

LETTER TO THE EDITOR

Antibiotic therapy in oral surgery: a cross sectional survey among Italian dentists

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To the Editor,

Antibiotic prescription for oral surgery procedures and infective disease represents a highly debated topic in dentistry. As is well known from the literature, oral microbiome is composed by 700 taxa, of which 170 are also isolated in the blood stream, and it is also well known that oral procedures, invasive or non, are involved in transient bacteremia (1). It is for that reason we decided to conduct a study to better understand what kind of antibiotic therapy or prophylaxis was mostly used in order to avoid local and systemic complications. This is a cross-sectional study describing Italian dentists' knowledge in Abruzzo (Italy) in 2012 regarding the use of antibiotic prophylaxis in certain oral surgery procedures, as well as the molecule choice, dosage, modality and the timing of administration. As a secondary aim, we decided to investigate the knowledge and use of the antibiotic scheme proposed by the American College of Cardiology/American Heart Association (ACC/AHA) in 2008 for the IE prophylaxis (2).

MATERIALS AND METHODS

One thousand questionnaires were sent by mail to dentists in private practices in Abruzzo, of which only 93 were filled in anonymously and returned for review. The questionnaire was made up of 8 questions based on essay questions and multiple choice. Only one question was

related to the use of the scheme for Infective Endocarditis prophylaxis proposed by the ACC/AHA in 2007, whereas five questions concerned oral surgery, antibiotic administration, chosen drugs, administration via, amount and timing.

In 2007, the American Heart Association revised the guidelines for the prevention of Infective Endocarditis, establishing that a single oral administration of 2 grams of Amoxicillin 30 to 60 minutes before the dental procedure was sufficient to protect from an infective event. Other possibilities related to the impossibility of oral subadministration, as in allergic patients, are described in Table I (2). Each dentist who participated in the anonymous study was required to report only their graduation year and the university they attended. The collected data were tested for statistical analysis.

RESULTS

The survey was conducted in an Italian region, Abruzzo, of about 1,300,000 people. As previously indicated, 1,000 anonymous questionnaires were sent by mail. Only 93 dentists participated in the study, and they all graduated between 1973 and 2009. The reason for which the remaining (907 dentists) did not cooperate is unknown, and only one of them justified their non-participation in the questionnaire due to an internship in England. With reference to their graduations, 64 of them achieved their degree in

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the University "G. d'Annunzio" of Chieti and in the University of L'Aquila, both located in Abruzzo cities. The remaining 29 dentists completed their studies in other Italian universities.

The analyzed data showed that 53.06% of the dentists were used to prescribing antibiotic coverage for all oral surgeries, 25.51% only in case of infective complications, and 20.41% solely in interventions with flap preparation. The molecule choice was amoxicillin, of which 24.3% used it pure, 21.5% in association with clavulanic acid, whereas 7.48% used clarithromycin. The remaining 46.72% used a variety of molecules belonging to the group of penicillins, macrolide, cephalosporins and lincosamides, although in low doses. The first choice for administration was oral in 65.26%, followed by 2.11% through intramuscular administration. Surprisingly 30.53% declined answering this question. In regard to antibiotic posology, 42.71% did not answer, and 37.5% administered 1g/bis in die. Antibiotic administration was started in 34.38% of cases the day

before the surgical operation, in 19.79% of cases the same day, and in 15.63% two or more days before. Administration lasted up to 5/6 days in 51.06% of cases, and also in this case 30.85% did not give an answer. The scheme proposed by the ACC/AHA in 2008 for the prophylaxis of infective endocarditis was used by 52.69% of dentists, with no response in 10.75%. Last, but not least, it emerged that the main reason that influenced the choice of the antibiotic molecule was in 30.25% a summoned "clinical efficacy" and only in 15.97% a review of the literature, or the application of guidelines, was considered.

DISCUSSION

The debate on antibiotics in dental procedures has always been controversial, especially in the field of oral surgery and in the need to prevent infections in surgical sites or infections of distant organs (involving principally the endocardium), and avoiding overtreatment and possible side effects,

Table I. (From Wilson 2007, modified)

Regimen for a Dental Procedure			
		Regimen: single dose 30 to 60 min before procedure	
Situation	Agent	Adults	Children
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin	2 g IM or IV	50 mg/kg IM or IV
	OR Cefazolin or Ceftriaxone	1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillins or ampicillin-oral	Cephalexin	2 g	50 mg/kg
	OR Clindamicin	600 mg	20 mg/kg
	OR Azithromycin or Clarithromycin	500 mg	15 mg/kg
Allergic to penicillins or ampicillin and unable to take oral medication	Cefazolin Or Ceftriaxone	1 g IM or IV	50 mg/kg IM or IV
	OR Clindamycin	600 mg IM or IV	20 mg/kg IM or IV

IM: intramuscular

IV: intravenous

high costs and antibiotic resistance related to their use. According to our data, practitioners are more likely to prescribe antibiotic therapy for any kind of oral surgical procedure, thereby disregarding the fact that patients could be high or low risk patients. According to Lodi et al., the use of antibiotic prophylaxis led to a lower risk of infection, dry sockets and pain following third molar extraction and resulted in an increase in mild and transient adverse effects. In the same paper the authors highlighted the fact that, due to an increasing prevalence of bacteria which are resistant to treatment by current available antibiotics, clinicians should carefully consider whether treating 12 healthy patients with antibiotics to prevent one infection is likely to do more harm than good (3). Singh et al. shared the same opinion, and concluded that clinicians should decide on the actual need to use antibiotics after a careful evaluation of the risks in developing an allergic reaction or antibiotic resistance (4). Menon et al. examined data related to 1,615 tooth extractions over 5 years in clinical records of 992 patients. Antibiotics were prescribed postoperatively in 44% of the extractions. The overall infection rate was 2.05%. There was no significant difference in infection rates between the groups which underwent extractions with or without antibiotics (OR = 0.68; $P = 0.289$). We found a significantly higher risk for infections with increasing age ($P = 0.002$) (5).

According to one systematic review, literature reveals ambivalent results in antibiotic use for dentoalveolar procedures, such as third molar or implant surgery (6). In our study, amoxicillin was the antibiotic of choice for oral surgery, although it was preferably used by only 24.3% of the operators examined, and 1.87% used ampicillin which has the same spectrum of amoxicillin, but it is absorbed less and has more gastro-intestinal side effects.

The combination of amoxicillin and clavulanic acid was used by 21.5%, and should be considered a second choice antibiotic; this is probably due to the killing strategy of beta-lactamase-producing bacteria. Macrolides (erythromycin, spiramycin, clarithromycin, roxithromycin) were prescribed for a total of 13.08%, but clarithromycin is a second choice antibiotic for all, though it becomes the first choice for the treatment of penicillins-allergic patients. Other

antibiotics were not considered as the first choice, such as Lincosamides and Cephalosporins, which are normally considered as reserve antibiotics for the treatment of bone infections or anaerobic infections refractory to common treatments. These data seem to concur with the literature. Thornhill et al. (2019) pointed out amoxicillin as molecule of choice, leaving other drugs as second-rate therapy (7). The preferred administration route was oral, as also emphasised by the literature. Crincoli (2014) noted that there is no difference between oral and intramuscular via, with the exception of reduced gastrointestinal disorders related to oral administration (8).

With regard to posology, 42.71% did not give an answer and 37.5% administered 1g every 12 hours, even though no one indicated the reason for that kind of timing. In accordance with the literature, there is no advantage in postoperative recovery following or not an antibiotic scheme of therapy in healthy patients (9). Only 15.97% answered that molecule choice was related to a review of scientific literature, while other responses indicated that the drug choice was based on pharmacokinetic characteristics (good absorption in bone tissue 1.68%, better absorption 0.84%, elimination path 0.84%). Finally, there is still someone who nowadays relies on the experience of others (4.2%) and on the greater knowledge of a given molecule (1.18%).

With reference to Taubert and Wilson (2017), it seems that there is no need for infectious endocarditis (IE) prophylaxis for dental treatments, except for surgery, such as tooth extraction, in patients with cardiac problems. It is due to this fact that normal dental procedures imply a transient bacteremia, and IE prophylaxis does not seem to avoid it. For that reason the UK has deleted IE prophylaxis entirely, while the USA and European societies have not (10).

According to our data, it emerges from this study that there is an irrational choice about the use of antibiotics, and prescribing it for all oral surgery procedures. As well stated in literature, these habits could lead to an antibiotic lack of efficacy due to induced resistance. In light of this, patients who do not need antibiotic prophylaxis should receive a careful post-operative follow-up, and only when there is an actual onset of infection signs or symptoms, a

correct antibiotic therapy should be undertaken, which has been proved conclusive in literature, in controlling a confirmed infection.

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