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Effects of full-mouth disinfection on the recurrence of Helicobacter pylori infection

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ABSTRACT

Introduction: The oral cavity has been suggested as a potential reservoir for Helicobacter pylori (H. pylori), which could be a major cause of reinfection after standard systemic therapy. The aim of this study was to evaluate the effect of full-mouth disinfection (FMD) on the recurrence of H. pylori infection.

Materials & Methods: This randomized clinical trial was conducted on 40 patients with chronic periodontitis and H. pylori infection. Of these, 20 patients received quadruple anti-H. pylori therapy only (group A) and the other 20 patients received quadruple therapy plus FMD (group B). The presence of H. pylori was detected by a 14C-urea breath test (UBT) after 1 and 6 months. Data were analyzed with SPSS 16 using the chi-square test. A value of $p<0.05$ was considered statistically significant.

Results: Of 40 dyspeptic patients, 15(75%) and 18(90%) of 20 in groups A and B, respectively, had a negative UBT after 4 weeks. Of the patients with successful eradication of H. pylori after 1 month, 8(53.3%) and 6(33.3%) of 15 in group A and 18 in group B, respectively had a positive UBT after 6 months. There were no statistically significant differences between the two groups in the follow-up periods ($p>0.05$).

Conclusion: Implementation of quadruple therapy plus FMD may reduce recurrence of the infection although further studies are recommended to confirm the results.

Keywords: Disinfection, Helicobacter Pylori, Infection Recurrence.

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Introduction

Helicobacter pylori (H. pylori) is a Gram-negative, spiral-shaped bacterium that infects about half of the population around the world. The latest meta-analysis indicates that 50% of the population especially adults and men, in Iran are infected with H. pylori. [1] This infection is associated with gastritis, gastric ulcers and increased risk of gastric cancer. [2] It seems that control of H. pylori infection is an important health problem, as eradication is low and reinfection rates are high even after standardized treatment regimens. [3] Bacterial resistance to antibiotics and the presence of the pathogen in extra-gastric reservoirs have been considered as reasons for reinfection. The oral cavity has been suggested as a possible reservoir for H. pylori. The presence of H. pylori in the oral cavity has been shown to have a negative effect on the eradication of gastric infection. [4] Dye et al. found a positive association between H. pylori seropositivity and periodontitis. [5] Patients with gingivitis or chronic periodontitis who are positive for H. pylori may still harbor HP after systemic eradication. Bacterial colonies in the biofilm of the dental plaque would protect against the host immunological response and antimicrobial agents. [6]

Standard triple or quadruple therapies are routine first-line treatments recommended for H. pylori, but they have been less effective in eradicating bacteria in the oral cavity and periodontal pockets. [7] The most recent meta-analysis highlighted the value of periodontal treatment in the eradication and recurrence of gastric infection, but did not evaluate the effect of full-mouth disinfection (FMD). [7] FMD is introduced with the aim of performing scaling and root planning with chlorhexidine solutions and gels within 24 hours. [8] It has been recommended that FMD be used as the first choice in the treatment of chronic periodontitis in adults. [9] This study investigated whether quadruple therapy alone or together with FMD helped to reduce the recurrence of H. pylori infection.

Materials & Methods

This randomized clinical trial was conducted in the Department of Periodontics, Faculty of Dentistry, and Department of Gastroenterology Sayyad Shirazi Hospital, Golestan University of Medical Sciences. The study participants were 40 patients (21 men and 19 women) aged 20-53 years. The sample size was determined according to the main study. In the current study, the recurrence rate of H. pylori infection after 6 months was about 20% in the case group and 85% in the control group. Therefore, with a statistical power of 90% and a significance level of 0.05, seven patients were divided into each group. [10] However, according to this formula, 20 patients were included in each group.

$$n = \frac{(Z_{1-\alpha/2}\sqrt{2(\overline{PQ})} + Z_{1-\beta}\sqrt{P_1Q_1 + P_2Q_2})^2}{(P_1 - P_2)^2}$$

They all had chronic periodontitis and gastric H. pylori infection. Gastric H. pylori status was determined by a 14C-urea breath test (14C-UBT) (Baharafshan- Iran). Oral examination was performed by an experienced physician. Probing depth (PD) and clinical attachment level (CAL) were recorded at six sites per tooth. Patients with fewer than 10 teeth, a gingival index (GI) of Löe-Silness>3, PD≥4mm, and CAL>5 were excluded. We also excluded patients who had taken antimicrobials, proton pump inhibitors, and H_2 blockers in the past 2 months, who had undergone eradication therapy, smokers, and pregnant women. The presence of H. pylori in dental plaque was verified using the rapid urease test. Plaque samples were collected from tooth surfaces using a sterile

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periodontal curette. They were then immediately soaked in Urease rapid test gel and the results were reviewed. Patients who tested positive for H. pylori in both the gastric biopsy samples and the dental plaque samples were included in this study. Written informed consent was obtained from all participants in accordance with the Declaration of Helsinki. [11] The Ethics Committee at the Golestan University of Medical Sciences approved the study design and protocols (IR.GOUMS.1396.131). The registration number of the clinical trial was IRCT2017080530744N2.

Quadruple therapy consisting of bismuth 525 mg, amoxicillin 500 mg, clarithromycin 500 mg, and proton pump inhibitor 20 mg twice daily was administered to all patients for two weeks. Twenty subjects received full-mouth disinfection (FMD) (test group), and 20 subjects did not receive it (control group). Assignment to a treatment group was based on which day of the week they appeared for testing. There were no significant differences in age, gender distribution, or oral health status between these two groups (Table 1). FMD included scaling and root planning at two visits within 24 hours, disinfection of the dorsum of the tongue by brushing for 1 minute with a 1% chlorhexidine gel, a 1-minute mouth rinse with a 0.2% chlorhexidine solution, and subgingival irrigation of all periodontal pockets for 10 minutes at 3 intervals with a 1% chlorhexidine gel. Patients were also asked to use a 0.2% chlorhexidine mouth rinse twice daily for two weeks. Subjects were instructed to brush their teeth three times daily using the Bass method for at least 3 minutes. The toothbrush was replaced every month. Interdental plaque control was performed with dental floss or interdental brushes. An oral examination was performed every two weeks to check the hygiene status. Subjects in the control group did not receive professional plaque control and performed their routine oral hygiene. Gastric H. pylori infection was determined at 1 and 6 months after the intervention with 14C-UBT. Statistical analyses were performed using SPSS16. H. pylori infection was evaluated with the chi-square test. A value of $p<0.05$ was considered statistically significant.

Results

The demographic and clinical parameters of all study participants are illustrated in Table 1. The 14C-UBT showed that 18 (90%) of 20 patients in the test group and 15 (75%) of 20 patients in the control group were negative for H. pylori after one month. There were no statistically significant differences between the two groups (P= 0.40). In the current study, 33 patients with the negative test were followed-up for 6 months. After this period, 8 (53.3%) of 15 patients in the control group and 6 (33.3%) of 18 patients in the test group were positive for H. pylori. There were no statistically significant differences between the two groups (P=0.20) [Table 2].

Table1. Demographic and clinical parameters of all study participants

Parameter	Case (n=20)	Control(n=20)	P-value
age(Mean±SD)*	36.75±9.38	35.5±9.37	0.67
Male	10	11	
Female	10	9	
Gingival index(Mean±SD)*	2±4.5	2±4.3	0.57
Pocket depth(Mean±SD)*	2.5±0.6	2.5±0.5	0.23
Clinical attachment loss(Mean±SD)*	3±0.7	3±0.4	0.46

* No significant difference between the groups (P>0.05)

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Table 2. Results of treatment with quadruple therapy alone and treatment with triple therapy plus full-mouth disinfection

Variable	Treatment		P-value
	Control	Case	
UBT after 1 month			
Positive	5(25%)	2(10%)	0.40
Negative	15(75%)	18(90%)	
UBT after 6 months			
Positive	8(53.3)	6(33.3)	0.20
Negative	7(46.7)	12(66.7)	

UBT: urease breath test

Discussion

In contrast to the low rates of H. pylori reinfection in Western populations, high recurrence rates have been reported in developing countries. Recurrence in the first year after eradication therapy is likely due to inadequate treatment. [12] H. pylori has been found in oral biofilm, where it is protected from systemic medications. Its habitat includes saliva, supragingival biofilms, periodontal pockets, tonsils, and the dorsum of the tongue. Mechanical periodontal therapy can disrupt the structure of the dental biofilm and enhance the effect of quadruple therapy. [13] In FMD protocol, the practitioner would clean all bacterial niches with scaling and chlorhexidine rinse. In addition, oral hygiene instructions and home mouthwash prescriptions may help control plaque. [8] The aim of the present study was to evaluate the effect of FMD as a preferred protocol in mechanical periodontal debridement on the recurrence of H. pylori infection.

In the current study, it was found that FMD plus quadruple therapy improved H. pylori eradication after one month although the difference between the two groups was not statistically different. The recurrence of the infection after 6 months was also not statistically different, but the reduction in the percentage of reinfection was clinically noticeable.

Yuksel et al. [14] stated that there were no statistically significant differences in eradication rates between triple therapy plus periodontal treatment and triple therapy alone after 3 months, which is in agreement with the results of the present study. In both studies, the UBT test was used to detect the bacteria, but the follow-up period in the ongoing study was 6 months. Tongtawee et al. [13] found that periodontal therapy plus gastric H. pylori treatment reduced the recurrence of gastric H. pylori infections after 1 year, but the eradication was not significant after 4 weeks, which is consistent with those of the current study. They suggest that H. pylori in saliva may be a risk factor for gastrointestinal reinfection. The presence of the bacteria was confirmed in their study by polymerase chain reaction (PCR). This method has high sensitivity and specificity, but the results are variable due to the use of different primers and the inability to distinguish between DNA from dead and live bacteria. [15] In the present study, the UBT was used to detect H. pylori. According to the study by Khalifehgholi et al., [16] the UBT has a sensitivity and specificity of 95.6% and 100%, respectively, which is acceptable although biopsy-based methods are preferred over other methods.

Poor oral hygiene and periodontitis have been shown to be associated with a high prevalence of gastritis caused by H. pylori. [17] Avcu et al. [18] found that the recurrence of gastric H. pylori infection

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after triple therapy was more frequent in patients with poor oral hygiene than in patients with good oral hygiene. Jia et al. [10] stated that the prevalence of H. pylori in the oral cavity and periodontal pockets was influenced by oral hygiene status. Therefore, to maintain the long-term results, routine supportive periodontal therapy and daily oral hygiene measures should be performed. [7]

For periodontal treatment, the FMD is suggested as described in the periodontal literature. FMD consists of complete scaling/mechanical debridement of the tooth root surfaces. Antiseptic irrigation of the gingival pockets and dorsum of the tongue and tonsils is also performed. The entire procedure should be completed in one session (or two sessions within 24 hours). [9] Clarithromycin, prescribed as part of quadruple therapy, has shown excellent availability in the gingival area. Thus, the antibiotics used to eradicate HP are also effective against the anaerobic periodontopathogens. The periodontal FMD protocol and quadruple therapy allow optimal treatment of both pathologies, and can significantly support oral HP eradication. [19]

One of the major limitations of the ongoing study was the small sample size. Therefore, multicenter studies and large-scale randomized controlled trials are needed to achieve a better representation of the data. Moreover, the effect of the combination of surgical periodontal treatment in deep pockets and quadruple therapy should be investigated in future studies.

Conclusion

Within the limitations of the present study, implementation of quadruple therapy plus FMD may reduce recurrence of the infection although further studies are recommended to confirm the results.

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Conflicts of Interest

There is no conflict of interest.

Authors' Contribution

The study was designed by Elham Fakhari and Taghi Amiriani. The study data were collected by Arezoo Yadollahzade. Elham Fakhari, Taghi Amiriani and Arezoo Yadollahzade edited and reviewed the article.

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References

1. Moosazadeh M, Lankarani KB, Afshari M. Meta-analysis of the Prevalence of Helicobacter Pylori Infection among Children and Adults of Iran. Int J Prev Med 2016;7:48.
2. Sujatha S, Jalihal UM, Sharma S. Association between periodontal disease and oral and gastric Helicobacter pylori infection. Indian J Gastroenterol 2015 34:343-4.
3. Ziyaee F, Alborzi A, Pouladfar G, Pourabbas B, Asaee S, Roosta S. An Update of Helicobacter pylori Prevalence and Associated Risk Factors in Southern Iran: A Population-Based Study. Arch Iran Med 2020;23:665-71.
4. Yee JKC. Are the view of Helicobacter pylori colonized in the oral cavity an illusion? Exp Mol Med 2017;49:e397.
5. Al Asqah M, Al Hamoudi N, Anil S, Al Jebreen A, Al-Hamoudi WK. Is the presence of Helicobacter pylori in dental plaque of patients with chronic periodontitis a risk factor for gastric infection? Can J Gastroenterol 2009;23:177-9.
6. Zaric S, Bojic B, Jankovic Lj, Dapcevic B, Popovic B, Cakic S,et al. Periodontal therapy improves gastric Helicobacter pylori eradication. J Dent Res 2009;88:946-50.
7. Marbaix S, Soueidan A, Romani M, Campard G, Amador G, Badran Z. Helicobacter Pylori and Periodontal diseases: An update and proposal of a multidisciplinary clinical protocol. Open J Stomatol 2013; 3: 318-22.
8. Isabella Karina Gutiérrez-de la Garza, Gloria Martínez-Sandoval, Norma Idalia Rodríguez-Franco, María Gabriela Chapa-Arizpe, Jesús Israel Rodríguez-Pulido. Full-mouth disinfection protocol: Applications, techniques and variables in non-surgical periodontal treatment literature review. Int J Appl Dent Sci 2019;5:25-9.
9. Fang H, Han M, Li QL, Cao CY, Xia R, Zhang ZH. Comparison of full-mouth disinfection and quadrant-wise scaling in the treatment of adult chronic periodontitis: a systematic review and meta-analysis. J Periodontal Res 2016;51:417-30.
10. Jia CL, Jiang GS, Li CH, Li CR. Effect of dental plaque control on infection of Helicobacter pylori in gastric mucosa. Tex Dent J 2012 ;129:1069-73.
11. Goodyear MD, Krleža-Jerić K, Lemmens T. The declaration of Helsinki. BMJ 2007; 335: 624–5.
12. Kayali S, Manfredi M, Gaiani F, Bianchi L, Bizzarri B, Leandro G,et al. Helicobacter pylori, transmission routes and recurrence of infection: state of the art. Acta Biomed 2018;89:72-76.
13. Tongtawee T, Wattanawongdon W, Simawaranon T. Effects of periodontal therapy on eradication and recurrence of Helicobacter pylori infection after successful treatment. J Int Med Res 2019;47:875-883.
14. Yuksel Sert S, Ozturk A, Bektas A, Cengiz MI. Periodontal treatment is more effective in gastric Helicobacter pylori eradication in those patients who maintain good oral hygiene. Int Dent J 2019 Oct;69:392-9.
15. Song HY, Li Y. Can eradication rate of gastric Helicobacter pylori be improved by killing oral Helicobacter pylori? World J Gastroenterol 2013 ;19:6645-50.
16. Khalifehgholi M, Shamsipour F, Ajhdarkosh H, Ebrahimi Daryani N, Pourmand MR, Hosseini M, et al. Comparison of five diagnostic methods for Helicobacter pylori. Iran J Microbiol 2013;5:396-401.
17. Venkata T, Chickanna R, Prabhuji M. Effectiveness of nonsurgical periodontal therapy on the levels of Helicobacter pylori in dental plaque and saliva of patients with chronic periodontitis. Eur J Gen Dent 2017;6:29-35.
18. Avcu N, Avcu F, Beyan C, Ural AU, Kaptan K, Ozyurt M, et al. The relationship between gastric–oral Helicobacter pylori and oral hygiene in patients with vitamin B-12 deficiency anemia. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2001; 92: 166–9.
19. Figliuzzi MM, Iuliano E, Altilia M., Altilia S, Iuliano R Fortunato L. The Benefits of Non-Surgical Periodontal Treatment in Association with Gastric Eradication. Open J Stomatol2020;10: 281-99.

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