

ROLE OF ANTIBIOTICS IN CONTROL OF POST-ENDODONTIC PAIN: CASES OF SYMPTOMATIC IRREVERSIBLE PULPITIS AND PERIAPICAL PERIODONTITIS: A RANDOMIZED CONTROL CLINICAL TRIAL

Khalid Rehman*, Iftikhar Akber**, Javed A Qazi***

***Khyber College of Dentistry, Peshawar, Pakistan

**Peshawar Dental College Peshawar, Pakistan

ABSTRACT

Objective: To determine the role of antibiotics in post endodontic pain in cases of acute irreversible pulpitis and acute periapical periodontitis.

Material and Methods: This was a randomized controlled clinical trial of 90 subjects with symptomatic irreversible pulpitis and periapical periodontitis. This study was carried out at the department of Operative Dentistry, Khyber College of Dentistry, Peshawar, from August 2011 to December 2011. The subjects were divided into two groups, placebo and antibiotic group with 45 subjects in each group. Data was collected on the pain experienced using the visual analog scale (VAS) at 12, 24, 48 and 72 hours intervals respectively.

Results: Ninety subjects were included in this study with age range 10-63 years. Among these 52.2% were females and 47.8% were males. Postoperative pain was 64.4% and 66.7% in placebo and antibiotic group respectively in the first 12 hours and markedly reduced in the following 72 hours. Females were found to have experienced more pain in the first 12 hours than males ($P < 0.05$). Statistically no significant difference in occurrence of pain was found between various age groups ($p > 0.05$).

Conclusion: This study concluded that antibiotics have no significant role in the control of post endodontic pain.

Key Words: Postoperative pain, Antibiotics, Irreversible pulpitis, Periapical periodontitis.

INTRODUCTION

Pain is a frequent complication associated with endodontic treatment¹ and it has a great impact on the quality of life². Post operative pain after endodontic procedures is an undesirable occurrence for both patients and clinicians. Causes of post-operative pain include mechanical, chemical and microbial injuries to the pulpal or peri-radicular tissues. Microbial injury is probably the major and most common cause of postoperative pain and some gram negative anaerobic micro-organism

may play an important role in the development of symptoms^{3,4}.

Many endodontically involved teeth that are treated with antibiotics are not infected and even if they are infected, antibiotics do no good as they cannot reach to the site due to paucity of circulation. Antibiotics are not an alternative to dental intervention but they are used as an adjunct to it^{5,6}. However, antibiotics are appropriate in some patients with acute dentoalveolar infections, such as cellulites or a spreading infection. Indiscriminate use of antibiotics can give rise to drug resistance which is one of the most significant and emerging problem of the present time⁷. We have now entered an era in which some bacterial species, including those involved in endodontic infections,

Correspondence:

Dr. Khalid Rehman

Head Department of Operative Dentistry,
Khyber College of Dentistry, Peshawar, Pakistan

Cell: 0300-5976764

E-mail: khalidkcd@hotmail.com

are resistant to full range of antibiotics presently available⁸.

Endodontic is one of the discipline of dentistry where antibiotics are used extensively either for therapeutic or prophylactic purposes⁹. A definitive indication of antibiotics in endodontics is controversial because there is paucity of scientific evidences to support the use of antibiotics in clinical practice^{9,10,11}. Some studies give conclusive evidence of therapeutic benefit, while others indicate that antibiotics are not beneficial¹².

The primary aim of the present study was to investigate whether antibiotics could be of any help to relieve post-endodontic pain in patients with symptomatic irreversible pulpitis or periapical periodontitis.

SUBJECTS AND METHOD

In this randomized controlled clinical trial, a sample size of 90 subjects was used. The study was approved by the ethical committee of Khyber College of Dentistry. The subjects were randomly placed either in group 1 (placebo group) or group 2 (Antibiotic group). Patients were divided into three age groups i.e. 10-27 years, 28-45 years and 46-63 years. Cooperative and healthy subjects of both sexes who presented at the Department of Operative Dentistry, Khyber College of Dentistry, Peshawar, between August 2011 and December 2011 with a diagnosis of acute irreversible pulpitis and acute periapical periodontitis were included in this study. Patients with a sinus tract, periapical abscess, pulp necrosis, chronic periapical periodontitis, and patients already on antibiotics were excluded. Periapical radiographs were taken and thoroughly studied to exclude teeth with any periapical lesions.

A thorough root canal cleaning and shaping was done using step-down technique. Sodium hypochlorite (2.25%) was used as an irrigation solution and calcium hydroxide as an intra-canal medicament. A size 10 K-file was used for patency of the apical foramen. The patients were guided to record the intensity of pain postoperatively at 12, 24, 48 and 72 hours interval on short ordinal numerical pain visual analogue scale (VAS) graded from 0 to 3: zero (0) indicating no pain, one (1) mild pain, two (2) moderate pain, and three (3)

severe pain. The patients in group 1 were given a placebo for three days while patients in group 2 were medicated with antibiotic (Co-Amoxiclave 1G, b.d) for the same period of time. Nimusulide (100 mg, b.d) was given as an analgesic in both groups for three days. The patients were recalled after three days and the proforma was collected. The data was analyzed using SPSS version 17. Chi-Square test was applied for variables i.e. gender, age, occurrence of pain and use of antibiotic or placebo. The level of statistical significance was set at $p < .05$.

RESULTS

Ninety subjects were included in this study. Age range was from 10 to 63 years with mean age 34.16 ± 12.82 years. Out of 90 subjects, 52.2% were females and 47.8% were males. Forty five subjects were assigned to placebo group, 37.8% with acute irreversible pulpitis and 12.2% with acute periapical periodontitis. Similarly 45 subjects were placed in antibiotic group, 35.6% with acute irreversible pulpitis and 14.4% in acute periapical periodontitis. Male and female distribution of the initial diagnosis showed, that 67.5% of males had acute periapical periodontitis while 32.5% had acute irreversible pulpitis. In females these figures were 21.2% and 78.8% respectively. All subjects presented with preoperative pain of certain degree.

Figure 1 shows that in the first 12 hours, pain was reported in 64.4% and 66.7% of the subjects in group 1 and 2 respectively. However, at 72 hours, the occurrence of pain was reduced to 11.1% in group 1 and 15.6% in group 2 with statistically no significant difference between the two groups. The occurrence of pain in the first 12 hours was significantly higher in females ($P < .021$) than males as shown in Figure 2.

In the age group of 10-27 years post endodontic pain remained for 24 hours as compared to the other two age groups, where pain was high in the first 12 hours but significantly reduced at 24 hours. However, statistically no significant difference in occurrence of pain was found between various age groups ($P > 0.05$). The details are given in Figure 3.

Curve of pain for postoperative time interval in gender.

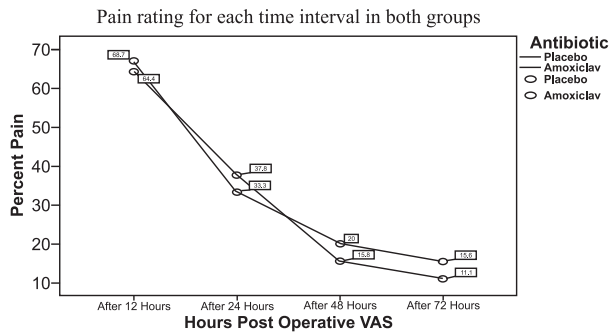


Fig. 1

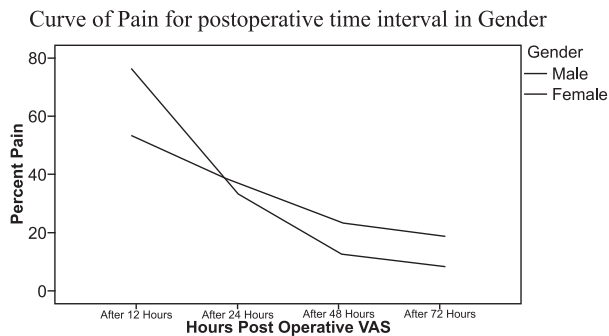


Fig. 2

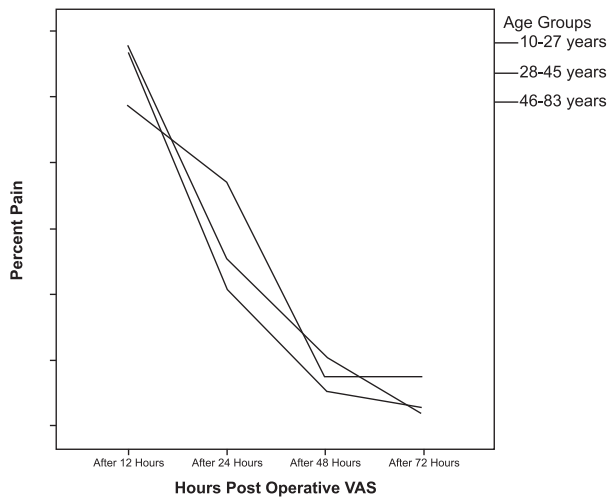


Fig. 3

DISCUSSION

The indiscriminate use of antibiotics is a common practice in dentistry. Dentists contribution to the problem of antibiotic resistance can be substantial as dentists prescribe approximately 10% of all prescribe antibiotics¹³. Antibiotics have become integral part of prescriptions for a patient presenting with pain.

Although inter-appointment flare up is uncommon in cases of symptomatic irreversible

pulpitis or periapical periodontitis, post operative pain occur frequently even if the treatment is appropriately performed¹⁴. In a recent systematic review, it is reported that postoperative pain prevalence at 24 hours was 40% and was markedly reduced during the next 2 days¹⁵. The results of the present study also showed that post operative pain did occur during the first 24 hours. Other studies also showed different results with post operative pain occurrence ranging from 1.1% to 16% and that age, gender, tooth type, pulpal status and pre operative pain play fundamental role¹⁶.

O’Keefe¹⁷ found a strong relationship between pre and postoperative pain. Patients with moderate to severe pain prior to treatment were five times more likely to experience moderate to severe pain postoperatively. In the present study the same trend was observed, where mild to severe pain was recorded in all patients pre operatively. Post operatively, the occurrence of pain during the first 12 hours was 64.4% in group 1 and 66.7% in group 2 but markedly reduced to 11.1% and 15.6% in group 1 and group 2 in the next 72 hours. This decrease in pain may be considered as a result of the effect of analgesic.

Studies have shown that women reporting more post-endodontic pain than men¹⁸, but differences in reports do exist in the literature¹⁹. A study by Catherine et al²⁰ reported that women were more likely to anticipate higher pain than men, however, experienced outcome level did not differ by gender. The results of the present study indicated that women experienced significantly higher pain (P.021) than men during the first 12 hours, with no significant difference in pain at 72 hours. Sex differences in presentation of clinical situation may relate to differences in care. Literature also supports evidence that women and men receive differential care for similar pain problems^{19,21}. Women seem to be more expressive of pain, where men tend to minimize symptoms. Women are more worried about pain, whereas men are more embarrassed by pain²².

It is frequently assumed that aging results in loss of pain sensitivity. Experimental studies of acute pain responses do not show significant age related change in pain perception of healthy elderly subjects²³. In the present study no significant

differences in post operative pain were found in different age groups.

The dentinal debris extrusion during endodontic procedures may induce acute inflammatory response^{24,25}. It has been shown that the amount of debris extruded through apical foramen was more in case of manual instrumentation (2.58 mg) than through NiTi rotary instruments (<.50 mg)²⁶. Rotary instruments involve rotating action which cause less debris extrusion compared to manual technique with linear filing movements. In a recently published study²⁷, it has been shown that postoperative pain was significantly less when glide path was made by rotary path glider size 1, 2 and 3 compared to manual glide path by K-files. Since root canal preparation was done manually in this study, the extrusion of debris may be the primary cause of post operative pain.

There is no evidence that systemic antibiotics are justified in the treatment of pulpitis or apical periodontitis pre or post operatively. Mark et al²⁸ reported that administration of systemic penicillin post operatively did not significantly reduce pain, percussion sensitivity or swelling. James et al²⁹ also found no significant differences in pain relief for patients with untreated irreversible pulpitis who received antibiotics and those who did not. The results of the present study support the previous studies that antibiotics make no difference regarding the occurrence of postoperative pain (P > 0.05). Immediate post operative pain severity sometime slightly exceeds the pretreatment level simply due to inflammation.

CONCLUSION

From this study it was concluded that antibiotics have no significant role in the control of post endodontic pain.

REFERENCES

1. Oguntebi BR, DeSchepper EJ, Taylor TS, White CL, Pink FE. Postoperative pain incidence related to the type of emergency treatment of symptomatic pulpitis. *Oral Surg Oral Med Oral Pathol* 1992; 73: 479-83.
2. Gatten DL, Riedy GA, Hong SK, Johnson JD, Cohenca N. Quality of life of endodontically treated versus implant treated patients: a university based qualitative research study. *J Endod* 2011; 37: 903-9.

3. Penniston S, Hargreaves K. Evaluation of periapical injection of ketorolac for management of endodontic pain. *J Endod* 1996; 22: 55-9.
4. Negam M. Effect of intracanal use of nonsteroidal anti inflammatory agents on postoperative endodontic pain. *Oral Surg Oral Med Oral Pathol* 1994; 77: 507-13.
5. Martin MV, Longman LP, Hill JB, Hyder P. Acute alveolar infections: an investigation of the duration of antibiotics therapy. *Br Dent J* 1997; 183: 135-7.
6. Trope M, Sigurosson A. clinical manifestation and diagnosis. In: Orstavik D, Ford TR, editors. *Essential endodontology*, London Blackwell, 1998. 157-79.
7. Lewis MA. Why we must reduce dental prescription of antibiotics: European Union Antibiotic Awareness Day. *Br Dent J* 2008; 205: 537-8.
8. Sedgley CM, Lee EH, Martin MJ, Flannagan SE. Antibiotic resistance gene transfer between *Streptococcus gordonii* and *Enterococcus faecalis* in root canals of teeth ex. Vivo. *J Endod* 2008; 34: 570-4.
9. Whitten BH, Gardiner DL, Jeansonne BG, Lemon RR. Current trends in endodontic treatment-report of national survey. *J Am Dent Assoc* 1996; 127: 1333-41.
10. Miles M. Anaesthetics, analgesics, antibiotics and endodontics. *Dental Clinics of North America* 1984; 28: 865-82.
11. Pallasch TJ. Antibiotics in endodontics. *Dental clinics of North America* 1979; 23: 737-46.
12. Fouad AF, Rivera EM and Walton RE. Penicillins as a supplement in resolving the localized acute apical abscess. *Oral Surg Oral Med Oral Pathol Oral Radiol and Endod* 1996; 81: 590-5.
13. Pallach TJ. Global antibiotic resistance and its impact on dental community. *J Cal Dent Assoc* 2000; 28: 215-33.
14. Siqueira JF Jr. Microbial causes of endodontic flare ups. *IntEndod J* 2003; 36: 453-63.
15. Pak JG, White SN. Pain prevalence and severity before, during and after root canal treatment: a systematic review. *J Endod* 2011; 37: 429-38.
16. Wang C, Xu P, Ren L, Dong G and Ye L. Comparison of post-obturation pain experience following one visit and two visit root canal treatment on teeth with vital pulp: a randomized controlled trail. *Int Endod J* 2010; 43: 692-7.
17. O'Keefe EM. Pain in endodontic therapy: preliminary study. *J Endod* 1976; 2: 315-9.
18. Unruh AM, Ritchie J, Merskey H. Does gender affect appraisal of pain and pain coping strategies? *Clin J Pain* 1999; 15: 31-40.

19. Unruh AM. Gender variations in clinical pain experience. *Pain* 1996; 65(2): 123-67.
20. Catherine A. Watking, Henrietta L. Logan and Lester H. Kirchner. Anticipated and experienced pain associated with endodontic therapy. *J Am Dent Assoc* 2002; 133(1): 45-54.
21. McDonald DD. Gender and ethnic stereotyping and narcotic analgesic administration. *Res Nurs Health* 1994; 17(1): 45-9.
22. Klonoff EA, Landrine H. Sex roles, occupational roles and symptoms reporting: a test of competing hypothesis on sex differences. *J Behav Med* 1992; 15: 355-64.
23. Harkins SW, Price DD, Bush FM and Small RE. Geriatric pain. In Wall PD, Meizack R eds. *Textbook of pain*. 3rd ed. London Churchill Livingstone 1994: 769-84.
24. Chavez depaz Villanueva LE. *Fusobacterium-nucleatum* in endodontic flare ups. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2002; 93: 179-83.
25. Goldman M, Rankin C, Mehlman R and Santa CA. The immunologic implications and clinical management of the endodontic flare up. *Compendium* 1988; 9: 126-30.
26. Reddy SA, Hicks ML. Apical extrusion of debries using two hand and rotary instrumentation technique. *J Endod* 1998; 24: 180-3.
27. Pasqualini D, Mollo L, Scotti N, Cantatore G, Castellucci A, Migliaretti G et al. Postoperative pain after manual and mechanical glide path: a randomized clinical trial. *J Endod* 2012; 38: 32-6.
28. Mark H, Al Reader and Mike B. Effect of penicillin on postoperative endodontic pain and swelling in symptomatic necrotic teeth. *J Endod* 2001; 27: 117-23.
29. James V. Keenan, Allen G. Farman, Zbigniew Fedorowicz and Jonathan T. Newton. A Cochrane systematic review finds no evidence to support the use of antibiotic for pain relief in irreversible pulpitis. *J Endod* 2006; 32: 87-92.