

ORIGINAL ARTICLE

COMPARISON OF INTRAVENOUS AND SUBMUCOSAL DEXAMETHASONE ON POSTOPERATIVE SEQUALE FOLLOWING THIRD MOLAR SURGERY

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ABSTRACT:

Background: Surgical removal of third molars is a routinely performed procedure. It involves removal of hard and soft tissues leading to pain, swelling and trismus. Corticosteroids are given to reduce these post operative sequels. In this prospective study, we evaluate the effectiveness of 4mg dexamethasone given intraoperatively by either sub mucosal or intramuscular route. We study its effects on postoperative pain, trismus and swelling. **Materials and Methods:** A total of 38 patients were involved in this study which were divided in two groups – Group I receiving 4mg of submucosal dexamethasone and Group II receiving 4 mg of intravenous dexamethasone intraoperatively during the removal of third molars. Swelling, trismus and pain scores were noted in both the groups during 2nd and 7th postoperative days. SPSS software was used for analysis and Chi square test was applied as a test of significance. **Result:** There was no significant difference in the demographic data and duration of surgery amongst the groups. Pain scores were significantly lower in Group II during 2nd postoperative day. There was a significant difference in facial swelling during both 2nd and 7th postoperative days. Trismus index showed no significant difference between the groups. **Conclusion:** Injection of intravenous dexamethasone provided a significant reduction in pain and swelling scores without significant reduction in trismus index.

Keywords: Corticosteroids, Dexamethasone, Intravenous, Submucosal, Trismus

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INTRODUCTION

Surgical removal of third molars is the most frequently performed procedure by oral and maxillofacial surgeons. It involves calculated and deliberate trauma to the hard and soft tissues leading to pain, swelling and trismus. All these things bring discomfort to the patient and interfere with its social well being.^{1,2} Reduction in the post-operative sequel is of prime concern for both the surgeon and the patient.

Tissue damage leads to inflammation as phospholipase A₂ catalyzes the conversion of phospholipids into arachidonic acid and forms leukotrienes, prostaglandins or thrombxane. These symptoms peak during 2nd day after extraction.³ Corticosteroids are drugs that act by inhibiting body's inflammatory response to injury leading to reduction in fluid transudation and hence oedema.^{4,5} They can be given by various routes like intramuscular, intravenous, oral or sub mucosal. Though various routes have been reported but there has been no clear practice as to which route provides most effective and quick relief. Most of the studies lack comparability with respect to patient selection, timing, dosage and route of steroid administration.⁶ In this prospective study, we evaluate the effectiveness of 4mg dexamethasone given intraoperatively by either sub mucosal or intramuscular

route. We study its effects on postoperative pain, trismus and swelling.

MATERIALS AND METHODS

This randomised prospective study was conducted in the Department of Dentistry, Karwar institute of medical Sciences, Karwar, Karnataka. It involved approximately 38 patients with 19 patients in each group. Both men and women participated in the study. Class II, class III impactions and Position A/B/C according to Pell and Gregory classification were included in the study. All the patients were elder than 18 years and there was no active infection at the time of operation. Immunocompromised patients, history of allergy to local anaesthesia, pre existing steroid use, pregnancy or lactation, patients on antibiotics were not included in the study. Patients who refused to take part in the study or used any other drug during observation period were also excluded. Patients were randomly allocated into Group I and Group II. Group I patients received 4 mg of dexamethasone sub mucosal during the procedure and Group II patients received 4 mg of dexamethasone intravenous during the procedure.

Surgical Technique

Local anaesthesia was given as inferior alveolar, lingual and buccal nerve block using 2 % lignocaine HCl in 1:100000 adrenaline. A single operator performed all the surgeries. Ward’s incision was given and surgical access was made using triangular full thickness mucoperiosteal flap. Buccal guttering was performed with the help of round bur under continuous irrigation with chlorhexidine solution. Sectioning of the crown or roots was performed as required. After complete removal of the tooth, the socket was debrided and irrigated. All the sharp bony margins were smoothed. The socket was closed with interrupted sutures using 3-0 mersilk. The duration of operation was taken from starting from incision to the last suture was recorded. Postoperative antibiotics (Cap Amoxicillin 500mg TDS) and analgesic (Tab Ketorlac DT TDS) were prescribed. Patients were also given chlorhexidine mouthwash twice daily for a period of 5 days. Follow Up: Facial swelling, trismus and pain were measured on 2nd and 7th post operative day. Swelling was measured from tragus to midline and gonion to lateral canthus of eye using tape measure. Sum of two values was taken as a reading. Mouth opening was measured as the maximum distance between upper and lower incisors. Trimus was taken as the difference in mouth opening before and after surgery. Post operative pain was recorded on the visual analogue scale with 0 meaning no pain and 100 meaning worst possible pain.

Data analysis

The data was arranged in a tabulated form and analysed using SPSS software. Mean of the values were recorded and chi square test was applied as the test of significance. Probabilities of less than 0.05 were regarded as significant.

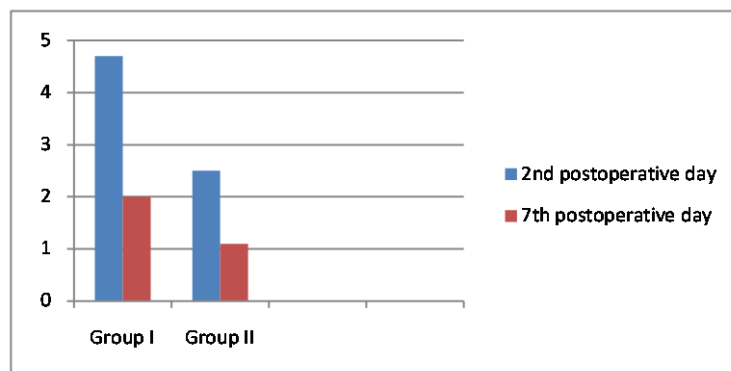
Table 1: Demographic data and duration of surgery

	Dexamethasone 4 mg (Submucosal)	Dexamethasone 4mg (intravenous)	P value
Age	29.6 yrs	28.4 yrs	>0.05
Gender			
Males	9	11	>0.05
Females	10	8	>0.05
Duration of Surgery (mins)	30.2	32.4	>0.05

Table 2: Comparison of facial swelling

Time after surgery	Dexamethasone 4 mg (Submucosal)	Dexamethasone 4mg (intravenous)	P value
2 nd postoperative Day	4.7	2.5	<0.05
7 th postoperative day	2	1.1	<0.05

Graph 1: Comparison of facial swelling



RESULT

A total of 38 patients took part in this prospective study with the mean age of 29 years. This study was conducted over a period of 2 months i.e. 1st November, 2016 – 1st January, 2017.

Table 1 demonstrates the demographic data related to the study and the mean duration of surgery in both the groups. There was no significant difference between the groups and the p value was greater than 0.05.

Table 2, graph 1 shows the comparison of facial swelling on 2nd and 7th post operative day. In both the groups swelling was more marked on 2nd post operative day and later diminished by 7th post operative day. On both 2nd and 7th post operative day swelling was more marked in Group I (submucosal dexamethasone) compared to Group II (intravenous dexamethasone) and the differences were statistically significant (p<0.05).

Table 3, Graph 2 shows the comparison of trismus index between the groups. Patient’s experienced more limitation in mouth opening during 2nd post operative day which became lesser by 7th post operative day. The difference between both the groups was not significant (p>0.05).

Table 4 enumerated the pain scores in both the groups. On 2nd post operative day, in Group I, 12 patients suffered from severe pain, 6 patients had moderate pain and only 1 patient had mild pain. In group II, only 5 patients suffered from severe pain, 10 patients had moderate pain and 4 patients had mild pain. The difference was statistically significant between the groups. There was statistically no significant difference between the groups on 7th post operative day.

Table 3: Comparison of trismus Index

Time after surgery	Dexamethasone 4 mg (Submucosal)	Dexamethasone 4mg (intravenous)	P value
2 nd postoperative Day	16.4	13.2	>0.05
7 th postoperative day	6.7	5.4	>0.05

Graph 2: Comparison of trismus Index

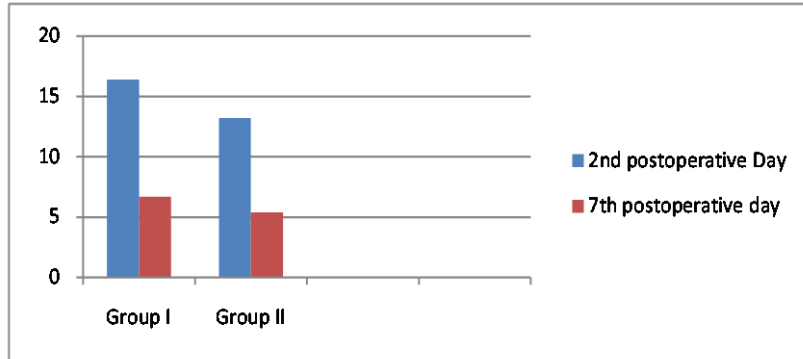


Table 4: Comparison of pain scores

Time after surgery		Dexamethasone 4 mg (Submucosal)	Dexamethasone 4mg (intravenous)	P value
2 nd postoperative Day	No pain	0	0	<0.05
	Mild pain	1	4	
	Mod. Pain	6	10	
	Severe pain	12	5	
7 th postoperative day	No pain	8	11	>0.05
	Mild pain	12	6	
	Mod.pain	1	0	
	Severe pain	0	0	

DISCUSSION

Third molar removal is one of the most dreaded and feared situation amongst patients. To top it, its post operative sequel like trismus, swelling and pain bring discomfort to the patient and interfere with its social well being. Various approaches, techniques and medications are being used in present scenario to reduce these sequels.

Intraoperative/ postoperative use of corticosteroids has gained widespread importance in this arena.^{6,7,8} El Hag et al conducted a study and compared 1 mg dexamethasone injection 1 hour preoperatively and 10-18 hours postoperatively. He noted a significant reduction in swelling and trismus following third molar surgeries. A study conducted by Hooley and Francis in 1969 concluded that patients receiving betamethasone has less pain and required less analgesics postoperatively compared to ones without betamethasone.⁹ Dexamethasone is a potent anti inflammatory drug that has no mineralocorticoid action and has a half life of 36-72 hours. Corticosteroids reduce the number of inflammatory mediators in the body and they stabilize the lysosomal membrane and prevent the release of proteolytic enzymes. They also decrease the capillary permeability.

In our study, we have compared submucosal and intravenous dexamethasone. According to our study there was a significant difference in swelling and pain scores amongst both the groups. Group II patients receiving intravenous dexamethasone showed more marked reduction compared to Group I receiving

submucosal dexamethasone. According to a study by Sisk and Bennington¹⁰, a marked reduction in pain, swelling and trismus was seen when intravenous 125 mg of methylprednisolone was used preoperatively following mandibular third surgery. According to a similar study conducted by Beirne and Hollander¹¹, they found decreased oedema on first day after surgery but also noted rebound increase in oedema on 2nd and 3rd post operative day.

Dionne et al¹² noted no analgesia by administering 4 mg of dexamethasone orally 12 hours preoperatively or 4 mg intravenously preoperatively. A study by Graziani et al¹³ noted that topical injection of 4 mg dexamethasone neither reduced trismus nor pain amongst subjects. According to a study by Giovanni et al¹⁴ submucosal injection of 4 mg of dexamethasone was effective in preventing post operative oedema but increasing the dose to 8 mg produces no extra effect. In a study by Majid et al¹⁵, he compared submucosal and intramuscular injection of 4 mg dexamethasone with controls. A significant reduction in swelling and pain was seen in both the groups receiving dexamethasone compared to control. A study by Warraich et al also concluded that submucosal dexamethasone was effective in managing post operative complication following third molar surgery compared to no steroid administration.

It has been seen that factors such as age, gender and operating time also influence healing and swelling after surgery.¹⁶⁻¹⁸ But in our study there was no significant

difference amongst all these variables hence they had no impact on our study.

CONCLUSION

Corticosteroids act as useful agents in reducing the post operative sequels following third molar surgery. Injection of dexamethasone significantly reduces swelling, pain scores though the effect of intravenous dexamethasone was more pronounced compared to submucosal injection.

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