



Review

Role of antimicrobial photodynamic therapy in the treatment of aggressive periodontitis: A systematic review



Fahim Vohra^{a,*}, Zohaib Akram^b, Syarida Hasnur Safi^b, Rathna Devi Vaithilingam^b, Alexis Ghanem^c, Konstantinos Sergis^d, Fawad Javed^c

^a Department of Prosthetic Dental Sciences, College of Dentistry, King Saud University, Riyadh, Saudi Arabia

^b Faculty of Dentistry, Department of Restorative Dentistry, University of Malaya, Kuala Lumpur, Malaysia

^c Division of General Dentistry, Eastman Institute for Oral Health, University of Rochester, NY 14620, USA

^d Dental Practice, 13 Xenofontos Str., Athens, Greece

ARTICLE INFO

Article history:

Received 30 May 2015

Received in revised form 16 June 2015

Accepted 29 June 2015

Available online 14 July 2015

Keywords:

Aggressive periodontitis

Photochemotherapy

Photosensitizing agents

Periodontal

disease

Photodynamic therapy

ABSTRACT

Background: The aim was to assess the efficacy of antimicrobial photodynamic therapy (aPDT) in the treatment of aggressive periodontitis (AgP).

Methods: The addressed focused question was “Is aPDT effective in the treatment of AgP?” MEDLINE/PubMed, EMBASE, Scopus, ISI Web of knowledge and Google-Scholar databases were searched from 1977 till May 2015 using combinations of the following keywords: antimicrobial; photochemotherapy; photodynamic therapy; photosensitizing agents; AgP; scaling and root-planing (SRP). Reviews, case reports, commentaries, and articles published in languages other than English were excluded.

Results: Seven studies were included. In 5 studies, aPDT was performed as an adjunct to SRP. Laserwavelengths and duration of irradiation ranged between 660–690 nm and 60–120 s, respectively. Laser power output as reported in 2 studies was 75 mW. One study showed significant improvement in periodontal parameters for subjects receiving aPDT as an adjunct to SRP as compared to treatment with SRP alone at follow up. However, comparable periodontal parameters were reported when aPDT as an adjunct to SRP was compared to SRP alone in the treatment of AgP in one study. One study showed comparable outcomes when aPDT was compared to SRP in the treatment of AgP. In two studies, adjunctive antibiotic administration to SRP showed significantly better outcomes when compared to application of adjunctive use of aPDT to SRP.

Conclusion: aPDT is effective as an adjunct to SRP for the management of AgP, however, further randomized clinical trials with well defined control groups are needed in this regard.

© 2015 Elsevier B.V. All rights reserved.

Contents

1. Introduction	140
2. Materials and methods	140
2.1. Focused question	140
2.2. Selection criteria	140
2.3. Search strategy	140
2.4. Screening methods and data abstraction	140
2.5. Study selection	142
2.6. Methodological study quality assessment	142
3. Results	142

* Corresponding author at: Department of Prosthetic Dental Sciences, College of Dentistry, King Saud University, PO-Box-60169, Riyadh 11545, Saudi Arabia.
Fax: +966 1477444.

E-mail address: fahimvohra@yahoo.com (F. Vohra).

3.1. General characteristics of included studies	142
3.2. Laser and photosensitizer related parameters	142
3.3. Microbial and immunological parameters of the included studies	143
3.4. Periodontal parameters of included studies	143
3.5. Main outcome of the studies	143
3.6. Quality of the clinical studies	144
4. Discussion	144
5. Conclusion	145
Conflict of interest	145
Appendix A	145
List of excluded studies. Reason for exclusion is shown in parenthesis	145
References	146

1. Introduction

Aggressive periodontitis (AgP) is a rapidly progressive periodontal disease, which is not coincident with the amount of oral biofilm and typically shows no association with any systemic disease. The treatment strategies for AgP is challenging as there are no out-right procedures and standards for its effective management [1]. Studies [2–5] have recommended various therapeutic strategies including surgical and non-surgical debridement, disinfectants and antibiotics for the treatment of AgP.

Scaling and root planing (SRP) is the most common treatment procedure performed in patients with AgP with adjunctive treatments. However, SRP has physical limitations, such as limited access of interproximal and furcation areas for the removal of plaque deposits and calculus. Furthermore, efficacy of SRP in deep periodontal pockets attenuates in completely eliminating plaque and calculus deposits [6]. Some studies [7,8] have reported that SRP when performed with adjunct antibiotic therapy is more effective in the treatment of periodontal disease than when SRP is done alone. However, results from a systematic review showed that the significance of antibiotic therapy as a potential adjunct to SRP is debatable [9]. To overcome the limitations of scaling and root planing and to reduce the bacterial load, antimicrobial photodynamic therapy (aPDT) has been proposed as a treatment strategy for AgP. The mechanism of action of aPDT involves the excitation of photosensitizer dye molecules by laser light or visible light of specific wavelength. This undergoes transition of dye molecule from ground singlet state to excited state triplet. The triplet state photosensitizer reacts with endogenous oxygen resulting in the formation of highly reactive singlet oxygen. These reactive oxygen species are highly cytotoxic causing bacterial cell death [10,11]. The benefits of aPDT includes instant eradication of causative bacteria, least antibiotic resistance, absence of systemic disturbance and undesirable effects on the healthy periodontal tissue [12]. In a study by Moreira et al. [13] AgP patients treated with aPDT as an adjunct to SRP showed significant improvement in clinical periodontal parameters as compared to those treated with SRP alone. Similar results were shown by Novaes et al. [14]. Results from these studies [19,20] suggest that aPDT is a potential treatment strategy for AgP. However, Chitsazi et al. [15] in a clinical trial evaluating the effect of aPDT in the management of AgP, concluded that AgP patients treated with and without aPDT showed comparable clinical outcomes at follow up. Therefore, there appears to be a controversy with regards to the role of aPDT in the treatment of AgP.

The aim of the present study was to systematically review the efficacy of aPDT in the treatment of AgP.

2. Materials and methods

2.1. Focused question

Based on the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines [16], a specific question

was constructed. The focused question was “Is aPDT effective in the treatment of AgP?”

2.2. Selection criteria

The following eligibility criteria were entailed: (a) prospective clinical trials; (b) interventions evaluating efficacy of aPDT in treating AgP; (c) studies reporting one or more clinical periodontal parameters as outcome including pocket depth, clinical attachment loss, gingival recession, plaque index, gingival index or bleeding on probing; (d) studies reporting immunological and bacterial profile in vivo after aPDT application in AgP and; (e) studies published in English language only.

The exclusion criteria included; review papers, in vitro and experimental studies, case reports, commentaries, interviews, updates.

2.3. Search strategy

Two authors (ZA and FV) searched the MEDLINE/PubMed, EMBASE, Scopus, ISI Web of knowledge, and Google-Scholar databases from 1977 up to and including May 2015 for articles addressing the focused question. A structured and logical approach to literature searching was used to identify the relevant papers that report the efficacy of aPDT in the treatment of AgP in adults. Reference lists of original studies were hand searched to identify any articles that could have been missed during the initial search. Hand searching of the following journals was performed: Journal of Clinical Periodontology, Journal of Periodontology, Clinical Oral Investigation, Journal of Dental Research, Lasers in Medical Science, Journal of Photochemistry and Photobiology, Photodiagnosis and Photodynamic Therapy and Journal of Research and Science. Any disagreements regarding study selection were resolved via discussion. Electronic database searches were performed using different combinations of Medical Subject Headings (MeSH) terms and free text words: 1. Photochemotherapy; 2. Photodynamic therapy; 3. Photosensitizing agents; 4. Aggressive periodontitis; 5. Periodontitis; 6. Periodontal disease; 7. Clinical trials; 8. Randomized controlled trials; and the combinations 1 or 2 and 3; 1 or 2 and 3 and 4; 1 or 2 and 3 and 5; 1 or 2 and 3 and 5 or 6 or 7; and 1 or 2 and 3 and 4 and 5 or 6 or 7 or 8.

2.4. Screening methods and data abstraction

Titles and abstracts of articles that satisfied the selection protocol were screened by the three authors (FV, FJ and ZA) and checked for agreement. The information from the accepted studies was tabulated according to the (1) study design, (2) demographic characteristics of the participants, (3) their follow-ups, (5) study outcome, (6) laser characteristics, (7) type of photosensitizer, (8) assessed periodontal parameters including; changes in Pocket depth, clinical attachment loss, gingival recession, Plaque index,

Download English Version:

<https://daneshyari.com/en/article/3817618>

Download Persian Version:

<https://daneshyari.com/article/3817618>

[Daneshyari.com](https://daneshyari.com)