ORIGINAL ARTICLE

ROLE OF DEXAMETHASONE AT SURGICAL SITE IN THE CONTROL OF PAIN AND EDEMA IN THE MANAGEMENT OF MANDIBULAR FRACTURE OSTEOSYNTHESIS

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ABSTRACT

Dexamethasone has a high response at low doses and it is used considerably in oral surgery with varying dose, route and timing of administration. To compare the outcome of dexamethasone and placebo in terms of mean pain and edema scores at surgical site of mandibular osteosynthesis patients.

A total of 80 patients having mandibular fractures at one site of age 15-50 years and both genders were included. Patients with associated other fractures of facial bones, having significant medical history of diabetes, heart and renal diseases with chronic use of medicines and pregnant women were excluded. Eight milligram of dexamethasone was administered via submucosal infiltration at the surgical incision site in the experimental group and control group received normal saline. Pain and edema was measured at twenty four and at seventy two hours after surgery by the use of visual analog scale and nine line measurement respectively.

In this study, there was significantly less score of pain on visual analog scale in group I (experimental group) 2.08 ± 0.92 and group II (control group) 3.43 ± 1.42 at 24 hours after surgery and 2.23 ± 0.80 in placebo and 0.5 ± 0.68 in dexamethasone group at 72 hours. There was significantly less edema score of patients receiving group I (dexamethasone) postoperatively up to 4.1 ± 1.43 as compared to group II (placebo group) 6.0 ± 1.22 on 24 hours after surgery and 2.0 ± 0.85 in placebo and 0.05 ± 1.2 in dexamethasone group after 72 hours. This study concluded that there was less pain and edema scores after dexamethasone use at surgical site of mandibular osteosynthesis patients.

Keywords: *mandibular osteosynthesis, dexamethasone, edema.*

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INTRODUCTION

The mandibular bone is more prone to fracture in the face as it is prominent and exposed.[1] Mandibular fractures often treated by open reduction and internal fixation (ORIF).[2,3] ORIF is associated with high post-operative sequel that have a social and biological impact.[4]

The commonest postoperative complication after mandibular osteosynthesis by open reduction and internal fixation is pain, swelling, trismus, infection, hypomobility of jaw etc. These complications are influenced by gender, age, medical conditions, time interval between trauma and surgery, antibiotics, the fracture site, fracture severity, operating time, incision type, surgeon experience, and method of fixation.[4,5]

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Among these, most common complication encountered is pain and edema. Pain usually reaches peak level in 6-12 hours postoperatively.[5] Visual Analog Scale (VAS) is used to measure pain after surgery. Patient is asked to choose a number from 0 to 10 on scale. '0' means no pain and '10' means worst possible pain. Postoperative edema is the expression of exudate and transudation.[6] Edema has been assessed by means of 9-line measurement.[1,7] Nine lines are marked with the use of measuring tape (line 1, right lateral canthus to right gonion, line 2, left lateral canthus to left gonion , line 3, right commissure of the lips to right tragus, line 4, left commissure of the lips to left tragus, line 5, midline in chin to right tragus, line 6, midline in chin to left tragus, line 7, right ala to right tragus, line 8, left ala to left tragus, line 9, left gonion to right gonion).

Post-Operative sequel and complications can be minimized by using corticosteroids in oral surgery. Corticosteroids are helpful in managing inflammation by making changes in the inflammatory response.[8] The extensive use of dexamethasone is due to its high response at low doses.[8,9] Several routes and times of administration is advocated in literature.

ORIF exposes patient to various possible surgical complications. Several methods utilized to control and reduce edema and pain after ORIF. There is lacking literature on the subject in our population. The rationale of this study was to help surgeons to use and recommend dexamethasone for reducing pain and edema after surgery.

MATERIALS AND METHODS

This randomized controlled trial was conducted in Department of Oral & Maxillofacial Surgery, Punjab Dental Hospital, Lahore on 80 patients diagnosed as having mandibular fractures at one site of age 15-50 years and both genders were included. Patients associated with other fractures of facial bones, having significant medical history of diabetes, heart and renal diseases with chronic use of medicines and pregnant women were excluded.

Included patients were divided into two groups; group I (experimental) and group II (control) by lottery method, each group consisted of 40 patients. All patients in both groups had undergone surgery using aseptic and standard technique under general anesthesia. Intraoral approach was used for exposure of the fractures segment via vestibular incision. Open reduction and fixation of fracture segments were performed by mini-plates. After primary closure of the incision site with 3-0 polyglactin suture, 8 mg of dexamethasone was administered via sub mucosal infiltration in the surgical site and normal saline was administered in the control group. Pain was measured at 24 hours and 72 hours after surgery ended using a visual analog scale. It was measured on a scale from 0 to 10 in terms of mean pain scale. Where, 7-10 score means severe pain, 4-6 means moderate, 1-3 means mild pain, 0 means no pain. Edema was evaluated at 24 hours and 72 hours after surgery using nine line method[7]. All this information was recorded in a pre-designed proforma.

RESULTS

The age ranged from 15 to 50 years with mean age of 36.89 ± 7.64 years. The mean age of subjects in group I was 36.30 ± 7.57 years and in group II was 35.43 ± 7.80 years. Majority of the patients 63 (78.75%) were between 30 to 50 years of age. Out of 80 patients, 46 (57.50%) were males and 34 (42.50%) were females. Mean duration of surgery was 55.23 ± 10.71 minutes.

In this study statistically significant less score of pain was observed on visual analog scale in group I (dexamethasone) 2.08 ± 0.92 and group II (control group) 3.43 ± 1.42 at 24 hours after surgery and 2.23 ± 0.80 in placebo and 0.5 ± 0.68 in dexamethasone group at 72 hours. There was significantly less edema score of patients receiving group I (dexamethasone) postoperatively up to 4.1 ± 1.43 as compared to group II (control group) 6.0 ± 1.22 on 24 hours after surgery and 2.0 ± 0.85 in placebo and 0.05 ± 1.2 in dexamethasone group after 72 hours.(Table 1)

DISCUSSION

Short-term corticosteroids are frequently used with oral and maxillofacial surgical procedures to reduce postoperative pain and edema. However, their influence on tissue repair, inflammation and immune system can be detrimental therefore evaluating clinical correlation is essential.[8]

In a recent study the researchers administered four miligram dexamethasone, eight miligram dexamethasone and saline in three equal groups after wisdom tooth extraction and evaluated them at 2nd post-operative day and 7th postoperative day. In both four miligram and eight miligram groups, edema of the face was significantly reduced in comparison with the placebo group, but there was no significant difference between the two dosage protocol. In addition, there was no significant difference in all treatment groups on the seventh postsurgical day.[10]

In another study[9] there was reduced swelling of patients receiving dexamethasone postoperatively on 24 hours after surgery after 72 hours. This study also reported less score of pain on visual analog scale in

TABLE 1: STRATIFICATION OF MEAN PAIN AND EDEMA SCORES OF BOTH GROUPS ACCORDING TO AGE GROUPS

Variables		Group I (n=40)		Group II (n=40)		P-value
		Mean	SD	Mean	SD	
Pain score at 24 hours	31-50	2.09	0.93	3.39	1.17	0.0001
	15-30	2.00	0.93	3.56	1.33	0.0001
Pain score at 72 hours	31-50	0.56	0.72	2.03	0.79	0.0001
	15-30	0.25	0.46	2.89	0.33	0.0001
Edema score at 24 hours	31-50	4.41	1.39	6.13	1.2	0.0001
	15-30	2.88	0.83	5.56	1.24	0.0001
Edema score at 24 hours	31-50	0.031	1.15	1.97	0.87	0.0001
	15-30	-0.38	1.41	2.11	0.78	0.0001

dexamethasone at 24 hours after surgery and at 72 hours.[9]

Another researcher performed wisdom tooth extraction on one hundred patients between 18 to 40 years, divided in two equal groups. In fifty patients (experimental group) 4 mg submucosal dexamethasone intraoral injection was administered preoperatively at the surgical site and no injection was administered in the control group. Assessment of swelling, edema of the face and mouth opening was done. The results concluded that submucosal infiltration of dexamethasone had significant effect in trismus and reduction of swelling on 2nd post-op day.[11, 12]

Another randomized clinical trial had thirty three patients who underwent surgical extraction of the impacted mandibular wisdom tooth. Submucosal injection of corticosteroid was given in one group and intramuscular injection was given in the second group. Both groups showed significant improvement on speech, appearance and quality of life. Both routes of administration showed effective results.[5,12]

The interest in the use of corticosteroids in association with oral and maxillofacial surgery was awakened in the 1950s.[13,14] Since then, the usefulness of corticosteroids has been investigated particularly in association with third molar surgery, and several studies have demonstrated benefits of corticosteroids on recovery.[15] Local injection of corticostedoids has shown benefits similar to those of systemic administration.[16] According to a questionnaire filled out by oral and maxillofacial surgeons, perioperative corticosteroids are favored especially because of their ability to reduce postoperative edema, an effect that has been shown in several studies.[13,16] Corticosteroids also reduce pain after surgical procedures in the oral cavity in general[15] and have beneficial effects on neurosensory recovery after orthognathic surgery in particular.[17-19]

CONCLUSION

This study concluded that there was less pain and edema scores after dexamethasone use at surgical site of mandibular osteosynthesis patients.

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