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Guest Editorial

Antimicrobial profiles of periodontal pathogens and systemic antimicrobial therapy

Focused Perspective on van Winkelhoff et al., J Clin Periodontol 2005; 32: 893–898

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The publication in this month's issue of a paper by van Winkelhoff et al. (2005) serves as an opportunity to discuss the use of antibiotics in periodontics and the utility of supplementary diagnostics to guide such therapy.

In recent years, it has become clear that the addition of systemic antimicrobials to mechanical periodontal therapy can be beneficial. Studies have repeatedly demonstrated more clinical attachment gain, better reduction of probing depths, and reduced risks for further loss of attachment in patients treated with mechanical means plus systemic antibiotics. Given the relatively low costs of antimicrobial agents in relation to the costs of potentially avoidable further mechanical therapy, a general recommendation to adjunctively administer antibiotics routinely would probably be defendable from a purely economic point of view. Such a recommendation would however be in contrast to the current general consensus that the use of these drugs should be restricted to specific groups of patients, for example those with very deep pockets, highly active disease, or a specific microbiological profile. Studies have indicated that certain antimicrobial regimes, particularly the combination of amoxicillin plus metronidazole, are exceptionally efficacious to suppress microorganism that are difficult to suppress with mechanical means alone. Microbiological testing has thus been advocated to identify subjects that harbour these organisms. However, other studies show considerable adjunctive benefits to mechanical treatment of the same regimen even in the absence of specific target organisms (e.g. Rooney et al. 2002). In fact, one could argue that nobody has ever shown certain patients to be better off, if treated *without* antibiotics.

The arguments to restrict the use of adjunctive systemic antimicrobials are the avoidance of unwanted systemic effects in treated subjects, and the prevention of resistance development in microorganisms in general. While these concerns are certainly real and well founded, to date we lack models that enable us to calculate under which specific circumstances the benefit of systemic antibiotics outweighs the costs and risks for unwanted effects – for the patient, and for society. In a systematic review focusing on the question of whether microbial testing influenced the management of patients with periodontal diseases (Listgarten & Loomer 2003), 13 studies were identified reporting on microbiological identification as an aid in treatment planning, and 11 studies reporting a differential clinical response depending on the detection or lack of detection of specific organisms. So far it has however not yet been evaluated to what extent microbiological testing prevents unwanted effects of periodontal therapy, or reduces the development of microbial resistance to antibiotics.

The paper by van Winkelhoff et al. in this issue adds another facet to this discussion. Based on reports of higher antibiotic resistance among human pathogens, such as streptococci and staphylococci, in Mediterranean than northern European countries, and a correlation of this phenomenon to a higher frequency of intake of antibiotics, they studied the antibiotic resistance of periodontal pathogens isolated in the Netherlands and Spain specifically. We learn from this study that multiple antibiotics require higher minimal concentrations to inhibit microbial isolates from Spain than for isolates from Dutch subjects. The authors suspect that therefore therapy of severe periodontitis may not be possible everywhere with the same uniform adjunctive antimicrobial regime. This may indicate utility of antimicrobial susceptibility testing for a predictable treatment outcome. The issue of susceptibility testing in periodontal practice has been raised previously, but convincing evidence for its clinical benefit has been lacking up to now.

Based on genomic and proteomic techniques a new class of diagnostic tools is currently developed, opening new opportunities for diagnostics to identify individuals with an increased risk for unwanted effects of certain drugs and to identify the presence of microorganisms with properties increasing their resistance against specified antimicrobial agents. These methods will provide some answers to old questions but will also confront us with new diagnostic challenges. If questions remain regarding the utility of presently available microbiological testing to improve periodontal therapy, we need to resolve this issue as a matter of priority before the next revolution in diagnostics passes by without a clear impact on periodontology. Extensive

research in properly designed prospective studies will be necessary to show the clinical benefit of presently accessible and new sources of information for the best selection and dosage of drugs in clinical routine.

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