Preventive administration of oral antibiotics for minor oral surgery

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We designed a questionnaire to study how oral surgeons and general practitioners prescribe antibiotics for infection control during oral surgery. The results suggested that the criteria for administration of antibiotics are not well understood by all dentists. This problem could be improved by making free use of communication networks to provide antimicrobial prophylaxis information. Further, the criteria for antibiotic administration should be updated in dental school curriculums. (J Osaka Dent Univ 2009; 43: 143–147)

Key words: Antibiotics; Oral surgery

INTRODUCTION

Precise infection control in the operation field during and after oral surgical procedures such as tooth extraction and cyst enucleation affects the prognosis during minor surgery. Infection control not only requires disinfection of the surgical field, sterilization of instruments and preoperative hand-washing, but also the use of preventive medications such as oral antibiotics.1 Although the procedures and techniques for surgery are well known, exact criteria for the use of prophylactic antibiotics during oral surgery are still not well established. Many dentists prescribe antibiotics based on their own experience or personal preference.

We designed a questionnaire for oral surgeons and general practitioners to determine what medicines are most often prescribed. We analyzed the information obtained and attempted to standardize the prescription of antibiotics for routine minor oral surgery.

MATERIALS AND METHODS

The questionnaire was filled out by 78 randomly selected oral surgeons (OS group) of the First Department of Oral and Maxillofacial Surgery, Osaka Dental University, and 25 general practitioners (GP group) in Osaka Prefecture. The form contained 1) age of the dentist, 2) initiation of administration, 3) type of antibiotic, 4) dosage, 5) duration of administration, 6) reason(s) for administration, 7) assessment of effect, and 8) dentist’s knowledge of guidelines for antimicrobial prophylaxis. The survey was carried out during the three years 2003, 2006 and 2008 for the OS group, and during 2003 for the GP group.

RESULTS

OS group

The results for the 25 respondents for years 2003 and 2006, and the 28 respondents of the year 2008 were as follows.

Age of the respondent

The ages of the dentists ranged from 27 to 62 (average 37) years for 2003, from 27 to 60 (average 37) years for 2006, and from 25 to 59 (average 33) years for 2008.

Initiation of administration

Post-operative administration, after returning home, was most frequent; 72% in 2003, 54% in 2006, and 57% in 2008. In contrast, the data showed that 16% of the dentists preferred pre-operative administration of medication in 2003, while 12% preferred administration immediately after the surgery in 2006, and 39% preferred this method in 2008 (Table 1).

Type of antibiotic

Cefcapene-pivoxil (cephem) was the most com-
monly used antibiotic in the 2003 (40%) and 2008 (54%), while lenampicillin (penicillin) was the next in 2003 (36%) and 2008 (36%). In contrast, in 2006 lenampicillin was most frequently prescribed (56%), and cefcapene-pivoxil was the next (36%) in 2006 (Table 2).

**Dosage**
Administration three times a day was most frequent (84% in 2003, 88% in 2006 and 93% in 2008; Table 3).

**Duration of administration**
The medication was administrated for three days in most cases (44% in 2003, 48% in 2006 and 68% in 2008). It was administrated for 4–5 days (32% in 2003, 44% in 2006 and 25% in 2008) by some dentists. A duration of either 6–7 days (12%) or more than 7 days (4%) was answered by some respondents in the 2003 OS group (Table 4).

**Reason for administration**
Many of the OS group (52% in 2003, 42% in 2006 and 64% in 2008) prescribed the medication based on advice from superiors or senior oral surgeons (Table 5).

**Assessment of effect**
The data indicated that the majority of the OS
Table 5  Reasons for administration

<table>
<thead>
<tr>
<th></th>
<th>Oral surgeons</th>
<th>General practitioners</th>
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<tbody>
<tr>
<td>Personal experience</td>
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<td>16</td>
</tr>
<tr>
<td>Recommendation from scientific</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Advice of pharmacy or manufacturer</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>Co-workers used this medicine</td>
<td>52</td>
<td>42</td>
</tr>
<tr>
<td>No specific reason</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
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<td>4</td>
</tr>
</tbody>
</table>

(%)  

Table 6  Assessment of effect

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<th>General practitioners</th>
</tr>
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<td>24</td>
</tr>
<tr>
<td>Satisfied</td>
<td>72</td>
<td>60</td>
</tr>
<tr>
<td>Dissatisfied</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Very dissatisfied</td>
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<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

(%)  

Table 7  Dentist's knowledge of guidelines for antimicrobial prophylaxis

<table>
<thead>
<tr>
<th>Knowledge</th>
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<th>General practitioners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper understanding</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>General understanding</td>
<td>88</td>
<td>60</td>
</tr>
<tr>
<td>No understanding</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

(%)  

group (72% in 2003, 60% in 2006 and 54% in 2008) were fairly satisfied with the therapeutics (Table 6).

Dentist's knowledge of guidelines for antimicrobial prophylaxis

Most of the respondents (88% in 2003, 60% in 2006 and 50% in 2008) answered that they had heard of "The Criteria for a Proper Prescription of Antibiotics." On the other hand, some OS group dentists (32% in 2006 and 36% in 2008) answered that they had never heard it (Table 7).

Comparison of the OS group (25 dentists) with the GP group (25 dentists), especially in 2003

Age of the dentist

The age of the OS group was between 27 and 62 (average 37) years, while the GP group was between 27 and 69 (average 39) years.

Initiation of administration

Post-operative medication for the patient to take after returning home was most frequent in both the OS group (72%) and GP group (64%). We found that some of the OS group (16%) preferred pre-operative administration, while some of the GP group (20%) preferred immediate post-operative administration under supervision in the hospital or clinic (Table 1).

Type of antibiotic

Cephem (52% and 68%) and penicillin (44% and 32%) were the first choices in the OS and GP groups, respectively. The data indicated that the OS group had a preference for cefcapene-pivoxil (52%) over lenampicillin (44%). In the GP group, 12% prescribed cefcapene-pivoxil, 16% prescribed cefasirnir, 16% prescribed cefalexin, 12% prescribed cefditoren-pivoxil, and 12% prescribed amoxicillin. We observed that lenampicillin was more often used by the OS group (36% in 2003, 56% in 2006 and 36% in 2008) than by the GP group (8% in 2003; Table 2). Also, we found that lenampicillin (36%, 56% and 36% in the 2003, 2006 and 2008 OS groups, respectively; 8% in the 2003 GP group) was the second choice following cefcapene-pivoxil (40%, 36% and 54% in the 2003, 2006 and 2008 OS groups, respectively; 12% in the 2003
GP group; Table 2).

**Dosage**
Most dentists in both the OS (84%) and GP (84%) groups prescribed the medication to be taken three times each day for minor oral surgery (Table 3).

**Duration of administration**
In 2003, administration for three days was more common in the GP group (72%) than in the OS group (44%). In contrast, we noticed that 32% of the OS group prescribed antibiotics for four to five days, and that 20% of the GP group prescribed medication for only 2 days (Table 4).

**Reason for administration**
We found that most dentists prescribed antibiotics based on the advice of superiors or senior doctors (Table 5).

**Assessment of effect**
The survey found that most dentists in both the OS (72%) group and GP (76%) group were fairly satisfied with the therapeutics they prescribed (Table 6).

**Dentist’s knowledge of guidelines for antimicrobial prophylaxis**
Most of the OS respondents had a general understanding (88%) of the criteria for antimicrobial prophylaxis, but 56% of the GP dentists had no understanding of the criteria (Table 7).

**DISCUSSION**

The Center for Disease Control and Prevention (CDC) in the United States has published “CDC Infection Control Guidelines -Prevention of Surgical Site Infection” since 1999. The guidelines suggested that clean and semi-clean surgeries should be pre-medicated with 1st- or 2nd-generation cephem, while more involved operations should receive additional doses of the cephem.\(^2\)\(^3\) However, long duration administration of antibiotics was not recommended.\(^4\)\(^6\) These are for routine cases, as well as general guidelines for hospitalized gastrointestinal and general surgeries. We think that the same degree of infection control should be established whether the operation is a in a dental office or in a hospital, and regardless of the degree of invasiveness.

For maintaining an effective serum concentration of the preventive medication of antibiotic, pre-operative chemotherapy is better than post-operative chemotherapy.\(^10\) According to the survey, however, most dentists in both the OS and GP groups prescribed post-operative medications (for after returning home) for infection control; oral surgeons prescribed pre-operative medication less frequently. We found that both groups favored 3rd generation cephems; penicillins were also frequently prescribed for infection-control. While antibiotics are usually used during oral surgery, a proper cephem or penicillin should be selected based on susceptibility tests for identification of specific microbial strains causing infectious diseases (Ohkubo et al, 2003).

In principle, the long term use of prophylactic antibiotics is not advisable.\(^3\) Although the results showed that the prophylactic antibiotics were most often prescribed for a duration of three days, they were often prescribed for two days and for four to five days by both groups; the OS group had a tendency for more long-term use of antibiotics. We found that many dentists quite routinely prescribed antibiotics (including cephems, penicillins and penems) at a dosage of three times per day. While the recommended frequency of dosage is generally three times per day for 3rd generation cephems, four times a day is necessary to maintain effective serum concentration of lenampicillin. These results show the need for dentists to be aware of the appropriate dosage of antibiotics. The results also led us to conclude that doctors should prescribe medications based on scientific evidence and not just custom. On the other hand, we realize that antibiotics are useful for preventive infection control; both the OS and GP groups confirmed this in their answers. Concerning knowledge of “The Criteria for a Proper Prescription of Antibiotics," we noticed that the OS group had good understanding (8–14% proper and 50–88% general understanding), but the GP group had less understanding (44% general and 56% without understanding) of the guidelines for antimicrobial prophylaxis.

The results of the survey revealed that the significance and details of the criteria for prescribing anti-
biotics for minor oral surgery are not clearly understood by all dentists. We propose that dentists should be able to obtain up-to-date information on a preventive antibiotic chemotherapy through the internet, meetings and research papers. Further, we propose that the criteria for antibiotics therapeutic administration should be updated in dental school curriculums.

REFERENCES