To Prescribe or Not To: Systemic Antibiotics in Treatment of Periodontal Infections

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Abstract: Periodontitis is a chronic infection induced by a mélange of microfloral aetiology. The first line of treatment by and large includes non-surgical mechanical debridement and regular periodontal maintenance care. In some cases surgical intervention may be indicated to improve access to the root surface for meticulous debridement. An array of systemic antimicrobials available as adjuncts for treatment of periodontitis has been recorded. While some studies claim superior clinical outcomes following inclusion of these, others do not. A controversy was born as to question the role of systemic antibiotics in the treatment of periodontal diseases. Recent orderly reviews have bestowed an evidence-based assessment of the possible perks of adjunctive antibiotics in periodontal therapy. This review aims to provide an update on clinical issues of when and how to prescribe systemic antibiotics in periodontal therapy.

Keywords: periodontitis, adjunctive therapy, systemic antibiotics, root planning.

1. Introduction

The objective of this review is to render the clinician an updated current literature regarding the use of systemic antibiotics in periodontal treatment. While the use of systemic antimicrobials for treatment of periodontitis has been controversial, the recent publication of two systematic reviews has provided an even-handed evidence-based assessment of the possible advantages of systemic antibiotics. This paper will discuss some important clinical questions regarding when and how to use systemic antibiotics for the treatment of periodontal disease.

2. To Use Or Not To Use In The Treatment Of Periodontal Infections

A meta-analytical study indicated that systemically administered antibiotics provide a clear clinical benefit in terms of mean periodontal attachment level “gain” post-treatment when compared with groups not receiving these agents. Subjects with aggressive periodontitis showed greater benefit than subjects with chronic periodontitis. The Sixth European Workshop of Periodontology concluded that there is no direct evidence to recommend a specific protocol for the adjunctive use of the antimicrobials.

2.1 Are adjunctive systemic antibiotics expedient over surgical mechanical therapy alone?

Deficiency of access for effective mechanical debridement calls for surgical intervention. An additional clinical attachment level gain (weighted mean gain 0.6 mm) was reported in a systematic review by Haffajee et al. which encompassed prescribing systemic antibiotics as an adjunct to surgical mechanical debridement in deep pockets. The results of three studies using different antibiotics (tetracycline, penicillin, amoxicillin plus clavulanate) were merged in this meta-analysis comparing periodontal surgery plus adjunctive antibiotic versus periodontal surgery plus placebo.

However, Hererra et al. in his most recent review of the literature, concluded that there was deficient data supporting additional benefits of adjunctive antibiotics when combined with periodontal surgery. Haynes et al in 1992 stated the results of a meta-analysis, however, did not demonstrate an additional benefit of the systemic administration of tetracycline.

Similarly, Elter et al. 1997 suggested that the additional benefit of the systemic metronidazole was not evident after a thirteen week follow-up period. Contrary to the above findings a recent systematic review and meta-analysis by Sgolastra F, et al. 2012 seems to support the combined systemic administration of amoxicillin and metronidazole adjunctively to scaling and root planning. However, due to the small number and discrepancy regarding dosages of the included studies, no judgement could be made. Although the cost effectiveness of this therapeutic modality, the risk of inducing bacterial resistance should be taken seriously into considerations before antibiotics are prescribed as adjuncts of the nonsurgical periodontal therapy.

Although an additional clinical benefit of adjunct systemic antibiotics has been described, it would be wise not to use this remedy routinely but only in cases of refractory or aggressive periodontitis so that the risk of developing antibiotic resistance is substantially reduced.

While these reviews indicate that, on average, the antibiotics contribute to therapeutic success, they fail to answer a number of critical questions.
The optimal timing of antimicrobial drug administration is consecutive days is required as opposed to one tablet three times a day for seven days with other antibiotic regimens.

Significance of compliance as a part of oral hygiene and maintenance care should also be delivered. It should be noted that, in studies where beneficial results following adjunctive antibiotics were reported, patients had received optimum maintenance care and had good plaque control. If a patient was belligerent with protocols of oral hygiene maintenance, then a benefic treatment causatum following adjunctive antibiotics was implausible. Prescription of antibiotics is no proxy for meticulous debridement, good oral hygiene technique and regular maintenance care.

4. Conclusion

The clinical diagnosis and situation dictate the need for possible antibiotic therapy as an adjunct in controlling active periodontal disease as the patient's diagnosis can change overtime. Continuing disease activity is an indication for periodontal intervention and possible microbial analysis.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Antibiotic regimen</th>
<th>Periodontal disease as described by authors</th>
<th>First author / year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetracycline</td>
<td>250 mg, 4 x day, 14 days</td>
<td>Advanced chronic periodontitis</td>
<td>Al Joburi, 1989⁵⁸</td>
</tr>
<tr>
<td>Doxycycline</td>
<td>200 mg, 1 x day, 8 days</td>
<td>Generalized rapidly progressive periodontitis</td>
<td>Sigusch, 2001⁵⁹</td>
</tr>
<tr>
<td>Spiramycin</td>
<td>1.5 U, 2 x day, 14 days</td>
<td>Advanced periodontal disease</td>
<td>Bain, 1994⁴⁰</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>500 mg, 1 x day, 3 days</td>
<td>Aggressive periodontitis</td>
<td>Haas, 2008⁵⁹</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>250 mg, 3 x day, 7 days</td>
<td>Periodontitis ≥10% spirochetes</td>
<td>Slots, 2001⁴¹</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>150 mg, 4 x day, 10 days</td>
<td>Refractory periodontitis</td>
<td>Slots, 2001⁴¹</td>
</tr>
<tr>
<td>Amoxicillin and Metronidazole</td>
<td>375 mg, 3 x day, 8 days</td>
<td>Chronic periodontitis</td>
<td>Walker, 1993⁴²</td>
</tr>
<tr>
<td></td>
<td>250 mg, 3 x day, 8 days</td>
<td>presence of A.a, P.g</td>
<td>Flemming, 1998⁴³</td>
</tr>
</tbody>
</table>

3. Patient compliance : A crucial perspective

The concern of patient compliance has been intermittently documented in publications assessing the effects of systemic antibiotics. Some studies have demonstrated patient compliance, with antibiotic regimens prescribed, to be as little as 20 percent.⁵⁹

Antibiotic azithromycin, due to its pharmacologic properties and long half life, may be advantageous over other antibiotic regimens as only one tablet (500 mg) per day during three consecutive days is required as opposed to one tablet three times a day for seven days with other antibiotic regimens.²⁰

Significance of compliance as a part of oral hygiene and maintenance care should also be delivered. It should be noted that, in studies where beneficial results following adjunctive antibiotics were reported, patients had received optimum maintenance care and had good plaque control. If a patient was belligerent with protocols of oral hygiene maintenance, then a benefic treatment causatum following adjunctive antibiotics was implausible. Prescription of antibiotics is no proxy for meticulous debridement, good oral hygiene technique and regular maintenance care.
through plaque sampling. Also, cases of refractory or aggressive periodontitis may indicate the need for antimicrobial therapy. When used to treat periodontal disease, antibiotics are selected based on the patient’s medical and dental status, current medications, and results of microbial analysis, if performed. Microbial samples may be obtained from individual pockets with recent disease activity or from pooled subgingival sites. A pooled subgingival sample may provide a good representation of the range of periodontal pathogens to be targeted for antibiotic therapy. Plaque sampling can be performed at the initial examination, root planing, reevaluation, or supportive periodontal therapy appointment. Systemic antibiotic therapy should be an adjunct to a comprehensive periodontal treatment plan. An antibiotic strength 500 times greater than the systemic therapeutic dose may be required to be effective against the bacteria arranged in the biofilms. Therefore, it is important to disrupt this biofilm physically so that the antibiotic agents can have access to the periodontal pathogens. Antibiotics have also been shown to have value in reducing the need for periodontal surgery in patients with chronic periodontitis. Risks and benefits concerning antibiotics as adjuncts to periodontal therapy must be discussed with the patient before the antibiotics are used.

References


