

Dexamethasone versus Methylprednisolone in Third Molar Impaction Surgery: A Comparative Study

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ABSTRACT

Background: Postsurgical complications like pain, swelling, impaired function cause transient morbidity is very common. Various anticipatory drugs are prescribed to prevent patients from such unpleasant situations. Both dexamethasone and methyl prednisolone can be used for this purpose in surgery of third molar impactions.

Materials and Methods: This was a split mouth study consisting of 25 patients having Pell and Gregory's class II position B bilateral impactions. Eight mg dexamethasone and 40 mg methyl prednisolone were prescribed randomly one hour prior to the surgery. Pain, swelling and trismus were noted on 1st, 2nd, 3rd and 7th day following surgery. Wilcoxon test was used to assess the significance between the parameters.

Results: Reduction in swelling and trismus was found to be significantly more with dexamethasone than methyl prednisolone. However no statistically significant difference was found in post-operative pain.

Conclusion: Dexamethasone can be used as a potent preemptive drug for controlling post-operative complications in removal of third molar impactions.

Keywords: Dexamethasone, Methylprednisolone, Third Molar, Trismus.

INTRODUCTION

Oral surgery procedures such as surgical removal of the impacted third molars can give severe pain to the patients. The common sequelae of mandibular third molar surgery are facial swelling, pain, and trismus, all of which arise as a result of tissue inflammation due to surgical insult.¹ It also occurs due to severe tear and tissue injury to soft and hard tissues surrounding it²⁻⁴. This causes pain, swelling and restricted mouth opening among the patients. Although it is known that inflammatory response is good for faster cure but an exacerbated response causes a severe complication. To overcome these complications clinicians mostly prescribe corticosteroids^{5,6}.

The Machinery of inflammation characterizes a chain of ordered, dynamic responses with both cellular and vascular events with precise humoral secretions.^{7,8} These paths involve changing physical position of white blood cells (monocytes, basophils, eosinophils, and neutrophils), plasma, and fluids at inflamed site.⁷ A collection of secreted mediators and other signaling molecules are released by immune defense cells primarily in the mechanism which can contribute in the event of inflammation.⁹

In the initial phase of inflammatory process, corticosteroid acts by suppressing the production of vasoactive substances such as prostaglandins and

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leukotrienes.¹⁰ This reduces fluid transudation and hence reduces chances of swelling. These drugs help to control mild pain hence they should be used in conjugation with potent analgesics.¹¹ Few complications like, stomach irritation, such as indigestion, rapid heartbeat (tachycardia), nausea, insomnia, a metallic taste in the mouth are present but it all depends on the dose and duration of administration.¹² Prolonged use can delay healing and increase patient's susceptibility to infections. But in dental extraction the doses are for shorter duration hence chances of adverse effects are very rare. Till date only one study has been which relates to type, dosage, time and mode of administration of these drugs. Further these drugs in surgical extraction have remained under investigated. In international research scenario this topic is very much debated.¹³

The aim of the study is to find out, which drug among the two is better in surgical dental extraction.

MATERIALS AND METHOD

This research was conducted as a split mouth study in the Department of Oral and Maxillofacial Surgery. Twenty five patients were selected from the OPD based on the inclusion and exclusion criteria's. The study was presented and approved from the ethical committee of the college and an informed consent was signed by all the patients (ETH/OS/233/2020). Patients who were having bilateral mandibular third molars with Pell and Gregory's Class II position B impaction assessed clinically and radiographically were included in the study. Exclusion included the patients on any anti-inflammatory or analgesic drugs 15 days prior to study or having any known allergy to drugs used in the study. Pregnant and lactating females were also excluded from the study. Both the surgeries were performed with a gap of 3-4 weeks by the same surgeon to avoid crossover effect. The side of surgery and the drug to be prescribed were randomly selected on the day of the first surgery. The drug either dexamethasone 8 mg or methyl prednisolone 40mg was administered to the patient 1 hour prior to the surgery.

On the day of surgery extraoral asepsis was performed by 10% povidone iodine. Anaesthesia was achieved by administration of 2% lidocaine

with 1:100,000 epinephrine⁷. First incision was placed from distal to mesial on the alveolar ridge till the distolingual region of the second molar. Then intrasulcular incision was placed encircling the second molar till the interdental papilla between the second and first molar region. Following the incisions a full thickness mucoperiosteal flap was raised. After sectioning the tooth, it was removed and the surgical site was cleaned with copious irrigation of saline. The flaps were sutured with 3-0 silk sutures. The duration of the surgery was measured in minutes from time of incision to suture placement. Post operatively patients were instructed to keep the surgical site clean and restrict physical exertion. Analgesics were prescribed to the patient immediately after surgery.

After surgery the intensity of the pain was measured by a 10-point Visual Analogue Scale. Pain was assessed at 8 hours intervals for the first three days of the post-operative period and numbers of analgesics consumed in 7 days postoperatively were also noted.

Post-operative swelling was evaluated by the method described by Ustun et al⁸. The assessment of the swelling was carried out before the beginning of the surgical procedure (baseline) and after 1,2,3 and 7 days following surgery. Trismus was assessed by measuring the distance between the right upper and lower central incisors with the help of a caliper. The evaluation of trismus was also done preoperatively (baseline) and after 1,2,3 and 7 days following surgery. All the measurements were performed by a single trained examiner.

RESULTS

This study was carried out with 25 patients maintaining all the protocols. All the patients were cooperative and reported on all the follow up visits. There were no cases of any post-operative complication. Wilcoxon test was applied to see the significance of the different parameters.

When duration of surgery and number of analgesics (group A mean 16 tabs and group B mean 14.01 tabs) were compared no significant differences (p value 0.642) were found (Table 1). It was noted that maximum swelling resulted at 48 hours in both the groups (group A mean 4.80 and group B Mean 7.98). A Statistically significant difference was observed in

all phases of swelling between both the groups (p value 0.021, 0.002, 0.023 and 0.11 respectively). Patients were more comfortable with dexamethasone than Methylprednisolone. Mouth opening reduction were noted in all groups regardless of the drug used but reduction was more following surgery in which methylprednisolone was prescribed. A statistically significant difference was found at 24th, 48th and 72nd hours (p value 0.211, 0.038 and 0.398), whereas on 7th day the mouth opening reduction was non-significant (p value 0.711) (Table 3).

No statistically difference was noted with regard to post-operative pain during the follow up visits. However, low pain scores were obtained with use of dexamethasone before surgery.

Table 1: Comparison of number of analgesic consumed and duration of surgical procedure

	Dexamethasone 8 mg Mean	Methylprednisolone 40 mg Mean	P-value
Analgesic Consumption (n)	16	14.01	0.642
Duration of Surgery (Min)	33.00	30.20	0.612

Table 2: Comparison of facial swelling on different visits

Time of Visit (Hours)	Dexamethasone 8 mg Mean (SD)	Methylprednisolone 40 mg Mean (SD)	P-Value
24 h	3.69(3.24)	5.72(2.23)	0.021
48 h	4.80(3.63)	7.98(2.14)	0.002
72 h	3.14(3.42)	6.28(3.01)	0.023
168 h	0.20(0.51)	1.50(1.32)	0.011

Table 3: Comparison of reduction in mouth opening during each postoperative visits.

Time of Visit (Hours)	Dexamethasone 8 mg Mean (SD)	Methylprednisolone 40 mg Mean (SD)	P-Value
24 h	-11.98(7.02)	-13.98(6.28)	0.211
48 h	-12.41(8.01)	-16.69(6.98)	0.038
72 h	-11.72(7.62)	-13.28(4.95)	0.398
168 h	-4.4(4.86)	-5.02(2.98)	0.711

DISCUSSION

Drugs like corticosteroids and others are very well known manage inflammation, reduce transudation and edema. Majority of the surgeon prescribes corticosteroids to control surgery outcome and yield a comfortable post-surgical healing period. However there are no definite recommendations related to different molecules or regimes, time and root of administration.¹⁴ There is limited information on use of corticosteroids as a single oral pre-surgical dose to reduce pain during third molar extractions.¹⁵ The drug doses used in the present study were based on the previous literature available. The dose of the drug should be more than the cortisol released normally by the body. Due to this reason, in the present study 8mg¹⁶ dexamethasone and 40mg methylprednisolone were used which corresponded to 200mg of cortisol.¹⁷

The present study is a split mouth study as it reduces the subject variability and reduces confounders. Also, same position or levels of impacted teeth were selected with the help of a radiograph as it is a good indicator for complications occurring after surgery. Thus Pell and Gregory's classification was used in the study.

Duration of surgery and analgesics consumed by the patients were evaluated and checked for their effect on the parameters taken in the study but no statistically significant result was found which was in accordance to various other studies.¹⁸⁻²⁰

Inability to open the mouth completely is a complication after surgery that hinders patients' activities like eating, drinking and performing oral hygiene procedures. Dexamethasone caused less trismus out of the two drugs which was significant on the second day of evaluation.⁴ This could be due to the long lasting action of the drug as compared to methyl prednisolone which is intermediate acting drug and has a shorter half life than dexamethasone.²¹ This result was in accordance to a study done by Vegas-Bustamante et al.

Facial swelling is another complication that can occur after surgery. It can be caused by the response of the tissues to manipulation and trauma caused during surgery.²² Its onset is gradual and maximum swelling is present during 48 hrs after surgery. In the present study dexamethasone has significantly reduced the incidence of swelling as

compared to methyl prednisolone. This is again attributed to the half life of the drug which is more than methyl prednisolone.²³ The efficacy of dexamethasone is also due to the reason that it reduces the formation of thromboxane A2 which in turn reduces the amount of prostaglandin E2 that is formed.

Graziani et al. in his study with 43 patients stated that dexamethasone in conjugation with augmentin 12th hourly for 5 days, best controlled the edema and swelling.²⁴

Patients were asked to take acetaminophen 750mg as a rescue drug in case the pain persisted. A numerical rating scale was used to rate the pain caused to the patients in the early post-operative period. Patients rated less pain in all surgeries where dexamethasone was administered as compared to methyl prednisolone. The production of prostaglandins that influence the peripheral pain response is not controlled^{25,26} thus emphasizing the result obtained. The effect of corticosteroids is not influenced by the amount of analgesics taken.

CONCLUSION

From the present study it can be concluded that 8mg dexamethasone is more efficient in controlling swelling and trismus as compared to 40mg methyl prednisolone. But both drugs have similar pain control ability. Although much attention is given to post-operative medication, radiography, dental morphology and depth of impaction, but age of the patient as well as experience of the surgeon should also be taken into account. Further studies are needed to be undertaken which include all parameters mentioned above to establish this fact.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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