

Significance of Serum Pepsinogens in Atrophic Gastritis

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Summary:

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Background: Chronic atrophic gastritis is a precancerous lesion. A commonly used test for the diagnosis of chronic atrophic gastritis, gastric endoscopy with biopsy collection, and a good serological test would be best include low levels of pepsinogen I (PGI) or a low PGI/PGII ratio.

Aim of the study: To confirm the use of serum pepsinogens as a screening marker in atrophic gastritis.

Patients and Methods: A study was conducted in the period between December 2005 and March 2006 on 25 patients with atrophic gastritis attending Gastroenterology and Hepatology Teaching Hospital in Baghdad, and 25 healthy control subjects. Sera were tested for PGI and PGII by ELISA test.

Results and Conclusions: the serum PGI were decreased significantly with atrophic gastritis and the PGI/PGII ratio were decreased in (78%) of patient group and not affected in healthy people.

Key Words: PGI, PGII and Chronic atrophic gastritis.

Introduction:

Intestinal-type gastric adenocarcinomas, the most common type of gastric cancer (1&2), are preceded by a series of precancerous lesions, starting with chronic atrophic gastritis, progressing to intestinal metaplasia, dysplasia, and finally becoming cancer; this sequence occurs over several decades (3). Screening tests should ideally be convenient, virtually free of discomfort or risk, efficient, and economical (4). A commonly used test for the diagnosis of chronic atrophic gastritis, gastric endoscopy with biopsy collection, is invasive and as such has none of these characteristics. A good serological test would be best. A number of studies have examined a variety of serological methods to identify people with precancerous conditions, either as individual tests or as combinations of tests; these include low levels of PGI or a low PGI/II ratio, elevated gastrin levels, and the presence of antibodies to either *H. pylori* or to the CagA protein, a marker of *H. pylori* strain virulence (5,6,7,8,9&10). PGI is a precursor enzyme of pepsin and is synthesized by the chief cells and neck cells of the gastric corpus. The major part of PGI is secreted into the gastric lumen but a small amount can be found in the blood (11). Correspondingly, the loss of chief cells results in a linear decrease in serum PGI. The loss of chief cells is, on the other hand, a result of atrophic gastritis (12). PGII is produced by chief cells and mucous neck cells of the gastric mucosa, in pyloric glands in the gastric antrum and Brunner's glands in the proximal duodenum. The ratio of concentration of PGI to

PGII in serum or plasma of normal subject is about 4:1 (13). The PGI/PGII ratio decreases linearly with increasing grade of atrophic gastritis in the corpus (14&15). Although depressed pepsinogen levels have been considered the best serological marker of gastric preneoplastic conditions to date (16). The current study was performed to confirm if the level of serum PGI and PGII can be considered a screening marker of chronic atrophic gastritis.

Patients and Methods:

Over 4 months period (December 2005- March 2006), a study was conducted on 25 patients attending Gastroenterology and hepatology teaching hospital in Baghdad, who had histologically diagnosed as atrophic gastritis and 25 healthy control volunteers.

Blood sample were taken from each individual, serum PGI & PGII were measured by an immunoenzymometric assay (Biohit Plc), a low serum PGI result (25 mg/l) indicates advanced atrophic gastritis of the corpus mucosa. A PGI/PGII ratio lower than 2.5 indicates that the patient has advanced corpus atrophy and an increased risk of gastric cancer.

Results:

The results of serum PGI & PGII of 25 patients with atrophic gastritis who diagnosed endoscopically compared to that of 25 healthy control group show that (92%) of patient group were with low serum level of PGI while only (4%) of healthy subjects show decrease in serum PGI (table-1). Thus the serum PGI were decreased significantly with atrophic gastritis.

The PGI/PGII ratio were decreased in (78%) of patient group and not affected in healthy people (Table-2).

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Table-1- Serum PGI level in atient and control

Groups	Normal PGI No. %	Low PGI No.	Total
Patients	2 8	23 92	25
Control	24 96	1 4	25

Table-2- Serum PGI/PGII ratio in atient and control rou s

Groups	Normal PGI/PGII No. (%)	Decreased PGI/PGII No. (%)	Total
Patients	6 (24)	19 (76)	25
Control	25 (100)	0 (0)	25

Discussion:

The positive predictive values for low pepsinogen levels as a screening tests were high and Generally, pepsinogen levels are known to be lower in subjects with atrophic gastritis compared with normal controls. These markers have been shown to discriminate between affected and unaffected people in some studies (5,11,17& 18), but not in others (7& 19). A number of investigations have determined the sensitivity and specificity of these and other screening tests for a range of cutoff values, either directly or by providing data permitting their calculation (7,9,10,12,15,20&21). For each screening test, variation in both sensitivity and specificity is remarkably wide.

Although this enormous variation across studies can be attributed in part to differences in study design, underlying population characteristics (such as country of origin or patient selection criteria), and very different cutoff values, it may be explained largely by the lack of a standardized method for diagnosing atrophic gastritis. Studies have used different diagnostic methods: some studies considered only severe atrophy, whereas others considered any atrophy; overall, the prevalence of this condition ranged from 3 to 78%. Indeed, even among collaborating pathologists, rates of agreement regarding the diagnosis of chronic atrophic gastritis have been notoriously poor (22). Standardization permits direct comparison across studies. Five recent investigations examined a variety of screening tests for chronic atrophic gastritis diagnosed using the Sydney classification (10&23). Our study confirms the excellent specificity of low PGI levels found in the study by Knight et al. (10). PGI levels may confirm the absence of chronic atrophic gastritis in a particular patient, but they are less useful in identifying persons at risk of this condition at

the population level. Additionally, the use of healthy volunteers may partially explain the rate of atrophy seen in this study (4%), which is low particularly compared with that of the patient group.

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