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Evaluation of postoperative discomfort following third molar surgery using submucosal dexamethasone – a randomized observer blind prospective study

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Background. Surgical removal of impacted lower third molar is still the most frequent procedure done by Oral and Maxillofacial surgeons and is often associated with pain, swelling and trismus. These postoperative sequelae can cause distress to the patient as a result of tissue trauma and affect the patient's quality of life after surgery. Use of antiseptic mouthwashes, drains, muscle relaxants, cryotherapy, antibiotics, corticosteroids and physiotherapy seems to decrease postoperative discomfort. Among them corticosteroids are well-known adjuncts to surgery for suppressing tissue mediators of inflammation, thereby reducing transudation of fluids and lessening edema. The rationale of this study is to determine the effectiveness of submucosal injection of dexamethasone in reducing postoperative discomfort after third molar surgery.

Patients and Methods. 100 patients requiring surgical removal of third molar under local anesthesia were randomly divided into 2 groups, group I receiving 4 mg dexamethasone as submucosal injection and the control group II received no steroid administration. Facial swelling was quantified by anatomical facial landmarks. Furthermore, pain and patient satisfaction, as well as neurological score and the degree of mouth opening were observed from each patient.

Results. Patients receiving dexamethasone showed significant reduction in pain, swelling, trismus, a tendency to less neurological complaints and improved quality of life compared with the control group.

Conclusions. Submucosal injection of dexamethasone is more efficient to manage postoperative discomfort after removal of third molars compared to no steroid administration. (Oral Surg Oral Med Oral Pathol Oral Radiol 2013;■:1-7)

The surgical extraction of lower third molars is the most frequent intervention in oral surgery.[1] This procedure is often associated with significant postoperative sequelae that may have both a biological and social impact.[2,3] This is because molars show a high incidence of impaction and are often associated to highly diverse disorders such as pericoronitis, periodontal defects in the distal aspect of the second molar, caries of the third molar or second molar, pressure resorption of second molar, different types of cysts and odontogenic tumors and neurogenic pain, provoking or aggravating orthodontic problems and obstruction of placement of a complete or partial denture.[4] The surgical procedure which usually involves incision, flap reflection and bone removal to expose the impacted tooth is associated with postoperative pain, swelling and trismus. The adverse effects of wisdom tooth surgery on the quality of life has been reported to show a threefold increase in patients who experience pain, swelling or trismus alone or in combinations; compared to those who were asymptomatic.[5] Many clinical studies investigate treatments to reduce postoperative complications by using antiseptic mouthwashes, use of drains, flap design, antibiotics, corticosteroid treatment, muscle relaxant and physiotherapy.[6] Among them corticosteroids are well-known adjuncts to surgery for suppressing tissue mediators of inflammation, thereby reducing transudation of fluids and lessening edema.[7]

As a routine protocol, antibiotics and NSAIDs (non-steroidal anti inflammatory drugs) have been prescribed pre- and postoperatively. The introduction of NSAIDs has significantly altered the management of

Statement of Clinical Relevance

This study provides modern treatment strategies and effectiveness of submucosal injection of dexamethasone on swelling, pain, trismus, neurological complaints and patient satisfaction after third molar surgery. This study provides a basis for the routine administration of preoperative submucosal dexamethasone in a subtherapeutic dose to reduce the intensity of post surgical sequelae such as pain, swelling and trismus.

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postoperative pain in dentistry and medicine. By administering the NSAIDs prior to pain onset, drug absorption would have begun and therapeutic blood level will be present at the time of pain onset. Secondly, the presence of cyclooxygenase inhibitor may limit the production of prostaglandins and prostacyclins associated with pain and edema.[8] Corticosteroids (Dexamethasone, Prednisolone) dramatically reduce the manifestations of inflammation including redness, swelling, heat and tenderness that are commonly present at the inflammatory site. The effect of dexamethasone on the inflammatory process is the result of a number of actions including the redistribution of leukocytes to other body compartments, thereby lowering their blood concentrations. Also involved is the inhibition phospholipase A2 (due to steroid mediated elevation of lipocortin) which blocks the release of arachidonic acid, the precursor of prostaglandins and leukotrienes from membrane bound phospholipids.[9] Clinical trials in Oral Surgery have also supported the hypothesis that preemptive NSAIDs and Corticosteroids are effective in delaying and preventing many postoperative sequelae.[5]

Topographical considerations make it difficult to quantify facial volume of swelling. However, different methods of measuring facial swelling have been proposed, e.g., verbal response scales (VRS), mechanical methods (cephalostat, calipers, registration of reference points or landmarks), ultrasound, photographic techniques, computer tomography (CT), magnetic resonance imaging (MRI) and optical face scanning with mirror construction.[10-15]

The aim of this study was to evaluate the effectiveness of submucosal injection of dexamethasone on swelling, pain, trismus, neurological complaints and patient satisfaction after third molar surgery.

MATERIALS AND METHODS

The study was approved by the local ethics committee at the Nishtar Institute of Dentistry (NID/01-2008). At the beginning of the study, written informed consent was obtained from each patient.

Patients

100 healthy male and female patients (M = 26.9, SD = 4.45 years) attending the Oral and Maxillofacial Surgery requiring surgical removal of upper third molars and bilateral impacted lower third under local anesthesia were included. Only patients, who required an osteotomy of the lower mandible wisdom teeth, were included in the study. They were divided randomly into 2 treatment groups. The observer did not know about the kind of therapy applied at the time of the patient examinations.

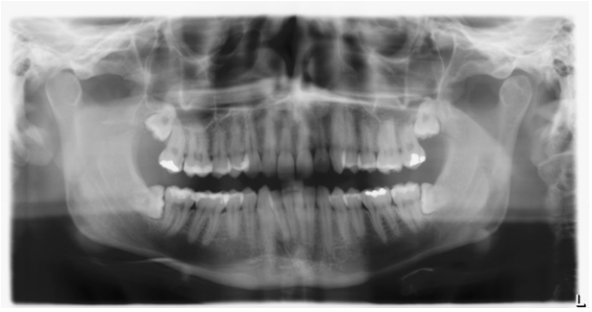

Fig. 1. This figure shows an orthopantomogramm (OPT) of a patient, who fulfills the criteria by Pell & Gregory level B and C.

Surgical procedure

The surgical procedure took place using local anesthesia. Surgical procedure involved adequate elevation and reflection of adequate buccal mucoperiosteal flap under local anesthesia (2% lidocaine hydrochloride with 1:100,000 adrenaline), buccal and distal guttering to facilitate delivery of the third molar and then meticulous irrigation of the surgical site with normal saline (0.9%). Flap was repositioned and sutured. Only in group I, patients were given injection of dexamethasone (Decadron 4 mg/mL; Merck Sharp & Dhome of Pakistan, Ltd.) in submucosa before the start of the surgical procedure (in the mucogingival junction on the buccal aspect of molars and loose submucosa distal to the third molar). A single experienced surgeon has performed the surgical procedure.

Study including criteria and protocols

Only patients with a Pell & Gregory level B and C were included in this study (Figure 1). Patients who needed a simple extraction of wisdom teeth of the mandible were not included in this study. Clinical significant medical history was taken to exclude participants on the basis of known hypersensitivity, allergies or idiosyncratic reaction to any study medications, hepatic or renal disease, blood dyscrasias, heart disease, gastric ulcer, cushing syndrome or adrenocortical insufficiency, pregnancy and lactation, recent anti-inflammatory treatment or chronic use of medications that would obscure assessment of anti-inflammatory response, infected third molar with associated swelling. All patients were examined and scanned on fixed dates using standardized methods and techniques.

Thus every patient received the same postoperative analgetic (1st day: ibuprofen 600 mg 3 times per day, 2nd day: ibuprofen 600 mg 2 times per day, 3rd day: ibuprofen 600 mg 1 time per day, 4th day: ibuprofen 600 mg 1 time per day) and no antibiotic prophylaxis therapy.

During the study the following parameters were assessed: swelling, pain, neurological complaints, patient satisfaction and mouth opening.