RESEARCH ARTICLE

A PROSPECTIVE RANDOMIZED STUDY FOR EVALUATION OF TWO FORMULATION OF DEXAMETHASONE IN IMPACTED THIRD MOLAR SURGERY

Aniruddh Pratap Singh[1],Jonathan PT[2], Hari shankar[2],Kavikumar V[4],Dinesh Nandkumar G[5],Geeth Deepika KG[6].

1. Senior Lecturer, Dept Of Oral & Maxillofacial Surgery,Dental College Azamgarh,Azamgarh,U.P
2. PT, consultant, pediatric dentist, Madurai, Tamilnadu
3. P.G , Dept of Periodontology Maharaja Ganga Singh Dental college Rajasthan .
4. Consultant, pediatric dentist, udumelpet, Tamilnadu
5. Senior lecturer, Orthodontist Ultra's best Dental college Madurai Tamil Nadu
6. Senior lecturer Conservative dentist& Endodontist C.S.I Dental college Madurai Tamil Nadu

ABSTRACT

Introduction: To evaluate the relative ability of 4 mg dose of intraoperative dexamethasone, administered submucosally and introrally, to reduce the postoperative discomfort after third molar surgery.. It brings great discomfort to the patients the effect of 4mg dexamethasone given by either sub mucosal or intraoral route on pain, swelling and trismus after third molar surgery

Material and Methods: A total of 50 patients were enrolled in this prospective study which were divided in two groups – Group A who received 4mg of submucosal dexamethasone and Group B who received 4 mg of intraoral route dexamethasone during the extraction of third molars. Swelling, trismus and VAS scores were measured in both the groups on 2nd 3rd and 7th postoperative days. Paired and non-paired tests was applied.

Result: There was no significant difference in the demographic data and duration of surgery between the groups. Swelling was more marked on 3rd postoperative day which slowly reduced but there was no significant difference in swelling between the groups. Trismus index was also comparable between the groups, showing no significant difference.

Conclusion: submucosal injection of dexamethasone produced comparable results when used intraoperatively during third molar surgery.

Keywords: Dexamethasone, Intraoral, Prospective, Submucosal, Transalveolar

INTRODUCTION:

The extraction of impacted lower third molars is the most common operation in oral surgery, and usually produces pain, trismus and facial swelling in the postoperative period. It involves intentional and minor trauma to the hard and soft tissues which generally leads to pain, swelling and trismus.[1] These things bring discomfort to the patient and interfere with its social well being.[1,2] The prime concern of the specialist is to reduce the post-operative squeal.

Extraction involves injury which further causes tissue trauma leading to inflammation due to the action of phospholipase A2 which catalyzes the conversion of phospholipids into arachidonic acid and forms leukotrienes, prostaglandins or thrombxane. These are referred to as mediators of inflammation. The symptoms peak during 2nd day after extraction.[1,3] Corticosteroids act by inhibiting body's inflammatory response to injury hence lead to reduction in fluid transudation and a decrease in oedema.[4,5] They inhibit the first step of inflammation.

Corresponding Author: Dr **Aniruddh Pratap Singh** Email:dsdraniruddh63@gmail.com

The use of corticoids as anti-inflammatory agents dates back to 1949, when Hench and Kendall first described the anti-inflammatory effects of these substances in the treatment of rheumatoid arthritis.[2] Dexamethasone is a white odorless compound, which is slightly soluble in water. It has a melting point of 240 to 260°C. It is a synthetic analog of prednisolone in which a methyl group has been added at the carbon 16 position and a fluorine atom at carbon 9 position.[12] Submucosal dexamethasone injection directly in the surgical area has been used in different dental procedures, but there are still few studies evaluating its efficacy as compared to oral route for impacted third molar surgeries. So, this study aimed to evaluate postoperative pain, edema and trismus after impacted third molar surgeries using oral or submucosal local injection of dexamethasone.[1]. Most of the studies are not comparable with respect to patient selectioning, dosage and route of steroid administration. In this prospective randomised study, we evaluate the effect of 4mg dexamethasone given by either sub mucosal or intramuscular route on pain, swelling and trismus after third molar surgery.

MATERIAL AND METHOD:

This was a prospective randomized controlled trial which was conducted on 50 consecutive patients reporting in the Department of Oral and Maxillofacial Surgery, Maharaja Ganga Singh Dental College, Sriganganagar, requiring surgical removal of a single impacted 3rd molar under local anaesthesia. The study involved 50 patients with 25 patients in each group. Both men and women equally participated in the study. According to Pell and Gregory classification, Class II, class III impactions and Position A/B/C were included in the study.[6] Patients between the ages of 18 years to 48 years with no active infection at the time of operation were enrolled in the study. Debilitated or immune compromised patients, patients allergic to local anaesthesia, patients on any existing steroid use, pregnancy or lactation, patients using antibiotics were excluded from the study. Patients who didn't report during follow up period or patients who used any other drug during study period were also excluded. **Group I** :- Received one regimen single dose of 4 mg Dexamethasone submucosally in impacted third molar vestibular region after establishing local anaesthesia. Group **II** :- Received one regimen single dose of 4 mg Dexamethasone tablet orally one hour before the procedure.

Surgical Procedure

Inferior alveolar, lingual and long buccal nerve block was administered using 2% lingnocaine HCl in 1:100000 adrenaline. A single surgeon performed all the surgeries. After giving Ward's incision, surgical access was made and a triangular full thickness mucoperiosteal flap was elevated. Buccal trough was prepared using round bur under copious irrigation with saline solution. Crown or roots sectioning was performed as required. Complete tooth was removed and debridement of the socket was performed and irrigation was done. Bone filing was done to smoothen any sharp bony margins. Primary closure of the socket with 3-0 mersilk interrupted sutures. The duration of operation was recorded from

the start of incision to the last suture and was recorded. Postoperative antibiotics (Cap Amoxicillin 500mg TDS and Tab Metrogyl 400 mg tds) and analgesic (Tab Combiflam TDS) were prescribed to all the patients. Patients were also given antibacterial mouthwash twice daily for a period of 7 days.

Follow Up

Extraoral swelling, trismus index and postoperative pain were measured on 2nd, 3rd and 7th post operative day. Swelling was recorded from tragus to corner of mouth and from tragus to pogonion with the help of tape measure. Both the values were added and taken as a reading. Mouth opening was recorded as distance between upper and lower incisors when mouth was maximally opened. Trismus was taken as the difference between this reading before and after surgery. Post operative pain was measured by the visual analogue scale in which 0 meant no pain and 100 meant worst possible pain.

Statistical Analysis:

Many statistical techniques rely on these theoretical distributions in order to work correctly. Statisticians describe these techniques as parametric. Non-parametric (also called distribution-free) alternatives exist that can be used for data that do not follow normal distributions. The non-parametric techniques are usually slightly less powerful (i.e. less able to detect a true difference when it exists) and more limited in their scope. Paired and non-paired tests It is also necessary to consider whether the data that we have collected arise from independent observations – unpaired tests or pre and post observations – paired observations.

RESULT:

A total of 50 patients were enrolled in this prospective study with the mean age of 28.3 +/- 2.4 years. The present study was conducted over a period of 3 month, from October 2020 - 2021 Table 1 illustrates the demographic data related to the patients and the mean duration of surgery amongst the groups. The mean age in Group A was 30.6 years and the mean age in Group B was 29.6 years. The mean duration of surgery in Group A patients was 34.1 +/- 1.3 minutes and the mean duration of surgery amongst Group B patients was 30.4 +/- 1.5 minutes. There was no significant difference amongst the groups and the p value was greater than 0.05. demonstrates the comparison of extraoral facial swelling on 3rd and 7th post operative days. There was considerable swelling present in both the groups on 3rd postoperative day which slowly diminished by 7th postoperative day. On both 3rd and 7th post operative day swelling was more in Group A compared to Group B. On 3rd postoperative day the mean swelling amongst Group A patients was 2.2 +/- 0.8 mm and amongst Group B patients it was 1.8 +/- 0.9 mm. The differences were statistically non significant ($p>0.05$) on both third and 7th postoperative days.

DISCUSSION:

Removal of mandibular wisdom tooth is one of the most painful, dreadful and frightful situation amongst patients. Its associated post operative consequences like trismus, swelling and pain interfere with patient's social well being. Operators are trying their best to reduce this discomfort. Various techniques and medications are being put into test in

present scenario to reduce these sequels. Corticosteroids like dexamethasone and methylprednisolone because of their pure glucocorticoid and no mineralocorticoid effect have been used widely in dentoalveolar surgery and they have least adverse effects on leukocyte chemotaxis. They have gained widespread importance in this arena. In a metaanalysis by Markiewicz et al,[14] he inferred that giving corticosteroids perioperatively has mild to moderate value in reduction of postoperative inflammatory signs and symptoms. El Hag et al in their study compared 1 mg dexamethasone injection 1 hour preoperatively and 10-18 hours postoperatively. He concluded that there is significant reduction in swelling and trismus following third molar surgery. A study by Hooley and Francis in 1969,[8] they came to the conclusion that patients receiving betamethasone had less pain and needed much less analgesics postoperatively compared to the patients without betamethasone. Dexamethasone has a half life of 36-72 hours. Corticosteroids stabilize the lysosomal membrane and therefore prevent the release of proteolytic enzymes. They also decrease the capillary permeability and therefore lead to a decrease in oedema. According to our study there was no significant difference in swelling and pain scores amongst both the groups. But Group B patients who received intramuscular dexamethasone showed more reduction in swelling and pain compared to Group A. According to a study by Sisk and Bennington[9], a marked reduction in pain, swelling and trismus were seen after administration of intravenous 125 mg of methylprednisolone preoperatively following mandibular third surgery. According to a similar study conducted by Beirne and Hollander[11], a marked reduction in oedema was seen on first postoperative day but there was a rebound increase in oedema on 2nd and 3rd post operative day. Dionne et al[13] reported no analgesic effect after giving 4 mg of dexamethasone orally 12 hours before the surgery or 4 mg intravenously preoperatively. In a study by Giovanni et al[16] submucosal injection of 4 mg of dexamethasone was efficient in preventing post operative oedema but when the dose was increased to 8 mg, it produced no extra effects. In a study by Majid et al[7], on comparing submucosal and intramuscular 4 mg dexamethasone injection with controls, a significant reduction in swelling and pain was observed in both the groups who received dexamethasone compared to placebo. In a study by Warraich et al[10] also concluded that submucosal dexamethasone was effective in reducing post operative complication following third molar surgery. In our study, there was no significant difference in trimus index between both the groups. This was similar to a stdy by Graziani et al.[15], where endoalveolar application of dexamethasone produced marked reduction in trismus but its submucosal administration did not produce notable results. According to a similar study conducted by Majid et al[7] submucosal administration of dexamethasone resulted in significantly less trismus only on first postoperative day. Various factors such as age, surgeon, gender and operating time have also been seen to influence healing and swelling after surgery. But in our study these variables were insignificant and same surgeon performed

all the surgeries, therefore they had no impact.

CONCLUSION:

Corticosteroids can play an important role in the reduction of postoperative complications of third molar surgery and hence may lead to a significant improvement in patient's social well being. From our study, we can conclude that submucosal or dexamethasone has no significant difference in the postoperative squeal and therefore any route can be used after surgery without much variations.

.

REFERENCES:

1. GrossiGB, Maiorana C, Garramone RA, Borgonovo A, Beretta M, Farronato D, et al. "Effect of submucosal injection of dexamethasone on postoperative discomfort after third molar surgery: a prospective study." J Oral Maxillofac Surg. 2007;65(11):2218-2226.
2. Savin J, Ogden GR: Third molar surgery—A preliminary report on aspects affecting quality of life in the early postoperative period. Br J Oral Maxillofac Surg. 1997; 35:246.
3. Troullos ES, Hargreaves KM, Butler DP, et al: Comparison of non-steroidal anti-inflammatory drugs, ibuprofen and flurbiprofen, with methylprednisolone for acute pain, swelling and trismus. J Oral Maxillofac Surg 48:945, 1990
4. Messer E, Keller J. The use of intraoral dexamethasone after extraction of mandibular third molars. Oral Surg Oral Med Oral Pathol. 1975;40:594–8.
5. Milles M, Desjardins P. Reduction of postoperative facial swelling by low-dose methylprednisolone: an experimental study. J OralMaxillofac Surg. 1993;51:987–91.
6. Pell GJ, Gregory GT. Impacted mandibular third molars: classification and modified technique for removal. Dent Dig. 1933;39:e330-e8.
7. Majid OW. "Submucosal Dexamethasone injection improves quality of life measures after third molar surgery: a comparative study." J Oral Maxillofac Surg. 2011;69(9):2289-2297
8. Hooley JR, Francis FH. Betamethasone in traumatic oral surgery. J Oral Surg. 1969;27:398-403.
9. Sisk AL, Bonnington GJ. Evaluation of methylprednisolone and flurbiprofen for inhibition of the postoperative inflammatory response. Oral Surg Oral Med Oral Pathol. 1985;60:137-45.
10. Warraich R, Faisal M, Rana M, Shaheen A, Gellrich NC, Rana M. "Evaluation of postoperative discomfort following third molar surgery using submucosal Dexamethasone - a randomized observer blind prospective study." Oral Surg Oral Med Oral Pathol Oral Radiol. 2013;116(1):16-22.
11. Beirne OR, Hollander B. The effect of methylprednisolone on pain, trismus and swelling after removal of third molar. Oral Surg Oral Med Oral Pathol. 1986;61:134
12. Mohammed Imran, Bipin C Reddy, Mueedul Islam, Azhar Khan, Shoaib N Parkar, TanmoyNath."Role of Dexamethasone in reducing Postoperative Sequelae following Impacted Mandibular Third MolarSurgery." A Comparative

Clinical Study Journal of Health Sciences & Research, July-December 2017;8(2):1-8
13. Dionne RA, Gordon SM, Rowan J, et al: Dexamethasone suppresses peripheral prostanoid levels without analgesia in a clinical model of acute inflammation. J Oral Maxillofac Surg. 2003;61:997.
14. Markiewicz MR, Brady MF, Ding EL, Dodson TB. Corticosteroids reduce postoperative morbidity after third molar surgery: a systematic review and meta-analysis. J Oral Maxillofac Surg. 2008;66:1881–94
15. Graziani F, D'Aiuto F, Arduino PG, et al: Perioperative dexamethasone reduces post-surgical sequelae of wisdom tooth removal. A split-mouth randomized double-masked clinical trial. Int J Oral Maxillofac Surg. 2006;35:241.
16. Giovanni Battista Grossi, Carlo Maiorana, Rocco Alberto Garramone, Andrea Borgonovo, Davide Farronato: Effect of Submucosal Injection of Dexamethasone on Postoperative Discomfort After Third Molar Surgery: A Prospective Study. J Oral Maxillofac Surg. 2007;65:2218-2226