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Diagnosis of Atrophic Gastritis with Plasma Biomarkers

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Gastrin-17 (G-17) and hydrochrolic acid form a feed-back loop that plays a central role in gastric physiology, homeostatis and function. G-17 is secreted from antral "gastrin cells" (G cells). G-17 stimulates output of acid from oxyntic glands in gastric corpus. Hydrochloric acid on the other hand, inhibits the release of G-17 from the antral G-cells. *Helicobacter pylori* gastritis and particulary atrophic gastritis, may break and interfere with this feed-back loop. Damages in the loop are dependent upon type, topography and grade of the lesions. Consequently, the risks of various gastric disorders are increased or decreased. The novel panel of blood tests (GastroPanel, Biohit Plc. Finland) allows the diagnosis of atrophic gastritis by assaying specific biomarkers from a blood sample. The test panel is composed of four biomarkers that are to be assayed from same blood (serum/plasma) sample. The markers are pepsinogen I (PGI) and pepsinogen II (PGII), G-17 and *H. pylori* antibody (IgG and IgA). PGI (or ratio of PGI to PGII) is a marker of the status and function of gastric corpus. G-17 is a biomarker of the antral mucosa (number and function of antral G cells). The presence or absence of *H. pylori* antibodies (IgG and IgA) is a biomarker of gastritis in general. Diagnostic accuracy of GastroPanel test is high as compared with endoscopy histology. Sensitivity and specificity in differentiation between healthy and diseased (*H. pylori* gastritis/atrophic gastritis), gastric mucosa are around 90%, and the overall accuracy is 80%.

Atrophic gastritis in corpus or in both antrum and corpus. Atrophic gastritis, or advanced multifocal atrophic gastritis in particular, is the most important known single risk factor for gastric cancer known so far (risk ratio 90x). The risk of peptic ulcer is nil. Output of intrinsic factor is low or absent resulting in risk for malabsorption of vitamin B12 and of high levels of homocysteine in tissues and circulation. By the gastroPanel test, PGI is low and G-17 is high if the antrum mucosa is non-atrophic. Both PGI and G-17 are low if the whole stomach (both antrum and corpus; i.e. advanced multifocal atrophic gastritis) is atrophic. Approximately 70% of patients have *H. pylori* antibodies suggesting of an on-going *H. pylori* infection even though breath test or stool antigen test are negative, and or biopsy microscopy and urease biopsy test are negative. Gastric cancer or early precancer lesions (dysplasia, early gastric cancer) can be found in up to 5% of the patients. **Atrophic gastritis is limited to antrum or chronic non-atrophic gastritis in antrum predominant.** Patients have an increased cancer risk if antrum is severely atrophic. Typically, the patients have normal or high acid output of (BAO and MAO are normal or high) and, subsequently, they are at risk for peptic ulcer disease. In GastroPanel test, PGI is normal but G-17 is low (there is a loss (atrophy) of antral G cells along with the loss of antral glands in association with normal or high acid output from non-atrophic corpus. The patients have always *H. pylori* antibodies.

Non-atrophic gastritis. There is some but low risk for cancer. In GastroPanel, PGI and G-17 are normal but the subjects have *H. pylori* antibodies. Treatment of *H. pylori* may prevent the later development of atrophic gastritis and gastric cancer.

Normal and healthy gastric mucosa. The risk of gastric cancer is minimal. GastroPanel test is normal. In subjects with healthy gastric mucosa but very low G-17 indicates high intragastric acidity that may indicate an increased risk of acid related damages of esophageal mucosa in the presence of GE reflux.

Keywords. Trophic gastritis, plasma biomarkers, PGI, PGII, G-17.

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