The Egyptian Journal of Hospital Medicine (January 2018) Vol. 70 (11), Page 1921-1924

Relationship between *Helicobacter Pylori*, Chronic Idiopathic Urticaria and Atopic Dermatitis

Areej Misfer Albisher[1], Manal Hassan Alharbi[1], Mohammed Misfer Albisher [2]
1- Alfaisal University, 2- King Saud University
Corresponding author: Areej Albeshr <areejmalbeshr@gmail.com>

ABSTRACT

Background: *Helicobacter pylori* (*H. pylori*) is the microorganism responsible for the most frequent and persistent bacterial infection worldwide. *H.pylori* infection affects nearly half of the world's population. In the developing countries, the prevalence of infection is as high as 90%, whereas in the developed countries, excluding Japan, the prevalence is below 40% **(1).** An association between *H. pylori* infection and skin diseases such as chronic idiopathic urticaria and atopic dermatitis has been suggested **(2).**

Aim of the work: this review aimed to focus on the relationship between *Helicobacter pylori*, chronic idiopathic urticaria and atopic dermatitis. This association was reviewed in the following lines. **Methodology:** we used scientific websites such as PubMed, Google Scholar and Research Gate to get related articles about this subject. **Results:** several studies have reported the presence of *H. pylori* DNA in environmental water sources. Diagnostic tests are usually divided into invasive (endoscopic-based) and noninvasive methods. Using proton-pump inhibitors (PPIs) in combination with several antibiotics such as amoxicillin plus clarithromycin or metronidazole have been considered as the first-line treatment. **Conclusion:** *H. pylori* has a great prevalence among world's population. *H. pylori* infection could play a role in the pathogenesis of a variety of skin diseases.

Keywords: *H.pylori*, urticaria, atopic dermatitis.

INTRODUCTION

Helicobacter pylori (*H. pylori*) is a spiral-shaped microaerophilic gram-negative bacterium that colonizes the gastric mucosa and induces a strong inflammatory response with release of various bacterial and host-dependent cytotoxic substances **(1-3)**. Epidemiological and experimental data had pointed to a strong relation of *H. pylori* infection with the development of many extragastric diseases, such as cardiovascular, immunologic and some skin diseases **(4)**.

Most infections are probably acquired in childhood, but geographic area, age, race, socioeconomic status and hygiene seem to play roles in the prevalence of *Helicobacter pylori*.

Higher rates of infection tend to occur at a younger age in the developing countries compared to the developed countries and in regions characterized by lower socioeconomic status and higher density living **(5)**. Since *Helicobacter pylori* (*H. pylori*) identification in 1983, an increasing amount of knowledge has collected, with this pathogen having been directly involved in the pathogenesis of several dermatological diseases **(6)**. An association between *H. pylori* infection and skin diseases such as chronic idiopathic urticaria and atopic dermatitis has been suggested **(2)**.

This review concerned with the association between *H. pylori* infection and occurrence of skin diseases especially urticarial and atopic dermatitis.

METHODOLOGY

We used scientific websites such as PubMed, Google Scholar and Research Gate to get related articles about this subject. The research process involved specific keywords "correlation between *H. pylori* infection and urticarial, correlation between *H. pylori* infection and atopic dermatitis, correlation between *H. pylori* infection and skin diseases and complication of *H. pylori* infection " to find more articles on the subject. We were more concerned about English published articles only which published from 1995 to 2017.

H. pylori epidemiology, sources, diagnosis, treatment and complications

Helicobacter pylori (*H. pylori*) is the microorganism responsible for the most frequent and persistent bacterial infection worldwide. *H. pylori* infection affects nearly half of the world's population. In the developing countries, the prevalence of infection is as high as 90%, whereas in developed countries, excluding Japan, the prevalence is below 40% **(2)**.

Several studies have reported the presence of *H. pylori* DNA in environmental water sources **(7-9)**, but this probably reflects contamination with either naked DNA or dead *H. pylori* organisms. Spread via fecal contaminants is supported by the occurrence of *H.pylori* infections among institutionalized young people during outbreaks of gastroenteritis **(10)**.

Received: 20/12/2017
Accepted: 30/12/2017
DOI: 10.12816/0044843

Other possible sources include contaminated food, *as H. pylori* may survive briefly in refrigerated food [11]. Coupled with the extreme sensitivity of *H. pylori* to atmospheric oxygen pressure, lack of nutrients and temperatures outside the 34 to 40°C range [12], direct person-to-person transmission remains the most likely transmission route.

Diagnostic tests are usually divided into invasive (endoscopic-based) and noninvasive methods. Invasive diagnostic tests include endoscopic image, histology, rapid urease test, culture and molecular methods. Non-invasive diagnostic tests included urea breath test, stool antigen test, serological, and molecular examinations [13].

The regimens that utilize proton-pump inhibitors (PPIs) in combination with several antibiotics such as amoxicillin plus clarithromycin or metronidazole have been considered as the first-line treatment for *H. pylori* infection [14].

In some countries, new first-line treatments are not accepted because of a lack of national validation studies and a lack of studies of clarithromycin resistance [15].

The Maastricht IV/Florence Consensus Report recommended the bismuth-containing quadruple therapy as an alternative for first-line empirical treatment in areas with the clarithromycin resistance over 15%-20%. If this regimen is not available sequential therapy or a non-bismuth quadruple therapy (the so-called "concomitant" treatment) is recommended [16].

Currently, *Helicobacter pylori* (*H. pylori*) infection is confirmed to correlate with chronic gastritis, peptic ulcer disease, Mucosa Associated Lymphoid Tissue (MALT)-lymphoma, precancerous changes in the stomach (atrophy, intestinal metaplasia) and gastric cancer. At the same time, *H. pylori* eludes the immunological response evoked by the host.

This chronic infection has the local production and systemic diffusion of pro-inflammatory cytokines, which may influence the remote organic systems and result in extragastric manifestations [17].

Some studies suggested that *H. pylori* infection could play a role in the pathogenesis of a variety of skin diseases [18]. The best evidence for such link is found for chronic urticarial [19].

Worthy of note, many case reports have described interesting associations between *H. pylori* infection and atopic dermatitis (AD) [20].

Correlation between chronic urticarial infection and *H. pylori* infection:

Chronic urticaria (CU) is defined as the occurrence of daily, or almost daily, wheals and itching for at least 6 weeks. It is a common and potentially debilitating skin condition that affects up to 1% of the general population with variable duration, typically several months but occasionally decades [21].

Chronic urticaria is associated with various autoimmune disorders [22]. There is a possible association with malignancies, although data are conflicting [23]. None of the theories of pathogenesis of CU has been fully established [24].The best-developed hypotheses included the autoimmune theory, theories involving histamine-releasing factors and the cellular defects theory.

Attempts have been made to associate some common chronic infections such as *Helicobacter pylori* with CU [25].

There is increasing evidence for systemic effects of gastric *H. pylori* infection, which may be involved in extra gastrointestinal disorders such as vascular, autoimmune and skin diseases.

A possible relationship between chronic idiopathic urticaria and *H. pylori* infection has been suggested in preliminary studies, in which antibiotic eradication of *H. pylori* lead to regression of urticaria in up 100% of cases [25-27]. Regarding the possible mechanisms involved in the relationship between *H. pylori* infection and chronic urticaria, a number of speculations and theories have been put forward. One possible explanation might be that the immunologic stimulation induced by infection might, through mediator release, causes a non-specific increase of the skin vessel sensitivity to agents increasing vascular permeability [28].

A number of agents might act through this mechanism. As a matter of fact, increased production of interleukin 8 (IL-8), platelet-activating factor (PAF) and leukotrienes (LT) B4 and C4 has been observed in the gastric mucosa of *H. pylori* infected patients and these mediators exert evident actions on the skin [29, 30].

Another possibility would be that urticaria patients might develop specific IgE antibodies to *H. pylori*, an attractive explanation that still requires confirmation [31]. In this context, **Liutu *et al.*** [32] have reported gre

ater rates of total IgE increase in patients with chronic urticarial and *H. pylori* infection than in those with chronic urticaria but without such infection.

There have also been observations reported of increased serum *H. pylori* IgE and basophil-bound IgE in subjects with infection [(33)] and increased basophil counts in peripheral blood in patients with dyspepsia and *H. pylori* positivity have also been reported [(34)].

CONCLUSION

H. pylori infection affects nearly half of the world's population. Recent evidence suggested that *H. pylori* infection could play a role in the pathogenesis of a variety of skin diseases. There is increasing evidence for systemic effects of gastric *H. pylori* infection, which may be involved in extra gastrointestinal disorders such as vascular, autoimmune and skin diseases [(27)]. It has been hypothesized an important role of *Helicobacter pylori* (*H. pylori*) infection in the host immune network arrangement and its influence on the development of allergic diseases such as atopic dermatitis [(38)].

REFERENCES

1. **Tonkic A, Tonkic M, Lehours P and Mégraud F (2012):** Epidemiology and diagnosis of *Helicobacter pylori* infection. Helicobacter, 17(1):1-8.
2. **Magen E and Delgado JS (2014):** *Helicobacter pylori* and skin autoimmune diseases. World Journal of Gastroenterology, 20(6):15101515.
3. **Tüzün Y, Keskin S and Kote E(2010):** The role of *Helicobacter pylori* infection in skin diseases: facts and controversies. Clinics in Dermatology, 28(5):478-82.
4. **Goodman KJ, Jacobson and van Zanten SV (2008):** Helicobacter pylori infection in Canadian and related Arctic Aboriginal populations. Canadian Journal of Gastroenterology and Hepatology, 22(3):289-295.
5. **Bashir AH, Yousif SM and Mahmoud MO (2011):**Clinicoepidemiological study in Sudanese patients: prevalence and effect of eradicative triple therapy on extra digestive Helicobacter pylori skin manifestations. Clinical Reviews and Opinions, 3(2):14-9.
6. **Marshall B and Warren JR (1984):** Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. The Lancet, 323(8390):1311-1316.
7. **Enroth H and Engstrand L (1995):** Immunomagnetic separation and PCR for detection of *Helicobacter pylori* in water and stool specimens. Journal of Clinical Microbiology, 33(8):2162-2167.
8. **Hegarty JP, Dowd MT and Baker KH (1999):** Occurrence of *Helicobacter pylori* in surface water in the United States. Journal of Applied Microbiology, 87(5):697-701.
9. **Queralt N, Bartolome R and Araujo R (2005):** Detection of *Helicobacter pylori* DNA in human feces and water with different levels of faecal pollution in the north-east of Spain. Journal of Applied Microbiology, 98(4):889-895.
10. **Laporte R, Pernes P, Pronnier P, Gottrand F and Vincent P (2004):** Acquisition of *Helicobacter pylori* infection after outbreaks of gastroenteritis: prospective cohort survey in institutionalised young people. BMJ., 329(7459):204-209.
11. **Poms RE and Tatini SR (2001):** Survival of *Helicobacter pylori* in ready-to-eat foods at 4 C. International Journal of Food Microbiology, 63(3):281-287.
12. **Kusters JG, Gerrits MM, Van Strijp JA and Vandenbroucke-Grauls CM (1997):** Coccoid forms of Helicobacter pylori are the morphologic manifestation of cell death. Infection and Immunity, 65(9):3672-3679.
13. **Wang YK, Kuo FC, Liu CJ, Wu MC, Shih HY, Wang SS, Wu JY, Kuo CH, Huang YK and Wu DC (2015):** Diagnosis of *Helicobacter pylori* infection: current options and developments. World Journal of Gastroenterology, 21(40):11221-11229.
14. **Olokoba AB, Obateru OA and Bojuwoye MO (2013):** Helicobacter pylori eradication therapy: A review of current trends. Journal of the Nigeria Medical Association, 54(1):1-9.
15. **dos Santos AA and Carvalho AA (2013):** Pharmacological therapy used in the elimination of *Helicobacter pylori* infection: a review. World Journal of Gastroenterology, 7:21(1):139-145.
16. **Malfertheiner P, Megraud F, O'morain CA, Atherton J, Axon AT, Bazzoli F, Gensini GF, Gisbert JP, Graham DY, Rokkas T and El-Omar EM (2012):** Management of *Helicobacter pylori* infection. The Maastricht IV/Florence Consensus Report, 61(5):646-664.
17. **Roubaud Baudron C, Franceschi F, Salles N and Gasbarrini A (2013):**Extragastric diseases and Helicobacter *pylori.* Helicobacter, 18(1):44-51.
18. **Shiotani A, Okada K, Yanaoka K, Itoh H, Nishioka S, Sakurane M and Matsunaka M (2001):** Beneficial effect of *Helicobacter pylori* eradication in dermatologic diseases. Helicobacter, 6(1):60-65.
19. **Magen E, Mishal J, Schlesinger M and Scharf S (2007):** Eradication of *Helicobacter pylori* infection equally improves chronic urticaria with positive and negative autologous serum skin test. Helicobacter,12(5):567-571.
20. **Corrado G, Luzzi I, Pacchiarotti C, Lucarelli S, Frediani T, Cavaliere M, Rea P and Cardi E (2000):** *Helicobacter pylori* seropositivity in children with atopic dermatitis as sole manifestation of food allergy. Pediatric Allergy and Immunology,11(2):101-106.
21. **Greaves M (2000):** Chronic urticarial. Journal of Allergy and Clinical Immunology,105(4):664-672.
22. **Confino-Cohen R, Chodick G, Shalev V, Leshno M, Kimhi O and Goldberg A (2012):** Chronic urticaria and autoimmunity: associations found in a

large population study. Journal of Allergy and Clinical Immunology,129(5):1307-1313.

23. **Zhang Y, Morita E, Matsuo H, Ueda D and Dekio S (2004):** Urticarial erythema associated with IgA myeloma. The Journal of Dermatology, 31(8):661-666.
24. **Vonakis BM and Saini SS (2008):** New concepts in chronic urticarial. Current Opinion in Immunology, 20(6):709-716.
25. **Di Campli C, Gasbarrini A, Nucera E, Franceschi F, Ojetti V, Torre ES, Schiavino D, Pola P, Patriarca G and Gasbarrini G (1998):** Beneficial effects of Helicobacter pylori eradication on idiopathic chronic urticaria. Digestive Diseases and Sciences, 43(6):1226-1229.
26. **Tebbe B, Geilen CC, Schulzke JD, Bojarski C, Radenhausen M and Orfanos CE (1996):** *Helicobacter pylori* infection and chronic urticarial. Journal of the American Academy of Dermatology, 34(4):685-691.
27. **Moreira A, Rodrigues J, Delgado L, Fonseca J and Vaz M (2003):** Is *Helicobacter pylori* infection associated with chronic idiopathic urticaria?. Allergologia et Immunopathologia, 31(4):209-214.
28. **Rebora A, Drago F and Parodi A (1995):** May *Helicohacter pylori* be important for dermatologists. Dermatology,191(1):6-8.
29. **Ahmed A, Holton J, Vaira D, Smith SK and Hoult JR (1998):** Eicosanoid synthesis and *Helicobacter pylori* associated gastritis: increase in leukotriene C4 generation associated with *H. pylori* colonization. Prostaglandins, 44(1):75-86.
30. **Pasechnikov V, Mashentseva E and Sohier M (1996):** Mucosal interleukin-8, platelet activating factor, endothelin-1, Leucotrine B4 and Leukotriene C4 production in patients with *Helicobacter pylori* infection. Gut, 39: 40-48.
31. **Realdi G, Dore MP and Fastame L (1999):** Extradigestive manifestations of **Helicobacter pylori** Infection (Fact and fiction). Digestive Diseases and Sciences, 44(2):229-236.
32. **Liutu M, Kalimo K, Uksila J, Kalimo H (1998):** Etiologic aspects of chronic urticaria. International Journal of Dermatology, 37(7):515-519.
33. **Karttunen TJ, Niemelä S and Kerola T (1996):** Blood leukocyte differential in *Helicobacter pylori* infection. Digestive Diseases and Sciences, 41(7):133213328.
34. **Dharmage SC, Lowe AJ, Matheson MC, Burgess JA, Allen KJ and Abramson MJ (2014):** Atopic dermatitis and the atopic march revisited. Allergy, 69(1):17-27.