

Table II: Comparison of mouth opening in both groups

Day	Group I	Group II	P value
1	45.8± 4.4	47.2± 3.5	0.1
4	42.0± 5.8	44.5± 7.6	0.2
7	40.1± 6.2	41.8± 6.9	0.41

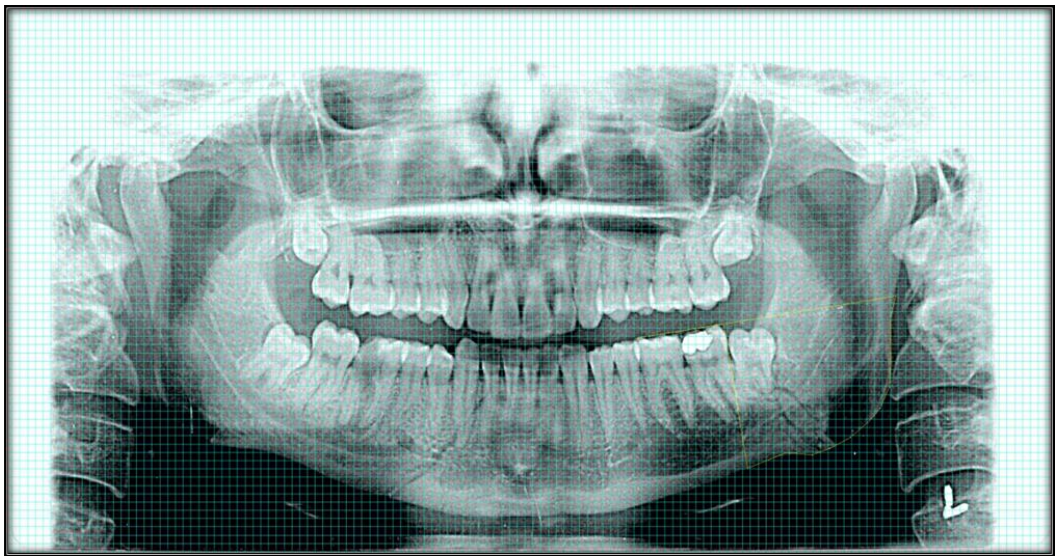

Fig. 1: Bilateral Impacted mandibular third molar at mandibular angle (Pre-surgical View)

DISCUSSION

Management of impacted mandibular third molar requires surgical intervention. Careful removal of tooth is required for better management. However, the most important aspect of the surgery is to minimize the pain and to prevent or lower down the post operative complications arising from it. It has been observed that there is considerable pain and post- operative diminished mouth opening.[5] In present study, there were 30 patients, who were divided into 2 groups. Group I had 8 males and 7 females and in group II, there were 6 males and 9 females. All patients had bilateral impacted third molars. We analyzed postoperative pain and mouth opening in both the groups. We found that in group I, on day 1, pain score was 5.8± 1.4 and in group II 4.2± 1.5. On day 4, it was 4.0± 1.6 in group I and 2.9± 1.8 in group II. On day 7, it was 2.1± 1.2 in group I and 0.6± 1.3 in group II. This was in agreement with Manjunath et al.[6] In their study, they divided patients into study group and placebo group. Study group received lignocaine and ketamine while placebo group received lignocaine along with ketamine. The pain scores at 30 min, 1, 4, 12 h and 1 day post-operatively was significantly less in the study group than in the placebo group. Author also assessed swelling and mouth opening. It was found that the study group and placebo group showed statistically non-significant difference on the 1st, 3rd and 7th post-operative days. In present study, we analyzed mouth oening also. We found that on day 1, the mouth opening was 45.8± 4.4 in group I and 47.2± 3.5 in group II. On day 4, it 42.0± 5.8 in group I and 44.5± 7.6 in group II and on day 7, it was 40.1± 6.2 in group I and 41.8± 6.9 in group II. This is similar to Satilmis et al.[7] Anadshah et al[8], in their study divided patients who had impacted mandibular third molars into 2 group. Group LAA was those patients who received lignocaine only and group LAK was those who received both lignocaine and ketamine. It was observed in their study that facial swelling on post-operative days was significantly lower in the LAK group than in the LAA group. The pain scores on the VAS were significantly higher in the LAA group than in the LAK group. Ketamine is widely used general anesthetic solution which has anti- inflammatory as well as analgesic properties. It is N-methyl- D-aspartate

(NMDA) antagonists which prevent central sensitization. Schmid et al[9]. conducted a study of use and efficacy of low dose ketamine in the management of acute postoperative pain and found that it has a important role in postoperative pain management when used as an adjunct to local anaesthetics, opioids or other analgesic agents. Hewit et al[10], in their study of the use of NMDA-receptor antagonists in the treatment of chronic pain found ketamine as a useful NMDA antagonist thus supported it as effective agent in management of pain especially after the surgery. Mazar et al[11] in their study of involvement of adenosine in the anti-inflammatory action of ketamine found that ketamine shows its action by release of adenosine and were effective only at the initial stage of sepsis. Authors found that the administration of sub-anaesthetic doses of ketamine might be advantageous in patients who undergo elective surgery or other invasive procedures with a high risk for bacteraemia.

CONCLUSION

Author found ketamine as a useful agent in management of post- operative pain in surgical extraction of impacted mandibular third molars. However, there was no difference in mouth opening in both groups. Our study results could be treated as suggestive for predicting ketamine's effectiveness in post- operative pain associated with impacted mandibular third molars. However we expect other large scale studies to be conducted that could further establish certain concrete guidelines in this prospect.

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