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Original Article

Pre-emptive effect of dexamethasone injection and consumption on post-operative swelling, pain, and trismus after third molar surgery. A prospective, double blind and randomized study

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ABSTRACT

Aim: To evaluate the preventative effect of intravenous 4 mg of dexamethasone and 8 mg oral dexamethasone on post-operative pain, swelling and trismus after the surgical extraction of mandibular third molars.

Materials and methods: A randomized clinical trial comprised of 200 patients (control group I intravenous and experimental group II orally) with impacted lower third molars, average age 20.8 years with no local or systemic problems, with bilateral impacted lower third molars, were operated under local anesthesia. Group I was given 4 mg IV and group II was given 8 mg orally of dexamethasone 1 h before procedure. The choice of which side to operate first and the amount of concentration of medication to use was made randomly and double-blindly. Post-operative pain was evaluated using a visual analog scale (VAS) and the degree of swelling was evaluated through facial reference points' variation. The presence of trismus was analyzed through measurement of the interincisal distance (IID). These assessments were obtained before the operation and 24 h, 48 h and 7th POD.

Results: No significant difference was found in facial swelling and trismus between IV 4 mg injection and oral 8 mg consumption after lower third molar surgery (student t test $P > 0.05$). The visual analogue scale scores for pain assessment showed no significant difference between IV injection and oral route of dexamethasone (student t test $P > 0.05$).

Conclusion: Patients can be administered 8 mg oral dexamethasone is as effective as 4 mg intra venous route without much difference in final outcome at any given point of time.

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1. Introduction

Surgical extraction of the mandibular third molar is one of the most common minor surgical procedure carried out in the Oral and Maxillofacial Field.[1,2] It is afflicted by various forms of injury. Normally our body will respond to any type of injury in a peculiar & predictable manner which shows in the form of cardinal signs of inflammation. Being maxillofacial region is a highly vascularized and constituted by loose connective tissue of the liberation of exudates and subsequent resulting in swelling, trismus and pain still more.[3] This result in more exaggerated response is predicted compared to other part of the body in of functional and structural form.

To control post-operative inflammation and symptoms associated, it is necessary to provide an adequate anti-inflammatory therapy intra and post-operative period. For several decades surgeons administered corticosteroids before or just after third molars' surgery to reduce inflammation and associated symptoms after oral surgical procedure. It is demonstrated that a better effect in the control of the swelling and trismus when using steroid anti-inflammatory drugs versus non steroidal anti-inflammatory drugs.[4–6] One of such drug is administration of corticosteroids (CS), by the action of the anti-inflammatory effects of cortisone and Adrenocorticotropic Hormone (ACTH). The use of these CS in the treatment of Rheumatoid Arthritis (RA), the fact that increased its popularity among medical authorities which was reported by Hench et al (1950).[7]

Corticosteroids mechanism of action includes the inhibition of the enzyme Phospholipase A2 (PLA 2), which reduces the release of arachidonic acid in the cells of the inflamed focus. This will decrease prostaglandins' and leukotrienes synthesis, therefore reducing the accumulation of neutrophils, which explains, at least partly, the greatest power of corticosteroids compared to non steroidal anti-inflammatory drugs (NSAID'S).[8]

However, the clinical use of this type of drugs should be moderate, rational, for shorter period of time, and smaller dose because, according to endocrinology analyses, after the 5th day of use, the therapy has already begun to produce immunosuppression. In some patients it may take up to 9 months to return to normal levels when it is used for longer period. Some studies show the use of different doses but they don't compare them.[8–11]

Many patients will be apprehensive for receive IV medication. For them alternatively we can substitute enteric route. But the absorption may be delayed which might alters the action of the same.

Taking into account these facts, the purpose of the present study was to compare the effects of pre-operative administration of two different dosages (4 mg and 8 mg) and routes (intravenous and oral) of dexamethasone on post-operative pain, swelling and trismus after third molar surgery.

2. Materials and methods

A prospective, randomized, controlled, double blind, parallel group design study was conducted with the approbation of the Department of Oral and Maxillofacial Surgery over the period of two years from September, 2012 to September, 2014. The procedures were explained to the patients verbally and in writing, and informed consent was taken before enrollment. Those who were not ready or fail to report according to the set criteria, excluded from the study. The patients were randomly allocated to two groups i.e. control group I 4 mg intravenous administration and experimental group II 8 mg orally administration group.

200 healthy patients (control group I 100 and experimental group II 100) with impacted lower third molars, with bilateral lower third molar in similar positions i.e. class II and position B (Pell and Gregory's classification)[12] along with same degree of surgical difficulty (Pederson's Index) (Table 1), age between 19 and 34 years (mean 20.8 years). All the patients had no history of allergy to dexamethasone, amoxicillin, or acetaminophen, and had no use of other medicines one month before and during the study period. Prior to the surgical procedure, a detailed case history was taken and an oral examination was performed, including a panoramic radiograph and IOPA, to confirm the need for third molar removal. The choice of surgical procedure was randomly allocated for both control (group I) and experimental (group II) groups. The operating surgeon was not allowed to know the dosages used for the respective sides. The surgical procedure was performed after 1 h of the random choice of the determination of the side and dose of dexamethasone. . Both the patients and the surgeon were blinded to the use of corticosteroid. A third person not involved in the study was made incharge of dispensing the solution randomly and maintaining the record of solution dispensed to each patient. This record was not revealed to the investigators till the completion of study and obtaining results.

For standardization of the sample, we used the following clinical criteria: 1) Age between 19 and 34 years, 2) Bilateral impacted third molars (According to Pell and Gregory's classification), 3) Equivalent degree of surgical difficulty (Pederson's Index) comparing one side with the other, 4) Absence of any systemic disease.

All the patients made a mouthwash with chlorhexidine tablets 0.2% (Water dissolvable) before administration of local anesthesia (lidocaine 2% with epinephrine 1:200,000) at the area to be operated. Standard inferior alveolar nerve block and long buccal nerve block of surgical site was given and the surgical procedure is performed to remove the third molars under standard protocol.

In the post-operative period, an antibiotic (oral amoxicillin 500 mg, three times daily for three days) and 500 mg of acetaminophen three times daily every 8th hourly for 3 days was prescribed. The patients were also instructed to record the

Table 1 – Type of lower third molar in similar positions.

Type of LTM	Numbers
Horizontal LTM impaction	104
Distoangular LTM impaction	30
Mesioangular LTM impaction	66