

Effect of Intraspace Injection of Dexamethasone on Reducing Postoperative Sequelae after Third Molar Surgery

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ABSTRACT

Introduction: A prospective randomised double-blind study done to compare the effects of intra-space injection of dexamethasone on reducing post-operative sequelae after third molar surgery. **Material and methods:** A prospective randomised double-blind clinical controlled trial done on 100 patients with impacted mandibular third molars. Hundred transalveolar extractions were done on 100 patients randomly allocated to each of the two groups (group A- steroid group, Group B- Non-steroid group). A ten point visual analogue scale (VAS) was used to assess pain scores in patients pre-operatively, intra-operatively and post-operatively for 7 days and facial measurements for swelling was done using Schultze –Mosgau³ method to assess swelling. Maximum mouth opening was taken as the parameter for trismus and pre-operative and post-operative values were compared. Number of analgesics taken post-operatively was also taken for assessing associated pain. **Results:** Mean VAS values were significant on all post operative days with less pain values both clinically and statistically. Facial swelling was clinically less in steroid group as compared to the non-steroid group but not statistically significant. Trismus was found less with steroid group as compared to the non-steroid group. **Conclusion:** Steroid group has a better clinical outcome as compared to the non-steroid group when compared pain, swelling and trismus.

KEYWORDS: Dexamethasone, Surgery, Mandibular Molar

INTRODUCTION

Surgical removal of mandibular third molars is the most common procedure performed in oral and maxillofacial clinics and it is associated with post-operative discomfort like pain, swelling and trismus.¹

Postoperative oedema and swelling may be due to the conversion of phospholipids A₂, and the resultant synthesis of prostaglandins, leukotrienes, or thromboxane-related substances which act as mediators of the inflammatory response. The symptoms are not observed immediately after surgery but rather begin gradually, peaking 2 days after the extraction.²

Associated discomforts can affect patient's quality of life after the surgery. Apart from non-steroidal anti-inflammatory drugs, other anti-inflammatory drugs like steroids are used to reduce these sequelae. This study compares the effect of intra-space dexamethasone on reducing post-operative sequelae after the surgery.³

MATERIALS AND METHODS

Study Sample: This study was done on 100 patients (45 males and 55 females) with age range of 18 to 35 years (mean 26.8) who had been treated at Department of Oral and Maxillofacial Surgery, Meenakshi Ammal Dental College, Chennai after getting a signed informed consent

for the trial. Hundred patients, each of whom required removal of a single impacted mandibular third molar under local anaesthesia, were allocated to one of 2 groups of 50 each. The experimental group (Group A) were given intraspace injection of 1 ml dexamethasone 4mg + 2 ml of 2% lignocaine 1:2,00,000 in the same syringe, and the control group (Group B) had no steroid i.e. 3 ml of 2% lignocaine 1:2,00,000 is given.

Inclusion and exclusion Criteria: Patients who were asymptomatic, with no signs of inflammation and infection were included in the study and patients with associated medical history or allergy to drugs, recent anti-inflammatory or antibiotic treatment, pregnant and lactating females were excluded. Third molar classification was done using Pell and Gregory classification on an intra-oral Periapical radiograph.

Test Groups: Fifty out of 100 patients were randomly allocated to two of the study group:

Group A: (Experimental group) 2ml of 2% lignocaine 1:2, 00,000 + 1 ml of 4 mg dexamethasone

Group B: (Control Group) 3ml of 2% lignocaine 1:2, 00,000.

Allocation of the group was done by a trained surgical staff nurse. Both the operator and patient were blinded for

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the use of steroids. The solutions were prepared just before the surgery and patients were randomly allocated to the groups.

Surgical procedure: All extractions were done by oral and maxillofacial surgery trainee with a standard technique. Nerve blocks were administered using a Luer-Lock plastic syringe.

Surgical access to the third molar was achieved by using a standard Ward's incision and envelop flap was raised. Bone guttering was done using a 702 surgical fissure bur under continuous saline irrigation. After osteotomy the tooth was gently elevated and delivered. Once the procedure is completed, the socket was inspected and sutured with interrupted sutures using 3-0 black silk.

Immediately after the procedure, details of each procedure were recorded.

Postoperative Management: After the procedure all patients were given standard post-operative instructions and given 1 form, after being instructed its use: 10 point VAS scale to record pain levels and number of analgesics taken. Standard antibiotic therapy (Amoxicillin 500mg, Metronidazole 400mg) every 8 hourly, and patients were instructed to take Tab. Imol(Paracetamol 325mg + Ibuprofen 400 mg) as soon as their pain reached a moderate level(Maximum 6 tablets daily), and were asked to enter their pain level and the time at which the analgesic taken and to then make no further recordings. The numbers of analgesics used were recorded until the end of the first post-operative week. Pain score was recorded preoperatively, postoperatively and for next 7 days by VAS scale.

Acquisition of Data: Patient data was acquired at the initial visit and at post surgery days 2 and 7, the information was recorded by a single examiner blinded as to the administration of experimental medication. The surgeon operated on the patients was never involved in the assessment. After patients consent to participate in the study, baseline data were recorded. Mouth opening, taken as the maximum distance between upper and lower central incisors will be measured by ruler (to the nearest millimetre). Facial swelling was evaluated by a modification of tape measuring method described by Schultze-Mosgau et al. Three measurements were recorded as distances from tragus to outer corner of the mouth, tragus to soft tissue pogonion and lastly, from lateral corner of the eye to angle of the mandible.

Statistical Analysis: Data was reported as the mean and standard deviation. Differences from the baseline preoperative and postoperative values were compared using student's t-test and Mann-Whitney test. Student's t-test was used as an appropriate to test any significant differences at the baseline for each treatment group and the same used to describe changes in the three primary outcomes (pain, oedema and trismus) over time. p-value <0.005 was considered significant; SPSS (SPSS for windows, version 11, SPSS Inc., Chicago, IL,USA) statistical software was used.

RESULTS

Steroid group showed a better clinical response when compared to the non-steroid group in pain, swelling and trismus reduction postoperatively. Mean VAS scores was found less on all postoperative days both clinically and statistically [Table, Diagram 1, 2]. Mean facial swelling values were clinically less on all postoperative days but not statistically [Table, Diagram 3, 4, 5]. Out of 3 swelling ratings, swelling rating from tragus to soft tissue pogonion showed statistically significant value on the 7th postoperative day. Trismus was less in steroid group patients as compared to the non-steroid group patients with more interincisal distance when compared with steroid group [Table, Diagram 6].

	Group	Mean	sd	p
Preoperative Pain	Group A	1.48	2.073	0.038
	Group B	0.78	1.112	
Postoperative pain	Group A	1.92	1.275	0.000
	Group B	3.88	2.017	
2 nd day	Group A	1.34	1.394	0.000
	Group B	5.32	2.045	
7 th Day	Group A	0.30	0.614	0.000
	Group B	3.32	2.180	

Table 1: VAS Score

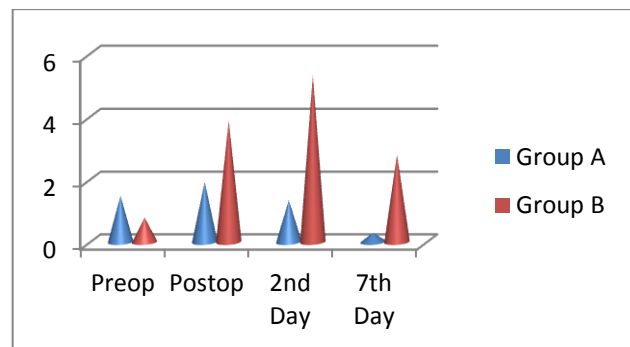


Diagram 1

Pain scores	Group	Mean	sd	p
Day 0	Group A	3.32	2.045	0.000
	Group B	6.62	1.772	
Day 1	Group A	2.84	1.707	0.000
	Group B	6.28	1.990	
Day 2	Group A	2.16	1.670	0.000
	Group B	5.68	2.171	
Day 3	Group A	1.40	1.400	0.000
	Group B	5.02	2.005	
Day 4	Group A	0.90	1.432	0.000
	Group B	4.42	1.885	
Day 5	Group A	0.38	0.878	0.000
	Group B	3.54	2.043	
Day 6	Group A	0.26	0.633	0.000
	Group B	3.34	2.076	

Table 2 Pain Scores on all postoperative days

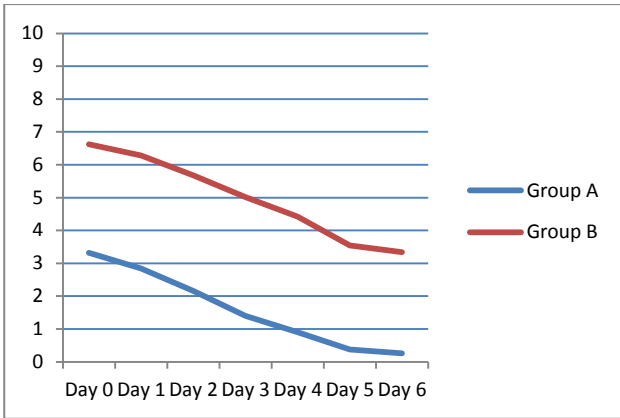


Diagram 2

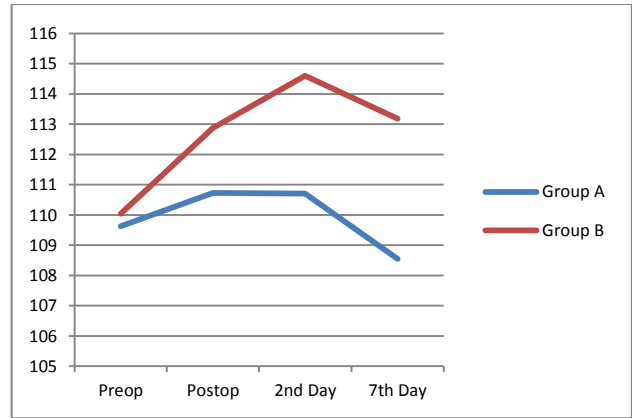


Diagram 4

	Group	Mean	sd	p
Preoperative	Group A	108.96	5.190	0.894
	Group B	108.80	6.694	
Postoperative	Group A	110.98	5.093	0.291
	Group B	112.20	6.337	
2 nd day	Group A	111.02	5.224	0.045
	Group B	113.68	7.654	
7 th Day	Group A	108.42	5.338	0.006
	Group B	111.94	6.976	

Table 3 Swelling Rating (From Lateral Corner Of The Eye To Angle Of Mandible)

	Group	Mean	sd	p
Preoperative	Group A	139.31	4.917	0.202
	Group B	140.82	6.663	
Postoperative	Group A	140.63	5.833	0.017
	Group B	143.90	7.399	
2 nd day	Group A	140.57	5.983	0.002
	Group B	145.02	7.617	
7 th Day	Group A	138.33	5.068	0.001
	Group B	142.86	7.972	

Table 5 Swelling Rating (From Tragus To Pogonion)

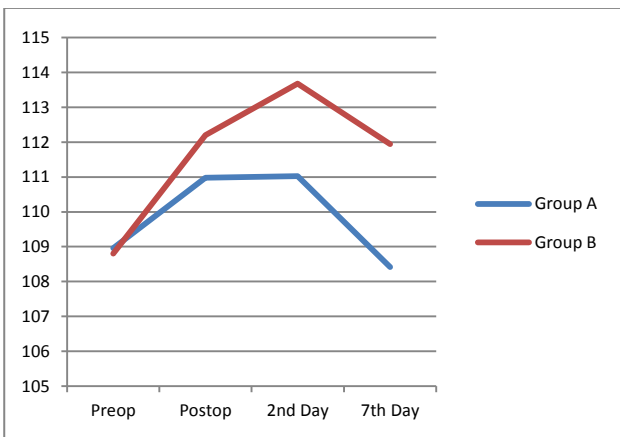


Diagram 3

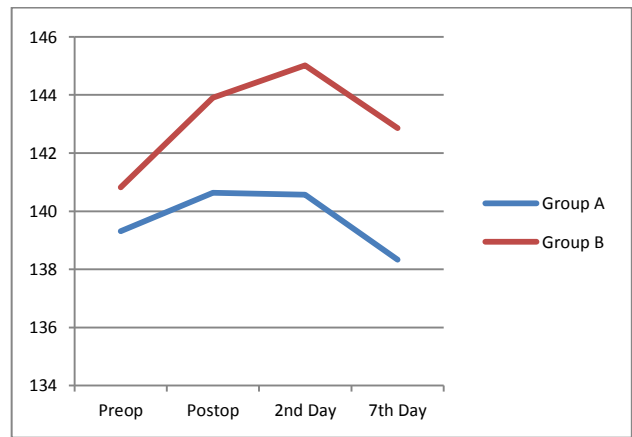


Diagram 5

	Group	Mean	sd	p
Preoperative	Group A	109.63	6.304	0.738
	Group B	110.04	5.785	
Postoperative	Group A	110.73	6.389	0.100
	Group B	112.88	6.467	
2 nd day	Group A	110.71	6.856	0.001
	Group B	114.60	4.695	
7 th Day	Group A	108.55	6.328	0.000
	Group B	113.18	5.306	

Table 4 Swelling Rating (From Tragus To Corner Of The Mouth)

	Group	Mean	sd	p
Preoperative	Group A	41.60	5.646	0.251
	Group B	40.38	4.899	
Postoperative	Group A	39.54	5.191	0.000
	Group B	34.28	6.376	
2 nd day	Group A	39.04	7.010	0.000
	Group B	32.40	6.138	
7 th Day	Group A	41.48	5.839	0.000
	Group B	35.42	5.202	

Table 6 Interincisal Distance

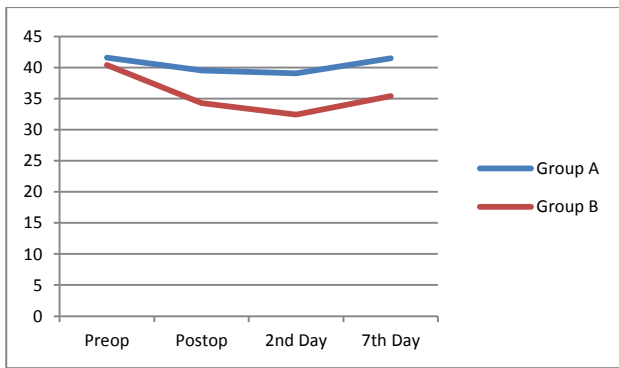


Diagram 6

DISCUSSION

Post surgical swelling affects patient's quality of life. This is due to trauma to the tissues during surgical procedures which releases inflammatory products and are responsible for post-operative pain, swelling and trismus. Corticosteroids use is advocated by many authors due to their strong anti-inflammatory action.^{4,5,6,7} This action is due to inhibition of arachidonic acid release by the cell membrane, with inhibition of the synthesis of leukotrienes, prostaglandins and thromboxane related substances. The advantages of giving dexamethasone injection into the pterygomandibular space is that patient will have one needle prick (during inferior alveolar nerve block) and the secondly due to mixing of two solutions the resultant pH increases which makes the injection less painful.

Grazani et al. reported that perioperative administration of dexamethasone reduces postoperative complication after surgery when given through endo-alveolar or sub-mucosally.⁸

Darpan et al. in a similar study also reported that steroid group patients had a better clinical outcome when compared to non-steroid group patients when dexamethasone is given in pterygomandibular space and as conventional methods like submucosal, intramuscular, intravenous and per-oral administration.⁹

Other drugs are also used as an adjunct with the local anaesthesia to reduce post-operative sequelae such as ibuprofen.¹⁰ In a study done for comparing the effect of preoperative ibuprofen and dexamethasone and authors stated that dexamethasone has a better clinical outcome as compared to ibuprofen on reducing post-operative discomfort.

In one study done to compare the effect of route of administration of dexamethasone stated that sub-mucosal injection and intramuscular has similar effect but authors also stated that injecting dexamethasone sub-mucosally is an effective way of minimising pain, swelling and trismus because it offers a simple, non-invasive, cost effective and painless treatment for removing third molar tooth.¹¹

Alcantara et al. compared 40mg methylprednisolone and 8 mg dexamethasone effectiveness on reducing post-op sequelae after wisdom tooth removal, and stated that 8

mg dexamethasone has a better results as compared to 40 mg methylprednisolone.¹²

Grossi et al. compared the two doses of dexamethasone, i.e., 4 and 8mg and concluded that there is no difference on post-op sequelae on increasing dexamethasone dose.¹³

The results of our study also favours the use of steroids for better patient comfort after third molar surgery and when compared clinical parameters like pain, swelling and trismus, steroids had a better control on all the post-operative days and increasing patient's quality of life after wisdom tooth surgery.

CONCLUSION

Patients in steroid group had a better clinical outcome and improved quality of life when compared to non-steroid group patients. Hence, this study favours the use of intraspase injection of dexamethasone injection for removal of wisdom tooth for better patient's comfort and quality of life.

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