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The Endoscopic and Clinical Characteristics of Autoimmune Atrophic Gastritis: a retrospective study

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Abstract:
Introduction:
Autoimmune atrophic gastritis (AIG) is a rare chronic autoimmune disease characterised by gastric mucosa inflammation and atrophy. Limited clinical data exists on AIG, especially in western populations. In addition, there are no western series on the magnifying endoscopic features in AIG. This study presents a cohort of 63 patients with AIG, reporting their clinical, laboratory, and endoscopic findings.
Methods:
A retrospective analysis was conducted on patients diagnosed with AIG at Kingston Health Sciences Centre, Canada, between January 2016 and December 2023. Data collected from medical records included age, sex, presenting symptoms, laboratory findings, endoscopic features, histopathology reports, and concomitant autoimmune diseases.
Results:
The study included 63 patients with autoimmune gastritis. Positive anti-parietal cell antibodies were found in the majority of patients (84.13%), while positive anti-intrinsic factor antibodies were less prevalent (25.40%). Deficiencies in vitamin B12 (49.21%) and iron (76.19%) were observed, along with a high prevalence of anemia (71.43%) and concomitant autoimmune diseases (58.73%). The dominant magnification pattern of atrophy in the body was oval/slit in 57.14% (n=36) of the patients, followed by tubular in 30.16% (n=19) and foveolar in 12.70% (n=8). The prevalence of neoplasia in our study was 42.86% (n=27).
Conclusion:
This study offers insights into the clinical, laboratory, and magnifying endoscopic features of patients with AIG. It demonstrates the three main magnifying endoscopic appearances of AIG and highlights the significant prevalence of gastric neoplasia, even in the low-risk Western population. These findings emphasize the importance of the endoscopic exam in identifying AIG and notably present the key magnifying endoscopy findings in a Western setting for the first time.

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Introduction

Autoimmune atrophic gastritis (AIG) is a chronic autoimmune disease characterised by inflammation and atrophy of the gastric mucosa. It is a rare condition with a reported prevalence of less than 2% in the general population, but it is more common in certain populations such as the elderly and those with other autoimmune diseases [1]. Despite its clinical significance, AIG is often underrecognized, potentially leading to underdiagnosis and mismanagement, which increases the risk of developing advanced gastric cancer [2]. AIG can result in impaired gastric acid secretion, leading to malabsorption of nutrients, iron deficiency anaemia, and an increased risk of gastric neoplasia [3].

There are numerous endoscopic signs that have been described in the gross description of gastric atrophy. The most characteristic endoscopic findings of AIG is corpus-dominant advanced atrophy accompanied by non- or less-atrophic patterns in the antrum (reverse atrophy) [4]. Other findings include: loss of gastric folds, dense adherent mucus, marked vascular appearance in the body, and nodular remnant mucosa (**Figure 1**). The updated Kimura-Takemoto classification is the commonly employed system for macroscopically characterising the extent of atrophy, comprising two primary categories: closed type atrophy and open type atrophy [5]. The former is defined as atrophic change restricted to the lesser curvature of the stomach, whereas the latter encompasses atrophic change affecting both the lesser and greater curvatures of the stomach body.

Microscopic or magnifying endoscopic findings of the gastric body in AIG have not been extensively described. However, in the Japanese literature, three main magnifying patterns of gastric body atrophy have been reported: foveolar (also known as ‘Cast-off skin appearance’ [4]), oval/slit, and ridge/villous (also known as groove) types [6–9].

Despite the importance of endoscopically identifying AIG, there is a paucity of literature on the macroscopic and microscopic (magnifying endoscopy) findings of this condition, particularly in the western population. Therefore, the aim of this study is to present a cohort of 63 consecutive patients with AIG in a tertiary care centre, focusing on the endoscopic, clinical and laboratory findings.

Methods

The objective of this retrospective cohort study was to examine individuals diagnosed with AIG at Kingston Health Sciences Centre, Canada, from January 1, 2016, to December 31, 2023 by a single endoscopist RB). A total of 4,345 esophagogastroduodenoscopies (EGD) were reviewed for patient eligibility from an administrative database. In our study, the diagnostic criteria for AIG were based on both endoscopic and serological findings, as per the guidelines outlined in the Diagnostic Criteria and Endoscopic and Histological Findings of Autoimmune Gastritis in Japan [10]. Specifically, participants had to exhibit severe mucosal atrophy predominantly from the gastric body to the fundus on endoscopy, or have histological findings consistent with AIG, or both, and be positive for gastric autoantibodies (either anti-parietal cell or anti-intrinsic factor antibodies, or both). All participants in our study met these inclusion criteria. Patients who did not meet the criteria or who had exclusion factors such as H. pylori infection were not included in the administrative database, and their numbers were not tracked. Consequently, our study predominantly included cases at an advanced stage of AIG. Patient inclusion and data collection were overseen by a single endoscopist experienced in magnifying endoscopy (RB).

The study received approval from the local ethics committee, and the reference is TRAQ: 6039408 approved on the 3rd of August 2023. Medical records were reviewed to collect data including age, sex, presenting symptoms, laboratory findings such as serum anti-parietal cells antibodies, anti-intrinsic factor antibodies, haemoglobin, vitamin B12, and Ferritin, endoscopic findings, histopathology reports, and concomitant autoimmune diseases. A cut-off value for anti-parietal cell antibodies was 1:80 in serum and a cut-off value for anti-intrinsic factor antibodies was 1:40 in serum, was established for the definitive diagnosis of AIG in our study. The total upper endoscopies performed were retrieved from the administrative billing database, and the patients with AIG were identified from the administrative upper endoscopy surveillance database. All patients with AIG are entered into an administrative database to ensure they receive surveillance endoscopies. The charts of these patients were then retrospectively reviewed to collect the aforementioned data. The diagnosis of AIG was based on typical histological findings of the biopsies of the antrum and corpus as outlined in the literature [11]. Descriptive statistics were used to analyse the data, with continuous variables presented as mean ± standard deviation, and categorical variables as frequency and percentages. We reported our findings following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement. Prior to endoscopy, patients did not undergo stomach cleaning with any solution. The procedures utilized a consistent set of endoscopes, specifically, either Fujifilm EG-760Z or Pentax EG-2990Zi, which were employed by the same endoscopist throughout the study (RB). The procedures involved conscious sedation, and the mucosa was carefully observed for relevant features, all cases were photographed for reference. Blue Laser Imaging (BLI) (Fujifilm, Japan) or Optical Enhancement Mode 1(OE-1)(Pentax, Japan) was employed for all patients in this study, areas pertinent to atrophy were particularly targeted. An Olympus black cap for lesion characterization and zoom endoscopy (MAJ-1990) was used in all cases. Mucosal characterization was successfully achieved in all patients included in the study. The endoscope used throughout the study maintained a medium to high magnification of 80- 135x (using a 19-inch monitor).

The biopsy protocol for autoimmune atrophic gastritis involved obtaining multiple biopsies from the gastric body and antrum during routine endoscopy. BLI or OE-1 was employed to enhance the micro surface and microvasculature visualization. Biopsies were taken as per Sydney Protocol on index endoscopy, and only targeted on subsequent endoscopy as indicated. Three dedicated gastrointestinal pathologists reviewed all biopsy specimens for consistent diagnosis of AIG based on histological

features. The Kimura Takemoto classification (KTC) was used to describe the extent of gastric atrophy, and the dominant magnification pattern of atrophy in the body was also recorded. In AIG, whole body of the stomach shows atrophic mucosa and no gland border is detected, which is called O-p, meaning 'pan-atrophy' (or O-4), this was used in our analysis [12]. Furthermore, the presence and type of neoplasia were documented.

The definition and diagnosis of neoplasia in this study were based on endoscopic and histopathological assessments. Endoscopic findings suggestive of neoplasia, were further confirmed through histopathological examination of biopsy specimens. The management of identified neoplastic lesions, including neuroendocrine tumours, adenomas, and early gastric cancers, underwent individualized treatment strategies. The specific interventions varied based on the type, size, and stage of the neoplastic lesion. Common management approaches included endoscopic resection for early-stage lesions, and surgical interventions or other therapeutic modalities for more advanced cases.

Magnifying Patterns of Gastric Atrophy:

Our study defines three main magnifying patterns of gastric body atrophy, which have been reported: foveolar (also known as 'Cast-off skin appearance' [3]), oval/slit, and ridge/villous (also known as tubular/ glandular or groove) [6–9]. In the foveolar type the micro surface and microvascular appearance is very similar to the normal gastric body (**Figure 2a**), the subepithelial capillary network is visible, however due to the mucosal atrophy the various layers of microvasculature are also visible while the crypt opening is less prominent (**Figure 2b**). This foveolar type is the typical finding of AIG. The oval/slit type is essentially a variation of foveolar type in that the gastric crypt opening (**Figure 2c**), have an oval or slit-like appearance. In the ridge/villous type **(Figure 2e, f)**, the appearance is more similar to that of the antrum **(Figure 2d)**. In this type, the pit is not clearly visible due to its oblique orientation, while the subepithelial capillary network (SECN) is observed coiled with surrounding marginal crypt epithelium.

Results

The present study aimed to describe the clinical characteristics, laboratory findings, and endoscopic features of patients with AIG at our centre. Between January 1, 2016, and December 31, 2023, a total of 4,345 individuals were screened, and 63 patients met the criteria for inclusion, resulting in a prevalence rate of 1.449. A total of 63 patients were included in the study, with a mean age of 62.94 years. The majority of patients were female, constituting 73.02% (n=46) of the population. The most common indication for endoscopy was iron deficiency, found in 60.32% (n=38) of the patients. Other indications for diagnosis included foregut symptoms (n=21, 33.33%), screening for a pre liver transplant patient (n=1, 1.59%), incidental finding on ERCP (n=1, 1.59%), cirrhosis (n=1, 1.59%), and FOB+ and colon normal (n=1, 1.59%). Out of the total number of patients, 25.40% (n=16) were discovered to have positive anti-intrinsic factor (anti-IF) antibodies, while 74.60% (n=47) tested negative for anti-IF antibodies. In contrast, a high majority of patients, 84.13% (n=53), tested positive for anti-parietal cell (anti-PC) antibodies, with only 15.87% (n=10) testing negative for anti-PC antibodies.

Approximately half of the patients were deficient in vitamin B12 (n=31, 49.21%) and iron (n=48, 76.19%). Additionally, 71.43% (n=45) of the patients were anaemic. Concomitant autoimmune diseases were present in 58.73% of the patients, with hypothyroidism being the most common (n=24, 38.10%). The remaining autoimmune diseases included non-insulin dependent diabetes (n=11, 17.46%), insulin-dependent diabetes mellitus (n=2, 3.17%), rheumatoid arthritis (n=3, 4.76%), Crohn's disease (n=1, 1.59%), autoimmune polyglandular disease (n=1, 1.59%), adrenal insufficiency (n=2, 3.17%), celiac disease (n=1, 1.59%), primary biliary cholangitis (n=1, 1.59%), Sjogren’s disease (n=1, 1.59) and psoriatic arthritis (n=1, 2.17%).

In our study, we examined the gross and magnifying endoscopic features observed in a cohort of patients. All patients (n=63, 100%) had pan-atrophy and were classified as type O-P (or O-4) according to the Kimura Takemoto Classification. Notably, the most expected observation, loss of gastric folds, was evident in all 63 cases (100%), underscoring its consistency and significance as a hallmark feature of the condition. Additionally, dense mucus was present in a significant majority of cases, with 76.19% (n=48) displaying this feature. Notably, marked vascular visibility was also a prominent feature, observed in 41.27% (n=26) of the cases. White global appearance was identified in 23.81% (n=15) of cases, indicating a relatively less common occurrence. Xanthomas, on the other hand, were observed in 26.98% (n=15) of cases, suggesting a moderate prevalence. A nodular remnant of normal mucosa was only seen in 14.29% (n=9) of cases, representing a rare finding. The dominant magnification pattern of atrophy in the body was the oval/slit pattern in 57.14% (n=36) of the patients, followed by the tubular pattern in 30.16% (n=19) and the foveolar pattern in 12.70% (n=8).

Of the 63 patients, 42.86% (n=27) had neoplasia. Among them, 25.4% (n=16) had neuroendocrine tumours (NET), 7.94% (n=5) had hyperplastic polyps, 7.94% (n=5) had adenomas, and 9.82% (n=6) had early gastric cancers, including high-grade dysplasia, intramucosal carcinoma, and superficial submucosal carcinoma, **Table 1**.

Discussion

Our study aimed to investigate the clinical and endoscopic characteristics of patients with AIG in a western centre. Our findings are consistent with previous studies that have reported a female predominance, high prevalence of iron and B12 deficiencies, and autoimmune diseases in patients with AIG [3]. However, the prevalence of anti-IF antibodies in our study was lower than that reported in other studies, which may be attributed to the small sample size of our series. The high prevalence of anti-PC antibodies in our study is in line with previous reports suggesting that this test has a high sensitivity for AIG diagnosis [13]. Our study also revealed a high prevalence of neoplasia in patients with AIG, with NET being the most common type. This is consistent with previous studies that have reported an increased risk of gastric neuroendocrine tumours in patients with AIG [11,14].

Our study highlights the importance of considering AIG in the differential diagnosis of iron and B12 deficiencies particularly with the comorbidities of hypothyroidism and other autoimmune disorders [3]. Moreover, our findings support the use of anti-PC antibodies as a sensitive and specific marker for AIG diagnosis [3]. The high prevalence of neoplasia in patients with AIG underscores the need for regular endoscopic surveillance to detect and resect these lesions at an early stage [15].

AIG is a systemic disease that requires a comprehensive assessment for diagnosis that includes a combination of clinical, serological and endoscopic [8,16]. Although the diagnosis of AIG in western cultures relies on the presence of anti-IF and anti-PC antibodies, Japanese guidelines aim to incorporate more endoscopically viable options to reduce the cost of histopathology [17–19]. In Japan, narrow-band imaging magnifying endoscopic diagnosis of inflammation, atrophy, and intestinal metaplasia of the gastric mucosa has been reported to be relatively accurate [4,20,21].This underscores the recognition of the endoscopic features in AIG diagnosis.

Iron deficiency is a prevalent factor in the assessment of AIG. This condition is a result of the decreased uptake of inorganic iron due to missing reduction of ferric iron, missing degradation of iron-protein complexes due to the lack of gastric acid, and reduced levels of ascorbic acid. Although AIG is associated with iron deficiency, the development of anaemic indices, whether normocytic or microcytic, varies among populations of AIG [3]. One study reported that in 160 patients with AIG, only 83 patients presented with iron deficiency anaemia, indicating that the variability in anaemic indices' development may be due to multiple factors in the range of disease progression and other factors [22,23].

The significance of diagnosing AIG lies in recognizing that AIG is associated with gastric cancer, NETs, and other autoimmune diseases, such as thyroid diseases, anaemia, and neurological symptoms due to impaired absorption of iron and vitamin B12 [4]. Diagnosing AIG involves identifying patients as a high-risk group for the development of gastric cancer and gastric NETs, detecting autoimmune endocrine diseases, and initiating therapeutic intervention before anaemia and neurological symptoms develop. In particular, previous reports from western countries have shown a prevalence of gastric cancer in AIG ranging from 0.7-2.6% [24–26]. In our present study, the prevalence of gastric cancer and gastric adenoma were quite high: 13.5% and 10.87%, respectively. In our cases, all of them showed O-p in the Kimura-Takemoto Classification showing pan-atrophy, which is a characteristic of end-stage AIG. All our cases are considered to be end-stage AIG; therefore, this may partially explain the higher prevalence of gastric cancer. The observed discrepancy between our study, which reports a gastric cancer comorbidity rate of approximately 10% in Helicobacter pylori-negative AIG patients, and the findings of Rugge et al., who suggest that gastric cancer does not arise from H. pylori-negative AIG, can be attributed to several factors

[25]. A significant possibility is the inclusion of unrecognized H. pylori-infected individuals in our cohort, which may inflate the observed cancer rate. Rugge et al. [25] may have studied a different subset of AIG patients with distinct clinical characteristics or progression patterns that were not captured in our cohort. Additionally, our cohort included patients referred for assessment of neoplasms, which could account for the higher prevalence observed.

In our study, we note that the awareness of AIG and its association with early gastric cancer among endoscopist in North America is generally low. This may result in the underdiagnosis and mismanagement of AIG, without appropriate surveillance, thereby increasing the risk of missing early gastric cancers on endoscopy and potentially allowing progression to advanced gastric cancer. There is a strong association between the accurate endoscopic staging of gastric atrophy and the risk of developing gastric adenocarcinoma [2,27,28]. Notably, the interobserver and intraobserver agreement for endoscopic severity assessments, when performed by experienced endoscopists, is reported to be moderate to excellent [2]. This suggests that, with proper training and awareness, endoscopic evaluation could serve as a key tool in identifying patients at higher risk for gastric cancer. However, given the current low recognition of AIG in North America, the potential for misinterpretation or underassessment of GA severity remains, which could further contribute to missed opportunities for early cancer detection in this population. Thus, improving endoscopists' awareness and training on the clinical relevance of AIG and its endoscopic features could enhance risk stratification and facilitate early intervention strategies [2].

Awareness of the macroscopic findings in AIG is important for endoscopists if they are to identify AIG during routine endoscopy[4,21,29]. We observed noteworthy macroscopic features of AIG, such as corpus-dominant advanced atrophy accompanied by non- or less-atrophic patterns in the antrum (reverse atrophy), loss of gastric folds, dense mucous and marked vascular appearance. Once the endoscopist suspects atrophy based on the macroscopic evaluation, microscopic evaluation becomes pivotal to confirm or refute the suspicion of AIG. In our study, the use of high magnification endoscopy (80-135x) allowed for detailed observation of mucosal and vascular characteristics, particularly in areas of atrophy. Microscopic findings in AIG include the three magnifying patterns in the gastric body: oval/slit, ridge/villous, and foveolar, which provide additional evidence for the presence of atrophy [4,21]. In previous reports, foveolar pattern is said to be the most characteristic feature in magnified endoscopy in AIG [9]. In this present study, oval/slit pattern was 50% and the prototypical foveolar pattern was 17.39%. However, since the oval/slit pattern is a variation of the foveolar type, 67.39% of the patients had a foveolar pattern (round-to-oval crypt openings and marginal crypt epithelium surrounded by sub-epithelial capillary network), which is consistent with previous reports [7–9]. In addition, these endoscopic findings correlate with histopathological changes associated with AIG. The normal “honeycomb” pattern reflects normal oxyntic glands with little or no atrophy, whereas the foveolar/oval/slit-like pattern indicates non-metaplastic atrophy of oxyntic glands[7,9]. The ridge/villous pattern typically reflects intestinal metaplasia and/or pseudo pyloric gland metaplasia in the histopathology[7,9]. The transition from the foveolar pattern to the oval/slit pattern, and further to the ridge/villous pattern, correlates with increasing severity of atrophy [7,9]. Recognizing and understanding these microscopic features is crucial for endoscopists to accurately diagnose AIG and identifying patients at risk for gastric cancer.

In addition to the macroscopic and microscopic findings, our study explored the associations between AIG and certain endoscopic features, such as WGA and xanthomas. The WGA appearance has been previously described in association with adenomas and early gastric cancer and consists of cystically dilated glands containing necrotic debris. [20]. While Xanthomas consist of lipid filled macrophages in the mucosa

and have been described to in association with H. pylori, gastric cancer, and metabolic dysfunction. The precise pathogenesis of either of these entities is still unknown. While our study showed a moderate association between AIG and these endoscopic features, the exact significance of these findings in the context of AIG remains unknown.

In our study, patients with evidence of H. Pylori on biopsies or positive H. Pylori serology were excluded. However, in East Asia, there are numerous cases of AIG combined with H. pylori-related gastritis due to the high prevalence of H. pylori. There are also reports that H. Pylori infection as the cause of AIG [9,30,31]. In a clinical setting, the diagnosis of AIG should be made keeping in mind that AIG could be combined with H. pylori infection.

Recently, the “Study Group on the Establishment of Diagnostic Criteria for Type A Gastritis” of the Japan Gastroenterological Endoscopy Society has proposed new diagnostic criteria for autoimmune gastritis. Based on the diagnostic criteria, the diagnosis of AIG can be made based on characteristic endoscopic findings and/or characteristic histological findings, accompanied by positive anti-parietal cell antibodies or anti-intrinsic factor antibodies.[10]. The primary characteristic endoscopic finding is severe atrophy predominantly in the body and fundus of the stomach. The secondary findings include dense adherent mucus, remnant of oxyntic mucosa, and hyperplastic polyps. These findings from Japanese cohorts are consistent with the findings that we observed in our western cohort. These new Japanese diagnostic criteria highlight the importance of endoscopic diagnosis in AIG, which is indeed also important in the western setting.

In western countries where the incidence of gastric cancer is comparatively lower than in Asia, the positioning and recognition of AIG as a risk factor for gastric cancer have been evolving [32]. Despite the lower overall incidence of gastric cancer in these regions, recent studies have indicated that AIG may still confer a notable risk. While AIG-associated gastric cancer remains relatively less recognized compared to other risk factors such as H. pylori infection or dietary factors, growing evidence suggests its significance, particularly in specific populations with predisposing factors such as autoimmune diseases or genetic susceptibilities [33]. Given the complexity of AIG diagnosis and its association with other autoimmune conditions, its role as a risk factor for gastric cancer in western contexts requires further elucidation and heightened clinical awareness to facilitate early detection and intervention strategies, especially among susceptible subgroups.

Our study has several limitations. Firstly, it is a retrospective cohort with a small sample size and limited generalizability to other populations. Secondly, endoscopy was conducted in a single centre by a single operator with a very specialized practice, which may limit the external validity of our findings. Thirdly, we did not assess the long-term outcomes of patients with AIG, particularly regarding neoplasia development, progression and miss rate. Future research should aim to confirm our findings in larger multicentre north American studies. Long-term follow-up is also necessary to investigate the natural history of AIG, the risk of neoplasia development, and the significance of associated findings such as WGA and xanthomas. This study demonstrates the distinct macroscopic and microscopic endoscopic findings that are vital in the identification and diagnosis of AIG. Lastly, one limitation of the study is that the presence of xanthoma, closely related to H. pylori infection according to the Kyoto classification, was observed in 25% of cases, potentially indicating unrecognized H. pylori infection, which could influence the high complication rate of gastric cancer.

Additionally, it highlights the high prevalence of neoplasia in this western cohort with AIG, emphasizing the importance of optical diagnosis and implementation of endoscopic surveillance for AIG.

Abbreviations:
AIG: autoimmune atrophic gastritis, EGD: esophagogastroduodenoscopy, FOB+: Faecal Occult Blood positive, ERCP: Endoscopic Retrograde Cholangiopancreatography, Anti-IF: Anti-Intrinsic Factor Antibodies, Anti-PC: Anti-Parietal Cell Antibodies, B12: Vitamin B12, RA: Rheumatoid Arthritis, IDDM: Insulin-Dependent Diabetes Mellitus, NIDDM: Non-insulin dependent diabetes, PsA: Psoriatic Arthritis, KTC: Kimura Takemoto Classification, NET: Neuroendocrine Tumour, LVI: Lymph vascular Invasion, BLI: Blue Laser Imaging.

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Figure Legend

1. Figure 1. Macroscopic findings in AIG a) Normal gastric body without AIG b) AIG with loss of gastric folds c) AIG with marked vascular visibility d) Dense adherent mucus e) Xanthomas f) Nodular remnant normal mucosa. The small inset on the left highlights the area indicated by the red arrow, showing a BLI view of the normal nodular remnant mucosa against a background of atrophic mucosa.
2. Figure 2. Magnifying finds in AIG a) Normal micro surface and microvasculature in gastric body showing the traditional “honeycomb” pattern b) Foveolar Pattern c) Oval/slit pattern d) Ridge/villous pattern without intestinal metaplasia e) Ridge/villous pattern with light blue crest sign (intestinal metaplasia) f) White globe appearance

Tables

TABLE 1: CLINICAL CHARACTERISTICS AND ENDOSCOPIC FINDINGS

PATIENT POPULATION		63	100.00
AGE (MEAN±SD)		62.94±10.84	
SEX			
	Female	46	73.02
	Male	17	26.98
INDICATION			
	Cirrhosis	1	1.59
	FOB+ and Colon Normal	1	1.59
	Foregut Symptoms	21	33.33
	Incidental Finding on ERCP	1	1.59
	Iron Deficiency	38	60.32
	Screening	1	1.59
ANTI-IF			
	Positive	16	25.40
	Negative	47	74.60
ANTI-PC			
	Positive	53	84.13
	Negative	10	15.87
B12 DEFICIENT		31	49.21
IRON DEFICIENT		48	76.19
ANAEMIC		45	71.43
CONCOMITANT AUTOIMMUNE DISEASE			
	Autoimmune Polyglandular Disease	1	1.59
	Crohn’s Disease	1	1.59
	Rheumatoid Arthritis	3	4.76
	IDDM	2	3.17
	NIDDM	11	17.46
	Hypothyroidism	24	38.10
	Eczema	2	3.17
	Psoriatic Arthritis	1	1.59
	Adrenal Insufficiency	2	3.17
	Celiac Disease	1	1.59
	Sjogren’s Disease	1	1.59
	Primary Biliary Cholangitis	1	1.59
	None	26	41.27
KIMURA TAKEMOTO CLASSIFICATION			
	O-p	63	100.00
MACROSCOPIC ENDOSCOPIC FEATURES			
	Loss of Gastric Folds	63	100.00
	Dense Mucus	48	76.19
	Marked Vascular Visibility	26	41.27
	Xanthomas	17	26.98
	White Global Appearance	15	23.81

	Nodular Remnant of Normal Mucosa	9	14.29
MAGNIFYING PATTERN OF ATROPHY IN BODY			
	Oval/Slit	36	57.14
	Ridge/Villous	19	30.16
	Foveolar	8	12.70
PRESENCE OF NEOPLASIA		27	42.86
TYPE OF NEOPLASIA			
	NET	16	25.40
	Hyperplastic Polyp	5	7.94
	Adenoma	5	7.94
	Early Gastric Cancer	6	9.52

All data is presented at number and percentage, respectively.

SD: Standard Deviation, FOB+: Fecal Occult Blood positive, ERCP: Endoscopic Retrograde Cholangiopancreatography, Anti-IF: Anti-Intrinsic Factor Antibodies, Anti-PC: Anti-Parietal Cell Antibodies, B12: Vitamin B12, RA: Rheumatoid Arthritis, IDDM: Insulin-Dependent Diabetes Mellitus, NIDDM; Non-insulin dependent diabetes, PsA: Psoriatic Arthritis, KTC: Kimura Takemoto Classification, NET: Neuroendocrine Tumour, LVI: Lymph vascular Invasion.