

Introduction of Polyvinyl Pyrrolidone (PVP) in the non surgical periotherapy of aggressive periodontitis

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Abstract:

The non surgical periotherapy are based on the bacteriologic back ground of periodontal diseases. More than 46 different verulant species were composing the bacterial flora. Tetracyclin , Doxycyline , Minocycline were used systemically and / or topically in association with conventional scaling and root planning , as well chlorhexidine and wide variety of antiseptics were used . Generalized and localized aggressive periodontitis being a complex disease showing a specific entity and a complex bacterial flora, a curative non surgical remedy not yet well realized. The polyvinyl pyrrolidone (PVP) a highly effective wide broad spectrum bactericidal, fungicidal and virocidal antiseptic used in low concentration (3%) as an intrapocket irrigation solution accompanied with conventional ultrasound scaling and root planning . Eight patients having aggressive were involved in this study, 12 therapeutic sessions were performed during 6 months. Once a week , in the first month , twice a month in the next 3 months , then once a month in the later 2 months . The result showed a significant improvement of the clinical parameters, gingival bleeding index (GBI), clinical pocket depth (CPD) , and clinical tooth mobility (CTM) , with radiologic evidences of bone formation .

The result suggests that PVP could be the promising effective, save clinically applicable , easy to use , and cheap remedy of complex periodontal diseases .

Kew words:

Periodontitis, nonsurgical therapy, polyvinyl pyrrolidone.

Introduction:

As the microbial colonies is the major causative factor of the initiation of periodontal diseases in general term , the pathogenic courses and duration of these diseases have some variation , aggressive periodontitis appeared clinically with almost very slight gingival inflammation and slight plaque deposits ⁽¹⁾ associated with rapid and sever bone loss with deep pocket formation leading to tooth mobility, which some times reported as the first singe of the disease and the major chief complain of the patient ⁽²⁾.

The periotherapy of established periodontitis based upon the actual knowledge is either an antibacterial chemotherapy associated with conventional root planning or a surgical elimination of the infected tissues and correction of periodontal apparatus, or a combination of both directions ^(3,4). Basically the remedy started with oral hygiene performance, initial preparation, surgical intervention if needed, then oral rehabilitation and finally a maintenance program. These rules may be inapplicable on all cases, specially those of aggressive perodontitis, due to

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Table (3): CTM Clinical tooth mobility

| | Base line | 6 month later | Amount of difference | Percent of difference | T test |
|-------|------------|---------------|----------------------|-----------------------|--------|
| LAP | 2.6±0.8 | 0.8±0.38 | 1.8 | 69.23% | P<0.01 |
| GAP | 2.7±0.89 | 1.4±0.45 | 1.3 | 48.148% | P<0.05 |
| Total | 2.68±0.879 | 1.2±0.99 | 1.48 | 55.224% | P<0.01 |

Radiologic findings: (Figures:1,2,3,4)

Showed a noticeable bone formation around teeth specially the multi-rooted, increase in opacity of alveolar bone and lamina dura, which could suggest a new bone deposits.



Fig.1.A.: Crater – like bony lesion involving the two-thirds of the root of the first lower right bicuspid.



Fig.2.A.: First lower right molar. Bony destruction involved the entire furcation and mesial bone wall.



Fig.1.B.: Six month later. Healing of lesion with osseous repair around the first lower right bicuspid.



Fig.2.B.: Six month later. Osseous repair is visible on the mesial and in the interradicular area of the first lower right molar.



Fig.3.A.: Infra bony resorption , with widening of periodontal chamber of the first upper right central incisor .



Fig.3.B.: Six month later . Visible bone formation supporting the first upper right central incisor , thinning the periodontal chamber.



Fig.4.A.: Bone loss associated with infrabony lesion involving the upper right bicuspid and molars.



Fig.4.B.: Six month later . Bone formation is visible in the interdental alveolus as well of the inter radicular septum of the upper right first molar , bone around the bicuspid is augmented close to the cemento-enamel junction

Discussion :

Since the Fifties of last century, the periotherapy takes three essential directions, preventive, surgical or the non-surgical remedy⁽²⁰⁾. The non-surgical periotherapy based upon the bacteriological findings⁽²¹⁾ and on the susceptibility of the causative micro organisms to the antimicrobial drugs⁽²²⁾ given systemically, topically used or both⁽²³⁾ the surgical periotherapy based upon the ideology of excision of the infected tissues and modify the environment to get the best condition for rehabilitating process with rigorous maintenance follow up⁽²⁾.

In spite of the technical limitations and the disadvantages of the surgical choices, still for more than century considered as the essential remedy^(22,24). Since the beginning of Eighties, a periotherapeutic protocol have been realized, it organized according to the etiologic, bacteriologic, histological, pathologic, and immunologic backgrounds of the usual adult type periodontitis^(3-5,25-26). A huge natural, synthetic and chemical materials have been experimented in association with surgery to improve and ameliorate the results^(6,8), to obtain a fibrous reattachment and to prevent the epithelial invasion in between flap and planned root surfaces^(27,28), finally to stabilize the post surgical periodontium in healthy level as long as possible⁽²⁹⁻³¹⁾.

On the same line, some expensive natural or synthetic materials have been used to obtain bone - build in order to compensate the pathologic bone loss and/or to enhance bone building^(20,32). Under the limitations of indications and contraindications of the periodontal surgery the authors were directed toward a non-surgical remedy^(4,9) the basic protocol includes a subgingival

scaling with antiseptic mouth rinse under a systemic cover of antibiotics specially tetracycline^(33,34).

A subgingival irrigation of antiseptic or antibiotic solutions have been experimented as a topical bactericidal therapy in association with scaling and root planning when showed a promising results^(9,23,35-37). Chlorhexidin gluconate 0.2%⁽³⁸⁻⁴⁰⁾ have been used as subgingival, intra pocket irrigation with or without surgery, the result showed a significant reduction in bacterial flora and a clinical improvement, but the recolonization of treated pocket by bacteria is often. Although it create a fibrous attachment and significant pocket reduction specially when accompanied with mechanical root planning⁽⁴¹⁾. Hydrogen peroxide 1-3% solution^(42,43) studied widely as a bactericidal antiseptic mouth rinse and subgingival irrigation, reduces the bacterial colonies and showed a temporary significant clinical cure especially on gingivitis and help in tooth whitening. Stannus floride, sanguinarin and aluminum chloride^(44,45) have also been used, they showed efficacy when irrigated with pressure in the periodontal pocket. Warm normal saline, and distilled water have demonstrated as effective subgingival cleaners, their results when used with jet irrigator device significantly equivalent to that obtained with antiseptic solutions^(42,46) these results suggested that the physical influence of washing the pockets able to eliminate the aerobic and anaerobic bacterial flora and perform the field for an immunologic repair process which result in a visible clinical improvement^(47,48).

Tetracycline a broad spectrum bactericidal antibiotics were widely used in the treatment of aggressive periodontitis as a systemic adjunctive and as a topical intra-pocket

filler^(23,33,34,49,50) or as an irrigation solution^(36,37).

Metronidazol^(51,52) as well as Doxycyclin^(24,53,54) were also administered systemically or topically as subgingival irrigations in the treatment of adult type, aggressive types as well as in cases of acute necrotizing ulcerative gingivitis, their administration based upon the fact that a broad spectrum bactericidal agent able to eliminate the majority of the intra pocket bacterial flora which is a collection of many bacterial associations. The results of these studies showed a significant improvement in clinical periodontal parameters when the systemic or topical administration accompanied with scaling and root planning, even a significant attachment gain were observed^(33,34,37,41,54). Systemic administration of antibiotics without scaling and root planning appeared useless^(24,34,49,53,55) while the topical application or intra pocket irrigations of antibiotics or antiseptics appeared more effective either with or without root planning⁽⁵⁶⁾.

The intrapocket micro were organisms were able to penetrate the epithelial lining of the pockets⁽⁵⁷⁾ the alveolar bone^(2,52), and able to colonize the bone surfaces or even the deeper layers of cancellers bone especially in cases of aggressive periodontitis^(59,60).

Topical subgingival hyaluronic acid gel was administered recently as an adjunctive to scaling and root planning, but the result showed a negative influence on microbial flora and a positive significant increase in the sulcus fluid flow rate leading to physical washing action⁽⁶¹⁾.

Aggressive periodontitis is associated with the presence of a specific bacterial colonies including Actinobacillus Actinomyces temcomitance (AAT)^(62,63), B. gingivalis, porphyromonas gingivalis,

tanerella forsythensis⁽⁶⁴⁾, spirochetes, protheromonas gingivalis⁽⁴³⁾. A novel single – strand circulating DNA virus has been recently isolated and named as TT virus (TTV), it has been demonstrated that peripheral blood cells harbors (TTV) DNA, this virus was first identified in the gingival tissues and was found to be significantly associated with the presence of periodontitis⁽⁶⁵⁾. Recent evidences showed that at least 46 different combinations of the assessed periodontal pathogens were isolated in subjects with periodontitis, and at least 10 different antibiotics regimens might be required to specifically target the various pathogen complexes⁽⁶⁶⁾.

The specific entity and the specific bacterial flora of GAP⁽⁷⁾ did an obstacle facing a successful curative therapy. Sever and rapid bone loss leads to a rapid tooth exfoliations are often characteristics. Thus, the surgical interference in these conditions perhaps leads to more bone loss and more tooth loss.

The curative therapy for these destructive diseases is still not yet well realized^(25,66). Scaling and root planning under a heavy dose of systemic Tetracycline^(23,37), Doxycycline^(41,53,54) metronidazol^(33,52) or minocycline⁽⁶⁷⁾ showed limited positive results^(2,24,46,55), topical application of these antibiotics or an antiseptic mouth rinses showed a questionable result resembles that obtained with normal saline irrigation associated with root planning^(38,39,42,62). The experimental therapy showed a promising positive result, but still conserved in the experimentation field which could not be yet applied clinically as a conventional therapy. Tooth discoloration, disagreeable test is usually associated with mouth rinses or subgingival irrigations^(43,58,68).

Scaling and root planning seemed to be effective in reduction of

the bacterial flora and eliminate the necrotic cementum as well as the infected epithelial lining of pockets^(2,4,60), which results in improvement of clinical parameters. Ultrasonic device seemed to be superior to the hand instrumentation^(10,11,69,70) with less possibility to induce blood bacteremia^(57,59,60) chronic periodontitis patients undergoing an episode of subgingival scaling showed a significant elevation in circulating endotoxine following treatment and may significant in terms of the relationship between periodontal diseases, bacteremia and cardiovascular diseases⁽⁷¹⁾. The physical effect of washing the periodontal pocket with a jet device or pistol-jet could eliminate the bacterial colonies, and improve the gingival healing, but for a short time due to the recolonization of the pocket by the bacteria which already penetrated the pocket wall and colonized the adjacent surfaces of alveolar bone, epithelial lining and cementum^(60,72).

The bactericidal effect of antiseptics or antibiotics when used as subgingival irrigations seemed to be unable to act on the bottom of deep pockets, it seemed to need a long duration exposure with bacteria or a higher concentration was suggested^(9,53,53) taking in consideration the increased tissueler damages associated with augmented concentrations^(39,38). Conditioning the diseased cementum with tetracycline may induce an intense inflammatory response⁽⁷³⁾. The bactericidal action of systemic antibodies seemed to be week, it could enhanced when accompanied with scaling and root planning, but its duration still shortly effective^(11,24,33,54).

The complex bacterial flora of aggressive periodontitis pockets could need highly effective bactericidal

subgingival irrigating solution, with save topical use.

Polyvinyl pyrrolidone PVP, is a disinfectant solution highly effective against the majority of microorganisms, the totality of gram negative and gram positive aerobic, anaerobic, acid fast bacteria were highly susceptible to a low concentration of PVP. Spores, lipophilic viruses, fungi and amoebic cyst were also susceptible⁽¹²⁾ the amount of free iodine is low but it is released as the solution is diluted, nevertheless it retains the activity of iodine⁽⁸⁹⁾.

PVP is less irritating and less likely to produce skin hypersensitivity⁽⁷⁴⁾ and less likely to produce inhibition of normal wound healing, acts as rapidly as chlorhexidine with a broader spectrum of action including sporicidal⁽²⁰⁾, virocidal even against HIV and HBsA⁽¹⁴⁾. Its content of citric acid perform an additional bactericidal action⁽¹⁵⁾ and demineralizing the necrotic cementum⁽⁷⁶⁾, it may fulfill the requirement of an ideal topical, anti-microbial agent for aggressive periodontitis conditions.

Our result showed a significant improvement in clinical parameters, reduction in GBI with gain of 1.002 (equal to 53.015%), pocket depth were reduced significantly (3.77mm = 43.766%). Tooth mobility also significantly reduced (1.48 = 55.224%). Radiographs showed evidences of bone formation around the bi-wall and tri-wall pockets when compared to the baseline x-rays film.

Conclusion:

Within the limit of this study and based on the current literature, the results demonstrate that a rigorous scaling and root planning eliminate the microbial field and prepare the

periodontium to a reattachment possibilities, intra pocket irrigation performs a washing mechanism.

In addition to its effective wide broad spectrum bactericidal and veridical actions, PVP could perform a long acting exposure with low concentrations and thus provide. A save, effective, clinically applicable, easy to use and cheap non surgical remedy for complex periodontitis conditions.

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