COMPARISON OF TWO DOSAGES OF SUBMUCOSAL DEXAMETHASONE TO CONTROL POSTOPERATIVE TRISMUS AFTER SURGICAL EXTRACTION OF MANDIBULAR IMPACTED THIRD MOLAR

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ABSTRACT

Objective: To compare the post surgical effects of two different concentrations' i.e. 4mg (milligram) and 8mg of sub mucosal dexamethasone to decrease trismus by comparing the mean decrease in interincisal distance in patients undergoing impacted mandibular third molar surgery.

Study Design: Randomized controlled clinical trial.

Place and Duration of Study: Outpatient department of oral and maxillofacial surgery unit, Mayo Hospital, Lahore. The study was completed in 6 months, from Jan 2012 to Jul 2012.

Material and Methods: This randomized controlled clinical trial was conducted on 150 patients. Patients were divided into two groups A and B. Mean interincisal distance of all patients was recorded pre operatively and post operatively. All patients were advised to use a mouthwash clorhexidine 0.2% before surgery. Group A received 4 mg dexamethasone and group B received 8 mg dexamethasone in the buccal vestibular tissues. Standard surgical procedure was performed by the same operator under same conditions. Postoperative mean interincisal distance of all patients was recorded on day 2 (after 48 hours of surgery).

Results: Average age of patients was 32.62 ± 7.86 years with minimum and maximum ages of 20 and 50 years respectively. Gender distribution was almost equal. Average "maximum interincisal" mouth opening distance was significantly higher in group B as compared to group A i.e. (36 ± 3.928 mm (millimeter) versus 26.04 ± 3.097 mm) with *p*-value=0.000.

Conclusion: Eight mg dose of dexamethasone was statistically more significant in reducing the trismus as compare to 4mg (*p*-value=0.000).

Keywords: Impacted tooth, Surgical extraction, Trismus dexamethasone.

INTRODUCTION

A tooth is considered to be impacted if it fails or is prevented to erupt to its normal correct position in the dental arch at the appropriate time for various reasons including lack of space, or other impediments[1-4]. The surgical extraction of impacted third molar is one of the most commonly performed dentoalveolar procedure in oral and maxillofacial surgery[5]. Surgical extraction of impacted third molar creates tissue trauma resulting in an inflammatory reaction[6]. This causes swelling, pain and dysfunction during the post-operative period[7]. Among these, trismus measured as a decrease in maximal interincisal mouth opening, is a significant postoperative Sequel caused by the oedema and swelling correlated with the surgical trauma[8]. Postoperative complications are uncomfortable and unpleasant for the patients and should be minimized as much as possible[9].

Corticosteroids are well-known adjuncts to surgery for suppressing tissue mediators of inflammation, thereby reducing transudation of fluids and lessening oedema[10]. Corticosteroids indirectly reduce trismus by decreasing the degree of local inflammation[7]. Various cortico-steroids have been used in published literature but dexamethasone seems to be most appropriate because it has the highest anti-inflammatory activity and a biological half-life of 36-54 hours[11].

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Sub mucosal dexamethasone is an effective alternative to dexamethasone given systemically[12]. Many studies have determined the efficiency of steroids after oral surgical procedures, but currently there is no standard dosing regimen[13]. Despite the frequent medical use of dexamethasone, very few studies compare the use of different dosage of corticosteroids[14]. The literature also shows lack of such study in Pakistan. Hence the rationale of this study was to determine the better dosage regimen of dexamethasone to reduce postoperative trismus, in pursuit of improving patient's quality of life after surgical extraction of mandibular impacted third molar in our setting.

MATERIAL AND METHODS

This randomized controlled clinical trial was carried out in the outpatient department of oral and maxillofacial surgery unit, Mayo Hospital, Lahore. The study was completed in 6 months from 20th January 2012 to 19th July 2012. One hundred and fifty patients (divided into 2 groups, 75 in each), calculated with 95% confidence interval, 80% power of test, and taking mean ± S.D of mean decrease in inter-incisal distance in both groups i.e. 17.92 ± 1.29 in 4mg group versus 3.22 ± 2.37 in 8mg dexamethasone group following mandibular impacted third molar surgery. The non- probability, consecutive sampling was done for grouping both genders with age of 20 years or older, mouth opening 35 mm or greater, patients having impacted third molar with class II or III and position B or C according to Pell and Gregory Classification on a radiograph[10] were included in the study.

Medically compromised patients such as patients suffering from diabetes mellitus, glaucoma and tuberculosis, assessed by history, clinical examination and radiographs, already on some anti-inflammatory medication (within 2 weeks of study entry) and with localized infection at the extraction site were excluded form the study.

Patients meeting the inclusion criteria were selected from the outpatient department of Oral & maxillofacial surgery, Mayo Hospital, Lahore. Approval of the ethical committee of Mayo hospital was also sought. Fully informed written consent of the patients was taken. A structured Performa was used to record the patient's demographic data like patient's name, age and gender.

Patients were divided into two groups by using random number table, with patients arrived at even numbers were placed in group A and patients arrived at odd numbers were placed in group B. During the preoperative period all patients had clinical and radiological evaluation. Mean interincisal distance of all patients was recorded by a ruler in millimetres pre operatively. All patients were advised to use a mouth wash clorhexidine 0.2% before surgery. Inferior dental and buccal nerve anaesthesia was achieved using a 2% lignocaine with epinephrine 1:100,000. At the report of

Table-I: Descriptive statistics of age (years) n=150.

N	**150**
Mean	32.62
Std. Deviation	7.86
Minimum	20
Maximum	50

Table-II: Descriptive statistics of Age (years) with respect to study groups.

Statistical parameters	**Dexamethasone dose**	
	4 mg	**8 mg**
N	75	75
Mean	33.04	32.2
Std. Deviation	8.26	7.48
Minimum	21	20
Maximum	50	47

Table-III: Descriptive statistics of maximum inter-incisal mouth opening distance (mm) before treatment.

N	150
Mean	49.10
Std. Deviation	6.610
Std. Error	0.661
Minimum	35
Maximum	63

subjective signs of anaesthesia, group A received 4 mg dexamethasone and group B received 8 mg dexamethasone injected into the buccal vestibule. Standard surgical procedure was performed by the same operator under same conditions. In the postoperative period, Paracetamol 500 mg; (1 tablet every 6 hours for 4 days) was prescribed. Postoperative mean interincisal distance of all patients was recorded on day 2 (after 48 hours of surgery).

Data Analysis

Data was entered and analyzed using Statistical package for Social Sciences (SPSS version 10.0). Mean ± S.D was calculated for the quantitative variable like age and interincisal distances (preoperatively & postoperatively). Frequencies and percentages were computed for categorical variables like gender. Independent sample t-test was used to test the significance level for Mean interincisal distance between the two treatment modalities at second day. A *p*-value<0.05 was considered as significant.

RESULTS

In this study a total of 150 patients were treated to control postoperative trismus after surgical extraction of mandibular impacted third molar with sub mucosal dosages of dexamethasone (4mg & 8mg). According to our study the average age of patients was 32.62 ± 7.86 years with minimum and maximum ages 20 and 50 years respectively (table-I). In group A the average age was 33.04 ± 8.26 years and in group B the average age was 32.2 ± 7.48 years (table-II).

Gender distribution was almost equal in this study, there were 74 male patients and 76 female patients. Thirty-six male patients were treated in group A and 37 female patients were treated in group B while 39 female patients were treated in group A and 38male patients were treated in group B.

Pre operatively the average "maximum inter-incisal" mouth opening distance was 49.10 ± 6.61 mm with range of 35-63 mm (table-III). After treatment the average "maximum inter-incisal" mouth opening distance was 31.02 ± 6.118 mm with range of 21-42 mm (table-IV).

In group A, the average "maximum inter-incisal" mouth opening distance was 26.04 ± 3.097 mm with minimum and maximum value 21 and 31 mm. In group B, the mean "maximum interincisal" mouth opening distance was 36 ± 3.928 mm with minimum and maximum values 30 and 42 mm respectively (table-IV).

According to our analysis the average "maximum inter-incisal" mouth opening distance was significantly higher in group B as compared to group A i.e. (36 ± 3.928 mm vs. 26.04 ± 3.097 mm) with *p*-value=0.001 (table-V).

Table-IV: Descriptive statistics of maximum inter-incisal mouth opening distance (mm) after treatment.

N	150
Mean	31.02
Std. Deviation	6.118
Std. Error	0.612
Minimum	21
Maximum	42

Table-V: Descriptive statistics of maximum inter-incisal mouth opening distance (mm) after treatment with respect to study group.

Statistical parameters	Dexamethasone dose		Total
	4 mg	8 mg	
N	75	75	150
Mean	26.04	36.00	31.02
SD	3.097	3.928	6.118
Std. Error	0.438	0.555	0.612
Minimum	21	30	21
Maximum	31	42	42

t-test = -14.08, *p*-value = 0.001

DISCUSSION

The impacted mandibular third molar tooth (wisdom tooth) is common among young adults. Obiechina *et al*, in 2001 reported that one out of every eleven mandibular third molar teeth is impacted in 19 to 25 years age in the Nigerian population[15]. Krishnan *et al*, in 2009 reported that in older Libyan adults, 1 in every 46 mandibular third molar teeth was reported to be impacted[16]. In our study the most common age at the time of presentation was 25 to 30 years. Thus 63% of the patients were in 3rd decade of life. The average

age of patients was 32.62 ± 7.86 years in this study. This decline in the number of 3rd molar impaction with increasing age is due to their operative removal. The extraction of third molar in male and female is statistically insignificant with equal proportion.

The evidence of higher female patients is also reported in literature by Halpern in 2003 (61% vs. 39%)[17]. In our study the mandibular third molar impaction was more common among females than male patients but the difference was statistically insignificant (51% vs. 49%).

Neupert *et al* in 1992 conducted a study on 60 patients with bilaterally symmetrical third molars and reported that maximum interincisal mouth opening was improved with 4 mg of intravenous (IV) dexamethasone in the first few days after surgery as compared to control (sterile water). After one day of surgery the limit of mouth opening was reduced by 9.3% using 4 mg of dexamethasone, and after 2 days of surgery it increased to 11.74%, showing clinical and statistic difference[18]. In our current study the number of patients was 150 and unilaterally impacted third molars were operated and 8mg dexamethasone proved better in reducing trismus while the route of administration was sub mucosal as compared to intravenous.

Beirne *et al* published that 125 mg of IV methylprednisolone after third molar surgery lessen the pain levels within the first post-operative day as compared to normal saline solution (used as control. The swelling and pain, but not the trismus, that developed after third molar removal were significantly reduced by a single dose of methylprednisolone[19]. In our study the 8mg dexamethasone proved better in reducing trismus as the average "maximum inter-incisal" mouth opening distance was significantly higher with 8mg dexamethasone as compared to 4mg.

Literature shows that, with the use of 4 mg dexamethasone trismus occurred up to 27.52 ± 3.42 mm and with use of 8 mg dexamethasone trismus occurred up to 34.52 ± 8.04 mm in patients undergoing mandibular third molar surgery[13]. In previous studies, single and different doses of steroids had been used intra-muscularly, intravenously or orally pre-operatively, perioperatively and postoperatively in third molar surgery[10]. In current study the submucosal route of administration was chosen.

In 2005 Tiwana *et al* also preferred that the administration of IV corticosteroids before third molar surgery offers a helpful effect on health-related quality of life (QOL)[20]. Regardless of the route of administration, the effects of cortico-steroids on QOL is comparable, since having less swelling and pain, the patient can return to his normal life as early as possible.

CONCLUSION

From this study we conclude that the dosage of 8 mg of dexamethasone was statistically more significant in the reduction of trismus as compare to 4mg. So it is recommended that dexamethasone with dosage of 8mg should be used to control postoperative trismus after surgical extraction of mandibular impacted third molar.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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