Clinical Evaluation of Cox-2 Inhibitor for Management of Post Operative Complications after Odontectomy of Impacted Lower Third Molar

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Abstract: Aim: to compare the efficacy of cox-2 inhibitor (celebrex) with NSAID (ibuprofen) on the postoperative complications after odontectomy of impacted lower third molar which are pain edema and trismus. **Patients and Methods**: atotal of 40 patients (20 males, 20 females) with impacted lower third molar divided into two equal groups. Group I: twenty patients treated with 600 mg/12h ibuprofen, GroupII: twenty patients treated with 200mg/12 h celebrex. **Results:** the results showed that compared with NSAID (ibuprofen) cox-2 inhibitor(celebrex) had superior analgesic effect on all measures of analgesic efficacy, in the 1 day post-operative it was 4.35 ± 1.14 in the NSAID group and 3.05 ± 1.64 in the cox-2 inhibitor group with p-value 0.01 * but at the 3 days post-operative it was 1.60 ± 2.04 in the NSAID group and 0 in the cox-2 inhibitor group with p- value 0.03 ***,** but there is no significant difference in the assessment of edema and trismus between the two groups. **Conclusion:** cox-2 inhibitor (celebrex) had superior analgesic effect when compared with the traditional NSAID (ibuprofen) but there is no significant difference between them in reduction of edema and trismus.

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Key words: Celebrex, cyclooxygenase-2 (cox-2) inhibitor, NSAIDS, ibuprofen, pain, edema and trismus.

1. Introduction

Third molars are the most likely teeth to become impacted[(1)]with around 33% of the population having at least one impaction.[(2)] Third molar tooth removal is frequently associated with debilitating acute complications including pain, swelling, trismus[(3)],and alveolar osteitis (dry socket).[(4)]

In this way, panoramic radiography permits an initial evaluation of any problems related to impacted mandibular third molar.[(5)] Factors affecting postoperative morbidity could be patient factors, tooth related factors and operative factors.[(6)] Patient factors include age, sex, size or build, ethnic background, smoking, contraceptives and oral hygiene [(7)],tooth related factors include existing infection (pericoronitis), type of impaction, depth of impaction, relationship to inferior alveolar nerve, density of surrounding bone and associated pathology like cyst or neoplasm[(8)], the operative factors include the use of drugs, type and extent of incision, wound closure technique, surgeons experience and duration of operation.[(9,10)] The surrounding bone in young patients is relatively soft and more resilient compared to older patients, where the bone is harder, necessitating more bone removal, with more difficulty in separating tooth from bone, resulting in more postoperative pain, swelling and trismus. [(11,12)] The postoperative course is characterized by pain, swelling and trismus in varying degrees affecting the patient's quality of life.[(13)] Postoperative pain is related to alterations in the central and peripheral nervous systems induced by surgical trauma.[(14)] Prostaglandins are derived from the precursor arachidonic acid; Arachidonic acid is a major component of mammalian cell membrane phospholipids and is released from these phospholipids via cellular phospholipases that have been activated by mechanical, chemical, or physical stimuli, arachidonic acid metabolism can proceed along 1 of 2 major pathways: the first pathway involves cyclo-oxygenase which is present in membranes of all cells that converts arachidonic acid into prostaglandins [(15,16)]Medications that inhibit prostaglandin production may prevent primary and/or secondary hyperalgesia, reducing postoperative pain and discomfort and the consumption of rescue analgesics. Non steroidalanti inflammatory drugs (NSAIDs) reduce the synthesis of prostaglandins by inhibiting two different isoforms of cyclooxygenase (COX-1 and COX2), thus blocking the nociceptive response to endogenous mediators of inflammation; the effect is greatest in tissues that have been subjected to injury and trauma[(17,18)] Based on the discovery of COX-2 enzyme, it was proposed that a selective inhibitor of COX-2 would be an attractive approach to the treatment of inflammatory conditions, without the side effects of gastric and renal toxicity and inhibition of platelet function [(19)]Ibuprofen belongs to the family of nonsteroidal anti-inflammatory drugs (NSAIDs) commonly used to treat chronic pain and inflammation [(20,21)]Cox-2 inhibitors metabolized by cytochrome p450 CYP 2C9 in liver, analgesia is achieved in one hour and anti-

inflammatory effect begins less than week after starting therapy. [22]

2.Patients and Methods

This study was carried out on fourty ASA class I patients, selected from the outpatient clinic of Oral and Maxillofacial Surgery Department Faculty of Dentistry- Suez Canal University, the selected patients required surgical removal of an impacted lower third molar, by radiographic examination,the cases were chosen as position B impaction.

All patients included in the study were subjected to:

Preoperative assessment:

1-Medical and dental examination sheet was performed for all patients.

2- Radiographic examination: Panoramic radiograph to evaluate depth and angulation of impaction.

3-Measurment of interincisal distance: was recorded by measurement of the distance between upper and lower central incisors during maximal mouth opening[23] by using disposable plastic ruler to the nearest (mm).

4- Measurement of facial contour: markings with marker pen was made prior to the surgery on the following facial regions: tragus, soft tissue pogonion, lateral corner of eye, angle of the mandible, and outer corner of the mouth.

In this study we were recorded in (cm) the distance:

I- between the lateral corner of the eye and the angle of the mandible.

II-between the tragus and the outer corner of the mouth.

III- between the tragus and the soft tissue pogonion.

The preoperative sum of the 3 measurements were considered as the baseline for that side.[24]

- The patients were randomly divided into two equal groups:

Group I: consisted of twenty patients, received postoperative Ibuprofen* 600mg /12 hours for 5 days postoperatively.

Group II: consisted of twenty patients, received postoperative Celebrex** 200mg/12 hours for 5 days postoperatively.

All patients in both groups were received Amoxicillin/clavulanic acid (Augmentin™) 1 gram/12 hours and Chlorohexidine solution (Hexitol) 15 ml of 0.12% chlorohexidine mouth rinse 3 times daily.

Postoperative assessment:

Follow up: each patient was examined at 1st day, 3days and one week postoperatively for assessment of pain, trismus and edema.

1-Assessment of postoperative pain by:

patient was described his pain level at 1day,3days and one week post- operative using a10 point visual analog scale (VAS) anchored by the verbal descriptors ranged from (no pain=0) to (that couldn't tolerated=10).[25]

2-Assessment of trismus:

Trismus was evaluated by measuring the distance between the incisal edges of the upper and lower central incisors during maximal mouth opening.[23]

3- Assessment of facial edema:

By measuring the same distances on the same facial regions as we describe in the preoperative assessment, then the postoperative edema assessment was done by calculating the difference between the postoperative and the preoperative measurements (baseline).[24]

3. Results

The selected patients were divided in to two equal groups.

Group (I):

Formed of twenty patients were twelve females and eight males.The mean age was 28.6± **3.8**years ranged from twenty to thirty five years.

Group (II):

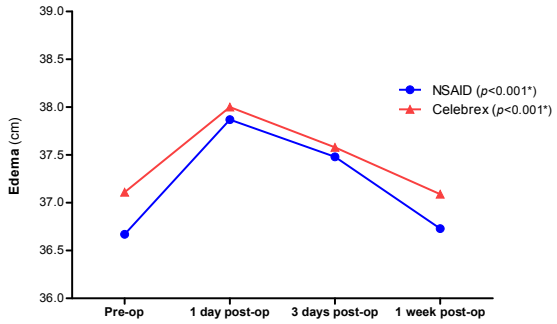
Formed of twenty patients were twelve females and eight males.The mean age was 26.9± **5.0**years ranged from nineteen to thirty five years.

There were no significant difference between the two groups regarding age and sex distribution, Also no significant difference between the two groups regarding the type of impaction as there were three distoangular, seven mesioangular, six horizontal and four vertical impaction in the NSAID group and were four distoangular,eight mesioangular,five horizontal and three vertical impaction in the cox-2 inhibitor (celebrex) group.

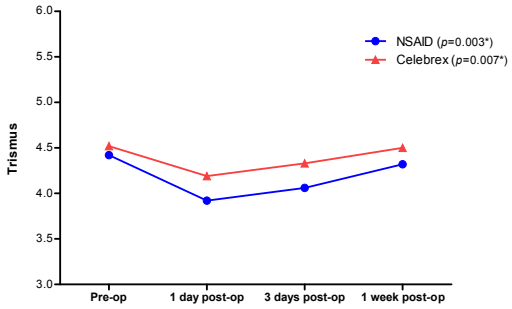
In both NSAID and Cox-2 inhibitor groups; edema was ***significantly*** increased initially (at 1 day post-op.) then decreased at 3 days& 1 week post-operative assessments, with no statistically significant difference between them. (Figure1)

In ***both*** NSAID and Cox-2 inhibitor groups, Trismus was ***significantly*** decreased initially (at 1 day post-op.) then increased at 3 days& 1 week post-operative assessments, with no statistically significant difference between them, in both NSAID and Cox-2 inhibitor groups (Figure2).

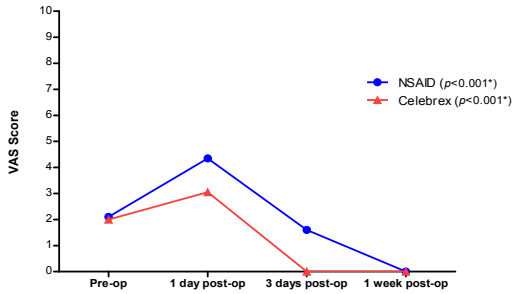
VAS score was ***significantly*** decreased from pre-operative to post operative assessments, but Celebrex showed more decrement (i.e. more pain improvement). (Figure3).



Figure[1] Post-operative changes in Edema (NSAIDS vs. Celebrex groups)



Figure[2] Post-operative changes in Trismus (NSAIDS vs. Cox-2 inhibitor groups)



Figure[3] Post-operative changes in VAS score (NSAID vs. Cox-2 inhibitor groups)

4. Discussion

This study was designed to evaluate the efficacy of Cox-2 inhibitor (celebrex) for management of postoperative pain, edema and trismus after surgical removal of impacted lower third molar through comparative study with traditional nonsteroidal anti-inflammatory drug (Ibuprofen).

This study concluded that Cox-2 inhibitor (celebrex) had superior analgesic efficacy when compared with the traditional NSAID (ibuprofen), assessment of pain indicate that there was a statistically significant difference in VAS score only at 1st day & 3 days post-operatively, assessment indicating that Celebrex was more effective in pain relief compared to Ibuprofen. The results were in agreement with **Al-Sukhun, *et al.*[26]** demonstrates the superior analgesic effect of celecoxib, for the release of acute postoperative pain following surgery, when compared with the traditional nonsteroidal anti-inflammatory drug ibuprofen. Also it was in agreement with **Moghaddamnia, *et al.*[27]** who concluded that Celecoxib had better results for pain relief in 24 hours after surgery in comparison to Prednisolone. On the other hand, it was disagree with another study by **Cicconetti, *et al.*[28]** who reported that COX-2 selective inhibitors display analgesic efficacy similar to that of traditional NSAIDs in the treatment of acute post oral surgery pain.

Derry *et al.*[29] stated that Single dose oral celecoxib is effective analgesic for postoperative pain relief, indirect comparison suggested that 400 mg dose has similar efficacy to ibuprofen 400 mg.

This study concluded also that Cox-2 inhibitor (celebrex) reported insignificant improvement in oedema and trismus than NSAID (ibuprofen), this was in agreement with **Moghaddamnia *et al.*[27]** who concluded that there is insignificant difference in the effects of Prednisolone (NSAID) or Celecoxib on the maximum mouth opening,while another study by **Al-Saffar, Maha [30]** concluded that Celebrex is more effective than paracetamol with less frequency of administration and longer duration of action in reducing post operative oral complication (swelling and trismus), with some analgesic effect after surgical removal of lower third molars.

Conclusions

From this study it has been concluded that both cox-2 inhibitor& non steroidal anti-inflammatory drug improve post operative complications after odontectomy of impacted lower third molar. Cox-2 inhibitor (celebrex) had superior analgesic efficacy when compared with the traditional NSAID (ibuprofen). Also, Cox-2 inhibitor (celebrex) reported insignificant improvement in oedema and trismus than NSAID (ibuprofen).

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