



Changes in c-reactive protein after tramadol and ibuprofen administration in mandibular third molar surgery: a double-blind randomized clinical trial study

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ABSTRACT

Introduction: Surgical removal of inferior third molar tooth is associated with post-operative complications such as pain, trismus and edema. Decreasing the post-operative inflammation and edema is one of the important goals in drug administration. For management of post-operative pain, nonsteroidal anti-inflammatory drugs (NSAIDs) and opioids can be administered. C-reactive protein (CRP) is one of the best paraclinical parameters for evaluation of tissue inflammation.

Materials and Methods: Thirty one patients aged 18 to 31years old were enrolled and evaluated in this randomized controlled clinical trial. They were classified into two groups, randomly. In one group, NSAID and in the other group tramadol was administered orally, after dental surgery. Blood samples were taken before procedure and 72 hours after procedure for CRP level evaluation.

Results: Regardless of the type of drugs, CRP changes were statistically significant in both groups before and after operation. Elevation of CRP serum level was higher in tramadol group in comparison to Ibuprofen group and the difference was statistically significant. (P.value<0.05).

Conclusion: This study has shown that NSAIDs have more anti-inflammatory effect than opioids.

Key words: Third molar surgery; opioid; C-reactive protein; ibuprofen.

Introduction

One of the most important challenges after surgical procedures is the amount of tissue damage and post-operative infection. Except clinical signs and symptoms such as pain, swelling and erythema, paraclinical findings can help to diagnose inflammation such as determination of serum levels of erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), tumor necrosis factor (TNF) and interleukin. CRP is an acute

phase protein which is produced by liver cells and its serum level can be detected in 99% of healthy people [1]. Interleukin (IL); which is synthesized by macrophages in the injury site, stimulates production of CRP, especially IL-6 [2]. Elevation of CRP serum level is faster than ESR, therefore it is better to use this laboratory finding to evaluate post-surgical infection [3,4]. Impacted mandibular third molar surgery is a common operation in oral surgery. It

may cause pain, trismus, swelling and periodontal damage to adjacent teeth [5-7]. Usually healthy and young people undergo third molar removal, so they can be good models for clinical and paraclinical studies. In this article, we compare anti-inflammatory effect of tramadol and Ibuprofen after third mandibular molar surgery.

Materials and Methods

A double-blinded randomized clinical trial study was designed. From the patients admitted to the oral and maxillofacial department, faculty of dentistry, Tehran University of medical sciences for mandibular wisdom tooth surgery, 31 individuals were selected. The proposal of this investigation was approved in the research and ethical committee of Tehran University of dental school and informed consent was obtained from each patient before surgery. Participants were healthy young patients without previous systemic disease or allergy to NSAIDs. None of them were using antibiotic or anti-inflammatory drugs in the last 2 weeks prior to surgery time. The impacted teeth were free of pathologic lesion or pericoronitis. Randomly, participants were divided into two groups. (Coin randomization) The first group consisted of 16 people. In this group, administration of 400mg tablet of Ibuprofen four times a day just post operatively, was carried out. The patients in the second group were given 100mg tablet of tramadol Tds orally, after operation.

Unilateral surgical removal of mandibular wisdom tooth was performed for each person (under local anesthesia with lidocaine 2% and epinephrine 1/100000). As much as possible we tried to choose third mandibular molars with the same difficulty according to clinical and radiographic finding. One surgeon performed all surgeries with the same technique. Envelope flap with full-thickness mucoperiosteal elevation were used for all patients. The incision began from the mesiobuccal papilla of first molar and extended to the distal of second molar. Time of the surgery was less than thirty minutes

Two venous blood samples were taken from the patients; first sample just before surgical procedure and the other one 72 hours after wisdom tooth surgery in order to evaluate CRP serum level. Medication started just after surgery. Antibiotic prophylaxis with Amoxicillin was carried out in both of the groups. (500mg tablet of Amoxicillin every 8hours for 72hours) .

The data collected from this study were statistically

analyzed by t-student test and Kolmogorov-Smirnov test by SPSS 16 for Windows (SPSS, Inc, Chicago, IL).

Results

31 healthy young patients were evaluated. The age of the patients ranged from 18 to 31 years old in the first group and 18 to 30 years old in second group 48% of patients were male (15 patients) and 52 % were female (Table 1). Mean age of the patients was 25 years. Presurgical CRP serum level showed that none of the patients had previous inflammatory conditions. The mean value of CRP level elevation in the Ibuprofen group was 5mg/lit with standard deviation (SD) of 1.57 and in the tramadol group was 8.83 with standard deviation of 5.48 (Table 2). The mean and SD of CRP concentration before surgery were 1.13 and 0.44 respectively. The results showed the mean CRP level elevation in tramadol group was significantly higher compared to Ibuprofen group (P.value=0.012) (Table 3).

Discussion

Surgical trauma causes an elevation in serum level of acute phase proteins [8]. CRP is the most common indicator of tissue injury and inflammation in clinical studies. Normal range of CRP serum level in healthy adults is less than 1mg/dl [1]. Faster elevation of CRP serum level was one of the reasons for choosing this element for this study[3,4]. CRP is a reliable indicator in inflammatory status. The use of tramadol for pain-relief has been developed in recent years [9]. NSAIDs are drugs of choice for dental pain [10]. In the previous studies, CRP was the most common indicator to assess tissue damage in oral and maxillofacial trauma. Iizuka and Lindqvist measured CRP level in mandibular fractures [11]. El-Sharawy et al assessed CRP level to compare the effect of tramadol and Ibuprofen after third molar surgery [12]. In that study, CRP serum levels were increased in both tramadol and Ibuprofen groups in comparison to presurgical serum level but elevation of this index was higher in tramadol group. In our study a significant increase in CRP titers was obvious in tramadol group. This result shows that tramadol has less anti-inflammatory effect than Ibuprofen though tramadol anti-inflammatory effects have been proved in the studies [13].

Conclusion

Ibuprofen has more anti-inflammatory effect in comparison to tramadol in oral surgery but effects of tramadol in this situation cannot be overlooked.

Table 1. Patients studied.

Variable	Patients
Gender	
Male	15 (48%)
Female	16 (52%)
Age	
Range	1831- years
Mean	25 years

Table 2. CRP changes in both groups (Kolmogrov-Smirnov test).

	CRP changes in Ibuprofen group	CRP changes in tramadol group
N	16	15
Mean	5	8.83
STD. Deviation	1.57	5.48
P-value	0.82	0.10

Table 3. Comparison of CRP changes in both groups of tramadol and Ibuprofen consumers (t test).

Test	CRP changes in tramadol and Ibuprofen groups	
T test	P-value	0.012
	Mean difference	-3.80
	Standard Error	1.43

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