

## Association between Gastric Carcinoma & *Helicobacter pylori*

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### الخلاصة

تم جمع 60 عينة دم من مرضى التهاب المعدة المزمن ، الضامر و قرحة المعدة منها 51 ظهرت موجبة لأختبار أضداد بكتيريا الحلزونية البوابية . لوحظ من الدراسة الحالية أن معظم المرضى هم من الذكور (64.7%). فضلاً عن ذلك بينت هذه الدراسة أن غالبية المرضى (70.7%) هم من البالغين الشباب وبإعمار دون الأربعين عاماً. علاوة على هذا، ظهر أن نسبة سرطان المعدة هي الأعلى (56.86%) بين هؤلاء المرضى مقارنة بقرح المعدة و التهاب المعدة المزمن وعلى وجه الخصوص بين هؤلاء ممن هم دون 40 عاماً (44.3%). ولهذا يستنتج ان الخمج بهذا الكائن الحي يجب ان يُولى المزيد من الأهتمام طالما أنه يشكل مشكلة معدية معوية. أن العلاج بالمضادات الحيوية و لفترات قصيرة كفيلاً بإجتثاث الخمج مع تحسين الظروف الصحية مما يوصى به لازالة مثل هذه المضاعفات .  
الكلمات المفتاحية : الجرثومة الحلزونية البوابية، سرطان المعدة، قرحة المعدة، أضداد الجرثومة الحلزونية البوابية، اليزا .

### ABSTRACT

Sixty blood samples have been collected from chronic active, atrophic gastritis and ulcer cases of which 51 was observed to be positive for *Helicobacter pylori*. In the current study it was observed that majority of patients infected with *H. pylori* were males (64.7%). Furthermore, this study revealed that most patients were young adults (70.7%) at age less than 40 years. Moreover, high incidence of stomach cancer (56.86%) was evoked among those who infected with *H. pylori* particularly young adult patients (44.3%) in comparison with ulcer and chronic gastritis cases. Infection with this organism should therefore be paying more attention since it formed a gastrointestinal problem. Treatment with short courses of antibiotics to eradicate the infection beside improvement of sanitary and hygienic conditions was recommended to eliminate such complications.

### INTRODUCTION

*Helicobacter pylori* is a helical shaped Gram-negative bacterium that infects various areas of the stomach and duodenum [1, 2]. Many cases of peptic ulcers, gastritis, duodenitis, and perhaps some cancer are caused by *H. pylori* infection. However, many who are infected do not show any symptoms of disease [3, 4]. *Helicobacter spp.* are the only known microorganisms that can thrive in the highly acidic environment of the stomach. Its helical shape is thought to have evolved to penetrate and favor its motility in the mucus gel layer [1, 4].

Many people contract *H. pylori* infection as a child, and the infection persists into adulthood, but adults also can contract *H. pylori* [5].

The bacteria seem to be transmitted from one person to another through contact with saliva, and contract an *H. pylori* infection by sharing an eating utensil with an infected person. It could also be contracted from contact with fecal matter that harbors *H. pylori* [6].

Diagnosis of *H. pylori* infection depends on one of four ways [7]: Invasive test (i.e. biopsy) which obtained during gastroscopy and Non-invasive tests which included culture, breathe testing [8,9] and blood testing depending on detection of IgG Anti-*H. pylori* antibodies [10]. For positive cases endoscopy [7,11] and stomach X-ray or barium upper gastrointestinal (GI) series are recommended [12].

The stomach is generally a very hostile environment for many bacteria, but *H. pylori* produces an enzyme that, through a series of biochemical processes, creates a low-acid buffer zone for itself [13,14]. Then, it weakens the protective mucous coating of the stomach and duodenum, which allows acid to get through to the sensitive lining beneath. Both the acid and the bacteria irritate the lining and cause a sore, or ulcer [13]. There is compelling evidence for the role of this bacterium in initiation of Correa's cascade (stepwise progression from chronic active gastritis, atrophic gastritis, intestinal metaplasia, dyspepsia and finally adenocarcinoma) [15].

The aim of this study was to detect the frequency of *H. pylori* infection among ulcer and chronic gastritis patients through IgG Anti-*H. pylori* determination and its correlation with gastric carcinoma.

## MATERIALS AND METHODS

Sixty samples have been collected from Iraqi out-patients (who were suffering from ulcer and gastritis) of Gastroenterology and Liver Teaching Center in Baghdad during the period of October/ 2007 and April/ 2008. The patients include (38) males and (22) females with age range from (21-63) years. The investigations results have been compared with 30 samples for apparently healthy individuals as a control group. Six samples of control group have been excluded due to incomplete information. Blood was collected from healthy control group as well as patient after endoscopic examination of patients under consultant supervision. Sera samples were isolated from the blood sample after coagulation and kept frozen at  $-20^{\circ}\text{C}$ . Sera samples investigated for IgG Anti-*H. pylori* antibodies by (Bio Hit , Finland using ELISA test) [16] depending on sandwich technique . All the results have been statistically analyzed by application of Chi- $x^2$  analysis for categorical data and were compared with t-test expressed as mean ( $\pm$ SD) [17].

## RESULTS & DISCUSSION

### 1. Distribution of Patients According to Gender

Sixty gastritis patients have been admitted to the Gastrointestinal Tract & Liver Teaching Hospital. Fifty one samples were found to be positive for *H. pylori*. Those samples belong to patients who included 33 males (64.7%) and 18 females (35.3%) (i.e. With Male: Female 1.83 ration) as shown in Table (1) in comparison with 24 apparently healthy individuals which 7 (29.2%) males and 17 (70.8%) females included in control group. It was observed that there is highly significant difference between both sexes since the majority of patients were males.

Table-1: Distribution of the Studied groups according to Gender

Gender	Studied Groups No. (%)		Total	Comparison of Significant	
	Control	Patients*		P value	Significance
Male	7 (29.2)	33 (64.7)	40 (53.3)	0.004	Highly Sig. (P value <0.01)
Female	17 (70.8)	18 (35.3)	35 (46.7)		
Total	24 (100.0)	51 (100.0)	75 (100)		

\* Only patients sera samples which were (+)ve for IgG anti *H. pylori* antibodies

### 2. Distribution of Patients according to Age Groups

The distribution of patients according to their age groups was listed in Table (2). This table revealed that most of patients who infected with *H. pylori* (56.9%) were at the fourth decade of age; in most specification at age group (20-39) years. While the other age groups involved less frequencies. Moreover, it seems that there was a decline in the percentage of patients with aging with highly significant differences between groups ( $P < 0.001$ ). The explanation of these results attributed this age group (i.e. 20-39 years) is the most active years of the life span in which the individuals became at great risk to be infected with bacteria in comparison with decrement in the frequencies of infection by aging.

Table-2: Distribution of age groups (years) among studied group.

Age Groups (years)		Studied group		Total	Comparison of significant	
		Control	<i>H. pylori</i> (+) ve Patients Samples		P value	Sig.
20-39	No.	24	29	53	0.001	Highly Sig. (p value <0.05)
	%	100	56.9	70.7		
40-59	No.	0	17	17		
	%	0	33.3	22.7		
> 60	No.	0	5	5		
	%	0	9.8	6.7		
Total	No.	24	51	75		
	%	100	100.0%	100.0%		

### 3. Mean of Anti-*H. pylori* Antibodies Titer among the Patients Sera.

Mean of anti-*H. pylori* antibodies titer is ( $91.33 \pm 5.3$ ) in comparison with ( $13.50 \pm 4.0$ ) for apparently healthy control group with highly significant difference between these groups ( $P < 0.001$ ). This arising, in IgG anti-*H. pylori* titer is related to the nature of *Helicobacter pylori* infection (i.e. chronic bowel inflammatory infection), which accompanied with elevation of IgG antibodies isotype rather than IgM.

### 4. Association between *H. pylori* infection & Patients' Clinical Status.

Recently, it was proposed that there was a relationship between *H. pylori* infection and gastric ulcer development and eventually progression into stomach carcinoma. The current study showed that 22 gastric or peptic ulcer have been progressed out of 60 gastritis cases of which 51 were infected with *H. pylori* cases (43.14%). Furthermore, 29 patients out of 51 developed gastric carcinoma (56.86%) with highly significant difference in comparison with general gastritis clinical status of patients ( $P < 0.001$ ). These data were listed in Table 3.

Table-3: Distribution of different clinical states among studied group.

Age Groups (years)		Clinical Status of Patients			Comparison of significant	
		Cancer	Ulcer	Gastritis	P value	Sig.
20-39	No.	13	16	32	0.12	Non-Sig. (p value >0.05)
	%	44.8	72.7	53.33		
40-59	No.	12	5	20		
	%	41.4	22.7	33.33		
> 60	No.	4	1	8		
	%	13.8	4.5	13.33		
Total	No.	29	22	60		
	%	56.86	43.14	100.0		

The incidence of Iraqi infection with *H. pylori* was higher than that for American (only 20 %) under 40 years in comparison with (56.9%) [18]. This highest frequency may be related to poor sanitation and health conditions particularly during the last years because of USA occupation and the destructive effect of occupation forces. Those factors might act to increase the chance for water and food contamination which, enhance children and youth to be infected with *H. pylori*.

Considering effect of gender on distribution of patients, the current study results are similar to those of recent studies which denoted to

predominance of disease among men rather than women [19,20] particularly under 60 years of age [20]. However the frequencies are varied according to the populations though, the recent study of Al-Arebi (2007) referred to 61.66% prevalence of *H. pylori* infection among males which is a little bit lower than the current results (64.7%) [19]. The interpretation of this minor difference may be related to the sample size in addition to the differences in the laboratory conditions and timing.

Regarding age groups, this study revealed an amazing results that the majority of gastric cancer patients below 60 years [21]. On the contrary, recent study referred to prevalence of gastric cancer above 60 years of age. This controversy may be related to variations in the environmental factor which Iraqi people exposed to; particularly during the last years and the effects of wars which enhance the disease development.

Mean of anti-*H. pylori* antibody titer ( $91.33 \pm 5.3$ ) was noticed to be higher than that of Al-Arebi, 2007 who recorded ( $83.8 \pm 14.3$ ). The level of Ab titer depends on the duration of disease chronicity since IgG anti-*H. pylori* Ab associated with chronic gastritis and subsequently the accumulation of antibodies [19].

Study the association between the clinical status and age groups, this investigation showed that peptic ulcer was predominant among the patients below 40 years while gastric cancer was the hall mark of patients above 40 to 60 years [22]. These results in agreement with [23].

Specifically, both [gastric cancer](#) and gastric [MALT lymphoma](#) (lymphoma of the [mucosa-associated lymphoid tissue](#)) have been associated with *H. pylori*, and the bacterium has been categorized as a group I [carcinogen](#) by the [International Agency for Research on Cancer](#) (IARC) [24, 25].

The current study revealed high frequency of cancer among positively associated *H. pylori* cases. These facts are true since it was proposed that *H. pylori* induce gastric carcinoma by two mechanisms. One mechanism involves the enhanced production of [free radicals](#) near *H. pylori* and an increased rate of host cell [mutation](#) [26]. The other proposed mechanism involves enhancement of the transformed host cell phenotype by means of alterations in cell [proteins](#) such as [adhesion](#) proteins. According to the proposed second mechanism, inflammation-associated signaling molecules that can alter gastric epithelial cell adhesion and lead to the dispersion and migration of mutated epithelial cells without the need for additional mutations in [tumor suppressor genes](#) such as [genes](#) that code for cell adhesion proteins [27].

It was concluded that infection with this organism should therefore be paying more attention since it formed a gastrointestinal

problem. Treatment with short courses of antibiotics to eradicate the infection beside improvement of sanitary and hygienic conditions was recommended to eliminate such complications. It is recommended to shed some light on the association between gastric cancer and its stages in a further study.

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