ORIGINAL ARTICLE

Effectiveness of 4mg Submucosal Dexamethasone Injection in Reducing Pain and Trismus after Mandibular Third Molar Surgery

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ABSTRACT

Background: Surgical removal of the third molar impaction is the most routine procedure done in Oral & Maxillofacial Surgery. "How to reduce the postoperative swelling, pain, and trismus?" is the most frequently asked question by surgeons. **Aim:** To evaluate the effect of the submucosal injection of 4mg dexamethasone on postoperative trismus and pain after third molar surgery.
Method: This study was conducted at the University College of Dentistry, University of Lahore, from January 2019 to December 2019. One hundred and fifty patients presented for the extraction of impacted third molar teeth were divided by using a random number into two groups. Group A received nothing while group B received submucosal 4mg dexamethasone soon after local anesthesia administration for extraction of the impacted third molar. The postoperative pain was assessed using the visual analog scale and trismus measured by interincisal distance on the third postoperative day. Statistical analysis was done through SPSS version 21.
Result: In group A, pain score varied from 4 to 9 on a visual analog scale (0=minimum to 10=maximum). The mean pain score was 6.5. While in group B, mean pain varied from 1 to 6 on a visual analog scale. The mean value of the pain score was 3.5 (P-value 0.000). In group A, the maximum mouth opening measured was 16mm and the minimum was 6mm with a range of 10mm. In group B, the maximum mouth opening measured was 26mm and a minimum of 12mm with a range of 14mm (P-value 0.000).
Conclusion: The submucosal injection of 4 mg dexamethasone injection effectively reduces trismus and pain after third molar surgery.
Keywords: third molar, submucosal dexamethasone, trismus

INTRODUCTION

Impacted teeth remain unerupted or out of occlusion due to obstruction, thick overlying mucosa, short mandible, the discrepancy in the crown size and space available, and other factors. Among all the impactions, third molars have the highest frequency of being impacted.[1]Impacted third molars cause pain, swelling, bone loss of adjacent teeth, pericoronitis, mandibular angle fractures, cyst formation, benign and malignant tumors and caries of adjacent teeth[1,2,3].

In oral and maxillofacial surgeries, the most routine procedure is the surgical removal of third molar teeth.[4] This procedure has immediate postoperative complications like trismus, pain, and swelling, which affects the patients' quality of life[5]. Swelling, pain and trismus result in considerable difficulty in eating, speech, sleep, appearance and other daily activities[6]. The third molar surgery is conducted in a highly vascularized area with loose connective tissue. There is a liberation of exudate so subsequent swelling, trismus, and pain are noted on the second postoperative day[7].

Oral surgeons have been using different pharmacological means including corticosteroids to minimize these sequelae[9]. Corticosteroids prevent the prostaglandin formation and suppress the leukocytes and macrophages accumulation at the inflammatory site.[8] Different corticosteroids are used including dexamethasone sodium phosphate for this purpose[6]. Dexamethasone is widely used because it is potent and has a long half-life[8]. Several different routes as intravenous, intramuscular, submucosal and administration times as preoperatively and perioperatively are used[8]. Submucosal dexamethasone is poorly investigated in the past.[8] Submucosal dexamethasone injection is convenient for the surgeons as the injection is in proximity to the surgical field. It is also convenient to the patient as it is administered in the anesthetized area after mandibular third molar surgery.

MATERIAL AND METHOD

It was a randomized controlled clinical trial conducted at the University College of Dentistry, University of Lahore, from January 2019 to December 2019. The sampling technique was non-probability purposive sampling. Inclusion criteria were 1) Both gender 18 years and older. 2) All patients having the third molar at Level B and Class II, according to Pell and Gregory Classification. The exclusion criteria were 1). Medically compromised patients (diabetes mellitus, renal failure, etc.) 2) Patients with localized infection at the site of tooth extraction. 3) Patients who were already taking steroids for their medical problems. One hundred and fifty patients having impacted mandibular third molar were selected from the Out-Patient Department of Oral & Maxillofacial Surgery, University dental hospital of the University of Lahore. Patients were

divided into two groups by using random number into group A and group B. Group A received nothing after nerves block. Group B received 4mg dexamethasone submucosal injection after the administration of local anesthesia.

All patients were asked to rinse with 0.02% chlorhexidine mouth wash before the procedure. Inferior alveolar nerve block, lingual nerve block, and long buccal nerve were anesthetized by 2% lignocaine with adrenaline 1:100,000. Teeth were extracted by the standard protocol and the standard postoperative instructions were given to the patients[10]. All patients have prescribed tablet naproxium sodium 550mg twice a day for 2 days. The pain was assessed using a visual analog scale (VAS). The minimum pain score was 0 (no pain) to a maximum score of 10 (maximum pain). Trismus was measured as a maximum interincisal distance between mandibular central incisors to maxillary central incisors by a ruler. Pain and trismus were assessed on the third postoperative day.

RESULTS

The mean age of 150 patients was 26.71(S.D ±3.845), ranging from 18 to 40 years. Ninety (60%) were males and sixty (40%) were females. The mean age of males was 27.22±3.806, while the mean age of females was 25.95±3.806. Eighty patients were in the age range of 23 to 27 years and 41 patients were in the age range of 28 to 32 years. In group A the mean age range was 26.37±4.61, while in group B mean age was 27.05±2.875.

In group A, pain score varied from 4 to 9 on a visual analog scale (1minimum to 10 maximum). The mean pain score was 6.5. While in group B, the mean pain score varied from 1 to 6 on a visual analog scale with the mean value of 3.5. Applying a t-test on mean pain gave the P-value 0.000, which is statistically significant.

In group A, the maximum mouth opening noticed was 16mm, and the minimum was 6mm with a range of 10mm. In group B, the maximum mouth opening noticed was 26mm and the minimum 12mm with a range of 14mm. Mean trismus in group A was 9.99±1.983 while in group B, mean trismus was 17.56±3.019.t-test applied on mean trismus gave a P-value of 0.000, which is statistically highly significant. So the results showed the submucosal 4mg dexamethasone injection significantly reduced pain and trismus after third molar surgery.

Table 1: Gender distribution

Group	Male	Female	Total
A	33	42	75
B	57	18	75
Total	90	60	150

Table 2: Mouth opening measured on the third postoperative day

Group A			Group B		
Max.	Min.	range	Max.	Min.	range
16	6	10	26	12	14

DISCUSSION

Surgical removal of the third molar results in postoperative pain and swelling even in experienced hands.[11] Many surgeons feel it necessary to control postoperative pain, swelling, and trismus[12]. In literature, many methods and techniques have been suggested for control of postoperative pain, trismus, and swelling[13,15]. These include different types of suturing techniques, use of drains, and postoperative use of analgesics and antibiotics[16,18]. A total of 150 patients with mandibular third molar impaction were included in the study. The mean age was 26.71±3.85 from 18 to 40 years. Majid OW[6] studied the use of dexamethasone in 33 patients with a mean age of 26.9±6.1 while Majid OW, Mahmood WK[4] has a mean age of 26.7±6.3 in their study. Grossi et al[8] have 27.7±6.5 mean age in their study of dexamethasone usage. Graziani et al[10] found the effect of preoperative dexamethasone injection on 43 patients with a mean age of 24±4. Thus according to mean age our study was comparable with Majid OW[6] Majid OW, Mahmood WK[4], but slightly lower mean age as compared to Grossi et al. study. It might be due to low sample size or due to the difference in socioeconomic status and protocols for extractions of wisdom teeth between the two places. In our study, the higher mean age might be due to the late presentation of patients in the oral surgery department, mostly when they become symptomatic.

In our study, the age range was 18 to 40 years, which is comparable with Majid OW, Mahmood KW[4,] in which the range was 20 to 48 years and Majid OW[6] in which age range was 19 to 48 years of age.

In total of 150 patients, ninety (60%) were males and sixty (40%) were females. Grossi et al[8] have 33(54%) males and 28(45%) females in his study of a total of 61 patients. Majid OW[6] has 16(53%) males and 14(46%) females in a total of 30 patients. Majid OW, Mahmood KW [4] in a total of 33 patients, 17(51%) were males and 16(48%) were females. Thus the present study has a comparable number of male and female patients ratio with these three studies, but the female was a predominant gender in Graziani et al. study with 30(69%) and 13(30) males out of 43 patients. The reason for more males in the present study might be less awareness and poor oral hygiene as compares to females. In a total of 150 patients mean age of males and females was 27.22±3.806 and 25.95±3.860, respectively. The slightly higher mean age of males in the present study might be due to the higher number of male patients.

In the present study, in group A (control) mean age was 26.37±4.6, while in group B (submucosal), the mean age was 27.05±2.875. In one study [4] in the control group, the mean age was 24.9±3.3 and in the submucosal group, the mean age was 25±4.7. In another study[6] in the control group, mean age was 28.7±6.5 and the submucosal group has a mean age of 26.8±6.4. In another study control, [6] group has to mean age of 24.9±3, and the submucosal group has a mean age of 25±4.4. Thus slightly higher mean age was noticed as compared to Majid OW, Mahmood WK[4] in both groups, but lower than Grossi et al[8] study in the control group. But the submucosal group has a comparable mean age with Grossi et al. study.

Thus present study has similar results with that of Warrich et al. [19] and Majid OW, Mehmood WK[4] study. Our study has contrary results as compare to Grossi et al. [6] and Graziani et al. [8] study. The difference might be due to

sampling size, doses of dexamethasone, and postoperative day of measurement of pain. Grossi et al[8] used 4mg and 8 mg submucosal dexamethasone while Graziani used 4 mg intra alveolar with 4 mg submucosal dexamethasone in their patients. They evaluate the patient's pain on the 2nd and 7th postoperative days. Both found no statistically significant effect on pain perception on the 2nd and 7th days. The difference between the present study and Majid OW[6] was that the present study used submucosal dexamethasone just before the operation after administration of local anesthesia, but Majid OW and Majid OW, Mehmood WK[4] gave submucosal dexamethasone immediately postoperatively.

Warrich et al[19] found mean trismus of 29.3mm in the control group and 32.8mm in the submucosal group with a P value of 0.004 on the second postoperative day. Thus the present study has similar results as compared with Warrich et al. study but the difference between the two studies is that the present study noticed trismus on the third operative day while Warrich et al. on the 2nd postoperative day. On the third postoperative day, trismus was noticed in Majid OW, Mehmood WK[4] study with mean trismus of 18.5mm±11.7mm in the control group and 8.2±8.8 in the submucosal group with a P value of 0.07; thus, Majid OW found no statistically significant association between control and submucosal group. The time of administration of dexamethasone was the main difference between the present study and Majid OW study. Graziani et al. [10] also found no significant improvement in mouth opening using topical dexamethasone but they surprisingly found that the usage of dexamethasone powder reduced postoperative trismus immediately after surgery after one week of therapy.

Majid et al. found a significant reduction in facial swelling on the third postoperative day with submucosal dexamethasone injection with the P=0.001. Warrich et al[19] also noticed a significant reduction in edema on the second postoperative day with submucosal 4 mg dexamethasone injection.

Grossi et al. [8] use the subjective tool as the patient perception of change of appearance, a PoSSe subscale and found a statically significant reduction in swelling in the dexamethasone submucosal group (p< 0.001). Sencimen[20] showed that the dexamethasone injection significantly reduced the postoperative swelling on the 2nd day of surgery when maximum swelling is expected. Thus the present study had similar results as compared to most of the previous studies. A study by Cherian [9] showed reduced postoperative swelling after the submucosal injection of 8mg dexamethasone. We have the same results, but we differ from them in the dosage of dexamethasone, we used 4mg and they used 8mg dexamethasone.

The strength of our study is the large sample size, so more generalizability. The study's limitations were that we had not monitored the duration of surgical procedure, body mass index of patients, and osteotomy time. These factors affect the results of the study.

Further studies are recommended by keeping in mind all these factors that can affect the study's result. Further studies may compare different dosages of dexamethasone to find out the minimum dosage to control postoperative pain and trismus.

CONCLUSION

The submucosal administration of 4 mg dexamethasone injection can effectively reduce postoperative trismus and pain after the third molar surgery. The submucosal injection technique is comfortable for the patients and surgeons because the injection is administered in an anesthetized area near the surgical site.

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