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Effect of Dexamethasone Versus Triamcinolone Acetonide on Postoperative Complications after Impacted Third Molar Surgery

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ABSTRACT

In the area of maxillofacial surgery, taking out of impacted teeth, particularly third molars represents a common practice. Corticosteroids play a substantial role in reducing edema and have been found to have anti-inflammatory belongings. **Objective:** To compare the outcome of Dexamethasone vs. Triamcinolone Acetonide after impacted third molar surgery. **Methods:** A quasi-experimental study was organized at the Department of Oral and Maxillofacial Surgery, Liaquat University of Medical and Health Sciences, Jamshoro/Hyderabad. A total of 288 patients with Mesioangular impaction of mandibular 3rd molar tooth were placed into two groups at random. Group-A (Dexamethasone Injection) 4mg was injected instantly into the submucosal at about 1cm above the surgical area and in Group-B (Triamcinolone Acetonide Injection) 4mg was also injected immediately at the same place. Measurements were made on the mouth opening, severity of pain, and swelling. **Results:** The mean pain score was significantly lower in group B than in group A on the 7th postoperative day ($p = 0.0005$). Mean facial swelling size was not statistically significant between groups at 2nd day but it was significantly low in group B as compared to group A at 5th and 7th postsurgical days. Mean mouth opening was also significantly higher in group B than in group A at the 5th and 7th postoperative days ($p = 0.0005$). **Conclusions:** Submucosal applying corticosteroid medication may be a very painless, effective, cheap, less hazardous, simpler technique for both the patient and the doctor, and its systemic effect is limited.

INTRODUCTION

The obstructed tooth declines to explode into its appropriate place at the period of emission and it is the last tooth to erupt in permanent dentition [1]. It is categorized radio graphically using angulations categorization based on the inclination to the long axis of the second molar i.e; Mesioangular (37.4%), Vertical (32.8%), Distoangular (16.6%), Horizontal impaction (11.2%), among the types of impaction. Mesioangular impaction is the most common type of mandibular impaction [2, 3]. The surgical process to take out third molars frequently includes incision, flap reflection, and bone removal to expose the socket is associated with postoperative complications [4]. Due to the anatomical location of submerged mandibular third molars, both soft and hard tissue trauma occurs and causes post-operative complications [5]. The impacted mandibular third molar tooth is on the point of the inferior alveolar vessels, so the surgical area is very highly vascular leading to postoperative complications [6, 7]. These

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complications interfere with the patient's comfort and social life. Many clinical studies investigate drug therapy to improve clinical results with minimization of postoperative complications of impacted mandibular third molar surgery using antiseptic mouthwash, antibiotics, muscle relaxants, corticosteroid treatment, and physiotherapy [8-10]. Amongst steroids are useful in surgery for decreasing chemical mediators of inflammatory tissues, by falling transudation of fluids and decreasing edema, pain, and trismus; Betamethasone, Triamcinolone Acetonide, Prednisolone, Hydrocortisone, Dexamethasone, Methylprednisolone [11-13]. The long-standing production of dexamethasone is un-justifiable because of half-life is 36-48 hours, so its duration of action is up to the 2nd day but not on the 7th day [14]. Another study shows that 63% of dexamethasone was slightly affected by post-operative pain and only 21.6% of dexamethasone experienced moderate to severe pain. Some authors showed the ability to reduce swelling by 42-50% and another study shows 73.7% mouth opening improved in 72% after using the dexamethasone [15]. The purpose of this study is to compare the efficacy of dexamethasone and triamcinolone acetonide on postsurgical complications after impacted third molar surgery. It may reduce post-operative morbidity and complications like pain, swelling, and trismus. The study was beneficial for clinicians/ surgeons to have a better treatment choice and for patients to have good treatment protocols.

This study aimed to compare the outcome of Dexamethasone vs Triamcinolone Acetonide after impacted third molar surgery.

METHODS

A quasi-experimental study was conducted at the Department of Oral and Maxillofacial Surgery, Liaquat University of Medical and Health Sciences, Jamshoro/ Hyderabad by employing a non-probability consecutive sampling technique in the time frame of six months (from 11-10-2019 to 10-03-2020) with approval of research ethics committee (LUMHS/REC/336) after getting the written consent from the patients. The epitools online calculator was applied to calculate the sample size. The study reported a mean reduction in pain, swelling, and trismus on the outcome variable on day 7 Dexamethasone group (1.23 ± 3.01, 0.22 ± 0.51 and 3.46 ± 6.24 respectively) compared to current outcome variable on day 7. Triamcinolone Acetonid (0.42 ± 1.65, 0.08 ± 0.10 and 2.53 ± 3.90 respectively) [9, 10]. Considering 95% confidence interval, considering power as 80% is 288 with 144 patients in each group. Patients with mesioangular impaction mandibular 3rd molar tooth diagnosed clinically and on radiographic examination, having age from 18 to 45 years, either gender and good oral hygiene in terms of healthy, functionally and esthetically stable mucosa, were included and patients on steroid therapy, immunocompromised patients like; AIDS, Diabetics Mellitus, Alcoholism, Malnourished and patients with Acute Severe Pericoronitis were excluded from the study. The impacted tooth was diagnosed by history, clinical assessment, and radiographs like periapical and panoramic radiographs. The demographics age, gender, and clinical parameters like swelling, pain, and mouth opening were recorded. SPSS version 26.0 was employed for data analysis. The Mean and Standard deviation were counted for age. Frequency and percentage were figured for age, and gender. Comparison of facial swelling, pain, and trismus among groups was conducted by independent t-test. The p-value was measured as significant ≤ 0.05. The surgical procedure to remove the third molar was made with local anesthesia by giving a conventional inferior nerve block also anesthetizing the lingual nerve and buccal nerve by injecting xylocaine 2% with epinephrine 1:100000. Surgical blade no.15 was used for incision. An envelope mucoperiosteal flap was lifted to uncover the third molar. Before the start surgical process, all patients were given Clorohexidine mouth wash for at least two minutes. A Standardized surgical procedure was under taken as a means of to disclose the impacted mandibular third molar, the cortical bone at the buccal side, around with slow speed handpiece for the alveolotomy under continuous irrigation of 0.9% normal saline solution, then the tooth was exposed and extracted after taking away of a tooth any sharp bone was smoothened by same round bur and the socket was washed with 0.9% normal saline. The flap was repositioned and sutured with vickryl 3-0 in both groups. Submucosal injection of single dose dexamethasone (4mg) or Triamcinolone Acetonid was immediately injected at about 1cm above the surgical area following the surgical mandibular impacted third molar [8]. The pressure pack was placed for thirty minutes [3]. Post-operative directions consist of a soft diet, and maintaining oral hygiene via mouthwash, antibiotics, and analgesics three times a day for five days [6]. Analgesic Ibuprofen 600mg three times a day for five days. Antibiotic Amoxicillin with clavulanic acid 1 gram twice daily for five days. The sternness of pain was assessed by using a Visual Analog Scale. The extent of swelling was calculated by facial size through Amin and Laskin's criteria which was measured in millimeters. Normal inter-incisal distance is 35 to 45mm, less than 35 mm distance is considered as limiting mouth opening, which can be measured by ruler. Mouth aperture was considered by interincisal distance through a ruler (35-45mm normal value). All the data were documented on the 2nd, 5th, and 7th day by the clinician.

RESULTS

A sum of 288 participants were integrated for this study,

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the gender distribution shows male preponderance 168 (58.3%) were male and 120 (41.7%) were female. The greater part of the sample was aged between 31-40 years old (47.56%) followed by 21-30 years (29.51%) and a large amount of the patients have primary level education (32.63%) and bulk of the extractions were from the right side (52.08%) of the lower 3rd molar (Table 1).

Table 1: Demographic Status of Participants

Characteristics	Group A	Group B
Age		
18-20	12 (4.17)	18 (6.25)
21-30	39 (13.54)	46 (15.97)
31-40	75 (26.04)	62 (21.53)
>40	18 (6.25)	18 (6.25)
Mean ± SD	32.45 ± 7.81 Years	
Gender		
Male	85 (59.02)	83 (57.64)
Female	59 (40.98)	61 (42.36)
Site of Extraction		
Right	74 (51.39)	76 (52.78)
Left	70 (48.61)	68 (47.22)
Educational Status		
Illetrate	48 (16.67)	33 (11.46)
Primary	51 (17.71)	43 (14.93)
Matriculation	14 (4.86)	20 (6.94)
Intermediate	24 (8.33)	33 (11.46)
Graduate and Above	7 (2.43)	15 (5.21)

The mean pain score of the patients on different days it was not statistically significant between groups at 2nd and 5th postoperative days however mean pain score was significantly low in group B than group A at 7th postoperative day (p=0.0005) (Table 2).

Table 2: Comparison of Pain Between the Groups

Pain	Group A	Group B	p-Value
	Mean ± SD	Mean ± SD	
2nd day	4.59 ± 0.97	4.68 ± 0.85	0.402
5th day	3.33 ± 0.87	3.17 ± 1.06	0.170
7th day	1.27 ± 0.73	0.53 ± 0.59	0.0005

The comparison of facial size that was measured on 2nd, 5th and 7th days after impacted 3rd molar surgery. Likely mean facial swelling size was not statistically significant between groups at 2nd days but it was significantly low in group B as compare to group A at 5th and 7th postoperative day (Table 3).

Table 3: Comparison of Facial Size Swelling Between Groups

Facial size (mm)	Group A	Group B	p-Value
	Mean ± SD	Mean ± SD	
2nd day	1.42 ± 0.27	1.46 ± 0.26	0.177
5th day	1.20 ± 0.26	1.05 ± 0.39	0.0005
7th day	1.14 ± 0.22	0.73 ± 0.25	0.0005

The mouth opening size measured on 2nd, 5th, and 7th day mouth opening was significantly high in group B than group A on 5th and 7th postoperative days (p=0.0005) (Table 4).

Table 4: Comparison of Mouth Opening Size Between Groups

Mouth Opening (mm)	Group A	Group B	p-Value
	Mean ± SD	Mean ± SD	
2nd day	23.47 ± 5.46	22.36 ± 6.58	0.120
5th day	25.28 ± 5.28	39.74 ± 10.04	0.0005
7th day	31.11 ± 11.03	40.28 ± 10.37	0.0005

DISCUSSION

The highest percentage of individuals with at least one impaction had lower third molars accounting for 33% of cases. Third molars are often impacted due to skeletal deficiency in the area of eruption. Sagittal growth of mandible finished earlier than eruption of the third molar in many cases leading to impaction. Subtraction of impacted third molar is allied with postsurgical obstacles. Since corticosteroids have anti-inflammatory attributes, they are frequently used to treat these side effects [16-18]. Complications related to impacted teeth removals are not irrelevant and their improvement is conditioned via local and general elements inclusive of tooth position, age, and fitness popularity of the affected person, understanding and experience of the surgeon, and surgical device. Unlike the research conducted by Grossi *et al.*, and Graziani *et al.*, the current investigation discovered statistically significant differences between the DEX and TA groups on the seventh postoperative day [18, 19]. In comparison to the current study, high extent of patients older than 40 years were observed in a study that could be due to lack of oral health attentiveness leading to holdup in treatment [20]. While it is a minor surgical method, the common sequelae, which are pain, swelling, and trismus, can harshly influence patients' quality of life through the post-operative phase Both steroidal and non-steroidal anti-inflammatory drugs are extensively utilized to manage pain and inflammation [21-23]. In present study, the age ranges from 18 to 45 years with an average age 32.45 ± 7.81 years. In contrast to another study, age was counted from 20 to 50 years [15]. This age disparity can be because of a diversity of reasons like rational differences, or delayed reports by the patients at the hospitals. In current study out of 288 patients, there were 168 (58.3%) male and 120 (41.7%) female. In a comparable study by Tegginamani and Prasad 58% of the patients were male and 42% female thus demonstrating male dominance [16]. Comparably, a study carried out in India by Srinivasulu *et al.*, revealed that 45.33% of the patients were men and 54.67% of the patients were women [14]. This gender gap may be a result of specific social, environmental, and geographic factors. There were statistically significant differences between the two groups on the 7th day of the postsurgical time. The mean pain score was not statistically significant between groups at 2nd and 5th postoperative days however mean pain score was significantly low in group B (triamcinolone acetonide) than group A at 7th postoperative day (p = 0.0005). Similarly

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mean swelling facial size was not statistically significant between groups at 2nd days but it was significantly low in group B as compare to group A at 5th and 7th postoperative day. Mean mouth opening was also significantly high in group B than group A at 5th and 7th postoperative days (p = 0.0005). On the second and fifth postoperative days, there were no statistically significant differences between the DEX and TA groups for the assessment of pain. Triamcinolone acetonide works postoperatively, and its effect on trismus and pain was better than that of other groups, according to Srinivasulu *et al.*, comparison of the effectiveness of submucosal injection of dexamethasone and triamcinolone acetonide on postoperative pain, swelling, and occurrence following impacted mandibular third molar surgery in 150 patients [14]. Because of its greater local potency, a longer period of action, and lesser systemic absorption, trimetinone is a superior corticosteroid for intralesional injection.

CONCLUSIONS

The present study showed that administration of submucosal dexamethasone and TA produced similar effects in reducing edema, pain, and trismus after third molar surgery on day 2 to 5 postoperatively but on 7th postoperative day, TA was found to be more potent and effective. It may reduce the post-operative morbidity and complications like pain, swelling, and trismus. The study was beneficial for clinicians/surgeons to have a better treatment choice and for patients to have good treatment protocols.

Authors Contribution

Conceptualization: IBK

Methodology: IBK, THS, SS

Formal analysis: IBK

Writing-review and editing: AAK, MHZ, SUB, KAC

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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