



RESEARCH ARTICLE

COMPARISON OF EFFECTS OF PRE-OPERATIVE AND POST-OPERATIVE ADMINISTRATION OF DEXAMETHASONE IN SUB MUCOSAL AREA IN MINOR ORAL SURGICAL PROCEDURES

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ABSTRACT

Background and Objectives: Surgical trauma to the tissues in the oral cavity can cause complications like pain, swelling, impaired function cause transient morbidity for the patients. To reduce these complications many drugs have been used may be pre-operatively as preemptive analgesia or post-operatively also. In this study we have determined the effects of pre-operative and post-operative use of dexamethasone in minor oral surgeries. **Methodology:** A study was carried on 40 patients of age group 20-45 years requiring minor oral surgery procedures were included in the study in a randomized controlled manner, visiting the Department of Oral and Maxillofacial surgery. 2 ml of 4 mg/ ml dexamethasone (total 8 mg) was injected into the sub mucosal area near the operative site. Pain, swelling and trismus were noted on 2nd, 5th and 7th day following surgery. Statistical analysis was done using Mann-Whitney U test, Wilcoxon signed-rank test and chi square test. **Results:** Pre-operative dexamethasone was given in 20 patients in group A whereas post-operative dexamethasone was given in 20 patients in group B. Results showed that the post-operative swelling was significantly less in group A than in group B ($p < 0.05$). **Interpretation and Conclusion:** Pre-operative dexamethasone was better in reducing the post-operative complications than the post-operative administration of dexamethasone.

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INTRODUCTION

Postoperative period of a patient is highly unpredictable treated for minor oral surgical procedure. Postsurgical edema is a normal physiological reaction to insult and injury. When body tissues are injured the normal physiologic response is inflammation, leading to edema. Postoperative edema depends upon various factors including method of bone removal, hemostasis, oversuturing of the wound, or rough tissue handling and systemic factors as age, bleeding tendency, nutrition, use of drugs, or presence of diabetes (Chaudhary et al., 2015). Trauma to the tissue results in vasodilation, migration of leukocytes and plasma transudation via endothelial gap junctions (Khawaja, 2006). Corresponding clinical manifestation includes swelling (tumor), redness (rubor), increase in temperature (calor), pain (dolor) and loss of function (functiolaesa) (Miloro et al., 2004). Surgery causes mechanical tissue damage, the prevalence of associated complications such as pain, emetic episodes,

nausea, dehydration, and poor oral intake are direct responses to this event (Bhattacharya, 2001). Inflammatory response is good for healing but exacerbation in this response causes complications. To overcome these, clinicians mostly prescribe corticosteroids (Baxendale, 1993; Klonoj et al., 2012; Alcântara et al., 2014). Corticosteroids are known to reduce inflammation, fluid transudation and edema (Patten et al., 1992; Holte, 2002). But their adverse effects limit their use in every patient (Goodman, 2005). Often used in oral surgery are long-acting corticosteroid compounds. Among these, the most frequently used is dexamethasone that is about 25-30 times more potent than cortisol. It is available in oral, parenteral and topical formulations and is largely used in oral surgery pre- or only post-surgery due to its high efficacy and long half-life (Sortino, 2001). Suppression of each stage of the inflammatory response appears to be the major action of the glucocorticoids (Kim et al., 2009). Many studies have evaluated the use of dexamethasone through intramuscular route of administration (Fenton, 1985; Neupert et al., 1992; Roger, 2000). The irrational use can lead to an adrenal insufficiency. Care should be taken during the use of this drug. The duration and the dosage of the drug should be monitored.

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This study was conducted in an aim to compare the efficacy of a single dose of dexamethasone administered submucosally pre-operatively and post-operatively in an minor oral surgical procedure.

Aim: To compare the effectiveness of pre-operative and post-operatively dexamethasone in reducing the post-operative complications after minor oral surgical procedure.

MATERIALS AND METHODS

The study sample consisted of 40 patients of age group of 20-45 years, who require minor oral surgical procedure under local anesthesia. Patients were allocated to two groups in a randomized manner. Procedures were performed by the same surgeon using standard techniques. After the objective signs of anesthesia were evident, 2 ml of 4 mg/ ml dexamethasone (total 8 mg) was injected into the sub mucosal area in group A whereas in group B patient's dexamethasone was injected soon after the procedure. In group A patients a latency time of 15 minutes was taken after administration of dexamethasone and before the commencement of the procedure. All patients were subjected to extra-oral antiseptics with a 2% chlorhexidine gluconate solution and intraoral antiseptics (mouth rinses) with 15 mL of 0.12% chlorhexidine gluconate for 1 min in the immediate preoperative period. Procedure was performed and hemostasis was achieved. Wound toileting followed by suturing with 3-0 Mer silk sutures was done.

Osteotomy done by using rotary instruments with a number 702 trunk-conical drill and irrigation with 0.9% saline solution. Patients were given the routine postoperative instructions and were prescribed routine antibiotics. Assessments of facial swelling and mouth opening were done preoperatively before the procedure (baseline) and post-operatively on 2nd, 5th and 7th day. Post-operative swelling was evaluated by the method described by Ustun *et al.* (2003) Trismus was evaluated by measuring the distance between upper and lower incisal borders of the central incisors using calipers in millimeters. The patients were given a pain control form to record the daily degree of discomfort using a 100-mm visual analogue scale (VAS) from patient assessed at intervals of post-operative day 2, post-operative day 5 and on post-operative day 7 for the evaluation of post-operative pain.

RESULTS

Statistical analysis was done using Mann-Whitney U test, student T-test, Wilcoxon signed-rank test and chi square test. The study consists of 40 patients out of which 17 were females and 23 were males. Pre-operative dexamethasone was given in 20 patients in group A whereas post-operative dexamethasone was given in 20 patients in group B. In group A 10 patients were females and 11 patients were males whereas in group B 7 were female and 12 were male patients. Mean age of the patients in group A was 27.07 ± 8.7 year whereas in group B it was 25.3 ± 7.87 year. The mean of the duration of operation in group (A) was 42.56 minutes, while the values were 45.09 minutes in group B, with no statistically significant difference. The minor oral surgical procedures include- Molar impaction, canine impactions, cyst removal, apicectomy, other procedures (table 1). Trismus was determined by mouth opening in both the group in 2nd, 5th, 7th post-operative day. No statistically significant difference was found in the mean values of scores of two groups (p value > 0.05) (Table- 2).



Figures 1. 2. Pre-operative and operative pics of canine impaction done with pre-operative dexamethasone



Figures 3.4. Operative and post-operative pics

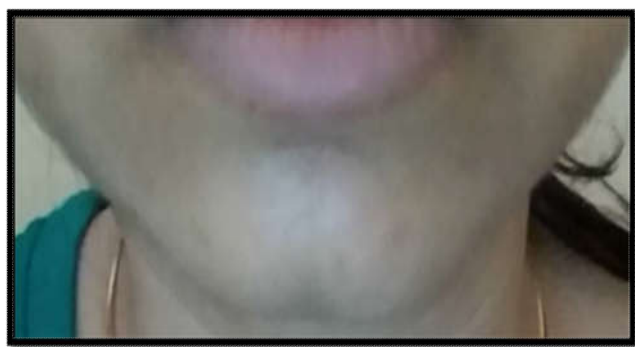


Figure 5. Post-operative 7th day follow up pic of canine impaction done with pre-operative dexamethasone

Table 1. Type of procedure done in two groups

Type of procedure	Group A	Group B
Molar impaction	7(35%)	7(35%)
Canine impactions	6(30%)	7(35%)
Cyst removal	5(25%)	3(15%)
Apicectomy	2(10%)	3(15%)

Table 2. Trismus seen post-operative in group A and group B

Mouth opening	Group A	Group B
Pre-operative	35.34± 3.45	34.46± 2.12
2 nd day	32.09± 2.28	30.09± 2.41
5 th day	33.97± 2.60	32.84± 3.05
7 th day	35.12± 1.84	33.78± 2.11

Table 3. Comparison of swelling seen post-operative in group A and group B

Swelling comparison of base line difference	Group A	Group B
2 nd day	3.9±2.36	6.45± 3.44
5 th day	1.25± 2.14	3.54± 2.63
7 th day	0.22± 0.34	1.46± 2.74

Table 4. VAS score seen post-operative in group A and group B

VAS score	Group A	Group B
2 nd day	28.85± 7.84	31.73± 6.97
5 th day	14.74± 6.84	19.53± 6.43
7 th day	7.73± 3.73	9.32± 3.86

Swelling was evaluated on 2nd, 5th, 7th post-operative day. Statistically significant difference was found in the mean values of scores of two groups (p value< 0.05) (table- 3). VAS score was determined by patient using a 100-mm visual analogue scale (VAS) mouth opening in both the group in 2nd, 5th, 7th post-operative day. With regard to pain no statistically significant difference was found in the mean values of scores of two groups (p value> 0.05) (Table- 4)

DISCUSSION

Submucosal injection of dexamethasone 4 mg is an effective therapeutic strategy for improving the quality of life after surgical removal of impacted lower third molars with a comparable effect on postoperative sequelae to intramuscular injection (Majid, 2011). Dexamethasone of 8 mg was more effective than that of 4 mg at reducing facial swelling and trismus. No significant differences were observed between the 8 mg dexamethasone intramuscular injection group and 8 mg dexamethasone consumption group in this study (Filho, 2008). A study conducted by Bhargava *et al* concluded that intra-space

injection of dexamethasone in pterygomandibular space as Twin mix was found to have similar clinical effects as conventional methods of administering steroids via intraoral-submucosal, intramuscular, intravenous and per-oral routes. Steroid groups had a better clinical outcome with improved quality of life post-operatively when compared to the non-steroid study group (Bhargava *et al.*, 2014). Antunes *et al* concluded that post-operative pain is more in non-steroid group of patients and less in case of steroid groups. No statistically significant difference was noted in mouth opening between two steroid groups. But post-operative edema was much less in injectable form than oral steroid tablets (Antunes *et al.*, 2011). Markiewicz *et al* found that use of corticosteroids reduced edema and improved the range of mouth opening (Markiewicz *et al.*, 2008). Similarly, Deo reported significant reduction in swelling and trismus with submucosal dexamethasone use (Deo, 2011). The results were in accordance with our study. In our study there was reduction in the swelling post-operative in group using dexamethasone pre-operatively than group using it post-operatively whereas there was no difference in mouth opening and pain scores post-operatively between two groups.

Majid *et al* suggested that submucosal dexamethasone injection is quite simple, less invasive, painless, convenient for the surgeon and the patient (Omer Waleed Majid, 2011). Al-Khateeb *et al* 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 (Al-khateeb, 1996). Duration of surgery was evaluated, the drugs used were standardized. There affects were studied on the parameters of the study but no statistically significant result was found which was in accordance to various other studies (Beirne, 1986; Dionne *et al.*, 2003). Glucocorticoids action is thought to involve suppression of leukocyte and macrophage accumulation at the site of the inflammation and prevention of prostaglandins formation (Rich, 2013). Inflammatory complications remain an important factor in quality of life of patients at the early postoperative periods (Osunde *et al.*, 2011). So, being oral and maxillofacial surgeon, we should be aware of the different modalities which help to alleviate these complications to reduce the postoperative complications and faster recovery of the patients.

Conclusion

Results of this study suggest that a single preoperative injection of dexamethasone in a dose of 8 mg for adult patients, undergoing minor oral surgical procedure significantly reduced postoperative facial swelling than the post-operative injection of drug of same dose. However, the reduction in trismus and pain were equal in both the groups.

Conflict of interest: none declared.

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