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ORIGINAL ARTICLE

Evaluation of the Interleukin-8 and Interleukin12 Indices among Individuals Infected with *Helicobacter pylori* and Suffering from Gastric Ulcers

Baneen S. Mohammed, Ahmed A.J. Aljanaby*
University of Kufa-Faculty of Science-Department of Biology-Iraq

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Corresponding Author:
Ahmed Abduljabbar Jaloob Aljanaby
University of Kufa-Faculty of Science-Department of Biology-Iraq
ahmedaj.aljanabi@uokufa.edu.iq

ABSTRACT

Background: *Gastric ulcers, also known as peptic ulcers, are a common gastrointestinal condition characterized by the presence of sores or lesions in the lining of the stomach or the upper part of the small intestine.* ***Objective:*** *This study investigates the relation between interleukin-8 and interleukin-12 in individuals infected with Helicobacter pylori and suffering from gastric ulcers.* ***Methodology:*** *The study involved 30 healthy individuals and 30 individuals with Helicobacter pylori infection and gastric ulcers recruited between September 2023 and January 2024. All individuals' serum levels were measured using the ELISA technique for detection of interleukin-8 and interleukin-12.* ***Results:*** *The serum levels of interleukin-8 and interleukin-12 were significantly higher ($P<0.05$) in patients than in healthy individuals. On the other hand, cases with gastric ulcer had significant higher ($P<0.05$) serum levels of IL-8 and IL-12 compared to cases only infected with H. pylori.* ***Conclusion:*** *In patients with stomach ulcers and H-pylori infection, IL8 and IL-12 levels were significantly higher than in controls, suggesting that these markers may be useful for diagnosis.*

INTRODUCTION

The bacterium *Helicobacter pylori* (*H.pylori*) has been linked to the development of certain types of stomach cancer. Understanding and studying *H.pylori* is crucial for effective diagnosis, treatment, and prevention of related diseases[1,2]. Furthermore, *Helicobacter pylori's* ability to adapt and develop antibiotic resistance poses a significant challenge in managing infections caused by this bacterium[3]. Therefore, ongoing research and advancements in the study of *H.pylori* are necessary to combat its impact on human health. *Helicobacter pylori* can cause chronic inflammation and ulcers in the stomach lining[4]. Healthcare professionals need to stay updated on the latest research and guidelines regarding the evaluation and treatment of *H. pylori* infection to provide the best possible care for their patients[5].

By understanding the pathophysiology of *H. pylori* infection, healthcare professionals can better diagnose and manage the condition in patients[6]. Additionally, the use of a urea breath test is an effective diagnostic tool for *H. pylori* infection. By staying updated on the latest research and guidelines and utilizing diagnostic tools such as the urea breath test, healthcare professionals can accurately diagnose this condition[7,8].

Furthermore, *Helicobacter pylori's* interactions with the immune system and host genetics are still not fully understood, highlighting the need for further research[9]. Also, *Helicobacter pylori's* ability to establish chronic infection in the stomach and evade immune defenses underscores the importance of developing effective vaccines and therapies to combat this persistent and potentially serious bacterial infection[10,11]. In summary, understanding the intricacies of *Helicobacter pylori* is crucial for diagnosing, treating, and preventing gastrointestinal disorders and stomach cancer[12,13]. The present study aims to measure serum levels of IL-8 and IL-12 patients suffering from *H. pylori* infections and gastric ulcers.

METHODOLOGY

Patients

A total of 90 cases with the age range (18-60 years) were enrolled in this study it was carried out in the Department of Nephrology at AL-Najaf Hospital in Al-Najaf City, Iraq from 1st August 2023 to the end of December 2024. Thirty patients were infected with *H.pylori*, 30 patients were infected with *H.pylori* and had gastric ulcer and thirty-healthy individuals were included in this study as control. *Helicobacter pylori* infected with gastric ulcer have been diagnosed by the physicians.

Ethics consideration

The Institutional-Ethics Committees of the College of Science at the University of Kufa and the Scientific-Committee for Research of the Health Department of Najaf both gave their approval.

Measurement of serum levels of IL-8 and IL-12

It was conducted following the directions provided by the manufactures instructions (Bioasay Technlogy Laboratry, Shanghaii, China). A sample of five ml of blood was collected from each individual, and a serum sample of two ml was centrifuged at 8000 rpm for 10 minutes[14-16]. ELISA has been used to measure IL-8 and IL-12 concentration in serum of the cases as follow[17-19]: after the determination of diluted standard, blank, and sample wells, the 100 µL each dilution of standard, blank and sample were added, and the micro-ELISA plate was covered by the sealer and incubated for 90 min at 37ºC. After incubation, all liquid was removed from each well, 100 µL of Bio-tinylated detection antibody solution were added to each well, and the micro-plate was covered with a new sealer and incubated for 1 hour at 37ºC . After incubation, all liquid were removed from each well and washed by adding 350 µL of washing buffer to each well (these steps were repeated three times). 100 µL of HRP Conjugate working solution were added to each well, covered by a micro-plate and incubated at 37ºC for 30min.The solution were removed from each well, and the washing step were repeated five times. Then 90 µL of substrate reagent were added to each well, and the micro-plate was covered by micro-plate sealer and incubated for 15 min. at 37ºC.Then 50 µL of stop solution were added to each well, and determination of the optical density (OD value) was done by ELISA reader at 450nm wavelength, then the results were calculated by plotting the standard curve.

Statistical analysis

Graph-Pad Prism version-6 was utilized for the statistical analysis, and for every result. For the statistical analysis, statistically-significant P values less than 0.05 were taken into account.

RESULTS

IL-8

The current study's findings showed that infection with *H.pylori* had significantly higher serum levels of IL8 (77.41 ± 3.029 pg/ml) than control (8.151 ± 0.4004 pg/ml) (Figure 1). Furthermore, a substantial rise (P = 0.0001) in serum levels was seen in individuals with gastric ulcer and *H. pylori* infection (251.6 ± 8.347 pg/ml) compared to the healthy individuals (Figure2). IL8 was considerably higher between patients with *H-pylori* and gastric ulcers (P = 0.0001) (Figure 3).

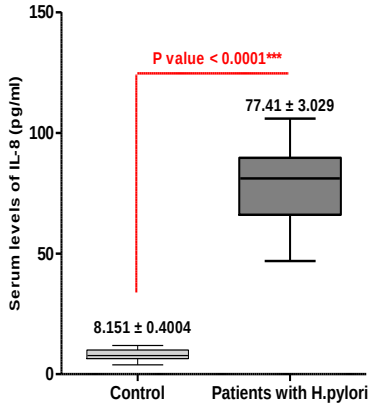

Fig.1. Serum levels of IL-8 in healthy individuals and patients with *H.pylori*

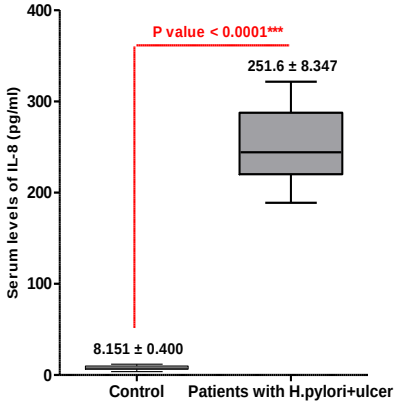

Fig.2. Serum levels of IL-8 in healthy individuals and patients with *H.pylori* and gastric ulcer

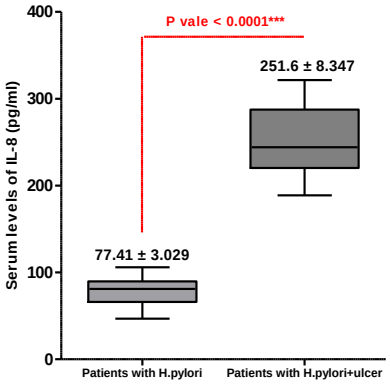

Fig.3. Serum levels of IL-8 in patients with *H.pylori* only and patients with *H.pylori* and gastric ulcer

IL-12

Figure 4 demonstrates that serum levels of IL-12 in *H.pylori*-infected was higher (P = 0.0001) than in control patients (10.72 ± 0.810 pg/ml). Additionally, the results showed a substantial rise (P = 0.0001) in serum levels among individuals infected with *H-pylori* with stomach ulcer (1293 ± 75.55 pg/ml) as compared to the control group (Figure 5). IL-12 serum levels, however, differed significantly (P = 0.0001) in *H.pylori*-individuals alone and those with gastric ulcer combined with *H.pylori* infection (Figure 6).

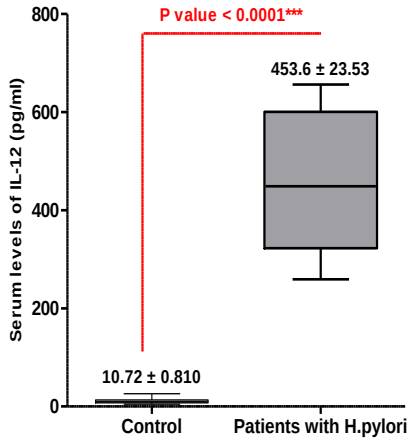

Fig.4. Serum levels of IL-12 in healthy individuals and patients with *H.pylori*

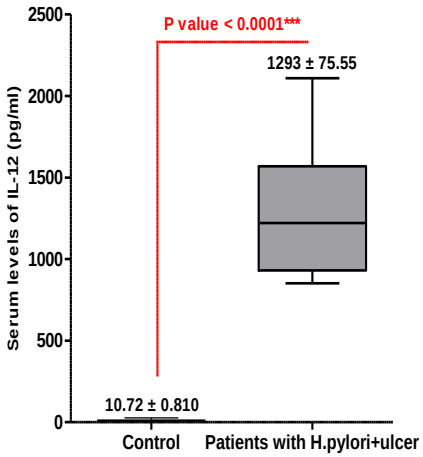

Fig.5. Serum levels of IL-12 in healthy individuals and patients with *H.pylori* and gastric ulcer

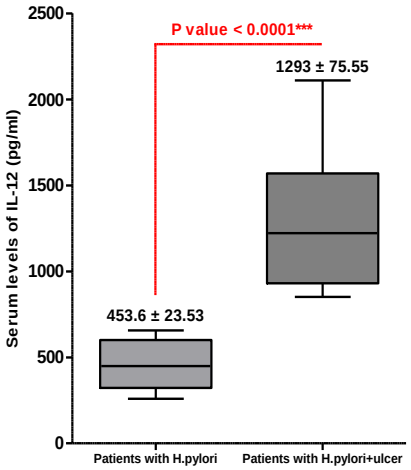

Fig.6. Serum levels of IL-12 in patients with *H.pylori* and patients with *H.pylori* and gastric ulcer

DISCUSSION

IL-8 is a crucial mediator in the immune-response to *Helicobacter pylori* infections, playing a vital role in inflammation, recruitment of immune cells, and the development of gastritis and gastric ulcers[20,21]. The interaction between IL-8 and *Helicobacter pylori* helps to recruit immune-cells to the site of infections, promoting inflammation and the clearance of the bacterium[22]. Additionally linked to the development of gastritis and stomach ulcers brought on by *H. pylori* is the synthesis of IL-8[23]. IL-8 is a critical-element in the immune response to *Helicobacter pylori* infection, acting as an essential mediator of inflammation, immune cell recruitment, and the pathogenesis of gastritis and gastric ulcers. When it comes to *H.pylori* infection, IL-8 plays a major role in regulating immune responses and the course of the disease[24].

Interleukin-12 is an important-cytokine involved in the immune response against *Helicobacter pylori* infection. It is essential for the activation of T-lymphocytes and natural killer-cells, promoting the production of interferon-gamma, and enhancing the bactericidal activity against *Helicobacter pylori*. Understanding the role of Interleukin12 in *H.pylori* infection is crucial for comprehending the mechanisms underlying these gastrointestinal diseases and developing effective treatment strategies[25]. It promotes the differentiation of Thelper-1 cells, which produce interferon-gamma and helps to eliminate *Helicobacter pylori* from the gastric mucosa[26]. The interaction between Interleukin-12 and *Helicobacter pylori*-infections is essential for understanding the pathogenesis of gastrointestinal diseases[27,28].

Interleukin-12, a crucial cytokine in the immune response, plays an important role in activating natural-killer cells and T-lymphocytes to enhance bactericidal activity against *Helicobacter pylori*[29,30].

CONCLUSION

In patients with stomach ulcers and *H-pylori* infection, IL8 and IL-12 levels were significantly higher than in controls, suggesting that these markers may be useful for early diagnosis of gastric ulcer.

Declarations:
Consent for publication: Not applicable
Availability of data and material: Data are available upon request.
Competing interests: The author(s) declare no potential conflicts of interest with respect to the research, authorship and/or publication of this article.
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