

Comparison of Dosage of 4mg Versus 8mg Dexamethasone on Post-Operative Swellings in Zygomatic Bone Fractures

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ABSTRACT

Objective: To compare the mean decrease in swelling with 4mg versus 8mg dexamethasone given preoperatively in patients undergoing surgery for zygomatic bone fractures.

Study Design: Randomized controlled trial study.

Place and Duration of Study: This study was conducted at the Department of Oral & Maxillofacial Surgery, Saidu Medical College/Saidu Group of Teaching Hospital, Swat KPK from July 2017 to December 2017.

Materials and Methods: One hundred patients were included and divided into equal two groups. Group A was given 8mg dexamethasone one hour before surgery while Group B was given 4mg dexamethasone one hour before surgery. Baseline reading of swelling was measured and patients were undergone surgery. Patients were asked to visit after 7 days of surgery in OPD.

Results: The mean ages were 27.66 ± 8.38 years in group A and 28.52 ± 8.38 years in group B. There were 82% males and 18% females in group A while in group B, 88% males and 12% females. The mean decrease in swelling, 7.12 ± 3.60 mm in group A while in group B, 5.14 ± 1.84 mm. Statistically the difference was significant ($P < 0.05$) in mean decrease in swelling.

Conclusion: The current study concluded that the use of 8mg of the dexamethasone was more effective than 4mg reduce the degree of post operative swelling in zygomatic bone fracture.

Key Words: Dexamethasone, Swelling, Zygomatic bone fractures

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INTRODUCTION

In human body face is the most prominent and important position and often involved in trauma injuries.¹ The zygomatic bone is particularly prone to facial injuries due to its prominence and is the second most common mid facial bone fracture.² Zygomatic bone fracture occurs most frequently in young males.² The most common cause of zygomatic bone fracture is road traffic accidents, personal assault, fall, and sport injuries.^{1,3} Zygomatic bone fracture often leads to distortion of appearance and may compromise masticatory system and ocular system.

There is different treatment recommendations of zygomatic bone fractures have evolved.

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The surgical reduction and rigid internal fixation is a satisfactory method of its treatment. In most cases surgical treatment leads to significant degrees of tissue trauma that again causes an inflammatory reactions.⁴ As a result of this inflammatory process patients display post operative swelling, pain and functional impairment.⁵ Facial swelling reach maximum after 48 to 72 hours post operatively.⁶

Corticosteroids are well-known adjuncts to surgery for suppressing tissue mediators of inflammation, thereby reducing transudation of fluids and reducing swelling.^{5,6} Primarily steroids are used to reduce the post op swelling after the surgical treatment of zygomatic fractures.⁷ In oral and maxillofacial surgery most clinical trials showed a significant decrease in edema after administration of corticosteroids.^{6,8,9}

Patients experience a considerable reduction in quality of life, dysfunction, and discomfort following surgery due to post operative pain and swelling.¹⁰ The post op swelling and pain results in considerable difficulty in eating, sleeping other daily activities and as well as cause distorted appearance.

Laureano Filho et al⁶ reported that there is no difference in postoperative swelling by measuring swelling from different angles in 4mg and 8 mg doses. But another study has showed that with 4mg dexamethasone, mean decrease in swelling was 1.2 ± 0.0 mm while with 8mg dexamethasone, mean decrease in swelling was

1.9±1.0mm at 7th post op day. The difference was significant ($p<0.05$).⁹

MATERIALS AND METHODS

This randomized controlled trial was carried out in the Department of Oral & Maxillofacial Surgery, Saidu Medical College/Saidu Group of Teaching Hospital, Swat KPK from 1st July 2017 to 31st December 2017 and comprised 100 patients. Patients were randomly divided into two groups by using random number table. Group A was given 8mg dexamethasone one hour before surgery and then 8mg dexamethasone in BD dosage post op for 3 days while Group B was given 4mg dexamethasone one hour before surgery and then 4mg dexamethasone in BD dosage post op for 3 days. Patients of 15 to 60 years of age with both sexes and unilateral zygomatic bone fracture were included. Those patients with diabetes mellitus (BSR>186mg/dl) and tuberculosis, use of anti-inflammatory drug within last 2 week and medically not fit for general anaesthesia (ASA grade III, IV) were excluded. At baseline, reading of swelling was measured and patients were undergone surgery under general anaesthesia. After surgery, patients were shifted in the wards and discharged from there after 48 hours. Patients were asked to present after 7 days of surgery in OPD. After 7 days, postoperative swelling was measured and then the difference between pre and post-operative treatment measurements were calculated to obtain decrease in swelling. All collected data was entered and analyzed by using SPSS-21.

RESULTS

The mean ages were 27.66±8.38 years in group A and 28.52±8.38 years in group B. The majority of patients were in the age range between 15-38 years, 44 (88%) patients used 8 mg dexamethasone and 42 patients (84%) used 5 mg dexamethasone also (Table 1). There were 41 males (82%) and 9 females (18%) in group A with male to female ratio was 4.5:1. While in group B, 44 males (88%) and 6 females (12%) with male to female ratio was 7.3:1 (Table 2). According to pre-operative swelling, 23 patients (46%) between 170-185 mm and 27 patients (54%) between 186-200 mm pre-operative swelling in group A with mean of 186.26±7.19. While in group B, 26 patients (52%) between 170-185 mm and 24 patients (48%) between 185-200 mm pre-operative swellings with mean of 184.68±4.50 (Table 3). Regarding post-operative swelling, 19 patients (38%) between 171-180 mm and 31 patients (62%) between 181-190 mm post-operative swelling in group A with mean of 182.34±4.13. While in group B, 18 patients (36%) between 171-180 mm and 32 patients (64%) between 181-190 mm post-operative swellings with mean of 181.36±2.91 (Table 4). When compared the mean decrease in swelling, 7.12±3.60 mm in group A while in group B, 5.14±1.84 mm.

Statistically the difference was significant ($P<0.05$) in mean decrease in swelling (Table 5).

Table No.1: Frequency and percentage of patients according to age (n = 100)

Age (Years)	8 mg dexamethasone (n = 50)		4 mg dexamethasone (n = 50)	
	No.	%	No.	%
15 – 38	44	88.0	42	84.0
39 – 60	6	12.0	8	16.0
Mean±SD	27.66±8.38		28.52±8.38	

Table No.2: Frequency and percentage of patients according to sex (n = 100)

Sex	8 mg dexamethasone (n = 50)		4 mg dexamethasone (n = 50)	
	No.	%	No.	%
Male	41	82.0	44	88.0
Female	9	18.0	6	12.0

Table No.3: Frequency and percentage of pre-operative swelling (n = 100)

Pre-operative swelling (mm)	8 mg dexamethasone (n = 50)		4 mg dexamethasone (n = 50)	
	No.	%	No.	%
170 – 185	23	46.0	26	52.0
186 – 200	27	54.0	24	48.0
Mean±SD	186.26±7.19		184.68±4.50	

Table No.4: Frequency and percentage of post-operative swelling (n = 100)

Post-operative swelling (mm)	8 mg dexamethasone (n = 50)		4 mg dexamethasone (n = 50)	
	No.	%	No.	%
171 - 180	19	38.0	18	36.0
181 – 190	31	62.0	32	64.0
Mean±SD	182.34±4.13		181.36±2.91	

Table No.5: Mean decrease in swelling of both groups

Mean decrease in swelling (mm)	8 mg dexamethasone (n = 50)	4 mg dexamethasone (n = 50)
	7.12±3.60	5.14±1.84
P value	.004	

DISCUSSION

Dexamethasone is a synthetic corticosteroid that acts as an inflammation suppressor and decreases facial oedema after oral surgical procedures. Many studies have reported that dexamethasone was effective in reducing postoperative discomfort (pain, trismus and oedema) after impacted third molar surgical extraction.^{11,12} Comparing both doses, the use of 8 mg

of dexamethasone has a statistical differential between the dosages in the preoperative measures of mandible angle to nose wing. This study recorded that more males than females (5.6:1) sustained zygomatic complex fractures. Similar findings were found by Aiabe et al¹³ 4.7:1, Chowdhury et al¹⁴ 5.2:1 and Kovacs et al¹⁵ 6.4:1, the relative ratio of male to female is comparable with the present study. The reason could be greater social and economic involvement of young adult males.

It was noticed that the age group mostly involved in our study was from 1st decade of life then followed by 2nd decade. The least incidence was found in 2nd decade of life with respect to maxillofacial trauma, which is relatively common worldwide in the 1st decade so is the case with zygomatic bone fracture. Results of the Studies reported by Chowdhury et al¹⁴ Motamedi et al¹⁶ and Al Ahmad et al¹⁷ according to the results of their studies zygomatic bone fractures are more common in 1st decade of life.

Our data results are also on consistent with the results of Graziani et al¹⁸ that the submucosal administration of dexamethasone 4mg resulted is statistically significant decreases the postoperative swelling/edema. Moreover, the higher dose of dexamethasone was not associated with a better response that the lower dose, and no statistically significant differences were observed between the 2 dosage regimens. This latter finding seems to confirm data reported by Graziani et al¹⁸, although they evaluated only the dose-dependent effects of the endoalveolar application of dexamethasone powder.

Similarly by another study by Graziani et al¹⁸ have also reported the topical injection of dexamethasone 4mg reduces neither trismus nor the patient's pain perceptions. On the contrary it was also noticed that the endoalveolar use of both 4 mg and 8 mg of dexamethasone in powder form reduced trismus by 7 days postoperatively, while only the lowest local powder application reduced the patient's pain perception as well.¹⁹ Without the assessment of which drug has been used to reduce the pain perception, an evaluation of the corticosteroid effects on trismus becomes difficult, because the effects of concomitant systemic medications as non steroidal anti-inflammatory drug (NSAIDs) may modulate the inflammatory response and modify or confound the study results.²⁰

Alexander et al²¹ suggested that the effect of dexamethasone is dose dependent and administration of less than 4mg is not beneficial. Grossi et al⁹ also evaluated the effectiveness of submucosal administration of 4mg and 8mg dexamethasone reported that there was no statistical difference between the two doses. Similarly, Majid¹² reported that 4 mg administration of submucosal and intramuscular administration of 4mg dexamethasone was compared,

both were effective in reducing facial oedema on postoperative on day 7. Injection of 8mg dexamethasone reduced facial swelling on postoperative day 7 in the present study this finding is inconsistent with the results of our study, which have shown not statistically significant difference between groups with regard to postoperative swelling in zygomatic bone fracture. This is in line with several authors who have observed the therapeutic efficacy of administration of dexamethasone in previous studies, may be a feasible for more invasive in dental procedures.^{22,23}

CONCLUSION

It is quite evident from the result of this study the parental submucosal injection of corticosteroid in the form of dexamethasone in 8 mg dose when compared with 4 mg dose proved to be more efficacious for the reduction of post operative edema and swelling for reduction of the Zygomatic Bone Fracture than any other route of its administration. It is beyond doubt that even low doses of dexamethasone sodium phosphate injection given submucoal intra-orally at the site of oral surgery provides relatively higher drug tissue concentration availability to its less loss as to some other compartment and drug elimination effect as it remains confined at that specific site. The results of our study favors the submucosal route of dexamethasone administration during maxilla-facial bone surgery even under local anesthesia as most suitable for patient compliance and ease of its administration from the operator point of view for its efficacy, even after repeated doses of its administration to maintain an adequate level of the drug during the operative procedure and post-operatively as well.

We also conclude that 8mg doses of dexamethasone proved to be statistically significant in the mean reduction of post operative edema, swelling and trismus when compared to its lower doses of 4mg, although it has been observed it does not have any roll for the postoperative pain control in zygomatic bone reduction.

Author's Contribution:

Concept & Design of Farhad Ali

Study:

Drafting: Muhammad Tariq Khan

Data Analysis: Muhammad Amir

Revisiting Critically: Farhad Ali, Muhammad Tariq Khan

Final Approval of version: Farhad Ali

Conflict of Interest: The study has no conflict of interest to declare by any author.

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