IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 9 Ser.11 (September. 2019), PP 07-12
www.iosrjournals.org

Efficacy of Antimicrobial therapy in Third Molar Surgery - A Comparative Study

Shashank Tripathi[1], Ravish Mishra[1], Laxmi Kandel[1], Deepak Yadav[1,] Bipulesh Goit[2]

[1](Lecturer, Department of Oral and Maxillofacial Surgery, UCMS College of Dental Surgery, Bhairahawa,Rupandehi, Nepal)

[2](Resident, Department of Oral and Maxillofacial Surgery, UCMS College of Dental Surgery, Bhairahawa, Rupandehi, Nepal)

Corresponding Author:ShashankTripathi

Abstract:

Purpose

Third molar extraction is most common procedures performed in oral and maxillofacial surgery. The most common complications after surgical extraction of third molar are pain, swelling, trismus, pyrexia, etc. The use of routine antibiotics therapy in patient undergoing surgical third molar extraction is controversial. The objective of the study were: 1. To evaluate the efficacy of antibiotics in pain, swelling, trismus, temperature and wound healing postoperatively; 2. To minimize the adverse effects of antibiotics; and 3. To decrease total operative cost factor.

Material and methods

Present study comprises 50 extractions of mandibular as well as maxillary third molar of patients who attended the OPD of Department of Oral and Maxillofacial Surgery, UCMS-CODS, Bhairahawa, Nepal from December 2018 to August 2019. The patients were divided into two groups: 1. Test group – who received antibiotics postoperatively for 5 days; 2. Control group – did not receive antibiotics. Patients were evaluated postoperatively on 1st day, 3rd day, 7th day and on 14th day.

Result

Fiftypatient were selected in this study, post operative pain, swelling, infection, trismus, temperature, wound healing were measured and analyzed. Statistically no significant difference were recorded.

Conclusion

Post operative uses of antibiotics do not seem to be necessary for reducing the post operative complications in cases of third molar extraction. Further studies with large number of patients should be carried out.

Keywords: *Antibiotics, third molar, extraction.*

Date of Submission: 07-09-2019 Date of Acceptance: 23-09-2019

I. Introduction

Third molar (M3) extraction is most common procedures performed in oral and maxillofacial surgery. The incidence of infectious and inflammatory complications following an impacted mandibular third molar extraction varies between 0% and 45%, according to different studies.[1]

During the first half of the 20th century, the removal of impacted third molars was a formidable surgical procedure. Practitioners were knowledgeable about the pathologies, such as infections, cysts, and tumors that could develop from impacted teeth. However, because of the difficulties and adverse side effects associated with their removal, surgery was often delayed until symptoms began to develop. During the second half of the twentieth century, a revolution began to develop as a result of the improved technology for the removal of impacted third molars. It has become almost universally accepted throughout the industrialized world that impacted third molars are not only removed after causing problems, but are often removed before actually developing objective signs or symptoms.[2]

The most common complications following third molar surgery include: sensory nerve damage, dry socket, hemorrhage, dysphagia and pain. Less common complications are: severe trismus, iatrogenic damage to the adjacent second molar and iatrogenic mandibular fracture.[3,4]

The oral cavity is colonized by more than 400 species of aerobic and anaerobic bacteria. The complexity of the oral and dental flora has prevented the clear elucidation of specific etiologic agents in many types of dental infection, but most are caused by mixed gram-positive aerobic and anaerobic polymicrobial

flora. More than half of the gram-negative anaerobic bacilli are capable of producing beta-lactamase, responsible for treatment failure in dental infections.[4]

It is shown that in periodontally healthy subjects third molar follicles harbour the same bacterial species that are common in periodontitis. Okell and Elliott (1935) were the first to demonstrate the presence of bacteria in the bloodstream following dental extractions.[5] It is a common practice in oral and maxillofacial surgery to use antibiotics after third molar surgery however the use of routine antibiotic therapy in patients undergoing surgical third molar extraction is controversial.[6]

It is widely agreed by health authorities that the overall use of antibiotics should be reduced and that antibiotics should be prescribed for life-threatening [5]infections to reduce the emergence of resistant bacterial strains.[7]The rampant misuse of antibiotic has been acknowledged. Rational use of antibiotics seeks to preserve antibiotic effectiveness against severe infections, reduce the emergence of bacterial resistance and minimize possible serious adverse reactions derived from antibiotic intake.[8] The aim of present study is to investigate or evaluate the efficacy of antibiotic.

II. Materials and methods

A prospective clinical trial was carried out in patients who came for extraction of maxillary and mandibular third molar in Department of Oral and Maxillofacial Surgery, UCMS-CODS, Bhairahawa, Nepal from December 2018 to August 2019. Fifty medically fit patients aged above 18 years and below 60 years were selected for the study. Informed consent was taken and data was filled into enclosed proforma. All patients were randomly categorized into two groups i.e. test and control group with 25 patients in each group.

Inclusion criteria:

- Patients with history of any discomfort in 3rd molar region because of impaction &pericoronitis.
- Patients with history of chronic cheek biting in third molar region.
- Patients with complain of gingival tissue overgrowth over the third molar were selected for the study

Exclusion criteria:

- Patients with history of severe periodontal disease
- Presence of periapical lesion
- Infection at the local site
- Uncontrolled systemic disease
- Chronic alcoholic, smokers, compromised immunity, associated bone pathology were not included in the study.
- Patient not willing to participate in the study.

A thorough history and clinical examination were carried out and were recorded on a specially drafted case sheet and confirmed radiographically. Routine blood investigation was done in all patients. Pre-operative clinical assessment as well as Winter's WAR lines was recorded and Pederson's Difficulty Index of 3rd molar was carried out. The entire sample was randomly divided into two groups irrespective of age, sex and occupation. Hand-written paper sheets with equal number of case and control group was picked up by junior doctor (internee) posted in department. Written consent was taken from all the patient who are involved in this study in a prescribed consent form.

Following medicines were prescribed:

For Group I (Test)

- Amoxycillin - 500mg – thrice a day for 5days
- Paracetamol + Ibuprofen (NSAIDs) thrice a day for 3days
- Mouthwash Chlorhexidine-0.2% 2-3 times daily

For Group II (Control)

- Paracetamol+Ibuprofen (NSAIDs) thrice a day for 3days
- Mouthwash Chlorhexidine 0.2% 2-3 times daily

Lignocaine 2% with adrenaline 1:200,000 was used as local anaesthetic agent. Ward's or modified Ward's incision was performed depending upon the position of mandibular 3rd molar followed by raising of full thickness mucoperiosteal flap. Bone guttering was done using micromotor straight handpiece and teeth was extracted. After achieving adequate haemostasis, the wound was closed without tension with 3-0 black silk suture. Post extraction instructions were given to the patient. Patients were recalled for follow up on subsequent time interval of 1st,3rd,7th and 14th post-operative day for further evaluation.

Pain: Visual Analogue Scale (VAS) where reference values are given by patients from 0 to 10
0 No pain where the patient experiences no pain
1 Mild pain where the patient marking value is between 1- 4
2 Moderate pain where the patient marking value is between 4- 7 can continue with normal activities
3 Severe pain where the patient scoring value is between between 7- 10 and hampers daily normal activities

Swelling: VAS scale to evaluate swelling: reference values given to patients

0	No swelling where patient does not detect swelling
1	Mild swelling where patient detects a slight swelling and is not very noticeable (difference in measurement is less than 5mm)
2	Moderate swelling where swelling was noticeable but does not interfere with normal mastication and swallowing (difference in measurement is less than10mm)
3	Severe swelling where marked swelling was present which hinders normal functions (difference in measurement is more than 10mm)

Trismus: (differences in maximum mouth-opening in mm)

Measurement of the interincisal opening was done before and after surgery. The distance between the upper right incisor and the lower right incisor at the moment of maximum mouth opening was measured using a ruler(in millimeter). Scoring was done based on the following:

Variables	**Score**
None	0
1-5 mm	1
6-10 mm	2
11-15 mm	3
16-20 mm	4
>20 mm	5

Temperature: Patients' axillary temperature was recorded on each study visit (0 - afebrile; 1- febrile where temperature > 38^0C)
Wound Healing: Wound healing of patient was clinically examined at periodic time interval and examined for presence of alveolar osteitis, presence of wound dehiscence and coded as
Satisfactory code 0
Unsatisfactory code 1

III. Results

Fifty patients were enrolled in study and followed up at subsequent time intervals for 2 weeks postoperatively. The data were analyzed statistically, using Statistical Package for the Social Sciences (SPSS) version 16. Bivariate analysis (chi square test) were used to examine the association between predictors such as pain, swelling, infection, trismus, temperature, wound healing and antibiotics status which is shown in tables below.

Table 1. Association between pain and antibiotics status

	Antibiotics Status		Total Number (%)	P-value
	Antibiotics Number (%)	No antibiotics Number (%)		
Pain in day 1				0.33
Mild	12(48)	17(68)	29(58)	
Moderate	12(48)	7(28)	19(38)	
Severe	1(4)	1(4)	2(4)	
Pain in day 3				0.59
Absent	2(8)	4(16)	6(12)	
Mild	14(56)	12(48)	26(52)	
Moderate	9(36)	8(32)	17(34)	
Severe	0(0)	1(4)	1(2)	
Pain in day 7				
Absent	9(36)	14(56)	23(46)	0.19
Mild	16(64)	8(32)	24(48)	
Moderate	0(0)	3(12)	3(6)	
Pain in day 14				
Absent	20(80)	21(84)	41(82)	0.7
Mild	5(20)	4(16)	9(18)	

Table 1 shows no statistically significant difference between two groups at subsequent time intervals

Table 2 : Association between swelling and antibiotics status

	Antibiotics Status			P-value
Swelling	Antibiotics Number (%)	No antibiotics Number (%)	Total Number (%)	
Swelling in day 1				0.30
None	6(24)	11(44)	17(34)	
Mild	14(56)	10(40)	24(48)	
Moderate	5(20)	3(12)	8(16)	
Severe	0(0)	1(4)	1(2)	
Swelling in day 3				0.12
None	9(36)	16(64)	25(50)	
Mild	13(52)	7(28)	20(40)	
Moderate	3(12)	1(4)	4(8)	
Severe	0(0)	1(4)	1(2)	
Swelling in day 7				0.49
None	19(76)	20(80)	39(78)	
Mild	6(24)	4(16)	10(20)	
Moderate	0(0)	1(4)	1(2)	
Swelling in day 14				0.5
None	24(96)	23(92)	47(94)	
Mild	1(4)	2(8)	3(6)	

Table 2 shows no statistically significant difference between two groups at subsequent time intervals

Table 3 : Association between trismus and antibiotics status

	Antibiotics Status			P-value
	Antibiotics Number (%)	No antibiotics Number (%)	Total Number (%)	
Trismus in Day 1				0.66
No	5(20)	3(12)	8(16)	
1-5 mm	4(16)	6(24)	10(20)	
6-10 mm	13(52)	11(44)	24(48)	
11-15 mm	3(12)	5(20)	8(16)	
Trismus in Day 3				0.93
No	7(28)	6(24)	13(26)	
1-5 mm	7(28)	7(28)	14(28)	
6-10 mm	10(40)	10(40)	20(40)	
11-15 mm	1(4)	2(8)	3(6)	
Trismus in Day 7				0.19
No	12(48)	13(52)	25(50)	
1-5 mm	10(40)	5(20)	15(30)	
6-10 mm	3(12)	7(28)	10(20)	
Trismus in Day 14				0.44
No	21(84)	18(72)	39(78)	
1-5 mm	4(16)	6(24)	10(20)	
6-10 mm	0	1(4)	1(2)	

Table 3 shows no statistically significant difference between two groups at subsequent time intervals.

Table 4 : Association between temperature and antibiotics status

	Antibiotics Status			P-value
Temperature	Antibiotics Number (%)	No antibiotics Number (%)	Total Number (%)	
Temperature in Day 1				0.50
Afebrile	23(92)	22(88)	45(90)	
Febrile	2(8)	3(12)	5(10)	
Temperature in Day 3				0.17
Afebrile	24(96)	21(84)	45(90)	
Febrile	1(4)	4(16)	5(10)	
Temperature in Day 7				NA
Afebrile	25(100)	25(100)	50(100)	
Temperature in Day 14				NA
Afebrile	25(100)	25(100)	50(100)	

Table 4 shows no statistically significant difference between two groups at subsequent time intervals

Table 5 Association between wound healing and antibiotics status

	Antibiotics Status			
Wound	Antibiotics Number (%)	No antibiotics Number (%)	Total Number (%)	P-value
Wound in Day 1				NA
Satisfactory	25(100)	25(100)	50(100)	
Wound in Day 3				0.75
Satisfactory	24(96)	24(96)	48(96)	
Unsatisfactory	1(4)	1(4)	2(4)	
Wound in Day 7				0.50
Satisfactory	25(100)	24(96)	49(98)	
Unsatisfactory	0	1(4)	1(2)	
Wound in Day 14				0.50
Satisfactory	25(100)	24(96)	49(98)	
Unsatisfactory	0	1(4)	1(2)	

Table 5 shows no statistically significant difference between two groups at subsequent time intervals.

IV. Discussion

The main objective for a successful surgery is to minimize, patients discomfort in the post-operative phase after tooth extraction. Post operative symptoms such as pain, edema, trismus, pyrexia and dry socket are complications which are unpleasant for patients. The oral environment contains a plethora of bacteria which have the potential to cause infections in wounds and antibiotics are effective in treating to preventing the development of painful wound infections. [9]

The prevalence of bacteremia, particularly of a streptococcal nature, was high after a single third molar extraction and was not related to the oral health status or to the magnitude of the surgical procedure. Positive blood cultures persisted for at least 15 min after three to four tooth extractions in a higher number of patients.[5]

Since antibiotics therapy following oral minor surgical procedures is a very common protocol in day to day life, the present study clinically asses the level of effectiveness of antibiotics after removal of third molars in terms of the postoperative complications.

The present study shows no statistical difference between the test group and the control group with regard to postoperative complications which is similar to the study conducted by Monaco G et al. (1999) , Lodi G et. al. (2012).[6,9]

In present study, axillary temperature of more than 38^0 C was considered as febrile, which was not statistically significant between test group and control groups. Three patients of control group and two patients of test group were febrile on the first day of surgery. On day 7^{th} and 14^{th} no individuals with fever were presentwhich is in coherent with the study done by Monaco G. et al. (1999) in which fever was considered to be a postoperative complication when present for atleast 2 days in a week following the extraction with no statistical significant difference between the test group and control groups.[6]

Presence of alveolar osteitis or dissolution of the blood clot and presence of wound dehiscence around extracted socket was examined in all patients at subsequent time intervals. In present study, total of two patients i.e. one patient from each group reported unsatisfactory wound healing on 3^{rd} postoperative day. Patient of control group had unsatisfactory wound healing on seventh day and fourteenth day which was statistically not significant which is in accordance with the study done by Lodi G et. al.(2012) where results indicate that evaluation of surgical difficulty, using a scoring system of the anatomic variability of lower third molars, predicts the risk of postoperative inflammatory complication after surgical extraction. [9]

The perioperative administration of antibiotics is still under discussion, it might be considered in patients with a high risk of postoperative inflammatory complications. The basic question regarding use of antibiotics still remains to be answered. So, prophylactic use of antibiotics in oral and maxillofacial surgery is a subject of controversy.

V. Conclusion

The use of antibiotics to reduce postoperative complications in third molar surgery remains questionable. Special attention should be gained towards other local measures that reduce surgical wound infection risk postoperatively. There was no statistically significant difference between both test and control groups. Hence, the use of antibiotics do not seem to be necessary for reducing the postoperative complications in cases of third molar extraction. Certain limitations like small sample size, limited time constrains; further studies with larger sample size should be carried out before to finally conclude the study.

References

[1]. Arteagoitia I - Diez A, Barbier L, Santamaria G,Santamaria J. Efficacy of amoxicillin/clavulanic acid in preventing infectious and inflammatory complications following impacted mandibular third molar extraction. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2005 Jul;100(1):e11-8.
[2]. Flick WG. The third molar controversy: Framing the controversy as a public health policy issue. *Journal of Oral and Maxillofacial Surgery : Official Journal of the American Association of Oral and Maxillofacial Surgeons* 1999;57(4):438-44.
[3]. Contar Cm , de Oliveira P, Kanegusuku K, Berticelli R-dS, Azevedo-Alanis L-R, Maria-Angela-Naval A-ALM, Machado MA. Complications in third molar removal: a retrospective study of 588 patients. *Med Oral Patol Oral Cir* 2010;1(15):74 -78.
[4]. Lacasa JM et al. Prophylaxis versus pre-emptive treatment for infective and inflammatory complications of surgical third molar removal: a randomized, double-blind, placebo-controlled, clinical trial with sustained release amoxicillin/clavulanic acid (1000/62.5 mg). *Int J Oral Maxillofac Surg* 2007 Apr;36(4):321-7.
[5]. Tomas I , Pereira F, Llucian R, Poveda R, Diz P, Bagan JV. Prevalence of bacteraemia following third molar surgery. *Oral Dis.* 2008 Jan;14(1):89-94.
[6]. Monaco G, Staffolani C, Gatto MR, Checchi L, Antibiotic therapy in impacted third molar surgery. *Eur J Oral Sci* 1999;107:437-41.
[7]. Mazzocchi A Fau - Passi L, Passi L Fau - Moretti R, Moretti R. Retrospective analysis of 736 implants inserted without antibiotic therapy. *J Oral Maxillofac Surg.* 2007 Nov;65(11):2321-3.
[8]. Sancho–Puchades M, et al. Antibiotic prophylaxis to prevent local infection in Oral Surgery: use or abuse? *Med Oral Patol Oral Cir Bucal* 2009 Jan 1;14(1):E28-33.
[9]. Lodi G, Figini L, Sardella A, Carrassi A, Del Fabbro M, Furness S. Antibiotics to prevent complications following tooth extractions. *Cochrane Database Syst Rev.* 2012 Nov 14;11:CD003811. doi: 10.1002/14651858.

ShashankTripathi. "Efficacy of Antimicrobial therapy in Third Molar Surgery - A Comparative Study." IOSR Journal of Dental and Medical Sciences (IOSR-JDMS), vol. 18, no. 9, 2019, pp 07-12.