ORIGINAL RESEARCH ARTICLE

The effects of long-term low-dose aspirin on coagulation function in gynaecological patients with co-existing chronic periodontitis

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Abstract

This study investigates the safety of non-surgical periodontal treatment during long-term low-dose aspirin therapy in patients with chronic periodontitis and gynaecological conditions, focusing on bleeding risk and coagulation function. Patients received low-dose aspirin (100 mg/d) and were divided into a medication continuation group (observation) and a cessation group (control), with 41 patients each. Key periodontal parameters (plaque index, probing depth, attachment loss) and coagulation indices (activated partial thromboplastin time, prothrombin time, thrombin time, prothrombin activity) were assessed post-treatment. Results showed no significant difference in coagulation indices and bleeding scores between the groups ($P > 0.05$). Grade 3 bleeding incidents were slightly higher in the observation group but not statistically significant. The observation group's maximum platelet aggregation rate was significantly lower ($P < 0.0001$), with no significant differences in activated partial thromboplastin time, prothrombin time, thrombin time, or prothrombin activity. The findings suggest that non-surgical periodontal treatment is safe for these patients under long-term low-dose aspirin therapy, with limited increased bleeding risk. *(Afr J Reprod Health 2025; 29 [1]: 153-159).*

Keywords: Intrauterine adhesions; polycystic ovary syndrome; aspirin; periodontitis; bleeding risk

Résumé

Cette étude examine la sécurité du traitement parodontal non chirurgical pendant un traitement à long terme par aspirine à faible dose chez les patients atteints de parodontite chronique et de problèmes gynécologiques, en se concentrant sur le risque hémorragique et la fonction de coagulation. Les patients ont reçu de l'aspirine à faible dose (100 mg/j) et ont été divisés en un groupe de poursuite du traitement (observation) et un groupe d'arrêt (témoin), comptant chacun 41 patients. Les paramètres parodontaux clés (indice de plaque, profondeur de sondage, perte d'attache) et les indices de coagulation (temps de céphaline activée, temps de prothrombine, temps de thrombine, activité de prothrombine) ont été évalués après le traitement. Les résultats n'ont montré aucune différence significative dans les indices de coagulation et les scores de saignement entre les groupes ($P > 0,05$). Les incidents hémorragiques de grade 3 étaient légèrement plus élevés dans le groupe d'observation, mais n'étaient pas statistiquement significatifs. Le taux d'agrégation plaquettaire maximal du groupe d'observation était significativement inférieur ($P < 0,0001$), sans différence significative dans le temps de céphaline activée, le temps de prothrombine, le temps de thrombine ou l'activité de prothrombine. Les résultats suggèrent que le traitement parodontal non chirurgical est sans danger pour ces patients sous traitement à long terme par aspirine à faible dose, avec un risque accru de saignement limité. *(Afr J Reprod Health 2025; 29 [1]: 153-159).*

Mots-clés: Adhérences intra-utérines ; syndrome des ovaires polykystiques ; aspirine; parodontite; risque de saignement

Introduction

Chronic periodontitis is a periodontal disease induced by microbial plaque that affects the periodontal tissue structures, with primary clinical manifestations including gingival bleeding, the formation of periodontal pockets, and alveolar bone resorption. In severe cases, tooth mobility, displacement, and loss may occur, subsequently affecting the patient's oral function and quality of life[1-3]. Aspirin is a commonly used non-steroidal anti-inflammatory drug that exerts its effects by non-

selectively inhibiting cyclooxygenase (COX), thereby reducing platelet aggregation and prostaglandin production, and is recognized as an effective treatment for secondary prevention of cardiovascular diseases[4-6].

In recent years, the application of low-dose aspirin in gynaecological diseases has expanded. Aspirin has been reported to decrease uterine arterial blood flow resistance and pulsatility index, thereby increasing the coverage area, circumference, and stroma area ofe endometrial glands, which improves uterine blood supply and viscosity, and, to some extent, increases endometrial thickness and receptivity, facilitating embryo implantation and enhancing clinical pregnancy rates and pregnancy outcomes[7-10]. However, the antiplatelet effects of aspirin can also lead to adverse reactions, such as a tendency for bleeding following long-term administration, which may increase the risk of bleeding during invasive periodontal treatments (e.g., scaling or deep cleaning) conducted in the oral cavity[11,12]. This poses challenges for patients with gynaecological diseases and concomitant periodontitis who require long-term aspirin therapy. This study aims to evaluate the feasibility and safety of performing basic periodontal treatment concurrently with long-term oral administration of low-dose aspirin in patients with chronic periodontitis accompanied by gynaecological diseases, providing a scientific basis for the comprehensive treatment of patients with multiple comorbidities.

Methods

Patient clinical data

A retrospective analysis was conducted on 82 patients diagnosed with moderate to severe intrauterine adhesions or polycystic ovary syndrome (PCOS) who were treated with low-dose aspirin from January 2022 to June 2024 at Eye & ENT Hospital of Fudan University. The inclusion criteria were as follows: (1) Diagnosis of periodontitis based on the 2018 classification of periodontal disease stages and grades[13,14]. Diagnosis was established if at least one of the following criteria were met: clinical attachment loss (AL) detected in two non-adjacent teeth; or AL of 3 mm observed on the buccal or lingual surfaces of two teeth with probing depth (PD) of 3 mm. The periodontitis was classified into stages I–III and grades A–B[15]. (2) Confirmed diagnosis of moderate to severe intrauterine adhesions or PCOS[16]. (3) Administration of 100 mg/day of aspirin for at least 4 weeks. (4) At least 20 remaining teeth in the oral cavity, with at least 4 teeth per quadrant.The exclusion criteria included: (1) Use of other anticoagulant medications; (2) Presence of other conditions unsuitable for non-surgical periodontal treatment, such as liver disease, kidney disease, lung disease, immune system disorders, or tumors; (3) History of periodontal treatment within the last 6 months; (4) Coagulation disorders.The research protocol was in compliance with ethical standards for human trials and received approval from the Medical Ethics Committee of Eye & ENT Hospital of Fudan University prior to initiation (NO.2024168). Patients were divided into two groups based on whether aspirin was continued or discontinued in the 1-2 weeks prior to non-surgical periodontal treatment: the medication continuation group (study group) and the medication cessation group (control group), with 41 patients in each group. The study group had a mean age of 29.8 ± 3.4 years; body mass index (BMI) was 22.2 ± 1.7 kg/m²; there were 18 cases of severe intrauterine adhesions and 23 cases of PCOS. The control group had a mean age of 30.3 ± 4.3 years, with a BMI of 22.8 ± 1.6 kg/m²; there were 24 cases of severe intrauterine adhesions and 17 cases of PCOS. No significant differences were found in baseline data between the two groups ($P > 0.05$).

Periodontal examination and treatment

Periodontal Pocket Probing: Prior to periodontal treatment, the probing depth of each tooth was measured at six sites using a periodontal probe, and the PD, AL levels, and bleeding upon probing were recorded.

Scaling: All cases underwent full-mouth supragingival scaling using ultrasonic scalers.

Curettage: Subgingival scaling was performed using ultrasonic curettes and hand instruments, including

subgingival curettage, root planing, and removal of inflammatory granulation tissue from the periodontal pocket walls.

No local anesthetics were used during periodontal probing and supragingival scaling; however, 4% articaine with epinephrine (1:100,000) was used for local infiltration anesthesia during subgingival scaling. All periodontal examinations and treatments were conducted by the same periodontal specialist.

Observed indicators

(1) Periodontal Indicators: a. Plaque Index (PLI)[17]: The probe was gently stroked across the tooth surface, and scores were assigned based on the amount and thickness of plaque. A score of 0 indicated no plaque detected; 1 indicated plaque detected only by probing; 2 indicated moderate amounts of plaque at the gingival margin or interproximal surfaces; 3 indicated plaque present in 2/3 or more of the gingival sulcus, gingival margin area, and interproximal surfaces. b. PD: A blunt-ended probe with measurement markings was used, with the tip placed against the tooth surface and directed parallel to the long axis of the tooth to measure the distance from the gingival margin to the bottom of the periodontal pocket. Six sites per tooth were measured, with each site measured twice, and the average value was recorded as the final PD value. c. AL: The distance from the cemento-enamel junction to the bottom of the periodontal pocket was measured using a periodontal probe.

(2) Bleeding and Coagulation Indices[18]: a. Periodontal Tissue Coagulation Index: Following non-surgical periodontal treatment, 1.5% hydrogen peroxide was used for rinsing, followed by a 30-second water rinse, with observation of gingival coagulation status 10 minutes later. The coagulation index was classified as: grade 0 for no bleeding; grade 1 for pinpoint bleeding with a clot formed; grade 2 for linear bleeding with a clot covering less than 1/3 of the tooth surface; grade 3 for surface bleeding with a clot covering more than 1/3 of the tooth surface; grade 4 for spontaneous bleeding with no clot, where bleeding could be stopped using hydrogen peroxide rinse and cotton ball pressure for 5-10 minutes. b. Bleeding status and control measures 30 minutes post-treatment: Active bleeding at the surgical site 30 minutes after treatment was considered postoperative bleeding requiring local hemostasis. The hemostatic protocol and grading were as follows: grade 0 for no bleeding 30 minutes after treatment; grade I for continued bleeding requiring hemostatic sponge packing and gauze pressure for 30 minutes, leading to hemostasis; grade II for continued bleeding after packing and pressure, treated with laser therapy at the bleeding site; grade III for continued bleeding post-laser treatment, with local suturing or periodontal packing as needed; grade IV for persistent bleeding despite the above measures, requiring collaboration with internal medicine for treatment.

(3) Platelet Function and Coagulation Function Indicators[19]: a. Maximum Platelet Aggregation Rate (MPAR): Measured using the arachidonic acid (AA) method. b. Coagulation Function Indicators: Fasting venous blood samples were collected before and after treatment to assess activated partial thromboplastin time (APTT), prothrombin time (PT), thrombin time (TT), and prothrombin activity (PTA).

Statistical analysis

Statistical analyses were conducted using SPSS 26.0. The normality of data was assessed using the Kolmogorov-Smirnov test and normality plots. For normally distributed continuous variables, independent or paired t-tests were used for group comparisons, with data expressed as mean ± standard deviation. Count data were analyzed using Fisher's exact test. A p-value of <0.05 was considered statistically significant.

Results

Changes in periodontal indicators before and after treatment

No statistical differences were found in periodontal indicators (PLI, PD, and AL) between the two groups prior to treatment ($P > 0.05$), indicating comparability between groups. (Table 1)

Table 1: Changes in periodontal indices before treatment in both groups ($\bar{x}\pm s$)

Groups	Control Group （n=41）	Study Group （n=41）	t	P
PLI	2.2±0.7	2.2±0.7	0.317	0.752
PD（mm）	3.6±0.9	3.6±0.9	0.354	0.725
AL（mm）	2.5±0.8	2.4±0.8	0.459	0.648

PLI: Plaque Index; PD: Probing Depth; AL: Attachment Loss

Table 2: Post-treatment bleeding grades and coagulation indices in both groups [n (%)]

	Control Group （n=41）	Study Group（n=41）	χ^2	P
Coagulation Index				
Grade 0	24（58.5）	16（39.0）	3.124	0.077
Grade 1	10（23.4）	12（29.3）	0.249	0.618
Grade 2	5（12.2）	8（19.5）	0.823	0.364
Grade 3	2（4.9）	5（12.2）	1.406	0.236
Grade 4	0 (0.0)	0 (0.0)	-	-
Bleeding Grade				
Grade 0	25 (61.0)	19 (46.3)	1.766	0.184
Grade 1	13 (31.7)	14 (34.1)	0.055	0.814
Grade 2	2 (4.9)	4 (9.8)	0.719	0.396
Grade 3	1 (2.4)	4 (9.8)	1.917	0.166
Grade 4	0 (0.0)	0 (0.0)	-	-

Table 3: Coagulation function indicators and maximum platelet aggregation rates after non-surgical periodontal treatment in both groups ($\bar{x}\pm s$)

Group	Control Group（n=41）	Study Group（n=41）	t	P
APTT（s）	31.9±3.3	32.7±3.4	1.048	0.298
PT（s）	12.4±1.0	12.9±1.2	1.880	0.064
TT（s）	17.2±2.0	17.9±2.0	1.733	0.087
PTA（%）	81.2±5.4	78.8±6.1	1.882	0.064
MPAR（%）	80.6±4.7	76.0±4.8	4.385	0.000

APTT: Activated Partial Thromboplastin Time; PT: Prothrombin Time; TT: Thrombin Time; PTA: Prothrombin Activity; MPAR: Maximum Platelet Aggregation Rate.

Post-treatment coagulation indices and bleeding status

Comparison of the periodontal coagulation indices and bleeding status between the two groups following non-surgical treatment revealed that neither group experienced any grade 4 coagulation or bleeding adverse events.

The number of cases with a coagulation index of grade 0 and bleeding grade 0 was higher in the control group compared to the study group, whereas the study group exhibited a greater number of cases with grade 3 coagulation and bleeding events compared to the control group; however, the differences between the two groups were not statistically significant ($P > 0.05$) (Table 2).

Post-treatment coagulation function indicators and maximum platelet aggregation

A comparison of the coagulation function indicators and maximum platelet aggregation rates between the two groups following non-surgical periodontal treatment revealed no significant differences in coagulation function indicators (APTT, PT, TT, and PTA) between the two groups ($P > 0.05$). However, the maximum platelet aggregation rate (MPAR) in the study group was significantly lower than that in the control group ($P < 0.0001$) (Table 3)

Discussion

Currently, aspirin is widely reported for use in various gynecological diseases and conditions, including severe pre-eclampsia recurrence, intrauterine adhesions, PCOS and endometriosis[20-22]. Studie3s have shown that oral administration of estrogen and low-dose aspirin post-surgery in patients with intrauterine adhesions promotes the regeneration and repair of the endometrium, thereby reducing the postoperative recurrence of intrauterine adhesions, improving menstruation, and ultimately enhancing reproductive outcomes[23,24].

Additionally, low-dose aspirin may increase the pregnancy rates in patients undergoing in vitro fertilization by enhancing estrogen receptor activity, significantly improving endometrial thickness and pregnancy rates in anovulatory PCOS patients, and potentially improving the success rates of pregnancy in patients with recurrent miscarriage through effective enhancement of uterine artery perfusion[25,26]. However, for gynaecological patients with concomitant periodontitis, long-term aspirin use may increase the risk of bleeding during periodontal treatment, and studies addressing the bleeding risks and safety of periodontal treatment in these patients are limited. This study primarily explored the safety of long-term low-dose aspirin in chronic periodontitis patients with gynecological diseases during non-surgical periodontal treatment, particularly focusing on changes in bleeding risk and coagulation function.

The results indicated no significant statistical differences in coagulation indices and bleeding scores between the medication continuation group and the medication cessation group following non-surgical periodontal treatment. Although the incidence of grade 3 coagulation and bleeding events was slightly higher in the observation group compared to the control group, the difference was not statistically significant. This finding supports the safety of low-dose aspirin in periodontal treatment. The primary mechanism of aspirin is the inhibition of COX-1, leading to reduced platelet aggregation; however, this effect may not be sufficient to significantly increase the bleeding risk during periodontal treatment. The study group exhibited a significantly lower maximum platelet aggregation rate (MPAR) compared to the control group, indicating the effectiveness of aspirin in inhibiting platelet aggregation. Nonetheless, despite the reduction in MPAR, no significant differences were observed in other coagulation function indicators (APTT, PT, TT, PTA), and bleeding events did not significantly increase. This suggests that the impact of low-dose aspirin on controlling platelet aggregation activity did not lead to a significant incidence of adverse bleeding events.

In female populations with gynecological diseases, hormonal fluctuations can affect oral health, particularly by increasing inflammatory responses in periodontal tissues, leading to gingival redness and increased bleeding tendency. For example, PCOS patients often require hormonal treatment, which may exacerbate inflammatory responses in periodontal tissues[27]. Nevertheless, the study results indicate that, under low-dose aspirin intervention, postoperative bleeding was well-controlled in these patients, suggesting that low-dose aspirin may provide a safe treatment option for patients with concomitant gynecological diseases and periodontitis.

This study has certain limitations. Firstly, the sample size was relatively small, and the data were derived from a specific patient population (i.e., periodontitis patients with specific gynecological diseases), thus limiting the generalizability of the results. Secondly, the follow-up period was relatively short, which did not allow for the observation of the long-term effects of low-dose aspirin on periodontal health. Future studies could

further validate the safety of aspirin in such patients and its potential effects on periodontal health through prospective randomized controlled trials with larger sample sizes.

Conclusion

The results of this study indicate that non-surgical periodontal treatment in patients with chronic periodontitis accompanied by gynecological diseases under long-term low-dose aspirin intervention is safe. Aspirin may provide certain antiplatelet protective effects without significantly increasing the risk of bleeding, offering valuable reference for periodontal treatment in gynecological patients requiring long-term low-dose aspirin therapy.

Contribution of authors

(I) Conception and design: XL and MJ;
(II) Provision of study materials or patients: CL and XH;
(III) Collection and assembly of data: NS and YS;
(V) Data analysis and interpretation: YS and HY;
(VI) Manuscript writing: All authors;
(VII) Final approval of manuscript: All authors.

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