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Assessment of Effect of Intra-Socket Ketamine and Tramadol in Third Molar Surgery

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ABSTRACT

Background: Mandibular third molar removal is the most performed surgical procedure in oral surgery. The present study was conducted to assess effect of intra-socket ketamine and tramadol in third molar surgery.

Material and Methods: 60 patients scheduled for mandibular third molar surgery of either gender. Patients were divided into three groups- Group I patients received tramadol 1 mg/kg, group II patients received ketamine 0.5 mg/kg and group III patients received normal saline 2 mL. All patients underwent mandibular third molar surgery under strict aseptic conditions. Pain was evaluated postoperatively using a visual analog scale (VAS) at 1 hour, 6 hours and 24 hours. The patients were asked to score the pain using the VAS (1 = no pain; 2 = mild pain; 3 = moderate pain; 4 = severe pain; 5 = very severe pain).

Results: Group I had males 12 and females 8, group II had males 11 and females 9 and group III had males and females 10 each. The mean age of patients in group I was 24.2 years, in group II was 23.8 years and in group III was 22.7 years. The average time taken to perform surgery was 28.1 minutes in group I, 27.9 minutes in group II and 28.4 minutes in group III. The difference was non- significant (P> 0.05). The mean VAS in group I at 1 hour, 6 hours and 24 hours was 3.5, 2.1 and 1.0, in group II was 3.8, 1.9 and 1.0 and in group III was 3.7, 2.8 and 2.3 respectively. The difference was significant (P< 0.05).

Conclusion: Intra socket use of tramadol and ketamine can be used as effectively used for decreasing pain after mandibular third molar surgery.

Keywords: ketamine, tramadol, visual analog scale.

INTRODUCTION

Mandibular third molar removal is the most performed surgical procedure in oral surgery. As mandibular third molar surgery is widely done, post-operative sequalae is also common.[1] Post-operative complications such as dry socket, nerve damage, bone fracture, delayed healing and injury to the second molar can occur frequently following the surgical removal of mandibular third molars. The lower third molar surgery require elevation of a full thickness gingival flap and removal of bone surrounding the tooth. These inflammatory responses after third molar surgery may badly affect a patients' quality of life.[2]

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Non- steroidal anti- inflammatory agents such as aspirin, diclofenac sodium or potassium are preferred line of drugs to control pain post- operatively.[3] Ketamine is an anesthetic agent with analgesic efficacy at subanesthetic dosage. It is an effective analgesic for pain of nociceptive and neuropathic origin.[4] The recommended route of administration of ketamine is intravenous or intramuscular; however, other routes of administration such as oral, intranasal, transdermal, rectal, intrathecal, and epidural are also advocated.[5] Local mechanism of action of ketamine is directly related to its potential to block NMDA receptors, which has been reported to prevail in peripheral nerve endings. Such interaction may attenuate the local effect of endogenous glutamate, attenuating its nociceptive potential and modulating its inflammatory response by decreasing multiple proinflammatory mediators.[6] The present study was conducted to assess effect of intra-socket ketamine and tramadol in third molar surgery.

MATERIAL & METHODS

The present study comprised of 60 patients scheduled for mandibular third molar surgery of either gender. The study protocol was approved from ethical review committee. A valid written consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Patients were divided into three groups- Group I patients received tramadol 1 mg/kg, group II patients received ketamine 0.5 mg/kg and group III patients received normal saline 2 mL. All patients underwent mandibular third molar surgery under strict aseptic conditions. The treatment was applied to the extraction sockets using resorbable gel foam. Average time taken for the procedure was recorded. Pain was evaluated postoperatively using a visual analog scale (VAS) at 1 hour, 6 hours and 24 hours. The patients were asked to score the pain using the VAS (1 = no pain; 2 = mild pain; 3 = moderate pain; 4 = severe pain; 5 = very severe pain). The number of analgesics taken after the third molar surgery was also recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II	Group III
Method	tramadol 1 mg/kg	ketamine 0.5 mg/kg	normal saline 2 mL
M:F	12:8	11:9	10:10

Table I shows that group I had males 12 and females 8, group II had males 11 and females 9 and group III had males and females 10 each.

Table II Comparison of mean age and time taken to perform surgery

Groups	Group I	Group II	Group III	P value
Age (years)	24.2	23.8	22.7	0.81
Time (mins)	28.1	27.9	28.4	0.94

Table II shows that mean age of patients in group I was 24.2 years, in group II was 23.8 years and in group III was 22.7 years. The average time taken to perform surgery was 28.1 minutes in group I, 27.9 minutes in group II and 28.4 minutes in group III. The difference was non-significant (P> 0.05).

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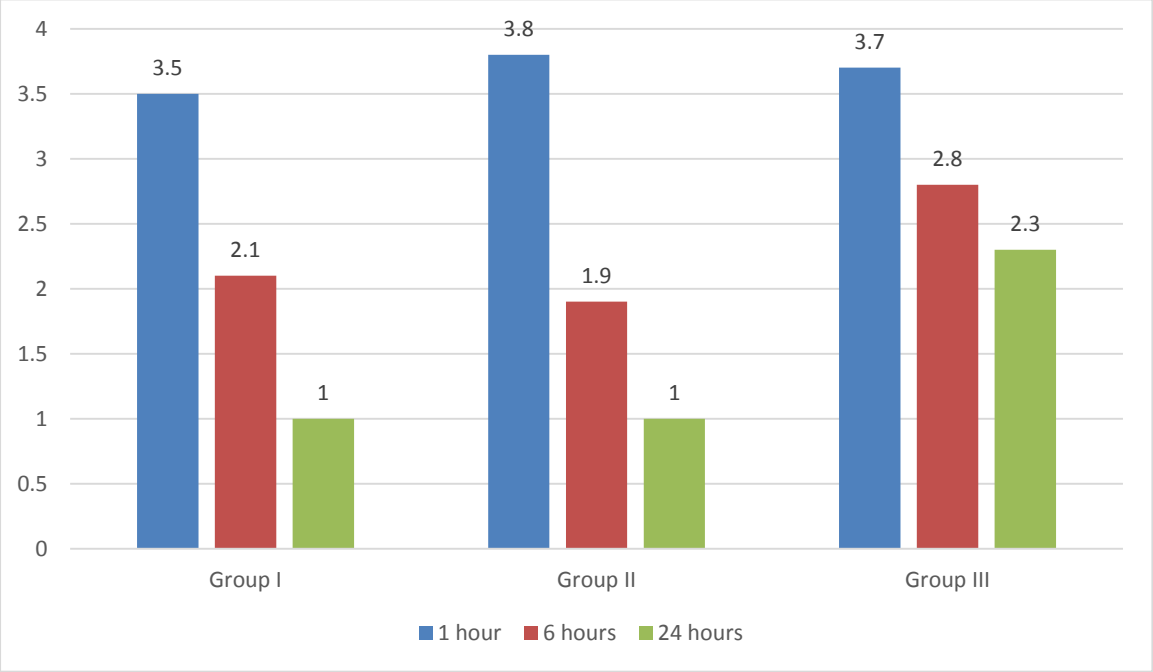
Table III Comparison of pain score

Groups	1 hour	6 hours	24 hours	P value
Group I	3.5	2.1	1.0	0.05
Group II	3.8	1.9	1.0	0.04
Group III	3.7	2.8	2.3	0.17

Table III, graph I shows that mean VAS in group I at 1 hour, 6 hours and 24 hours was 3.5, 2.1 and 1.0, in group II was 3.8, 1.9 and 1.0 and in group III was 3.7, 2.8 and 2.3 respectively. The difference was significant (P< 0.05).



Graph I Comparison of pain score

DISCUSSION

Mandibular third molar surgery is normally performed during impaction. Considering the local action of ketamine regarding clinical analgesia and anti-inflammatory effects, it is advisable to evaluate its peripheral use in third molar surgery.[7] Peripherally, ketamine may also act over NMDA receptors expressed by keratinocytes, blocking one of the sources of the pain pathway.[8,9] Different to the analgesic effect of parenteral ketamine (achieved with sub-anesthetic doses of 0.15-0.25 mg/kg intravenous and 0.5-1 mg/kg intramuscular), the local effect of ketamine is obtained by a short range of doses from 0.3 and 0.5 mg/Kg.[10] The present study was conducted to assess effect of intra-socket ketamine and tramadol in third molar surgery.

We found that group I had males 12 and females 8, group II had males 11 and females 9 and group III had males and females 10 each. Deshpande et al[11] compared the analgesic efficacy of intra socket application of tramadol versus ketamine for preventing pain after mandibular third molar surgery. Thirty patients who had undergone third molar surgery were randomly divided into three groups: Group T (tramadol 1 mg/kg), Group K (ketamine 0.5 mg/kg), and Group C (saline 2 mL). The treatment was applied to the extraction sockets using resorbable gel foam. Average time taken for the procedure was recorded. Pain was evaluated postoperatively using a visual analog scale (VAS) at 6 and 24 hours postoperatively. Furthermore, the number of analgesics taken in the 1st 24 hours was recorded. The VAS

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scores after extraction were statistically higher in Group C than in either treatment group. Group K had the lowest pain intensity. During the 1st 6 hour, patients reported statistically lower pain intensity scores in Groups K and T versus Group C. At 24 hours, Group K had the lowest pain intensity and Group T had less pain than Group C. The number of analgesics taken in the 1st 24 hours was highest in Group C.

We observed that mean age of patients in group I was 24.2 years, in group II was 23.8 years and in group III was 22.7 years. The average time taken to perform surgery was 28.1 minutes in group I, 27.9 minutes in group II and 28.4 minutes in group III. Esparza-Villalpando V et al[12] determined the efficacy of LAK in the control of pain, swelling and trismus in third molar surgery. A total of 110 study subjects (males and females with age range from 18-50 years old) were evaluated for analgesic effect. The SMD shows a significant analgesic effect (postoperative pain control) that favors the LAK. The anti-inflammatory effect of LAK includes 105 study subjects and showed significant lower swelling in the first postoperative day. Finally, the LAK does not reduce trismus in third molar surgery

We found that mean VAS in group I at 1 hour, 6 hours and 24 hours was 3.5, 2.1 and 1.0, in *group II was 3.8, 1.9 and 1.0 and in group III was 3.7, 2.8 and 2.3 respectively. Collins M* et al[13] *evaluated the analgesic effects of systemic and local (into the surgical site) tramadol* along with the placebo after extraction of an impacted mandibular third molar under local anesthesia. The study proved that the local injection of tramadol increased the duration of anesthesia and the systemic use of tramadol provided improved analgesia after removal of impacted third molar. Satılmış T et al[14] reported that the ketamine decreased pain in a patient with radiation-induced oral mucositis; the ketamine was prescribed as an oral rinse. Topical use of ketamine is also advocated in the literature to control the pain after tonsillectomy to reduce the need for rescue analgesia.

The limitation the study is small sample size.

CONCLUSION

Authors found that intra socket use of tramadol and ketamine can be used as effectively used for decreasing pain after mandibular third molar surgery.

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