



**A STUDY EVALUATING THE CURRENT PRACTICES AND
TRENDS FOR THE USE OF AMOXICILLIN-CLAVULANIC ACID ALONG
WITH OTHER ANTIMICROBIALS IN DENTISTRY**

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ABSTRACT

Introduction: Odontogenic infections are one of the most frequently encountered dental conditions which are managed primarily by surgical intervention along with antimicrobials.

Objective: The purpose of the study was to find out the current trend of Amoxicillin-Clavulanate prescription along with other antimicrobials and use of probiotics as cotherapy.

Methods: An Prescription based observational study was conducted on various facets like dental infections for which antimicrobial agents were prescribed, trend of Amoxycillin-Clavulanate along with other antimicrobial agents in dentistry.

Results: Out of 100 patients, males (54.0%) outnumbered females (42.0%). The most commonly reported dental infections for which antimicrobials were advised was Acute and Chronic periodontitis (48%), followed by Acute and Chronic gingivitis (32%), Caries (11%), Post RCT (4%), Pericoronitis (3%), Oral trauma (1%) and other condition (1%). Amoxicillin-Clavulanate (50%) followed by Ornidazole (21%), Ofloxacin (20%), Doxycycline (16%), Cefixime (9%) and Ciprofloxacin (3%), were used either as monotherapy or in combinations. Only two out of hundred patients were advised for culture & sensitivity tests to aid antimicrobial therapy. Two third of (74%) of patients completed the advised antibiotic therapy while 7 patients reported, nausea and vomiting as common adverse drug reactions (ADRs).

Conclusions: In the study, acute/chronic periodontal infections were reported as the most frequent condition for which antimicrobials were advised. Amoxicillin-Clavulanate emerged as the most widely used antimicrobial, and was prescribed in 51.5% of acute and 33% of chronic dental infections. A finding worth concern, was that the antimicrobials were prescribed without antibiotic sensitivity tests in most of the cases. 7% patients reported ADR's.

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INTRODUCTION

Dental infections are among the most common infections all over the world and are the prime reason for a visit to dental practitioners. Prescriptions for odontogenic infections account for about 7% to 11% of all antibiotic prescriptions [1], of which most common diagnosis are periapical abscess (25%), pericoronitis (11%), and periodontal abscess (7%) [2]. Most of the dental infections are polymicrobial, most commonly caused by Streptococci spp., Corynebacterium spp., Staphylococcus spp., Prevotella spp., Porphyromonas spp., Fusobacterium spp., and Bacteroides spp. [2,3]. So the therapeutic success is achieved primarily by surgical debridement and/or antimicrobial therapy which is indicated in systemic involvement including fever and

lymphadenopathy[2]. However injudicious and irrational use of antibiotics including selection of antimicrobial without prior culture and sensitivity tests, inadequate dosing, improper duration of treatment, lack of follow up is now major factor contributing to resistance among oral pathogens [4,5] and thus decreasing the efficacy of antimicrobials [6]. The most commonly advised antimicrobial agent for acute dental abscesses are Amoxicillin, Metronidazole, and Erythromycin with Clindamycin as an alternate in the beta-lactam allergic patients [3]. At present Amoxicillin-Clavulanate is among the most commonly prescribed antimicrobial agent for dental infections in North Indian region along with other agents like Metronidazole and Clindamycin [7]. Reason for such an extensive use of Amoxicillin may be its comparable clinical

efficacy to other antibacterials, favourable dosage, and tolerability [8]. The purpose of this study was to find out the current trend of Amoxicillin-Clavulanic acid prescription along with other antibiotics in various odontogenic infections encountered in dentistry.

METHODS

It was an observational study conducted at the Department of Pharmacology, J.N Medical College, AMU, Aligarh and Ziauddin Ahmad Dental College, AMU, Aligarh under which 115 prescriptions of patients presenting to various OPD's of Ziauddin Ahmad Dental College, AMU, Aligarh were collected during January-June 2016 over a period of six months. Various aspects like dental conditions for which antimicrobial were prescribed, choice of antimicrobial agents for management of acute and chronic conditions were analysed and tabulated and the final data was expressed as counts and percentages. Finally conclusions were figured out regarding the current practices and trends for the use of Amoxicillin-Clavulanic acid along with other antimicrobial in different orodental infections and adverse effects and patient compliance related to them.

RESULTS

A total of 115 prescriptions were collected, out of which 100 were included in the study. 15 prescriptions were excluded as the patients were reluctant and had discontinued the antimicrobial therapy. Most of patients with odontogenic infections were males (54%) and were in age group of 31-40 years. Maximum number of males (39%) were in age group 21-30 while females (43%) were in majority in 31-40 age group. (Table 1).

Table 1 Distribution of patients according to age and gender.

Age group of patients (Years)	No of patients(n)	Males(n)	Females(n)
0-10	00	00	00
11-20	11	04	07
21-30	30	21	09
31-40	31	11	20
41-50	20	14	06
51-60	07	03	04
61-70	01	01	00
71-80	00	00	00
Total	100	54	46

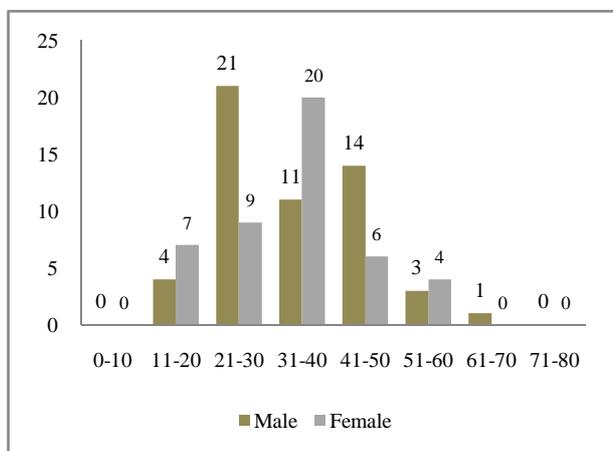


Chart 1 Distribution of patients according to age and gender.

Acute/chronic periodontitis (48%) followed by Acute/chronic gingivitis (32%), Caries (11%), Post RCT (4%), Pericoronitis

(3%) and Oral trauma (1%) were the most frequently reported odontogenic infections for which antimicrobials were prescribed by practitioners. (Chart 2).

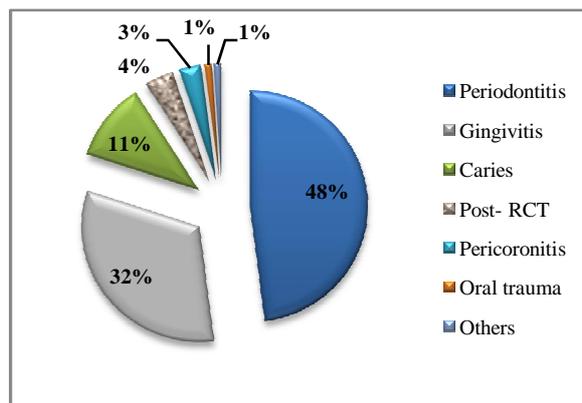


Chart 2 Distribution of the conditions for which antimicrobial were prescribed.

Table 2 Number of Acute/Chronic cases among Dental conditions for which antimicrobial were prescribed.

Conditions for which antimicrobials were advised	Acute cases	Chronic cases	Total
Periodontitis	05	43	48
Gingivitis	12	20	32
Caries	00	11	11
Post- RCT	04	00	04
Pericoronitis	03	00	03
Oral trauma	01	00	01
Others	01	00	01
Total	26	74	100

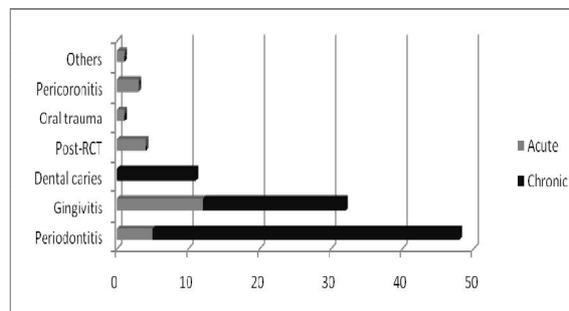


Chart 2 Acute/Chronic cases among Dental conditions for which antimicrobial were prescribed.

Among the antibiotics, Amoxicillin-Clavulanate cotherapy (41.3%), which was advised in 50 patients, was the most common antimicrobial agent. Other antimicrobials prescribed were Ornidazole (17.4%), Ofloxacin (16.5%), Doxycycline (13.2%), Cefixime (7.4%) and Ciprofloxacin (2.5%) which were used either as monotherapy or in combination.

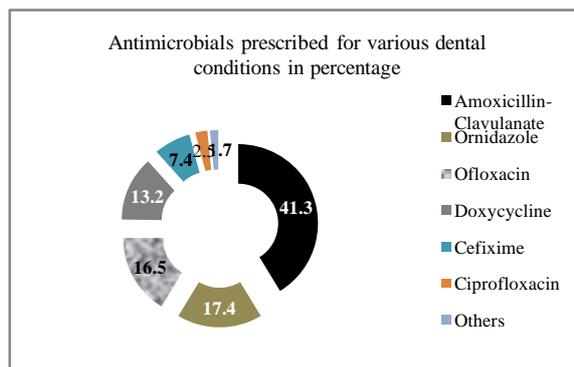


Chart 3 Antimicrobials prescribed for dental conditions in percentage.

Table 4 Chronicity of conditions for which antimicrobials were prescribed.

Conditions for which Antimicrobials were advised	Acute cases n(%)	Chronic cases n(%)	Total n(%)
Amoxicillin-Clavulanic acid	17(51.5)	33(37.5)	50(41.3)
Ornidazole	4(12.1)	17(19.3)	21(17.4)
Ofloxacin	3(9.1)	17(19.3)	20(16.5)
Doxycycline	1(3.0)	15(17.0)	16(13.2)
Cefixime	5(15.1)	4(4.6)	9(7.4)
Ciprofloxacin	1(3.0)	2(2.3)	3(2.5)
Others	2(6.2)	0(0)	2(1.7)

Amoxicillin-Clavulanate was the most common, and was used in 17(51.5%) patients followed by Cefixime and Ornidazole which were advised in 5(15.1%) and 4(12.1%) patients respectively. On the other hand for chronic conditions, Amoxicillin-Clavulanate 33(37.5%), Ornidazole 17(19.3%), Ofloxacin 17(19.3%) and Doxycycline 15(17.0 %) were most commonly used.

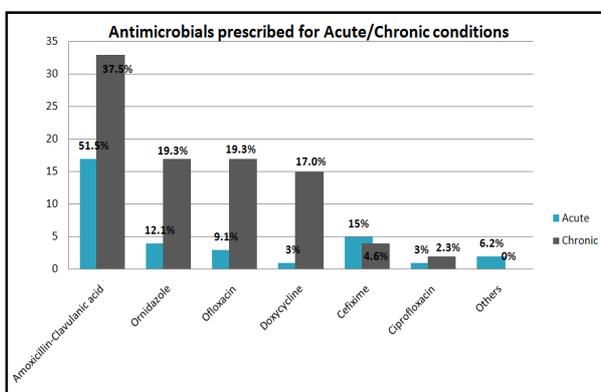
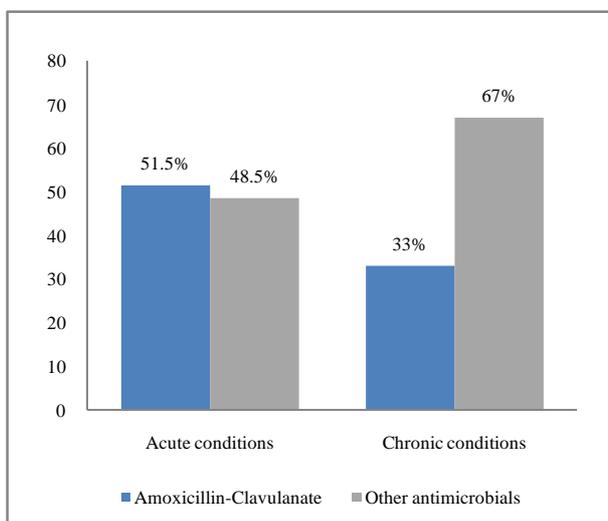


Chart 4 Distribution of antimicrobials prescribed in acute and chronic conditions.

Overall comparison between antimicrobials showed that in Acute conditions, Amoxicillin-Clavulanate was prescribed in 51.5% patients while other antibiotics were prescribed in 48.5% cases. However in chronic infections, the prescription of Amoxicillin-Clavulanate was 33% as compared to 67% of other antimicrobials, but still Amoxicillin-Clavulanate was most frequently advised antimicrobial in both acute and chronic infections.



Only two patients out of 100 were advised culture and sensitivity test before initiating antimicrobials. These patients were having chronic periodontitis with type 2 Diabetes Mellitus. 4 patients reported adverse drug reaction of which nausea and vomiting were most common. Probiotic supplements along antimicrobials were used in 4(4%) patients.

DISCUSSION

The purpose of the study was to find out the current trend of Amoxicillin-Clavulanate prescription and comparing it with other antimicrobials along with the dental conditions for which were used by dental practitioners at a tertiary care centre in North India. Data was tabulated from the 100 prescriptions which were collected from various OPDs of tertiary dental care centre. In the study it was found that the majority of patients (31%) were between age group 31-40 yrs with overall male (54%) dominance in numbers, which may be attributed to poor oral hygiene and tobacco chewing habit in North India.[9,10]. For the sake evaluation of the antibiotics prescription pattern, dental conditions were categorized into acute and chronic infections. The study showed that the Periodontitis (48%) was the most common dental condition for which antimicrobial agents were prescribed, of which 43(89.6%) cases were having chronic periodontitis while 5(10.4%) patients came with acute periodontitis. Second most common dental condition was Gingivitis (32%) with 12(37.5%) acute and 20(62.5%) chronic gingivitis cases. It was followed by dental caries (11%), post RCT infections (4%), pericoronitis (3%), oral trauma cases (1%) and one case of maxillary swelling (1%). This was in accordance with a study in North India by Pushp *et al* [11] which also reported soft tissue infection and chronic periodontitis as most common acute and chronic conditions treated with antimicrobials respectively. However another study by Gowri *et al* [7] reported post dental extraction (30.8%) and dental abscess (21.6%) as the most common indications for antibiotic use followed by Periodontitis (7.5%), Gingivitis (5%) which were less common.

Another important finding in our study was that the Amoxicillin-Clavulanate cotherapy 50(41.3%) was the most frequently used antimicrobial in both acute as well as chronic conditions. It was followed by Ornidazole 21(17.4%), Ofloxacin 20(16.5%), Doxycycline 16(13.2%) Cefixime 9(7.4%) and Ciprofloxacin 3(2.5%). However the choice of antimicrobial agent was not same in acute and chronic conditions as it was found that Amoxicillin-Clavulanate (51.5%), Cefixime (15.1%) Ornidazole (12.1%) were prescribed for acute cases while Amoxicillin-Clavulanate(37.5%), Ornidazole (19.3%) Ofloxacin (19.3%) and Doxycycline (17.0%), were preferred in chronic conditions. Antibiotics Prescribing Guidelines[12,13] also recommends Amoxicillin or Metronidazole as the first choice agents for acute cases while for Metronidazole and Doxycycline as first and second choice agents in chronic conditions, supporting the findings of the study. Another study by Gowri *et al* [7] reported similar findings according to which Amoxicillin was the most frequently prescribed agent for management of dental infections followed by Metronidazole, Amoxicillin-clavulanic acid cotherapy, Ofloxacin with Ornidazole, Ciprofloxacin and, Doxycycline. Palmer *et al* from England and Vessal *et al* from Iran also mentions Amoxicillin as preferred antimicrobial agent in acute dental infections where it was advised 70.5% and 74.5% respectively in those

countries while for chronic infections Beta-lactam antimicrobials (Penicillins and Cephalosporins 42%), Nitroimidazoles (24%), Fluoroquinolones-Nitroimidazoles (15%) and Tetracyclines (4%) were preferred antimicrobials.[14,15,16].

On the basis of our data and other studies from the same region, it can be concluded that Amoxicillin-Clavulanate cotherapy is now preferred antimicrobial for management of acute as well as chronic dental infections [17,7]. Preference of Amoxicillin-Clavulanate cotherapy over other antimicrobials may be due to its efficacy in infections by gram positive bacterial infections, lower adverse effects and selective marketing in favour of Amoxicillin-Clavulanate[17]. Another reason for such an extensive use of the antimicrobial may be its comparable clinical efficacy to other antibacterials, favourable dosage, and tolerability [18]. Although most of the antimicrobials were prescribed in accordance with Antibiotic Prescribing Guidelines however, a discouraging finding was that, the culture sensitivity tests prior to antimicrobial therapy were advised in only two patients. Delay in management and patients compliance could be a reason for this as the culture sensitivity reports are available only after 72 hrs. Also the use of probiotic supplements along with antimicrobials was minimal (4%), thus adding the risk of damage to intestinal flora and associated diarrhoea [19, 20].

CONCLUSIONS

Our findings confirms the results from other studies which concludes that the periodontal diseases are the most common presentation at dental out patients departments, followed by acute/chronic gingivitis for which antimicrobials agents are prescribed. Also we found that the Amoxicillin-Clavulanate was the single most frequently prescribed antimicrobial for the management of both acute as well as chronic dental infections. Among other antimicrobial agents Cefixime was frequently prescribed for acute infections while Ornidazole and Ofloxacin were preferred agents in chronic dental infections. Thus Amoxicillin-Clavulanate co-therapy emerges out to be preferred antimicrobial in both acute and chronic odontogenic infections. However, such a widespread use of the antimicrobial agent as empirical therapy without confirming the causative pathogen and its sensitivity pattern might decrease its efficacy and introduction of resistance. Further studies are required to relate it with emergence of resistance in gram positive organisms against Amoxicillin-Clavulanate. So there is a need to create awareness among healthcare providers and achieving rationality in prescriptions of antimicrobials to check adverse effects and emergence of resistance among pathogens.

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