American Journal of
Biomedical Science & Research

www.biomedgrid.com
ISSN: 2642-1747

Research Article

Prevalence of Helicobacter pylori IgG Class Antibody in Diagnostic Laboratory Blood Specimens of a Private Corporate Hospital at Dhaka City Bangladesh

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To Cite This Article: *ASM Giasuddin. Prevalence of Helicobacter pylori IgG Class Antibody in Diagnostic Laboratory Blood Specimens of a Private Corporate Hospital at Dhaka City Bangladesh. 2020 - 10(3). AJBSR.MS.ID.001502.* DOI: 10.34297/AJBSR.2020.10.001502.

Received: August 24, 2020; **Published:** September 15, 2020

Abstract

Approximately 50% (over 3 billion) of the world population are known to be infected with Helicobacter pylori (H pylori), a most common human infection worldwide. Hundreds of millions of them develop peptic ulcer disease during their lifetime and still tens of millions might progress to gastric cancer. The high prevalence of infection occurs mainly in developing countries and the test-and-treat strategy puts a huge economic burden on many of these countries. It is high time to take an immediate action toward this bacterial infection and adopt a strategy to prevent it. In this regard, it is important to know the prevalence of H pylori in hospitals and population in different geographical locations. The prevalence of IgG class antibody against H pylori was determined in requested blood specimens sent to Laboratory Medicine of Impulse Hospital Ltd, Dhaka, Bangladesh. Out of 142 blood specimens, 37.3% (53/142) were positive, 17.6% (25/142) were equivocal and 45.1% (64/142) were negative for IgG class antibody against H pylori. The results were reported and discussed in the present article accordingly.

Keywords: Prevalence, Helicobacter pylori, H pylori, IgG antibody

Introduction

Helicobacter pylori (H pylori) is a small, spiral-shaped, highly motile Gram-negative bacterium related to Campylobacter which colonizes the non-acid-secreting mucosa of the stomach and upper intestinal tract. Infection with H pylori is very common causing significant public health problem, with 50% of the world population infected approximately [1,2]. The infection often persists, with evidence showing strong correlation between its presence and a wide spectrum of upper gastrointestinal diseases such as gastritis, peptic ulcer disease, gastric carcinoma and mucosa-associated lymphoid tissue (MALT) lymphoma [3-5]. Previously called Campylobacter pyloridis and then corrected to Campylobacter pylori, it was renamed again as Helicobacter Pylori in a new genus, Helicobacter. Marshall and Warren discovered it in 1982 at the time when stress and diet were thought to be the only causes of peptic ulcer [2,6,7]. Marshall performed self-inoculation by Campylobacter-like organisms (CLOs) and showed self-inoculated gastritis in 1985. Subsequently, he treated it successfully with metronidazole and bismuth salts, thereby proving their ability to cause gastritis. Marshall and Warren were awarded the Nobel Prize in Physiology or Medicine in 2005 for their work on H pylori in the understanding of gastric disease [8].

In 1982, H Pylori was cultured from human gastric mucosa by Marshall and Warren [7,8]. The presence of H pylori was associated with a variety of gastrointestinal diseases such as gastritis, duodenal and gastric ulcers, non-ulcer dyspepsia, gastric adenocarcinoma and lymphoma. The organism was present in 95-98% of patients with duodenal ulcer and 60-90% of patients with gastric ulcers. Some studies also demonstrated that removal

of the organism by antimicrobial therapy was correlated with the resolution of symptoms and cure of diseases [9,10]. Patients with clinical symptoms relating to the gastrointestinal tract disorders can be diagnosed for H pylori infection by two methods i.e. (i) Invasive methods including biopsy followed by culture or histologic examination of biopsy specimen or direct detection of urease activity; (ii) Non-invasive methods including urea breath test and serum immunodiagnostic tests [11,12]. All the tests performed on biopsy samples are subject to errors related to sampling and interference of contaminated bacteria, etc. But detection and determination of H pylori infection in certain gastrointestinal disorders is vitally important for proper diagnosis and hence appropriate treatment. Enzyme immunoassay (EIA) test for determination of IgG class antibody for H pylori is the test of choice in recent times for its accuracy and simplicity [11-13]. Therefore, IgG class antibody against H pylori was determined by EIA method in serum specimens sent to the diagnostic laboratory of Impulse Hospital Ltd, Dhaka, Bangladesh and the prevalence of it has been reported in the present article.

Materials and Methods

A total of 142 blood samples were received in Laboratory Medicine Department, Impulse Hospital, Dhaka, Bangladesh over the period from February 2018 to January 2019 requesting for IgG class antibody test against H pylori with provisional diagnosis of varieties of gastrointestinal disorders. The separated serum samples were analysed for quantitative determination of IgG class antibody against H pylori using indirect IgG EIA test kit (Cat No: 1020) obtained from PerkinElmer Health Sciences Inc., CA94545, USA (www.perkinelmer) [13]. The principle of this Indirect IgG EIA test was as noted below: Diluted serum samples of patients, normal control subjects and positive and negative control sera and calibrators were added to microwells coated on the surface with purified antigen of H pylori. If present, the H pylori specific antibodies bind to the antigen on the surface of the plastic plate. After unbound materials were washed away with buffer, human IgG specific enzyme conjugate was added to the micro wells which binds to the antibody-antigen complex. Excess enzyme conjugates were washed off and then substrate and chromogen were added. The enzyme conjugate catalytic reaction was stopped at specific time by adding stop solution supplied. The color intensities (ODs) were read in a microwell plate reader at 450 nm including calibrators and controls. The ODs generated were proportional to the amount of IgG class H pylori specific antibody in the patient samples. Specimens yielding concentration of antibodies <12.0 iu/ml, >12.0-20.0 iu/ml and >20 iu/ml were considered as negative, equivocal and positive respectively. The intra-assay and inter-assay coefficients of variation (CVs) were 5.1-6.1% and 7.4-8.5% respectively [13].

Results

The details of blood samples received in the laboratory and entered in the log book between February 2018 to January 2019 were summarized and noted below:

Total number of patient specimens: 142, Age range of patients: 11 – 80 years,

Sex distribution of patients: 69 males, 73 females

Number of samples negative (IgG antibody<12.0 iu/ml): 64 (45.1%)

(Age range: 12-72 years; Sex: 31 males, 33 females)

Number of samples equivocal (IgG antibody>12.0-20 iu/ml): 25 (17.6%)

(Age range: 11-70 years; Sex: 10 males, 15 females}

Number of specimens positive (IgG antibody >20.0 iu/ml): 53 (37.3%)

(Age range: 19-80 years; Sex: 28 males, 25females)

As evident, a large number of specimens were positive i.e. 53 (37.3%) while 25 (17.6%) were equivocal and 64 (45.1%) were negative for IgG class antibody against H pylori.

Discussion

H pylori infection is well known to be the most common human infection and significant public health problem worldwide. Approximately 50% of the world's population are infected and that human beings are the main reservoir [1,2]. Although WHO estimates indicate high infection rates among the world populations, most infected subjects develop no clinical symptoms or peptic ulceration and continue their life with superficial chronic gastritis [14,15]. As stated earlier, it is the causative agent of chronic gastritis and peptic ulcer diseases and is an important risk factor for the development of gastric cancer i.e. mucosal-associated lymphoid tissue (MALT) lymphoma [3,5,14]. Still high percentage, i.e. about 17% of the infected subjects develop peptic ulcers and one-quarter of such patients i.e. about 4.25% even experience ulcer complications and still fewer (about 1%) may progress to gastric cancers [4,16].

Many studies were undertaken concerning the role of H pylori in the aetiopathogenesis of chronic gastritis and pepticulcer as well as stomach malignancies [17-20]. Out of all Saudi respondents (n=187), Khan et al reported that 86.6% (n=162) patients had significant gastritis followed by 6.4% (n=12) had normal histopathological finding, 3.7% (n=7) had non-specific findings and 3.2% (n=6) had malignancy [18]. Comparing the prevalence of H pylori infection between Bangladeshi and Japanese subjects, Matsuhisa and Aftab reported higher prevalence in Bangladeshi

than in Japanese subjects (60.2 vs 45.1%) respectively. However, all the scores for chronic inflammation, neutrophil activity, glandular atrophy and intestinal metaplasia were significantly lower in H pylori positive Bangladeshis than in H pylori positive Japanese [19]. In another study Aftab et al suggested that Bangladeshi strains were divided into two main populations of different strains and concluded that the low incidence of gastric cancer in Bangladeshi might be attributable to the high proportion of less-virulent genotypes [20].

Rimbara et al. reported that detection of H pylori by polymerase chain reaction (PCR) was possible using varieties of clinical samples such as gastric biopsy, gastric juice, saliva, dental plaque and stools as well as environmental samples [21]. Highly sensitive nested-PCR targeting the 23S rRNA gene have been reported to be useful for the detection of H pylori clarithromycin susceptibility/resistance and the mutation of the 23S RNA gene responsible for resistance can also be detected using stool as well as other clinical samples such as gastric juice or biopsy material [19-21]. This is important and relevant to recently stated guidelines of National Institute for Health Care Excellence, UK (NICE, UK) for first-line and second-line treatment of H pylori infections [22-24].

The finding of 37.3% (53/142) prevalence of positive H pylori infection in our present study was therefore considered as significant as a preliminary. The determination of genotypes of H pylori in these positive samples as well as other equivocal and negative specimens should be made in order to know the virulence and antibiotic resistance variety of H pylori strains in Bangladeshi population. Secondly, the study should be extended to other private corporate hospitals in Dhaka City for comparison of the prevalence and determination of genotypes of H pylori strains in Bangladeshi population. This will ensure most efficient and effective use of recently developed and practiced treatment protocol against the types of H pylori prevalent in Bangladesh [23-25].

Acknowledgements

The authors would like to appreciate and acknowledge the authority of Impulse Hospital Ltd, ImHS&RCLtd, 304/E Tejgaon Industrial Area, Dhaka-1208, Bangladesh for the support of the study; The authors also appreciate all staff members in different categories particularly Mr. Kazi Mofijul Islam, Medical Technologist, of Department of Laboratory Medicine, for their technical support in record keeping as well as laboratory analyses.

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