

Original article:

Analysis of Association Between Primary Open-Angle Glaucoma and Helicobacter Pylori Infection at a Tertiary Care Hospital

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ABSTRACT

Background: The present study was conducted for evaluating the association between primary open-angle glaucoma and Helicobacter pylori infection.

Materials & Methods: A total of 100 open angle glaucoma patients were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. A correlation of occurrence of primary open-angle glaucoma and Helicobacter pylori infection was assessed. All the results were recorded and were subjected to statistical analysis using SPSS software.

Results: 66 percent of the patients were males while the remaining were females. H. Pylori infection was seen in 23 percent of the patients. While assessing the Odd Ratio, it was seen that open angle glaucoma was not associated with H. Pylori infection.

Conclusion: No significant association exists between H. pylori and primary open-angle glaucoma.

Key words: Helicobacter Pylori, Open-angle, Glaucoma.

INTRODUCTION

Primary open-angle glaucoma (POAG) is one of the leading causes of blindness in the United States and worldwide. Three to 6 million people in the United States are at increased risk for developing POAG because of elevated intraocular pressure (IOP), or ocular hypertension. There is no consensus on the efficacy of medical treatment in delaying or preventing the onset of POAG in individuals with elevated IOP.^{1,2}

Glaucoma is the leading cause of blindness in individuals of West African origin. In the Baltimore Eye Survey, the age-adjusted prevalence rates of primary open-angle glaucoma (POAG) were 4 to 5 times higher in African Americans than in white individuals. The prevalence ranged from 1.2% in African Americans between the ages of 40 and 49 years to 11.3% in those 80 years and older. Furthermore, the Barbados Eye Study found a high prevalence and incidence of glaucoma among black individuals in an Afro-Caribbean population.³⁻⁶

Helicobacter pylori infection has been recognized as the most important pathogenetic principal of peptic ulcer disease, atrophic gastritis, gastric adenocarcinoma and MALT lymphoma. At the moment efforts are made to clarify its role in functional dyspepsia, and gastro-esophageal reflux disease. The complex interactions between

H. pylori infection and NSAIDs is another field of ongoing research. Diagnosis and eradication therapy are standardized. Established indications are peptic ulcer disease, low-grade gastric MALT lymphoma, early gastric cancer treated by mucosal resection and partial gastrectomy for gastric cancer. Atrophic gastritis, known to be a precancerous lesion, as well as first degree relatives of patients with gastric cancer is another widely accepted indication for eradication therapy.^{5- 8} Hence; the present study was conducted for evaluating the association between primary open-angle glaucoma and Helicobacter pylori infection.

MATERIALS & METHODS

The present study was conducted for evaluating the association between primary open-angle glaucoma and Helicobacter pylori infection. A total of 100 open angle glaucoma patients were enrolled in the present study. Complete demographic and clinical details of all the patients was obtained. Serologic testing (ELISA) was deliberately chosen instead of the urea breath test. The urea breath test can be normalized after a course of antibiotic treatment, whereas serologic ELISA testing usually remains positive even after a course of antibiotics. As the goal of the study was to detect previous exposure to H. pylori, we used ELISA, as it was more likely to detect evidence of previous infection than the urea breath test. This protocol therefore allowed the best possible chance for detecting any association between H. pylori exposure and glaucoma. Correlation of occurrence of primary open-angle glaucoma and Helicobacter pylori infection was assessed. All the results were recorded and were subjected to statistical analysis using SPSS software.

RESULTS

Mean age of the patients was 42.5 years. 66 percent of the patients were males while the remaining were females. H. Pylori infection was seen in 23 percent of the patients. While assessing the Odd Ratio, it was seen that open angle glaucoma was not associated with H. Pylori infection.

Table 1: Demographic data

Variable	Number	Percentage
Mean age (years)	42.5	
Males	66	66
Females	34	34

Table 2: Incidence of H. pylori infection

H. Pylori infection	Number	Percentage
Present	23	23
Absent	77	77
Total	100	100

Table 3: Association of primary open-angle glaucoma and Helicobacter pylori infection

H. Pylori infection	OR	95% CI	p- value
Present	1.52	1.42 to 1.62	0.415
Absent	1.39	1.25 to 1.51	

DISCUSSION

Primary open-angle glaucoma (POAG) is an optic neuropathy with characteristic optic disk and/or visual field (VF) changes that is accompanied by an open angle without gonioscopic abnormality. It manifests itself in an insidious, slowly progressive way (chronic open-angle glaucoma; COAG), and age has been identified as a major predictor of its incidence in many studies. However, some patients do present with characteristics similar to those of COAG before the age of 40 years.^{6- 8} *Helicobacter pylori* is known to be the cause of most gastric diseases, including both peptic ulcer disease and gastric cancer. In the absence of eradication, infection tends to be lifelong and the immune response ineffective in clearing the bacteria. A number of groups have investigated whether the immune clearance of infection can be achieved through a vaccination strategy, but to date, the results have been inconclusive. In fact, in most cases of natural infection, the host immune response leads to a chronic inflammation within the gastric mucosa that actually promotes the development of atrophy and neoplasia. In most cases, eradication of the organism leads to resolution of inflammation, which in many instances can result in reduction in atrophy and gastric cancer risk.^{7- 10} Hence; the present study was conducted for evaluating the association between primary open-angle glaucoma and *Helicobacter pylori* infection.

A total of 100 open angle glaucoma patients were enrolled. The mean age of the patients was 42.5 years. 66 percent of the patients were males while the remaining were females. *H. Pylori* infection was seen in 23 percent of the patients. While assessing the Odd Ratio, it was seen that open angle glaucoma was not associated with *H. Pylori* infection. Galloway PH et al determined the frequency of exposure to *Helicobacter pylori* infection in glaucoma patients. Ninety-seven consecutive patients attended a glaucoma clinic. These included 38 patients with primary open-angle glaucoma (POAG), 19 with normal pressure glaucoma (NPG), 16 with pseudoexfoliation glaucoma (PXE), and 24 with ocular hypertension (OHT). Ninety-four age-matched participants without glaucoma served as a control population. Serum was analyzed for the presence of *H. pylori*-specific immunoglobulin G antibodies by enzyme-linked immunosorbent assay. Seropositivity for *H. pylori* was higher in patients with glaucoma (26.0%) than in controls (20.2%), but this did not achieve statistical significance ($P = 0.46$). A total of 26.3% of POAG patients, 26.3% of NPG patients, 25.0% of PXE patients, and 25.0% of OHT patients were seropositive. Their study suggested that exposure to *H. pylori* infection is not associated with open-angle glaucoma.¹¹ Kountouras J et al investigated the levels of anti- *H. pylori*-specific IgG antibodies in the aqueous humor and serum of patients with primary open-angle glaucoma (POAG) and patients with exfoliation glaucoma (XFG), and to compare them with those in age-matched cataract patients. Aqueous humor was aspirated at the beginning of glaucoma surgery from 26 eyes of 26 patients with POAG, 27 eyes of 27 patients with XFG, and at the beginning of phakoemulsification cataract surgery from 31 eyes of 31 age-matched normotensive cataract patients. The mean concentration (\pm SE) of anti- *H. pylori*-specific IgG was significantly greater in the aqueous humor samples from patients with POAG (14.27 ± 3.86 U/ml) and XFG (14.25 ± 3.39 U/ml) than in those from age-matched control cataract patients (4.67 ± 1.07 U/ml). No difference was observed in the levels of *H. pylori*-specific IgG antibodies between POAG and XFG aqueous humor samples ($P=0.5$). Similarly, the serum concentration of anti- *H. pylori* antibodies was significantly greater in patients with POAG (69.96 ± 9.69 U/ml; $P=0.013$) and XFG (81.37 ± 10.62 U/ml; $P=0.002$) than in the cataract controls (44.16 ± 6.48 U/ml). The mean vertical cupping correlated significantly with the titre of anti- *H. pylori*-specific IgG in the aqueous humor in the POAG patients. *H. pylori*-specific IgG antibody levels are significantly increased in the aqueous humor and serum of patients with POAG and XFG.¹²

CONCLUSION

Therefore, it can be concluded that no significant association exists between *H. pylori* and primary open-angle glaucoma.

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