A Single Pre Operative Dose of Sub Mucosal Dexamethasone is Effective in Improving Post Operative Quality of Life in the Surgical Management of Impacted Third Molars: A Comparative Randomised Prospective Study

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Abstract

Objective The aim of the study was to observe and compare the effects of dexamethasone on pain, swelling and trismus administered as one dose preoperatively sub mucosal (study group 2) versus intramuscular injection (study group 1) keeping control as those who received no dose of steroid in the management of third molar surgery.

Materials and methods The group 2 (20 patients) is the study group in which all the patients had single dose of pre-operative sub mucosal dexamethasone of 4 mg/2 ml. The group 1 patients (20 patients) received single dose of pre-operative intra muscular dexamethasone of 4 mg/2 ml. The control group (20 patients) did not receive steroid in any form. The post operative pain, swelling and trismus were assessed for all the groups.

Results The submucosal dexamethasone group showed marked improvement in the mouth opening in the follow ups than the intra muscular dexamethasone group. In those five cases of bilateral impaction, in study groups 1 and 2, the mouth opening was very much significant when sub mucosal dexamethasone was given.

Conclusion The pre operative use of submucosal dexamethasone effectively reduces the post operative pain, swelling and trismus showing statistically significant results. The number of post operative use of analgesic tablets taken by the patients in the study group 2 were less compared to the study group 1 and the control group showing clinically significant results.

Keywords Sub mucosal dexamethasone · Pre operative dexta · Impacted 3rd molars · Pain · Swelling · Trismus · Oral surgery

Introduction

The removal of the lower wisdom teeth is one of the most common procedures that is done by Oral and Maxillofacial surgeons. This procedure is always associated with varying degrees of post operative pain and swelling that may have a social impact. The regional anatomy of the third molar region reveals it to be a highly vascularized area, predominantly constituted by loose connective tissue which leads to a series of functional and structural alterations in the postoperative period including the liberation of exudate and subsequent swelling, trismus and pain [1]. To control post-operative inflammation and symptoms associated, it is necessary to provide an adequate anti-inflammatory therapy and various medications have been prescribed for the same.

Hench and his colleagues were awarded Nobel Prize in 1950 for reporting the anti-inflammatory effects of cortisone in the treatment of Rheumatoid Arthritis [2]. For several decades surgeons administered corticosteroids before or just after third molars' surgery to reduce inflammation and associated symptoms after oral surgery [3]. Corticosteroids mechanism of action is the inhibition of the

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enzyme Phospholipase A2 (PLA 2), which reduces the release of arachidonic acid in the cells of the inflamed area. This will decrease prostaglandins and leukotriene synthesis; therefore reducing the accumulation of neutrophils has been the greatest advantage of corticosteroids compared to non steroidal anti-inflammatory drugs [4, 5].

There have been studies involving the use of dexamethasone using the intramuscular route of administration [6–12]. The irrational use of this drug can lead to an adrenal insufficiency and care should be taken during the use of this drug and the factors to be monitored are the duration and the dosage of the drug. Since the action of the drug is required in a local area, the systemic administration may not be required.

Taking into account these facts, the purpose of the present study was to observe and compare the effects of dexamethasone on pain, swelling and trismus administered as one dose preoperatively sub mucosal (study group 2) versus intramuscular injection (study group 1) keeping control as those who received no dose of steroid in the management of third molar surgery.

Materials and Methods

Materials

Patients who reported to the Department of Oral and Maxillofacial Surgery, Vinayaka Mission's Sankaracharya Dental College and Hospital, Salem during May 2012 with impacted mandibular molars were selected by simple randomization by consecutively allotting the patients into 3 groups. The group 1 (20 patients) is the study group in which all the patients had single dose of pre-operative intra muscular dexamethasone of 4 mg/2 ml. The study group 2 patients (20 patients) had single dose of pre-operative sub mucosal dexamethasone of 4 mg/2 ml. The control group (20 patients) did not receive steroid in any form. All the groups had 20 cases each. Inclusion criteria included partially impacted mandibular third molars with Class 2 or occlusions and Pell and Gregory classification A and B on the radiograph. Subjects were 18 years of age or older, and had no pericoronitis or infection at the time of operation. Exclusion criteria included are history of immune compromised, history of allergy to the drug used, recent use of any anti-inflammatory drugs or antibiotics, long-term use of any drug, pregnancy or lactation, those who refused to take part in the study and those who used other drugs during the observation period.

Method

After standard draping, patient was allowed to rinse the mouth using 0.12 % Chlorhexidine solution. Local

anaesthesia used was 2 % lidocaine hydrochloride with adrenaline concentration of 1:80,000. Inferior alveolar nerve block was given along with buccal and lingual nerve using direct fissure 123 technique. The study group 1 had intra muscular dexamethasone of 2 ml given in the gluteal region. Sub mucosal dexamethasone of 2 ml was given to the study group 2 just distobuccal to the 3rd molar region. They were allowed to wait for 15 min before the start of the surgical procedure. Wards incision placed, sub periosteal flap exposed, buccal guttering was done using saline cooled straight handpiece and bur, bone was removed in a collar like fashion and tooth removal was done. Crown and roots were sectioned wherever indicated. After complete removal of the crown and roots, the socket was flushed with 2 % betadine diluted with saline solution. The socket was then closed with two interrupted sutures using 3/0 silk. Standard post operative instructions were given to the patients. All these cases were done by the same surgeon. All the patients were given Amoxicillin 500 mg and Diclofenac 50 mg every 8 hourly for 5 days. They were asked to note down the number of Diclofenac tablets taken and report at the time of suture removal. All these patients were asked to use oral rinse of Chlorhexidine twice daily for 5 days.

Assessment

Assessment of Pain

The variables such as pain, swelling and trismus were evaluated on the pre-operative and the 1st, 3rd and 7th post-operative period by a person who did not involve in the study. Pain was assessed using the Visual Analog Scale (VAS) from 0 to 100 mm scale where 0 denotes no pain and 100 denotes severe pain. The patients were allowed to take anti-inflammatory tablets every 6 hourly and the number of tablets was recorded during the entire follow up period.

Assessment of Swelling

The evaluation of facial swelling was performed using two facial measurements as described by Majid [13]: tragus—midline and gonion—lateral canthus using a tape measure. The preoperative sum of the two values (mm) was taken as the baseline for that side.

Assessment of Trismus

The trismus was measured as the maximal inter incisal mouth opening both pre-operatively and post-operative follow up period.

Results

The collected data were statistically analysed using SPSS 11.5 for Windows (IBM, SPSS, Chicago, IL). The assessment of pain, swelling and trismus were done on immediate post operative, 1st post operative, 3rd post operative and 7th post operative days and those obtained were compared with the pre operative one. The results in Figs. 1 and 2 show that the pain and swelling were significantly low in both the study groups on all the post operative days (P value <0.01). Those in the submucosal dexamethasone group showed marked improvement in the mouth opening during the follow ups than the other intra muscular dexamethasone group. In those five cases of bilateral impaction, in study groups 1 and 2, the mouth opening was very significant when sub mucosal dexamethasone was given. The number of tablets taken by the patients were taken note of at the end of 7th post operative day which clearly showed that the study group patients had better comfort by administration of dexamethasone proving clinically significant results (Fig. 3).

Discussion

Removal of wisdom tooth is one of the most frequent procedures that we the oral surgeons most commonly do in a clinical practice. Trismus is a direct sequel of the post operative swelling, being able to compress nervous structures and generate mild to severe pain. Corticosteroids block the activity of phospholipase A2, thus inhibiting the release of arachidonic acid from cell membranes and the synthesis of prostaglandins, leukotrienes and thromboxanes [4]. There are numerous studies published on the use of steroids to control the post operative sequel of inflammation [3–12, 14–16]. Bodnar [3] stated that corticosteroids can be employed as an adjuvant after oral surgery procedures to reduce the presence of inflammatory mediators and thus lessen fluid transudation and edema. Darawade

Fig. 1 Assessment of pain between the study and control groups

Fig. 2 Assessment of swelling between the study and control groups

Fig. 3 Assessment of mouth opening between the study and control groups

et al. [17] in his study showed that the pre operative oral dose of 8 mg dexamethasone reduced post operative swelling and trismus.

Al-Khateeb et al. [18] stated that the submucosal infiltration technique does not require clinician's expertise or additional armamentarium as it is a local infiltration of the steroid submucosally around the site of surgery. The rate of absorption is highly dependent on the blood flow to the site. Majid and Mahmood [13] in their study concluded that submucosal dexamethasone injection is quite simple, less invasive, painless, convenient for the surgeon and the patient, and offers low-cost solution for the typical discomfort associated with the extraction of impacted lower third molars. These are the advantages of this technique over the intravenous and intramuscular routes of administration. Warraich et al. [19] in their study also showed that sub mucosal injection is effective in controlling post operative discomfort after third molar surgery. In our study, all the patients in the study group 2 (sub mucosal) had better comfort particularly in terms of mouth opening compared to both study group 1 (intramuscular) and control (without any steroid) showing P value 0.00. Between the study groups 1 and 2 (Intra muscular vs. Sub mucosal) those who underwent bilateral impactions had improved quality of life when given submucosal dexamethasone (Tables 1, 2).

Table 1 Comparison of pain, swelling and mouth opening between the study and control groups

	Control group		Study group 1		Study group 2			
	Mean	SD	Mean	SD	Mean	SD		
<i>Pain</i>								
Day 0	79.60	8.69	42.50	8.51	36.90	4.93	187.646	0.00**
Day 1	66.30	8.47	29.75	9.66	26.40	4.84	155.868	0.00**
Day 3	50.70	7.28	16.85	8.08	14.50	5.10	170.599	0.00**
Day 7	31.55	7.86	7.70	6.61	5.30	3.81	105.241	0.00**
<i>Swelling</i>								
Day 0	30.20	2.65	30.25	2.10	29.70	1.89	0.370	0.693
Day 1	40.15	2.68	32.40	2.19	30.65	2.30	88.872	0.00**
Day 3	36.30	2.54	31.60	2.06	30.15	2.16	40.415	0.00**
Day 7	33.20	2.71	30.35	2.11	29.80	1.96	12.787	0.00**
<i>Mouth opening</i>								
Day 0	34.30	2.68	33.15	2.70	34.60	2.44	1.723	0.188
Day 1	22.25	3.61	21.85	3.48	33.50	3.25	73.406	0.00**
Day 3	25.90	3.21	25.90	3.18	34.15	2.96	46.673	0.00**
Day 7	30.25	2.77	29.40	2.66	34.40	2.82	18.916	0.00**
No. of tabs	24.55	2.56	21.65	1.42	19.30	1.63	36.893	0.00**

** Highly significant

Table 2 Comparison between the study group 1 and study group 2 in 5 bilateral impaction cases

	Group	N	Mean	SD	t	P
<i>Pain</i>						
Day 0	Study group 1	5	41.00	7.416	0.000	1.000
	Study group 2	5	41.00	4.183		
Day 1	Study group 1	5	30.00	7.071	0.000	1.000
	Study group 2	5	30.00	3.536		
Day 3	Study group 1	5	16.00	5.477	0.730	0.486
	Study group 2	5	18.00	2.739		
Day 7	Study group 1	5	5.40	4.506	1.167	0.277
	Study group 2	5	8.00	2.121		
<i>Swelling</i>						
Day 0	Study group 1	5	28.60	2.191	0.000	1.000
	Study group 2	5	28.60	2.191		
Day 1	Study group 1	5	30.20	1.643	0.318	0.758
	Study group 2	5	29.80	2.280		
Day 3	Study group 1	5	29.60	2.510	0.516	0.620
	Study group 2	5	28.80	2.387		
Day 7	Study group 1	5	28.80	2.387	0.138	0.894
	Study group 2	5	28.60	2.191		
<i>Mouth opening</i>						
Day 0	Study group 1	5	35.40	2.191	0.000	1.000
	Study group 2	5	35.40	2.191		
Day 1	Study group 1	5	24.40	4.099	3.837	0.005**
	Study group 2	5	34.00	3.808		
Day 3	Study group 1	5	28.00	3.808	3.229	0.012*
	Study group 2	5	35.00	3.000		
Day 7	Study group 1	5	31.40	3.050	2.382	0.044*
	Study group 2	5	35.40	2.191		

Table 2 continued

	Group	N	Mean	SD	t	P
No. of tabs	Study group 1	5	22.80	1.643	3.584	0.007**
	Study group 2	5	19.40	1.342		

* Significant

** Highly significant

Conclusion

The pre operative use of submucosal dexamethasone effectively reduces the post operative pain, swelling and trismus showing statistically significant results. The number of post operative use of analgesic tablets taken by the patients in the study group 2 were less compared to the study group 1 and the control group showing clinically significant results. Also, the sub mucosal dexamethasone possesses many advantages over the other routes of administration. From our study, we can conclude that the single pre operative dose of submucosal dexamethasone effectively improves the post operative quality of life in the surgical management of impacted molars.

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