

CONTRIBUTION OF NON-INVASIVE TESTS IN THE DIAGNOSIS OF HELICOBACTER PYLORI INFECTIONS

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ABSTRACT

Helicobacter pylori infection remains the most common infection in the world, with differences between developed and developing countries, and between rural and urban areas. It is the cause of acute and chronic gastritis, duodenal and gastric ulcers, gastric MALT adenocarcinoma and lymphoma, and numerous extradigestive lesions that have been associated with various levels of evidence.

The main purpose of our study was to determine the prevalence of Helicobacter pylori infection in a sample of 300 patients referred by a physician for the diagnosis of acute gastritis.

The prevalence of Helicobacter pylori infection in our population was 46% on all tests. Serology had the highest percentage of positive results (71.4%) without distinguishing between active infections and old seroconversions, and testing for active infections had a positive rate of 36.25%. 21.78% each for stool antigen test and 13C-urea breath test. Women accounted for 59% of our positive results. This advantage is due to the larger number of females than the males in the sample, with a positive male-female rate of 46% for males and 45% for females.

Several factors contribute to the reduced prevalence of Helicobacter pylori infection, including improved socio-economic and health conditions, lifestyle and behavioral changes, and increased prescriptions for eradication treatment.

Non-invasive testing is the best diagnostic method for patients with no signs of warning.

Keywords: Helicobacter pylori, Diagnosis, non-invasive

INTRODUCTION

Helicobacter pylori infection has a very high prevalence, currently, with an infection rate of up to 50% of the world's population, *H. pylori* infection is the most widespread in the world. It is characterized by geographical disparity [1].

Although the infections are usually symptomless, they can lead to other diseases, including gastritis, peptic ulcers, gastric MALT lymphoma, and more rarely gastric adenocarcinoma. Its involvement in certain extra-digestive pathologies requires further investigation [2].

Accurate diagnosis of *Helicobacter pylori* (*Pylori*) infection is a crucial element in the effective management of many gastroduodenal diseases. Several invasive and non-invasive diagnostic tests are available for the detection of *Pylori* and each test has its utility and limitations in different clinical situations [2].

No single method can be considered the gold standard in clinical practice; several techniques have been developed to give the most reliable results.

The urea breath test and the stool antigen test are the most commonly used non-invasive tests, while serology is useful for screening and epidemiological studies.

We aim to study the prevalence of *Helicobacter Pylori* in our local population and compare the difference between the diagnostics methods reviewed in the literature

PATIENTS AND METHODS

This is a retrospective descriptive study including 300 patients who underwent one of the three non-invasive diagnostic tests

for *Helicobacter Pylori*, conducted in the Department of Bacteriology-Virology and Molecular Biology at the Military Hospital Avicenna between January 2020 and January 2022.

Patients were either external consultants in Gastroenterology or referred by other hospital for an acute gastritis.

For the urea breath test and the stool antigen test, patients should be fasting since the day before the test, have stopped all treatment:

- Antibiotic (Amoxicillin, Clamoxyl, Clarithromycin, Zeclar, Metronidazole, Levofloxacin, Pylera...), for 4 weeks.
- Anti-secretory for 2 weeks.
- Antacids and gastrointestinal dressings for 24 hours.

Data were collected from the databases of the results of the urea breath test, the stool antigen test and finally the serologies.

Analysis of the results allowed us to calculate the percentage of positive results according to the gender of the patients and to compare the positivity rate according to the different non-invasive diagnostic tests performed.

RESULTS

We collected 300 specimens, corresponding to 179 women and 121 men, with a sex ratio of 0.67.

The 300 specimens were divided into 3 non-invasive diagnostic methods (119 serologies, 101 labeled urea breath tests, and 80 stool antigen tests). Of the 300 tests performed, 136 were positive and 164 were negative (figure 1).

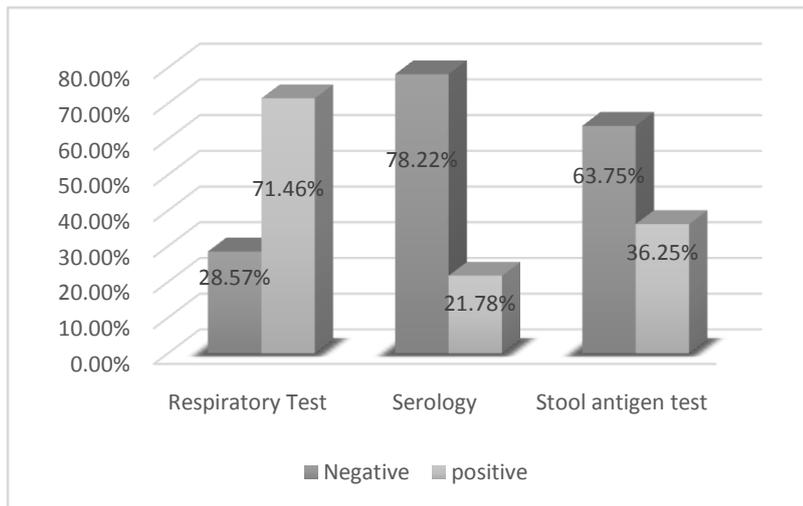


Figure 1: Comparison between the different positivity rates of non-invasive

The prevalence of helicobacter pylori in our population was 46% for all tests combined.

Serology had the highest percentage of positive results (71.4%) without differentiating an active infection from an old seroconversion.

The tests for active infections had positive rates of 36.25% and 21.78% respectively for the antigenic stool test and the 13C-urea breath test.

Women represented 59% of our positive results and the percentage of positive results within each sex was 46% for men and 45% for women. The difference between the two groups was not statistically significant (p=0,8).

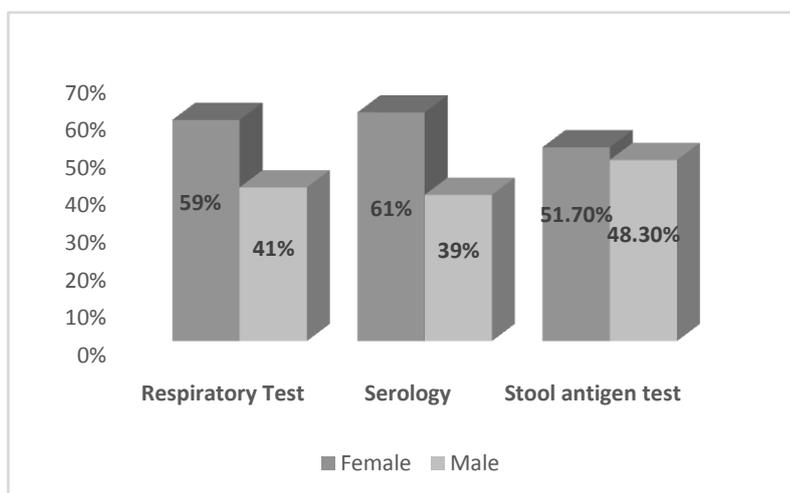


Figure 2: Comparison between the different positivity rates of non-invasive test according to gender distribution

DISCUSSION

The global prevalence of *Helicobacter pylori* infection is 50%, in a meta-analysis including data from 62 countries over the period from 1970 to 2007 estimated the global prevalence of *Helicobacter pylori* infection and its evolution over time. The results confirmed the disparities in prevalence between northern and southern countries. Africa is the continent with the most infected population with an estimated prevalence of 79.1%, while Europe shows a prevalence of 47%. [1]

Another meta-analysis based on data from studies carried out in MENA countries between 1984 and 2020 concluded that the prevalence in this region varies between 36.8% and 94% with a median of 55% [3].

In Morocco, for now, there are few studies treating the epidemiological aspect of *H. pylori* in gastric pathologies, these were conducted on pathological basis reporting a global prevalence of 69% [4,5]. No studies were conducted in our country evaluating this prevalence with noninvasive tests.

While comparing the difference in prevalence between males and females, the two studies conducted in Morocco suggest that there is no statistically significant difference [4,5], our results join these findings.

The diagnostics methods differ between clinicians, some uses both invasive and noninvasive procedures combined to confirm the infection, as it is the case of *Yoshihisa and al* [6], All patients underwent a FOGD with biopsy followed by a rapid urease test and a histological study; a patient is considered positive when both techniques are positive.

All patients underwent a blood test for IgG and IgA in the serum. 101 patients were positive of which 3 were IgG- and IgA-positive, i.e., 3% of infected patients.

Jaskowski and al [7] on the other hand tested systematically both IgG and IgA in serum. 526 patients had IgG - of which 38 had IgA + i.e., a percentage of 7.2% for the profile: IgG-/IgA+. *Helicobacter pylori* infection was excluded by the clinicians in 78.9% of these patients (i.e. 30 patients) based on IgG results only.

According to *Zamani and al.* [8] serology was the most used diagnostic method followed by urea breath test, stool antigen test and lastly histology. These tests were requested in the same order of frequency in our study.

Serology remains the most requested diagnostic test by clinicians in our study and represents 40% of the tests performed, although despite the fact that the percentage of positive results is 71.4%, its low cost, rapidity, and wide availability, it does not allow to distinguish an active infection from an old one since seropositivity can remain for years even after the elimination of the bacterium, which can lead to excessive eradication treatments and to underestimate the other etiologies of gastritis. It is therefore mandatory to confirm the results of a positive serology with another diagnostic test.

It is also important to underline the importance of combining the assay of both IgA and IgG antibodies to avoid underestimating the prevalence of the infection. In our study 43% of the patients were negative for one of the two immunoglobulins.

Table 1 regroups both invasive and noninvasive tests comparison of specificity and sensitivity according to the literature review.

Tests		Sensitivity	Specificity
Noninvasive tests	Serology	85% [9] ; 85-95% [10]	79% [9] ; 80-95% [10]
	Respiratory test	96 % [9, 10]	93% [9] ; 100% [10]
	Stool antigen test	93,3% [9] ; 91% [10] ; 62% [11]	93,2% [9] ; 93% [10] ; 100% [11]
Invasive Tests	Rapid urease test	88-95% [12,13]	95-100% [12,13]
	pathology	93-96% [12,13]	98-99% [12,13]
	Culture	80-98% [12,13]	100% [12,13]
	PCR	> 95% [11,12]	> 95% [11,12]

Invasive tests are expensive, not widely available, carry a significant risk of complications, their sensitivity and specificity is equal to non-invasive tests.

This justifies the importance of the <<Test and Treat>> strategy which consists in performing a non-invasive diagnostic test preferably a 13C-labeled urea breath test (Taukit in our context) failing which the antigenic stool test should be used and prescribing eradication treatment if positive without asking for excessive gastroscopy, in young patients with no alarm signs.

CONCLUSION

Despite the continuous decrease in the prevalence of Helicobacter Pylori infection in the world, it remains very frequent and constitutes the main cause of gastritis. There is still a discordance between practitioners on the reason for acute H.P. gastritis, between those who retain the diagnosis in front of acute dyspeptic symptoms associated with a positive search for H.P., those who retain it in front of the endoscopic aspect and those who require gastric biopsies.

There are many invasive and non-invasive diagnostic methods for Helicobacter pylori, the non-invasive methods remain the tool of choice in patients without warning signs.

The 13C-urea breath test being the gold standard.

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CONFLICT OF INTREST

None

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