Original Article

KNOWLEDGE OF ANTIBIOTIC PRESCRIPTION FOR ENDODONTIC TREATMENT IN FINAL YEAR STUDENTS AND HOUSE OFFICERS.

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Abstract

Background: Antibiotics have been used extensively for the management of odontogenic infections since their discovery.**Objective:** The objective of the study was to assess the knowledge of the antibiotic prescription during endodontic therapy and common errors made by fourth-year students and house officers at Multan Medical and Dental College. This study conducted in August 2017.**Methods:** Questionnaire was designed, regarding pattern of prescription of antibiotics by the dentists and the conditions for which they were prescribed. The self investigated questionnaire investigated dental students and house officer's knowledge of the indications for prescribing antibiotics for a number of systemic clinical signs that may be associated with a dental infection.**Results:** For chronic periapical lesions and chronic periapical abscess plus sinus tracts, 58.1% and 55.8% of respondents prescribed antibiotics, respectively. The drug of choice for these cases was Amoxicillin+clavulanic acid (52.6%) and Amoxicillin alone (47.3%). In this study the maximum antibiotics prescribed were prophylactic for congenital heart diseases 69.7% and uncontrolled diabetes mellitus 62.8%.**Conclusion:** This study supports the conclusion that there is a lack of knowledge about the correct indication, type, and dosage of antibiotics in dental practice.**Keywords:** Antibiotics, root canal treatment, prophylaxis

Introduction

Antibiotics have been used extensively for the management of odontogenic infections since their discovery. The advent of antibiotics resulted in a significant decline in the incidence of life-threatening infections and heralded a new era in the therapy of infectious diseases, but the enthusiasm turned out to be premature¹. Over the years, microbial evolutionary responses to the selected pressure exerted by antibiotics have resulted in microbial species resistant to virtually every known antibiotic agent. Over use and misuse of antibiotics has been considered the major cause for the emergence of multidrug-resistant strains^{2, 3 and 4}. Antibiotic resistance among obligatory anaerobic bacteria is increasing, with resistance to penicillins, clindamycin and cephalosporin noted at community hospitals and major medical centers⁵.

The risk/benefit ratio should be always weighed before prescribing antibiotics. Appropriately selected patients will benefit from systemically administered antibiotics. A restricted and conservative use of antibiotics is highly recommended in endodontic practice, but indiscriminate use (including cases of pulpitis- no infection) is contrary

to sound clinical practice. This may cause a selective pressure and consequent overgrowth of intrinsically resistant bacteria, predisposing patients to secondary and super infections and rendering drugs ineffective against potentially fatal medical infectious diseases¹.

Drugs are usually prescribed for a number of conditions by dentists. These drugs may cause harm to the patient if are not prescribed accordingly. Most adverse drug events (68-75%) are reported to have been related to incorrect prescription writing⁶. Although these events may not be fatal, they may be a source of morbidity to the patient. The act of prescribing is becoming increasingly challenging due to multiple factors. Prescribing errors can generally be categorized into those of decision making or of prescription writing. While the former may include errors, such as under prescribing, overprescribing, irrational prescribing and inappropriate prescribing^{7, 8} the latter focuses on errors made while writing a prescription⁹. Although poor prescribing by junior doctors and students has been reported in a number of studies, partly attributing it to knowledge-based errors.^{10, 11}

The objective of the study was to assess the knowledge

of the antibiotic prescription during endodontic therapy and common errors made by fourth-year students and house officers at Multan Medical and Dental College.

Methodology

This is a survey based study conducted among nineteen fourth-year dental students and twenty four house officers at Multan Medical and Dental College on August 2017. A questionnaire was designed, regarding pattern of prescription of antibiotics by the dentists and the conditions for which they were prescribed. The questionnaire investigated dental students' and house officer's knowledge about the indications of antibiotics prescription for a number of systemic clinical signs that may be associated with dental infections. The clinical signs chosen were fever and malaise, evidence of systemic spread, diffused swelling, and difficulty in swallowing. The students and house officers were also asked whether some clinical conditions required antibiotics and their choice of treatment if any. These clinical conditions were acute pulpitis, acute apical abscess, chronic apical abscess with sinus tract, chronic apical periodontitis. Also a number of factors that can influence antibiotic prescriptions were investigated. The questionnaire asked whether patient's expectation of prescribing antibiotics, two session root canal treatment, one long session root canal treatment, and retreatment might be the reason for prescribing antibiotics. The next part of the questionnaire assessed knowledge on the medical conditions and dental procedures that may require prophylactic antibiotics. The dental procedures were all root canal treatments, pre and post endodontic surgeries; the medical conditions included HIV+, hepatitis B, uncontrolled diabetes, congenital heart diseases, mitral valve prolapse and patients who have had prosthetic joint in the past 2 years or those with a history of cancer and radiotherapy. This questionnaire was distributed among 43 students of Multan medical and dental college. The collected data was tabulated and analyzed.

Results

The demographics of respondents are described in Table 1. Male and female dentists answered 39% and 61% of the questions respectively. Number of respondents is given in Table 2.

The drug of choice for these cases was Amoxicillin+clavulanic acid(52.6%) and Amoxicillin alone (47.3%).The greatest number of antibiotic prescriptions was written for acute apical abscess (62.8%) and patient with fever and malaise (62.7%). Overall, 11.6% of respondents always prescribed antibiotics after root canal therapy (Table 4). For chronic periapical lesions and chronic periapical abscess plus sinus tracts, 58.1% and 55.8% of respondents prescribed antibiotics, respectively. Amoxicillin+clavulanic acid was the drug of choice (52.6%) in all correct and incorrect cases.

Table 1. Description of respondents

Male	39%
Female	61%

Table 2. Number of respondents

House officers	19
Final year students	24

Table 3. Antibiotics that were prescribed by respondents

Antibiotic	%
Amoxicillin	47.3%
Amoxicillin + clavulanic acid	52.6%
Cephalosporins	10.52%
Clindamycin	10.52%

Table 4. Conditions and percentage of antibiotic prescription

Conditions	Prescribed Antibiotics (%)
Acute pulpitis	25.5%
Acute apical Abscess	62.8%
Chronic apical abscess with periodontitis	55.8%
Chronic apical abscess with sinus tract	58.1%
In patient with fever and malaise	62.7%
In patient with diffuse swelling	44.1%
In patient with swelling & difficulty in swallowing	58.1%
In two visit root canal treatment	13.9%
In retreatment	18.6%
If patient insist	13.9%
In prolonged root canal treatment	32.5%
After root canal treatment	11.6%

Table5. Conditions and percentage of Prophylactic antibiotic prescription

Conditions	Prophylactic prescription (%)
Always before every root canal treatment	13.9%
Only before endodontic surgery	27.9%
HIV + patients	41.9%
HBS + patients	18.6%
Uncontrolled diabetic patients	62.8%
Congenital heart disease (AV shunt and cardiac valve replacement)	69.7%
Mitral valve prolapsed	34.9%
Prosthetic joint in past 2 years	46.5%
History of cancer and radiotherapy	25.6%

In this study the greatest number of antibiotic prescribed were prophylactically for congenital heart diseases 69.7%, and uncontrolled diabetes mellitus 62.8%.

Discussion

Most oral diseases presenting are primarily inflammatory conditions that are associated with pain¹. In a considerable number of cases dental pain is due to either acute or chronic infections of pulpal origin, which necessitates operative intervention, rather than antibiotics¹. The vast majority of infections of endodontic origin are treated without the need for antibiotics.¹

In this study greatest numbers of antibiotic prescriptions written were for acute apical abscess (62.8%) and patient with fever and malaise (62.7%) which is comparable with the findings of Mohammed Reza who stated that 74% participants used antibiotics for apical abscess¹².

Palmer et al. showed that 12.5% of British GPs prescribed antibiotics for acute pulpitis¹³ while in this study only 25.5% participants prescribed antibiotics for acute pulpitis. Antibiotics are not indicated and will not assist cases where the pulp is still vital and there are no signs of local or systemic infection/involvement¹⁴ which in contrast to this study in which most of participants used antibiotics for pulpal conditions.

The proper treatment for irreversible pulpitis cases is debridement of the root canal space. Non-surgical root canal therapy without antibiotic is usually adequate to treat irreversible pulpitis, acute pulpitis and chronic apical periodontitis and draining sinus tract. The pulpal circulation is compromised in these cases and systemic antibiotic will not reach therapeutic concentrations in the pulp. Removing the source of the infection by performing thorough non-surgical root canal therapy will usually allow healing of periradicular lesion. Analgesics however are indicated for periapical conditions and pain due to pulpitis¹². But in this study greatest number of antibiotic prescriptions was written for acute apical abscess

(62.8%) and patient with fever and malaise (62.7%). Overall, 11.6% of respondents always prescribed antibiotics after root canal therapy. For chronic periapical lesions and chronic periapical abscess plus sinus tracts, 58.1% and 55.8% of respondents prescribed antibiotics respectively which is comparable with study of Nabavezadeh et al where percentage is 58% and 73.1% respectively¹².

The drug of choice for these cases was Amoxicillin+clavulanic acid (52.6%) and Amoxicillin alone (47.3%) which is comparable to another study where Amoxicillin 500mg was the drug of choice (57.6%)¹².

Prophylactic coverage with antibiotics is indicated only for the highest risk patients who are susceptible to infective endocarditis after bacteremia. The use of prophylactic antibiotics in these patients prevents blood-borne microorganisms from lodging on shunts and prostheses or from multiplying within a depressed system. Patient with HIV/AIDS may be effectively medicated with prophylactic drugs. Whereas in this study 41.8% of the respondents prescribed antibiotics prophylactically. Patient with prosthetic joint in past 2 years, congenital heart diseases (AV shunt and cardiac valve replacement), mitral valve prolapse, and uncontrolled diabetes are at high risk for development of infections during endodontic treatment and therefore require prophylactic antibiotics¹.

According to the present study, students and house officers in Multan medical and dental college use antibiotics inappropriately which could lead to problems such as drug resistance, resistant microorganisms and other side effects. It would appear from this study that knowledge about the use of antibiotics is far from ideal. In this study house officers have slightly higher knowledge as compare to the fourth year students. Rational prescribing based on a thorough evidence-based knowledge is essential. The publication of prescribing guidelines and protocols could help to achieve this. Moreover correct educational intervention may also be effective. The use of clinical audit and computers along with other tools to increase knowledge of antibiotic prescribing and improve patient care should not be underestimated.

Conclusion

This study supports the conclusion that there is a lack of knowledge about the correct indication, type, and dosage of antibiotics in dental practice. Efforts should be made to improve undergraduate education and other educational initiatives on antibiotic prescription skills. The curriculum should provide more focus on prescribing, and students should be taught good prescription practices in the classroom, using hypothetical or real cases.

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