Comparison of the frequency of Helicobacter pylori infection in the age group of 50-70 years in patients with Parkinson's disease and patients without Parkinson's disease referring to Yazd medical centers in the period of 2021-2022

Running title;

Helicobacter pylori Infection in Parkinson's Disease: A Comparative Study in Patients Aged 50-70

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Abstract

BACKGROUND:

Parkinson's disease is a progressive neurological disease that accumulates in the substantia nigra due to the loss of dopaminergic neurons. PD is a complex and multisystemic disease of unknown etiology. Several case-control studies have shown that HP antibodies are five times higher in PD patients older than 80 years. Due to the high probability of a connection between Helicobacter pylori infection and Parkinson's disease, we decided to conduct a study with the aim of comparing the frequency of Helicobacter pylori infection in patients with and without Parkinson's disease.

MATERIALS AND METHODS

This descriptive-analytical study tested 100 individuals with Parkinson's disease and 100 individuals without Parkinson's disease for Helicobacter pylori using Helicobacter antigen in the blood.

RESULTS:

The prevalence of Helicobacter pylori was 81% in patients with Parkinson's disease and 72% in non-Parkinsons's patients. There is no significant relationship between Parkinson's disease and Helicobacter pylori infection (P value>0.05). The prevalence of Helicobacter pylori infection was significantly higher in men (P value = 0.019). The frequency of tremor was significantly higher in the group of people with Parkinson's disease and Helicobacter pylori infection (p value = 0.016).

CONCLUSIONS:

The findings of the present study showed that there is no significant relationship between Parkinson's disease and Helicobacter pylori infection. Researchers found a significant relationship between sex and Helicobacter pylori infection. The group of people with Parkinson's disease and Helicobacter pylori infection showed significantly higher tremor.

- Keywords: Parkinson's disease, Helicobacter pylori, Tremor frequency, Infection prevalence, Neurological disease

Introduction:

Parkinson’s disease (PD) is the most prevalent degenerative disorder characterized by motor symptoms globally, and it ranks as the second most common neurodegenerative illness following Alzheimer’s(1).

Warren and Marshall first isolated Helicobacter pylori, a gram-negative bacterium, from the skin surface of the stomach epithelium in 1983 (2). HP causes chronic inflammation of the submucosa because the mucosal infection occurs in the first years of life and tends to spread unless treated (2). Studies done later, on the other hand, showed that this disease was linked to a number of other systemic diseases. These included heart diseases like ischemic heart disease, neurological diseases like stroke, Parkinson's disease, and Alzheimer's disease, as well as skin diseases and being overweight (3, 4).

Some studies have shown that the prevalence of HP infection in PD patients is very high (5-9) . Several case-control studies have shown that HP antibody is five times higher in PD patients over 80 years old(10). Also, studies have shown that the prevalence of positive HP tests in PD patients is three times higher than the normal population (11).

Researchers first reported the link between Parkinson's disease (PD) and gastric ulcers in 1960. First described as an independent component of the disease, the increased prevalence of gastric ulcers in PD patients resulted in gastrointestinal symptoms common to all PD patients. For instance, PD patients may exhibit signs of gastritis, such as hypokinesis. Researchers found that there is a relationship between PD and HP, and HP may cause PD (5, 12-14) .

One of the proposed hypotheses was that HP shows a neurotoxic effect by increasing cholesterol glucosides, while HP causes PD by degeneration of dopaminergic neurons in the brain (12) .

The second proposed hypothesis states that HP damages dopaminergic cells in the brain to cause Parkinson's disease (PD) when the immune system does not control the infection or eradicate it (15).

PD patients primarily use levodopa to replace dopamine (16). HP not only causes PD, but by influencing levodopa absorption, it leads to movement fluctuations in PD patients (17) . HP infection prevents absorption of levodopa, thyroxine, and davirdine. Note that after HP eradication, levodopa absorption in PD patients increases by 21 to 54% (18). Researchers believe that HP infection influences drug absorption by potentially altering intragastric pH (18, 19).

Furthermore, the successful eradication of HP in PD patients reduces movement fluctuations by altering the bioavailability of levodopa. Together, these findings show the potential importance of HP eradication in PD patients (20).

The on and off phenomenon is an almost constant result of continuous treatment with levodopa in patients with Parkinson's disease. Patients alternate between the stage of immobility and disability associated with depression and the stage of non-depression and proper movement. Both pharmacokinetic and pharmacodynamic factors are

involved in its pathogenesis. Additionally, some patients may benefit from the redistribution of levodopa doses, either at lower or higher than usual, to help control fluctuations. Limitation of protein in the diet and use of selegiline hydrochloride and bromocriptine may temporarily improve movement fluctuations. New ways of treating the condition include putting apomorphine under the skin and using peripheral dopa decarboxylase inhibitors to control the release of levodopa (21).

Due to the high probability of a connection between Helicobacter pylori infection and Parkinson's disease, we decided to conduct a study to compare the frequency of Helicobacter pylori infection in patients with Parkinson's disease and patients without Parkinson's disease who were referred to Yazd medical centers in the period 2021–2022.

method

This study, a descriptive-analytical cross-sectional survey, concentrated on patients referred to Yazd city's medical centers between 2021 and 2022, aged 50-70 years, both with and without Parkinson's disease. We considered the patient's willingness to cooperate in the research and their absence of chronic heart, kidney, or lung disease based on their previous history as inclusion criteria, while we considered the patient's unwillingness to continue the study and their COVID-19 disease as exclusion criteria. considered

The working method involved the doctor thoroughly explaining the above research plan to patients with and without Parkinson's disease, referring them to treatment centers, and obtaining their informed consent before carefully performing all neurological examinations on the patients and recording the examination results. The examining doctor also recorded the results of the blood test for HP infection in the questionnaire. We used the available sampling method to examine 100 individuals with Parkinson's disease and 100 individuals without the disease. The data collection tool included a questionnaire containing demographic information (age, sex, level of education), height, weight, presence of HP infection, and severity of Parkinson's disease symptoms. We used SPSS version 16 software for statistical analysis of the data. Additionally, we recorded patient information without mentioning their names and surnames. The code of ethics IR.SSU.MEDICINE.REC.1400.322 guided the implementation of this project.

Results

The present study examined 100 patients with Parkinson's disease and 100 patients without Parkinson's disease in the age range of 50–70 years as a control group. The average age of the patients was 62.35 ± 6.54 years. More than half of the patients were men. In this study, 81 patients with Parkinson's disease (81%) tested positive for Helicobacter pylori infection. Meanwhile, 72 non-Parkinson's patients reported a positive Helicobacter pylori infection (72%). Table No. 1 displays the statistical data from the two studied groups.

Table 1

Variables	Total participants	Parkinson disease with a positive HP test	Without Parkinson disease with a positive HP test	P-value
Suffering from Parkinson's				>0.05
Yes, n(%)	100 (100%)	81 (81%)	19 (19%)	
No, n(%)	100 (100%)	72 (72%)	28 (28%)	
SEX (%)				0.091

Male, n(%)	118(59%)	56(59.6%)	38(40.4%)	0.019
Female, n(%)	82(41%)	25(42.4%)	۳4(57.6%)	0.419
Education level (%)				0.091
diploma	61(30.5%)	41(67.2%)	20(32.8%)	0.192
Bachelor's degree	89(44.5%)	39(43.8%)	50(56.2%)	1.00
Master's degree	50(25%)	1(33.3%)	2(66.7%)	0.182
The presence of tremors				۰,۰۱٦
Yes, n(%)	۸۲(٤۱%)	٦٥(۸٤,٤%)	۱۲(۱٥,٦%)	
No, n(%)	۱۱۸(٥۹%)	۱٦(۲۱,۱%)	٦۰(۷۸,۹%)	

Prevalence of studied variables in two groups

discussion

The results of the current study showed that the prevalence of Helicobacter pylori infection is higher in people with Parkinson's disease; however, there is no significant relationship between Parkinson's disease and Helicobacter pylori infection. McGee, David J., and colleagues conducted a review and meta-analysis in Louisiana in 2018 to investigate a possible link between the human stomach pathogen Helicobacter pylori and Parkinson's disease. They concluded that there is accumulating evidence linking Helicobacter pylori to Parkinson's disease. The current study (22) is consistent with the relationship between Helicobacter pylori and Parkinson's disease, although its mechanism remains unclear and the effectiveness of Helicobacter pylori infection in causing Parkinson's disease remains uncertain.

The findings of the present study showed that there is no significant difference between the level of tests and susceptibility to Helicobacter pylori infection in patients with Parkinson's compared to non-Parkinson's patients. KR Mridula and his colleagues conducted a study in India in 2017 to investigate the impact of Helicobacter pylori infection on patients with Parkinson's disease, using a sample size of 36 patients. They concluded that the level of examination and susceptibility to Helicobacter pylori infection in patients did not significantly differ. There is no significant difference between Parkinson's patients and non-Parkinson patients, which confirms the findings of the present study. Additionally, this research's results demonstrated a significant correlation between the eradication of Helicobacter pylori infection and a better prognosis for Parkinson's patients (23).

The current research findings indicate a significant relationship between tremor in Parkinson's disease and susceptibility to Helicobacter pylori infection. Specifically, the frequency of tremor was significantly higher in the group of people with Parkinson's disease and Helicobacter pylori infection compared to the group with Parkinson's disease and no suspected Helicobacter pylori infection.

Conclusion:

The findings of the present study showed that there is no significant relationship between Parkinson's disease and Helicobacter pylori infection. Also, the prevalence of Helicobacter pylori infection was significantly higher in men with Parkinson's disease. However, there is no significant difference between the level of diagnosis and Helicobacter pylori infection in patients with Parkinson's disease. The group with Parkinson's disease and Helicobacter pylori infection showed significantly higher tremor than the group without Helicobacter pylori infection.

Suggestions:

The above suggests a connection between Helicobacter pylori and Parkinson's disease, but the mechanism remains unclear, and it remains uncertain if Helicobacter pylori infection can effectively cause Parkinson's disease. Scientists should look into how Helicobacter pylori affect the development of Parkinson's disease in animal models in the future. They should focus on the role of Helicobacter pylori toxins, inflammation, levodopa uptake, and microbiome dysbiosis.

Conflict of Interests

The authors declare no conflict of interest in this study.

Acknowledgments

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