

Metronidazole for the prevention of dry socket after removal of impacted mandibular third molar in Nepalese patients

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Abstract

Aim: The main purpose of the study was to see whether Metronidazole plays a role in reducing the incidence of dry socket after extraction of mandibular third molars.

Method: A total of 119 patients were evaluated out of which 59 patients were given a single dose of 1200 mg Metronidazole 45 minutes prior to the surgical extraction of third molar. The other 60 patients were not given any prophylactic dose of Metronidazole.

Result: Out of the fifty nine patients who were given Metronidazole prior to the surgical procedure, 16.95% of the patients developed dry socket and among the other 60 patients who were not given Metronidazole, 21.67% developed dry socket.

Conclusion: Metronidazole used as a prophylactic antibiotic for prevention of dry socket after extraction of mandibular third molars has little or no role in preventing dry socket.

Key words: Third molar Surgery, Prevention Antibiotic prophylaxis

Introduction

Dry socket which is also known as Alveolitis Sicca Dolorosa, ASD or Alveolar Osteitis is a common complication after removal of teeth, particularly after surgical extraction of mandibular third molars. The incidence varies from a few percent to 68% depending on the location of the removed tooth/teeth¹. It is a painful condition that usually occurs after few days following the removal of mandibular third molars and can be treated using antibiotics. Dry socket occurs when the blood clot at the site of extractions is dislodged, exposing the underlying bone and nerve endings causing significant pain. Patient presenting with dry socket can manifest any of the features like fever, severe jaw pain, facial swellings, and lymphadenopathy.

Even though the precise cause of dry socket remains the subject of study, researchers suspects several factors may be at play, including bacterial contamination of socket, difficult or traumatic tooth extraction, remaining roots or tooth/root fragments in the socket, type of impacted teeth, presence of pericoronitis etc. Other factors such as age, gender, use oral contraceptives,

menstrual cycle, smoking habits and prolonged use of antimicrobial drugs and mouth rinses can also have a role in the development of dry socket²⁻⁷.

Aim and Objective

The aim of this study was to see whether 1200 mg Metronidazole given as a single dose before extraction of impacted mandibular third molars reduced the incidence of dry socket. The 1200mg was chosen as the appropriate dose to ensure a high serum concentration of Metronidazole for a couple of hours after the surgical procedure.

Method

A total of 119 patients between 17- 30 years of age participated in the study. The patients were healthy and were not taking any other medications. All the 119 patients were treated within a period of 6 months. The patients were referred for removal of either unilateral and/or bilateral mandibular third molars and were treated at the Department of Oral and Maxillofacial Surgery, Kantipur Dental College, Basundhara, Kathmandu, Nepal.

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A criteria for inclusion of the case was that a surgical flap had to be reflected for removal of the tooth/teeth. Patients with acute pericoronitis were treated only after the symptoms of pericoronitis had ceased.

Among the 119 patients, 1200 mg Metronidazole was given as a single dose to 59 patients and for the remaining 60 patients Metronidazole was not given. Three 400-mg tablets (1200mg), were taken orally 45 minutes before starting the surgical procedure.

All extractions were done under local anesthesia using Lidocaine hydrochloride with 2% adrenalin. After giving the mandibular, lingual and the buccal nerve block, an incision was made from 37 / 47 and continued posteriorly beyond 38 / 48 upto the ascending ramus of the mandible, then the mucoperiosteal flap was raised. If the tooth could not be extracted in one piece, it was split with surgical burs. During drilling of bone and tooth, a constant irrigation was done with sterile saline. After removal of the tooth, the socket was carefully cleaned using sterile saline and the mucoperiosteal flap was repositioned and sutured using 3-0 silk non resorbable suture. All the patients were given the same postoperative instructions, and were prescribed analgesic tablets for the following 5 days.

The following data were recorded just before the surgical procedure: Age, sex, smoking habits and history of pericoronitis. The data recorded immediately after the operation were: The duration of extraction procedure, the amount of saline used for irrigation, and the amount

of bone removed (depth and volume). The collected data have been presented using percentage, mean and t-test.

On the postoperative recall visit after five days, the following data were noted: The presence of pain, the amount of swelling, presence of any foul odour and/or alteration of taste, and the presence or absence of blood clot. The diagnosis of dry socket was done on the basis of the following criteria: Absence of blood clot in the tooth socket, and continuous increasing postoperative pain from second postoperative day onwards.

Before starting the procedure the purpose of the study was fully explained to the patients and also a written detail of the procedure was provided to the patients.

Statistical analysis and data

Patient profile

Out of the 119 patients, 52 (43.70%) were males and the remaining were females (60) (56.30). Twenty nine patients (24.37%) had a history of smoking and 41 patients (34.45%) had a history of pericoronitis. The details are shown in Table 1.

Results

Out of the 59 patients who were given Metronidazole, 10 (16.95%) developed dry socket and among the other 60 who did not take Metronidazole 13 (21.67%) developed dry socket. Thus, there is no evidence of difference in proportion of dry socket in patients who took and those who didn't take Metronidazole. i.e. (P>0.05).

Table 1: Comparison between the two groups: number of patients.

	Metronidazole group (n=59)	Non Metronidazole group(n=60)	Total
Sex			
Male	22	30	52
Female	37	30	67
Smoking			
Yes	14	15	29
No	45	45	90
History of pericoronitis			
Yes	21	20	41
No	38	40	78
Amount of bone removed (mm³)			
None	2	6	8
1-10mm ³	22	22	44
11-20mm ³	23	21	44
>21mm ³	12	11	23
Dry socket			
Yes	10	13	23
No	49	47	96

Discussion

Earlier studies of the efficacy of Metronidazole, with different designs, have shown different results. Ritzau et al⁹ showed no prophylactic effect of a single dose of 800mg Metronidazole, which was also seen in the present study.

In an earlier study a higher incidence of dry socket was found after removal of partially erupted teeth than after the removal of impacted teeth (31% and 9%, respectively). Partially erupted lower third molar teeth have a pericoronal pouch, these pericoronal pouches may be heavily infected¹⁰. In infected pericoronal pouches there is mixed anaerobic and facultative anaerobic flora with large number of spirochetes, Porphyromonas species and other gram negative bacteria, and similar flora have also been found in the distal pocket of the adjacent second molars¹¹. These bacteria produce protease, have fibrinolytic activity¹² invade the surrounding tissue, and have other metabolic activities. For such gram negative bacteria, Metronidazole can be the drug of choice.

The finding that a single dose of metronidazole was ineffective in preventing the development of dry socket seems to argue against a microbial aetiology of dry socket. However, recent findings on the increased antimicrobial resistance of bacteria organized in biofilms may explain this. The mechanism of this increased antibiotic resistance has not yet been established, but may be a result from the establishment of functional mixed-species consortia into biofilm, where the cells have a modified metabolism compared with that in their planktonic stage¹³. This was seen in another study where *P. Gingivalis* was 160 times more resistance to Metronidazole in vitro when grown as a biofilm than when grown in suspension¹⁴.

Conclusion

Although systemic antibiotics are regularly used after surgical procedures to prevent and cure infection of the surgical wound, the use of 1200 mg Metronidazole as a prophylactic antibiotic 45 minutes prior to the surgical procedure to prevent the development of dry socket after extraction of mandibular third molars is not necessary as it plays little or no role in the prevention of dry socket. However, if the extraction socket is infected, then Metronidazole along with other systemic antibiotics are commonly prescribed for reducing the infection.

References

1. Alexander RE. Dental extraction wound management : a case against medicating postextraction sockets. *J Oral Maxillofac Surg* 2000;58:538-51
2. Larsen P. Alveolar osteitis after surgical removal of impacted mandibular third molars. *Oral Surg Oral Med Oral Pathol* 1992;73:393-7.
3. Chiapasco M, Crescentini M, Romanoni G. Gernectomy or delayed removal of mandibular impacted third molars: the relationship between age and incidence of complications. *J Oral Maxillofac Surg* 1996;53:418-28.
4. Heasman PA, Jacobs DJ. A clinical investigation into the incidence of dry socket. *Br J Oral Maxillofac Surg* 1984;22:115-22.
5. Sweet JB, Butler DP. Predisposing and operative factors: effects on the incidence of localized osteitis in mandibular third molar surgery. *Oral Surg Oral Med Oral Pathol* 1978; 44 14-20
6. Tjernberg A. Influence of oral hygiene measures on the development of alveolitis sicca dolorosa after surgical removal of mandibular third molars. *Int J Oral Surg* 1979; 8:30-4.
7. Kleinbaum DG. Logistic regression, a self-learning text. New York: Springer; 1992.
8. Rood JP, Murgatroyd J. Metronidazole in the prevention of dry socket. *Br J Oral Maxillofac Surg* 1979/1980;17:62-70.
9. Ritzau M, Hillerup S, Branebjerg PE, Ersboel BK. Does metronidazole prevent alveolitis sicca dolorosa? *Int J Oral Maxillofac Surg* 1992;21:299-302.
10. Leung WK, Theilade E, Comfort MB, Lim PL. Microbiology of the pericoronal pouch in mandibular third molar pericoronitis. *Oral Microbiol Oral Immunol* 1993;8:306-12.
11. Mombelli A, Buser D, Lang NP, Bertold H. Suspected periodontopathogens in erupting third molar sites of periodontally healthy individuals. *J Clin Periodontol* 1990; 17: 48-54.
12. Cortellini P, Pini Prato G, Clauser C. Fibrinolytic activity of human gingival in the presence or absence of plaque bacteria. *J Periodont Res* 1992; 27; 34-9.
13. Gilbert P, Das J, Foley I. Biofilm susceptibility to antimicrobials. *Adv Dent Res* 1997;11:160-7.
14. Wright TL, Ellen RP, Lacrois JM, Sinnadurai S, Mittelman MW. Effects of metronidazole on Porphyromonas gingivalis biofilms. *J Periodont Res* 1997;32:473-7.