

Role of Steroids in Reduction of Morbidity Following Mandibular Wisdom Tooth Surgery

SADDIQUE ASLAM, ASGHAR KAMAL*, MUHAMMAD SAJID**, AKHTAR MUNEER***, MUHAMMAD FAROOQ****

ABSTRACT

Aim: To evaluate the preoperative therapeutic effect of oral (10mg prednisolone that is 2 tablets of deltacotril) on post operative complications like edema, limited mouth opening and pain following wisdom tooth surgery.

Study design: This was a randomized control trial study.

Setting: was conducted at the private clinic of the author and dental section of DHQ Hospital Kohat, Khyber Pukhtoonkhwa, Pakistan.

Study period: from January 2011 to august 2011.

Material & methods Eighty patients with bilateral mandibular wisdom teeth impaction were included in this study. One side of the patient last mandibular molar either right or left, was allocated randomly as control and the other side as study group. Study group received 10mg prednisolone that is 2 tablets of deltacotril one hour before surgical extraction. Patients with contraindication to the use of steroids were excluded from this study. Facial edema and maximal inter incisal distance were measured by an independent examiner at baseline (preoperatively), and at 3rd, and 6th postoperative days. Pain was measured by counting the number of rescue analgesic tablets taken, and from the patients' response to a visual analogue scale.

Results: The steroid group showed significant reduction in edema ($p=0.6862$) and pain ($p=0.1587$) compared with the control group at all intervals. 10mg prednisolone that is 2 tablets of deltacotril resulted in significantly less limited mouth opening than controls on day3 postoperatively ($p=0.2544$), but there was no significant difference among the groups afterwards.

Conclusion: Steroid 10mg prednisolone that is 2 tablets of deltacotril is effective in reducing edema, limited mouth opening and pain after extraction of impacted mandibular wisdom teeth.

Keywords: Wisdom tooth, prednisolone, edema, limited mouth opening, pain.

INTRODUCTION

The extraction of impacted mandibular wisdom teeth is still the most common surgical procedure performed by oral and maxillofacial surgeons¹. As it involves trauma to hard and soft tissue therefore beside severe complications such as dysesthesia, severe infection, fracture and dry socket, patients frequently complain edema , limited mouth opening and pain^{2,3}. These post surgical complications can have a serious impact on the patient's quality of life⁴. These are due to postoperative inflammatory response and the use of corticosteroids has gained wide acceptance. Corticosteroid such as prednisolone may inhibit the initial step in the synthesis of prostaglandins, leukotrienes and thromboxane related

substances by inhibiting the conversion of phospholipids into arachidonic acid with a reduction of fluid transudation and therefore edema⁵. Over several decades many studies have reported the effectiveness of corticosteroids given before or just after removal of third molars in improving recovery^{4,6,10}. A single preoperative or postoperative intra-muscular dose gives good plasma concentrations of the drug with prolonged anti-inflammatory action¹¹. The anti-inflammatory effects of steroid after oral surgical procedures are well established. Since prednisolone has been shown to reduce post operative edema, it was decided to investigate the specific effects of prednisolone on swelling, limited mouth opening and pain following extraction of impacted wisdom tooth.

MATERIAL AND METHODS

This randomized controlled prospective trial study was conducted at the private clinics of the author and dental section of DHQ teaching hospital Kohat,

*Associate Professor, Medicine, KIMS, Kohat

**Assistant Professor, Pharmacology Deptt. KIMS, Kohat

***Assistant Professor, Pathology deptt. KIMS, Kohat

****Emergency Pathology Lab, SIMS/SHL, Lahore

Correspondence to Dr Saddique Aslam khattak, Assistant Professor, KMU institute of medical sciences, Kohat. Email:drssaddique@hotmail.com

Khyber Pakhtunkhwa, Pakistan after review and approval from the institutional review board for bioethics (IRBB) Kust institute of medical sciences (KIMS) Kohat, from January 2011 to august 2011. Eighty patients were enrolled in this study, who presented themselves for extraction of bilateral impacted wisdom teeth. They were enrolled after taking history, thorough clinical examination and periapical x-rays were taken for all selected patients partially impacted wisdom teeth with Class II or III occlusions and Pell and Gregory classification A, B or C on the basis of radiograph were the inclusion criteria. Subjects had no pericoronitis or infection at the time of operation. Patients with contraindication to steroids, Peptic ulcer, diabetics, bacterial infections, history of thromboembolic events, glaucoma, psychosis, patients taking other medications chronically and pregnant ladies were excluded from the study. Written informed consent was obtained from each patient prior to enrollment.

As all 80 patients were having bilaterally impacted mandibular wisdom teeth, therefore in each individual one side was randomly assigned to the study group and the other side used as control, thus each group consisting of 80 impaction cases. The study group received steroids 10mg prednisolone that is 2 tablets of deltacortil orally one hour before surgery, while the control received no such medication. Extractions of the two impacted teeth (one side study group and other side control) were carried out at six weeks interval. All patients were operated under local anesthesia by the author. In most cases, osteotomy with tooth sectioning were performed. All patients were given cephadrine 500(velocef) mg 10 hourly orally for 5 days, and ibuprofen 400mg (brufen) orally as required for analgesia. They were also given a normal saline mouth rinse twice daily starting on the day after operation for 6 days.

A single examiner recorded edema, mouth opening and pain before and after each surgical extraction of wisdom tooth. Clinical measurements were performed on 3rd and 6th days after the surgery.

Facial edema was evaluated by measuring the distance from the corner of the mouth to the attachment of the ear lobe following the bulge of the cheek, and the distance from the outer canthus of the eye to the angle of the mandible. The preoperative sum of the two values (mm) was taken as the baseline for that side.

Limited mouth opening was recorded as the difference in inter incisal distance at maximum mouth opening before and after the operation.

Severity of pain perception was assessed via a simplified visual analogue scale (VAS), 100 mm in length, where '0' was marked as 'no pain' and '100' as the most severe pain imaginable⁷. The significance of differences between the groups was calculated with the help of the Statistical Package for the Social Sciences (SPSS) version 12. Probabilities of less than 0.05 were taken as significant.

RESULTS

Among the 80 patients of bilaterally mandibular impacted wisdom teeth there were 60 males and 20 females with male to female ratio of 3:1. The age range was 20-35 and the mean age was 22 years.

Table 1: Age and Gender distribution

Age (yrs)	Mean age(yrs)	Male	Females	Male: females
20-35	22	60	20	3:1

Total of 160 surgical extractions were performed, 80 in control group and 80 in steroid group. At follow-up, no patients developed wound infection or serious post-operative complications and any drug side effect.

Table II: Mean measurements of edema, mouth opening and pain among the groups.

Variables	Control group	Steroids group	p-value
Edema (mm)			
Day 3	6.0	1.3	0.6862
Day 6	1.9	0.2	
Mouth opening (mm)			
Day 3	6.5	24.5	
Day 6	4.5	35.8	0.2544
Pain(VAS)			
Day 3	8.5	3.3	
Day 6	6.5	0.5	0.1587

VAS= Visual analogue scale

There was a significant reduction in edema both on 3rd and 6th (p value=0.6862) post-operative days in study group as compared to controls. Limited mouth opening differed significantly between the study group and the control on 3rd post operative day but not on 6th day (p value=0.2544). There was also significant reduction in pain post-operatively in study group as compared to control group(p value=0.1587) (Table II).

DISCUSSION

The surgical extraction of wisdom teeth is often associated with severe postoperative discomfort, even when teeth are removed using a gentle surgical technique¹. Perioperative use of corticosteroids is a pharmacological approach often used to limit postoperative edema, limited mouth opening, and pain after extraction of impacted wisdom tooth due to their suppressive action on transudation^{11,12}. Numerous papers have supported their systemic use in third molar surgery^{8, 11, and 15}. Recently, Mickiewicz et al¹⁶, in a meta-analysis, concluded that giving corticosteroids preoperatively was of mild to moderate value in reducing post operative inflammatory signs and symptoms specifically patients given corticosteroids had significantly less post operative edema and limited mouth opening than controls, both early (after 1–3days) and late (after 4–7 days). In addition, those who took corticosteroids reported less pain postoperatively than control groups. However, the effect on postoperative morbidity and the duration of the effect of the corticosteroids varied mainly as result of lack of consensus about the optimal route, dose, timing, and duration of treatment in addition to differences in methods used to evaluate clinical variables.

Few studies have objectively evaluated the effect of prednisolone as an intramuscular injection in wisdom tooth surgery, although this route is the one most likely to be used when a steroid injection is prescribed in outpatients. Intramuscular dosing studies have suggested that this route can be effective if a single dose is given either preoperatively or postoperatively^{2,5,6}. The effect may be dose-dependent. Some authors suggested using prednisolone 10mg for the best results¹⁵.

In this study oral prednisolone resulted in significant reduction in swelling post-operatively. This was as highly significant on the 3rd postoperative day, while maximum facial edema is expected after six days¹⁵. The result of this study is in agreement with those of previous studies^{18,19,20}.

Acute postoperative pain following wisdom tooth extraction is predominantly a consequence of inflammation caused by tissue injury, 21. Prednisolone in particular appears to decrease pain after surgery²². This study shows a significant decrease in patients' pain perception when comparing control to study group. This appears to be widely in agreement with the existing literature^{6, 7,9,10}.

A statistically high significant difference

between study group and control was observed overtime for limited mouth opening in this study. Test procedure did show a reduced postoperative degree of limited mouth opening, which is in accordance with other studies^{7,9,11,15}.

CONCLUSION

10mg prednisolone that is 2 tablets of deltalacotril given orally one hour before extraction of impacted wisdom tooth is an effective way of minimizing postoperative edema, limited mouth opening and pain.

REFERENCES

1. Shepherd JP, Brickley M. Surgical removal of third molars. *B M J* 1994; 309: 620–1.
2. Khan A, Khitab U, Khan MT. Impacted Mandibular Third molars: Pattern of presentation and post operative complications. *Pak Oral Dent J* 2010; 2:307-12.
3. Grossi GB, Maiorana C, Garramone AR, et al. Assessing postoperative discomfort after third Molar surgery: A prospective study. *J Oral Maxillofac Surg* 2007; 65: 901.
4. Giovanni BG, Carlo M, Rocco AG et al. Effect of sub mucosal injection of Dexamethasone on postoperative discomfort after third molar surgery: A prospective study. *J Oral Maxillofac Surg* 2007; 65:2218-26.
5. Ogino M, Ono T, Ogino K, Matsuo S, Harada Y. Are the anti-inflammatory effects of dexamethasone responsible for inhibition of the induction of enzymes involved in prostaglandin formation in rat carrageein-induced pleurisy? *Eur J Pharmacol* 2000; 400: 127–35.
6. Tiigimae SJ, Leibur E, TammeT. The effect of prednisolone on reduction of complaints after impacted third molar removal. *Stomatologija* 2010; 12:17-22.
7. Graziani F, D'Aiuto F, Arduino PG. Perioperative dexamethasone reduces post-surgical sequelae of wisdom tooth removal. A split-mouth randomized double-masked clinical trial. *Int. J. Oral Maxillofac Surg* 2006; 35:241–6.
8. Twiana PS, Foy SP, Shugars DA, Marciani RD, Conrad SM, Phillips C, et al. The impact of intravenous corticosteroids with third molar surgery in patients at high risk for delayed health-related quality of life and clinical recovery. *J Oral Maxillofac Surg* 2005; 63:55–62.
9. Muneem A, Qaiuoom Z. Effect of Dexamethasone, Ibuprofen combination on post operative sequelae of third molar surgery. *Pak Oral & Dent J* 2004; 24:23-6.
10. Ikram R. Evaluation of dexamethasone ibuprofen combination for the reduction of post surgical sequelae of third molar. *J. Pak Dent Assoc Karachi* 1997; 8:1402-8.
11. Montgomery MT, Hogg JP, Roberts DL, Redding S.

- The use of glucocortico-steroids to lessen the inflammatory sequelae following third molar surgery. *J Oral Maxillofac Surg* 1990; 48:179–87.
12. Alexander RE, Thondson RR. A review of perioperative Corticosteroid use in Dentoalveolar surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000; 90:406–15.
 13. Neupert III EA, Lee JW, Philput CB, Gordon JR. Evaluation of Dexamethasone for reduction of postsurgical sequelae of third molar removal. *J Oral Maxillofac Surg* 1992; 50:1177–82.
 14. Esen E, Tasar F, Akhan O. Determination of the anti-inflammatory effects of Methylprednisolone on the sequelae of third molar surgery. *J Oral Maxillofac Surg* 1999; 57:1201–6.
 15. Ustün Y, Erdogan Ö, Esen E, Karsli ED. Comparison of the effects of 2 doses of Methylprednisolone on pain, swelling and trismus after third molar surgery. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2003; 96:535–9.
 16. Markiewicz MR, Brady MF, Ding EL, Dodson TB. Corticosteroids reduces postoperative morbidity after third molar surgery: a systematic review and meta-analysis. *J Oral Maxillofac Surg* 2008; 66:1881–94.
 17. Dionne RA, Gordon SM, Rowan J, Kent A, Brahim JS. Dexamethasone suppresses peripheral prostaglandin levels without analgesia in a clinical model of acute inflammation. *J Oral Maxillofac Surg* 2003; 61:997–1003.
 18. Pedersen A. Decadronphosphate in the relief of complaints after third molar surgery. A double-blind, controlled trial with bilateral oral surgery. *Int J Oral Surg* 1985; 14:235–40.
 19. Baxendale BR, Vater M, Lavery KM. Dexamethasone reduces pain and swelling following extraction of third molar teeth. *Anaesthesia* 1993; 48:961–4.
 20. Moore PA, Brar P, Smiga ER, Costello BJ. Preemptive rofecoxib and dexamethasone for prevention of pain and trismus following third molar surgery. *Oral Surg Oral Med Oral Pathol* 2005; 99:1–7.
 21. Ong CK, Seymour RA. Pathogenesis of postoperative oral surgical pain. *Anesth Prog* 2003; 50:5–17.
 22. Beirne OR, Hollander B. The effect of Methyl prednisolone on pain, trismus, and swelling after removal of third molars. *Oral Surg Oral Med Oral Pathol* 1986; 61:134–8.