

Questionnaire survey to investigate antibiotic prescribing habits reported by general dentists in specific clinical situations in Udaipur.

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Abstract

Aim: To investigate antibiotic prescribing habits of general dentists in specific clinical situations in Udaipur.

Materials and Method: Questionnaire was prepared into two sections: the first section was a registration of personal data such as age, gender, years of experience in general dental practice and location (public or private) of dental practice; the second section included questions regarding the behavior of dentists when prescribing antibiotics in dental practice.

Results: Amoxicillin was chosen as the first-choice antibiotics for non-allergic patients, followed by amoxicillin and clavulanic acid in combination. A number of endodontists reported prescribing antibiotic in situations where it is not required.

Conclusion: There is a need of awareness regarding the role of antibiotics, as excessive and incorrect prescription of antibiotics in endodontics contributes to the global increase of microbial resistance. Likewise, the general administration of antibiotics was longer than required,

reinforcing the need of continuous education regarding the use and prescription of antibiotics.

Keywords: antibiotics, endodontic infections, antibiotic prescription habits, survey, udaipur, questionnaire.

Introduction

Antimicrobial resistance is the ability of a microorganism to withstand the effect of antibiotics which may occur due to certain bacterial species developing resistance to antibacterial agents shortly after they are used.⁽¹⁾

Odontogenic infections are commonly encountered by dentists for which antibiotics are frequently prescribed. Although considered as an adjunct to definitive treatment, antibiotics are usually prescribed for shorter periods by dentists as a substitute for the definitive treatment.⁽²⁾

Moreover, inappropriate prescription and use of antibiotics have been identified as major factors in the emergence of antibiotic resistance. In endodontics, it is recommended that antibiotics should be used only as an adjunct to definitive nonsurgical or surgical endodontic therapy.⁽¹⁾

Antibiotic therapy should be reserved for patients who have systemic signs. Consequences of resistance are higher treatment costs, longer hospital care time, health complications, mortality and ineffectiveness of antibiotics.

This problem has emphasized the need for rationalization of antibiotic use in treatment of infections.⁽¹⁾ Due to increased awareness of antibiotic resistance, there has been a lot of questions on the scope of antibiotic prophylaxis used in dentistry.⁽²⁾

Surveys about general dental practitioners prescribing habits have raised awareness of the quality of prescriptions and symptoms associated with endodontic infections, patients with progressive infections or patients who are immunocompromised.⁽¹⁾ However, there are no reports regarding the antibiotic prescribing patterns of

dentists in Udaipur in the treatment of endodontic infections.

Hence, the aim of this study was to investigate antibiotic prescribing patterns related to endodontic treatment by dentists in Udaipur, Rajasthan.

Materials & Method

A questionnaire regarding antibiotic prescribing habits was sent to registered dentists in Udaipur. Questions were adopted from previously published surveys (Bolfoni et al. 2018, Sumit Mohan et al. 2019, Antonio Rodriguez et al. 2009) with few additions and modifications.

The questionnaire was divided into two parts: the first part was detail of personal data such as name, age, years of experience in dental practice; the second part included questions regarding the preference of antibiotics by dentists.

Statistical Analysis

Data were collected and analyzed by SPSS 17.0 (SPSS, Inc., Chicago, IL, USA). Chi-square and Fisher's exact tests were used to test the significance of possible associations. A value of $P < 0.05$ was considered statistically significant.

Results

From the 227 questionnaires sent, a total of 109 were answered (48.01%). Most dental practitioners confirmed they prescribe antibiotics for 5 days (55.96%) [Table 1]. Most of respondents (48.62%) chose amoxicillin as the first-choice antibiotics for non-allergic patients.

Amoxicillin and Clavulanic acid combination was cited by 36.7% of respondents as the second-choice antibiotics, followed by Metronidazole (22.02%) [Table 2]. The first drug of choice for patients with allergy to Penicillin was Erythromycin (41.28%), followed by Clindamycin (32.11%) and Azithromycin (22.02%) [Table 3].

79.82% practitioners prescribed antibiotics in irreversible pulpitis, while 77.06% prescribed antibiotics in cases of

post operative pain as well as in cases of endodontic retreatment. The antibiotic prescription in cases of perforation and root-end surgery was reported by 70.64% and 38.53% of respondents, respectively. Similarly, 63.30% practitioners prescribed antibiotics in asymptomatic cases.

Discussion

The present observational study based on questionnaires answered by 109 professionals investigated the habits of dentists from Udaipur in prescribing antibiotics in different endodontic conditions. As with all questionnaire-based surveys, there is the risk in relation to the consistency of responses and the problem of nonresponse bias. Thus, caution was applied in interpreting the results.

Dentists prescribe antibiotics mainly for the following reasons: as adjunctive therapy in orofacial infections; as a preventive measure to prevent local infection after dental procedures and to prevent the systemic spread of oral micro-organisms. Additional considerations that shall define the antibiotic use in an individual patient are the severity of the infection, status of the immune system, and presence of systemic symptoms like fever.⁽⁴⁾

The human oral cavity contains a very broad range of microorganisms. The bacteria that cause odontogenic infections are generally saprophytes. The microbiology in this sense is varied, and multiple microorganisms with different characteristics can be involved. Anaerobic and aerobic micro-organisms are usually present in the oral cavity, and numerous aerobic species cause odontogenic infections — the most common being *Streptococcus* spp.⁽⁵⁾

In endodontics, antimicrobial drugs are prescribed during treatment of specific clinical situations related to acute apical infections as an adjunct to local treatment. Generally, β -lactam antibiotics are used as a first option

for treatment of endodontic infections. In the present study, Amoxicillin was the preferred antibiotic (48.62%).

Amoxicillin's broad spectrum is more than is required for endodontic needs. Therefore, the use of Amoxicillin should reduce, instead Penicillin V should be the antibiotic of choice to treat acute infections as it is effective against aerobic and anaerobic bacteria, strict and facultative bacteria, and has low toxicity.⁽¹⁾

The combination of Amoxicillin and Clavulanic acid was considered to be the second antibiotic of choice (38.53%). The Clavulanic acid in combination with Amoxicillin is, normally, prescribed because Amoxicillin is susceptible to degradation by β -lactamase producing bacteria. However, as the Amoxicillin and Clavulanic acid combination is characterized by a much broader spectrum of activity compared to Penicillin and Amoxicillin, it carries a risk of the development of bacterial resistance.⁽¹⁾

Metronidazole, which was the third most commonly prescribed antibiotic (2.75%), is an effective antibiotic against anaerobic bacteria, but not against facultative anaerobic or aerobic bacteria, so it needs to be used in association with another agent (combination of antibacterial agents) for chemotherapy of endodontic infections. The optimal dosage of antibiotics should be enough to eliminate the pathogens, with minimal adverse effects on the physiology of the host and microbial ecology.⁽¹⁾

As most oral bacterial infections have rapid onset, there is no way to establish in a short time the minimum inhibitory concentration of a particular drug. Therefore, it is recommended to start treatment with a loading dose, generally twice the maintenance doses. The ideal duration of antibiotic treatment is the shortest capable of preventing both clinical and microbiological relapse. Most acute infections are resolved within 3–7 days.⁽¹⁾ Antibiotics are

also more likely to be needed in an immunocompromised patient or a patient in poor health.⁽²⁾

Prescription of antibiotics should be made initially for a 3- or 5-day period.⁽¹⁾ In our survey, 13.76% and 55.96% of respondents reported that they prescribed antibiotics for a 3-day period and 5-day period respectively. Immunocompromised patients represent a special category of patients for dental professionals because such patients are more prone to bacteraemia, which may rapidly lead to septicaemia. Therefore, antibiotic prophylaxis may be given in such cases. Antibiotic coverage is also mandatory in patients with uncontrolled diabetes, who have to undergo invasive dental treatment.⁽⁶⁾

A higher serum concentration of the antibiotic in contact with infected tissues might provide better results than prolonged antimicrobial therapies. Also, short duration of therapy reduces risk of antibiotic-induced toxicity and/or allergy, and reduces risk of developing resistant microorganisms. At the same time, use of antibiotics with a wide spectrum of activity, which could include many species of bacteria found elsewhere in the body, also increases the risk of selecting resistant bacteria outside the oral cavity.⁽¹⁾

Before completing the 72 h of treatment, a reassessment of the clinical picture should be made to provide sufficient evidence that the patient host defences have gained control of the infection.⁽¹⁾

Based on the signs and symptoms, the physician must determine whether to maintain or stop the antibiotic therapy. The proper dose and duration of an antibiotic is enough when there is sufficient evidence that the patient host defenses have gained control of the infection. When the infection is resolving or has resolved, then the drug should be terminated.⁽²⁾

When local treatment is successful, the duration of antibiotic therapy should not exceed 7 days. The

prolonged use of antibiotics or an ineffective dose without the full coverage of the microbial spectrum can contribute to the development of resistant microbial species. If resistant species are already present, it will not matter how long the antibiotic is used; it will still be ineffective.⁽¹⁾

In irreversible pulpitis with acute apical periodontitis, the pulp remains vital; there is no infection or signs and symptoms of systemic involvement; thus, antibiotics are not indicated. Yet, 73.39% of the respondents reported they would prescribe antibiotics in this situation. It is important to point out that the administration of antibiotics does not reduce pain, percussion pain or the number of analgesic medications taken by patients with untreated irreversible pulpitis. Therefore, antibiotics should not be prescribed for such situations.⁽¹⁾

Asymptomatic cases of pulp necrosis with apical periodontitis associated with sinus tract should be treated by removal of the cause of the infection through root canal treatment, with the aid of intracanal medication. In this study, 63.30% of respondents prescribed antibiotics for this situation. In cases of endodontic abscesses, without local signs of infections spread, after root canal treatment, the host defences should be able to control these infections.⁽¹⁾

The cause of the pain may or may not be an infection. If the cause of pain is not an infection, there is no point in prescribing antibiotics.⁽³⁾ Therefore, the use of antibiotics in addition to analgesics for pain and local decontamination does not provide benefits to the patient. However, if the patient was systemically compromised and the sinus tract did not heal or the patient experienced a flare up with systemic involvement, then antibiotics are indicated.⁽¹⁾ According to the American Dental Association and the American Academy of Orthopedic Surgeons, evaluation is required of antibiotic prophylaxis

in patients with total joint prostheses in the presence of immune deficiency.⁽⁷⁾

The use of antibiotics in endodontics should be indicated for those patients with signs of local infection and fever.⁽⁸⁾

Antibiotic therapy should be reserved for cases when signs such as cellulitis, lymphadenitis, limitation of mouth

opening, associated with symptoms such as fever, loss of appetite and general malaise, suggesting that the immune system of the patient is not able to control the infection, which could disseminate to other regions, causing serious health problems.⁽¹⁾

Table 1: Duration of Treatment for antibiotic prescription by general dental practitioners

Table 1			
Duration of Treatment for antibiotic prescription		Count	%
	3 days	15	13.76
	10 days	6	5.50
	5 days	61	55.96
	7 days	22	20.18
	Until symptoms disappear	5	4.59
	Total	109	100

Table 2: Choice of antibiotics for non-allergic patients

Table 2					
Choice of antibiotics for non-allergic patients?		First Choice		Second Choice	
		Count	%	Count	%
	Amoxicillin	53	48.62	13	11.93
	Cefalexin	2	1.83	4	3.67
	Metronidazole	3	2.75	24	22.02
	Amoxicillin with Clavulanic acid	42	38.53	40	36.70
	Ciprofloxacin	2	1.83	7	6.42
	Penicillin	1	0.92	0	0.00
	Ampicillin	3	2.75	1	0.92
	Clarithromycin	0	0.00	2	1.83
	Tetracycline	0	0.00	1	0.92
	Azithromycin	1	0.92	6	5.50
	Clindamycin	2	1.83	10	9.17
	Cefaclor	0	0.00	0	0.00
	Erythromycin	0	0.00	2	1.83
	Others	0	0.00	0	0.00

Table 3: Drug of choice for patients allergic to penicillin

Table 3			
Drug of choice for patients allergic to penicillin.		Count	%
	Erythromycin	45	41.28
	Clindamycin	35	32.11
	Azithromycin	24	22.02
	Others	5	4.59
	Total	109	100

Table 4: List of percentage of respondents who prescribed antibiotics for various clinical situations

Table 4			
Antibiotic prescription for various clinical situations.		Count	%
	Irreversible pulpitis	87	79.82
	Irreversible pulpitis with acute apical periodontitis	80	73.39
	Necrotic pulp with acute apical periodontitis; no swelling, with pain	76	69.72
	Necrotic pulp with chronic apical periodontitis; with fistula; no pain	69	63.30
	Acute apical abscess; located intraoral swelling, with pain	32	29.36
	Acute apical abscess; diffuse intraoral swelling, fever and trism	20	18.35
	Acute apical abscess; diffuse intraoral and extraoral swelling, fever and trism	22	20.18
	Post-operative pain	84	77.06
	Endodontic retreatment	84	77.06
	Perforation	77	70.64
	Root-end surgery	42	38.53

Conclusion

A number of endodontists reported prescribing antibiotic in situations where it is not required. Therefore, there is a need of awareness regarding role of antibiotics, as

excessive and incorrect prescription of antibiotics in endodontics contributes to the global increase of microbial resistance. Likewise, the general administration of antibiotics was longer than required, reinforcing the need

of continuous education regarding the use and prescription of antibiotics.

References

1. M. R. Bolfoni, F. G. Pappen, T. Pereira-Cenci and R. C. Jacinto. Antibiotic prescription for endodontic infections: a survey of Brazilian Endodontists. *International Endodontic Journal* 2018; 51(2):148-156.
2. Antonio Rodriguez-Nunez, Rafael Cisneros-Cabello, Eugenio Velasco-Ortega, Jose Maria Llamas-Carreras, Daniel Torres-Lagares and Juan Jose Segura-Egea. Antibiotic Use by Members of the Spanish Endodontic Society. *Journal Of Endodontics* 2009; 34(9):1198-1203.
3. Sumit Mohan and Jyoti Thakur. A Questionnaire Based Survey on the Antibiotic Prescription Pattern of Dentists in Eastern Part of India. *International Journal of Contemporary Medical Research* 2019; 6(4):D16-D19.
4. Sivaramakrishnan Gowri, Deeksha Mehta, Sridharan Kannan. Antibiotic use in dentistry: A cross-sectional survey from a developing country. *Journal of Orofacial Sciences* 2015; 7(2): 90-94.
5. Sukhvinder S. Oberoi, Chandan Dhingra, Gaurav Sharma and Divesh Sardana. Antibiotics in dental practice: how justified are we. *International Dental Journal* 2015; 65(1):4-10.
6. Dena Ali and Carol Kunzel. Diabetes Mellitus: Update and Relevance for Dentistry. *Dentistry Today* 2011; 12: 45–50.
7. American Dental Association; American Academy of Orthopedic Surgeons. Antibiotic prophylaxis for dental patients with total joint replacements. *Journal of American Dental Association* 2003; 134(7):895-899.
8. Paul V. Abbott, Wyatt R. Hume and John W. Pearman. Antibiotics and endodontics. *Australian Dental Journal* 1990; 35(1):50-60.