

Evaluation of gastric polyps in patients with upper gastrointestinal endoscopy

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Research article

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Abstract

Background: According to the study population, incidence of gastric polyps (GPs) varies from 0.33% to 6.7% in various studies. Most GPs consist of hyperplastic polyps (HPs), fundic gland polyps (FGPs), and adenomatous polyps (APs). Despite the high malignant APs potential, sporadic FGPs has no malignant potential. On the contrary, HPs has a lower risk of potential harm. It is not sufficient to perform biopsies to determine the presence of polyp types and displacements, therefore, some polyps may require extensive biopsy or complete resection.

Methods: This retrospective study included GPs patients or polyphenic lesions with polyps or malignant histology found in polyps or gastroscopy at the Department of Gastroenterology, Shaanxi Hospital of Traditional Chinese Medicine from 2017 to 2019.

Results: In a series of 10,000 upper gastrointestinal endoscopy, 384 patients (3.84%) were found to have GPs. Of these patients, 98 (25.5) were male and 286 (74.5) were female. The average age of the patients was 62.8 ± 10.4 (36-75) years. HPs, APs and FGPs frequencies were 88.5%, 5.2% and 2.1%, respectively. The polyp size of 274 (71.3%) patients was ≤ 1 cm. Polyp was identified in 262 (68.2%) patients. The most common polyps are the antrum and the corpus. Endoscopic mucosal resection was performed on 128 patients. Bleeding events have been observed and endoscopic treatment is required after ESP.

Conclusion: In current study, GPs frequency was low (3.84%), and HP frequency may be high due to high frequency of *Helicobacter pylori* (HPy) infection in China. Due to the high frequency of HPy infection and the short-term use of proton pump use, FGP frequency may be low.

Background

Polyps are usually asymptomatic and > 80% are detected by esophagogastroduodenoscopy for other reasons. Large polyps can cause bleeding, anemia, abdominal pain, or obstruction due to their position [1]. The diagnosis of polyps must be confirmed by histological examination [2]. The frequency of gastric polyps (GPs) and other polyps varies depending on the population under study [3]. The prevalence of polyps is 0.6–6% [4]. Most polyps detected in the stomach are hyperplastic polyps (HPs), fundic gland polyps (FGPs) and adenomatous polyps (APs) [5]. HPs are most common in people with *Helicobacter pylori* infection [6]. In countries with low rates of *H. pylori* infection, FGPs are more common. The long-term use of proton pump inhibitors (PPIs) increases the frequency of FGPs [7]. The importance of GPs arises from the fact that some GPs have malignant potential or are associated with some hereditary syndromes. Although GPs appear in a number of congenital diseases, such as familial adenomatous polyposis, adolescent polyposis and Peutz–Jeghers syndrome, they are most commonly misdiagnosed [8]. There is an increased risk of cancer in polyps other than FGPs and inflammatory fibrinoid polyp (IFPs). In addition to FGP and polyps such as inflammatory fibrinoid polyp (IFP), the risk of cancer is increased with polyps. Although the risk of malignant transformation in HPs is low, it is more common in

APs. Due to their malignant potential and symptomatic nature, GPs are removed completely with endoscopic resection or surgery [9].

In this study, our aim was to evaluate demographic, clinical, endoscopic, and histological data of patients with polyps or polypoid lesions. In addition, we evaluated diagnostic procedures, treatments and their complications, and the relationship between age and size and number of polyps.

Methods

At the Department of Gastroenterology, Shaanxi Hospital of Traditional Chinese Medicine, we retrospectively reviewed the results of 10000 consecutive esophagogastroduodenoscopy (EGD) procedures performed for various reasons between September 2017 and July 2019. Patients with GP or polyphenic lesions with polyps or malignant histology found by EGD were included in this study. We excluded patients who did not have polyps detected by biopsy, and those who had previously participated in the study but for whom we could not obtain pathological records. We evaluated age and sex; endoscopic indications and findings; GP count, size and location; histological diagnostic methods; and endoscopic treatment complications. The relationship between age and size and number of polyps was also assessed. The endoscope used was the Olympus EG 290 WR videoendoscope. The size of the polyps was estimated by comparing it with the opening size of the biopsy forceps. In patients with multiple polyps, polyp diameter was calculated by measuring the largest polyp diameter.

Statistical Analysis

Data were analyzed using the SPSS software package program for Windows 23.0(SPSS, Chicago, IL, USA) . Descriptive statistics are used to describe continuous variables. The χ^2 (Fisher's exact) test was used to classify variables and expressed as the number of observations (and percentages). Statistical significance was obtained when the p value was <0.05. The Kolmogorov-Smirnov test was used to analyze the category data corresponding to the normal distribution, and Spearman correlation was used if the distribution of variables was abnormal.

Results

We included 10000 patients receiving EGD in our endoscopy unit. GPs were found in 384 patients, giving an incidence of 3.84%.

Table 1. Demographic data and clinical characteristics of patients

	Patients, <i>n</i> (%)		Patients, <i>n</i> (%)	
Sex				
Male	98 (25.5)		Polyp size (mean ± SD) (mm)	10.6 ± 4.1 (3-21)
Female	286 (74.5)		Distribution of polyp size (mm)	
Age (yr)			≤5	98 (25.5)
Male	63.8 ± 10.0 (39-75)	6-10		176 (45.8%)
Female	61.2 ± 9.8 (36-74)	11-20		90 (23.4)
Symptoms		> 20		20 (5.2%)
Dyspepsia	126 (32.8)			
Anemia	82 (21.3)			
Abdominal pain	70 (18.2)			
Other	106 (27.6)			

Patient characteristics are shown in Table 1. Among these patients, 34 (8.9%) were aged 41 years, 72 (18.7%) 41-50 years, 84 (21.9%) 51-60 years, 34 (33.8%) 61-70 years, and 64 (16.7%) > 70 years.

The average polyp diameter was 10.6 ± 4.1 (range: 3-21) mm: 98 (25.5%) were ≤ 5 mm, 176 (45.8%) 6-10 mm, 90 (23.4%) 11-20 mm, and 20 (5.2%) > 20 mm. There were no significant correlations between age and polyp size ($P > 0.05$).

Endoscopy revealed that 262 (68.2%) patients had one polyp, and 122 (31.8%) more than one. Age was not significantly associated with polyp count ($P > 0.05$). Two hundred and four (53.1%) patients underwent histopathological diagnosis of polyposis, 150 (39.1%) underwent polypectomy with forceps biopsy, and 30 (7.8%) underwent polypectomy and surgical resection. One patient could not be diagnosed by endoscopic biopsy. Histologically, the denucleated polyp was defined as IFP. Twenty (5.2%) patients had foveolar hyperplasia. Table 2 summarizes the histological distribution of polyps. Only one (0.3%) patient with GPs was diagnosed with adenocarcinoma. The most common localization of GPs was the antrum (150/384; 39.1%), followed by the corpus (112/384, 29.2%) and cardia (70/384, 18.2%). Polypectomy was performed in 150 (39.1%) patients using forceps biopsy. None of the 74 patients who underwent polypectomy using forceps biopsy had complications, and only one patient had bleeding in the form of a leak during polypectomy and bleeding was controlled by sclerotherapy.

Table 2. Distribution of histopathological types of GPs

	(n = 384)	%
Hyperplastic polyp	340	88.5
Foveolar hyperplasia	20	5.2
Fundic gland polyp	8	2.1
Adenomatous polyp	8	2.1
Adenomatous and hyperplastic polyp	2	0.5
Inflammatory fibroid polyp	2	0.5
Fibrotic polyp	2	0.5
Adenocarcinoma	1	0.3
Carcinoid tumor	1	0.3

Polypectomy with snare was performed in 128 (33.3%) patients, and was performed alone or in combination with sclerotherapy, endoclip, or endoloop treatments. The distribution of different polypectomy methods with snare is given in Table 3. In patients undergoing sectional polypectomy, polyp diameter was 10.6 ± 4.1 (3–21) mm. In 118 (92%) patients no complications related to polypectomy were observed. Bleeding was observed in eight patients during unknown polypectomy. Spontaneous bleeding occurred in two patients during endoscopic polypectomy and sclerotherapy was used in two patients. Bleeding was observed at the base of the polyp, and hematemesis occurred 4 h after polypectomy. Bleeding was controlled by sclerotherapy and blood transfusions were not required.

Table 3. Distribution of types of snare polypectomy

	Patients	%
PS	75	58.6
PS + sclerotherapy	41	32.0
PS + endoloop	7	5.5
PS + sclerotherapy + endoloop	3	2.3
PS + sclerotherapy + endoclip	2	1.6
Total	128	100

PS: Polypectomy with snare

Discussion

We found that the most common symptoms of GPs were nausea, anemia and abdominal pain. We also found that GPs were mostly located in the abdominal anterior, and the most common type of histopathology was HP. GP incidence was 6.35% in 2645 EGD procedures^[10]. The most common type of polyp was GFP, which accounted for 77% of all polyps, while HP and Foveolar hyperplasia [FHP]

accounted for 17% of all polyps^[11]. Sixteen percent of lesions defined as polyps did not have histopathological evidence of polyps or malignant histology. A previous study associated the high frequency of GFPs with long-term PPI use and low frequency of *H. pylori* infection^[12]. In a previous study of 3024 endoscopic procedures, the most common type of polyp was HP^[13,14]. The authors concluded that this may have been due to an increase in *H. pylori* infection^[15]. GPs (1.4%) were reported in 36 patients, the most common type being HP, in 2657 EGD procedures^[16]. In another study of 900 EGD procedures, GPs were found in 126 (1.4%) patients. Histological examination revealed 48 patients with HPs, 17 with GFPs, six with APs, and 118 had gastritis or normal histology^[17].

The most common type of polyp in our study was HP. The rate of *H. pylori* infection in China is 60–70%^[18]. In countries with high frequency of *H. pylori*, the most common type of polyp is HP^[19]. In a study of 3153 EGD procedures, 135 (4.3%) patients had polypoid lesions^[20,21]. The average age of the patients was 65 years. Polyp types were HP (52.3%), FGP (7.6%) and AP (3.5%). In addition, the incidence of adenocarcinoma was 1.8%. Histopathological examination of common mucosa showed that 29.7% of patients had polyps by EGD. A total of 153 patients (0.59%) were reported in 26 000 endoscopic procedures^[22,23]. Among these patients, 41.2% were female and the average age was 64 years. The frequency of the different types of polyps was 72.4% HP, 17.2% FGP was 17.2%, and 11.8% AP. Adenocarcinoma was found in patients with HP or AP. In a study by Molaei *et al*, HP frequency was 69.2%, FGP was 6.6%, and AP was 4.7%. The average age of the patients was 49 years and 73% were male. In 87% of cases, polyp size was < 10 mm^[24]. In a study by Fann *et al*, the mean age of patients was 54.7 years, 63% were female, and 37% were male^[25]. In our study, ~80% of patients diagnosed with GPs were > 50 years old. There was no relationship between age and size and number of polyps. HPs and APs are commonly present in elderly people^[26]. In our study, the incidence of GPs was 3.84%, which was lower than in most other studies. This may be due to patients who have been excluded because they had benign lesions or inappropriate polyp sampling. There have been few studies on GPs in China. In a study conducted by Gencosmanoglu *et al*, the incidence of GPs was 3.6%, and 48% of the polyps were HPs, 19% FHPs, and 17% FGPs^[27]. The average age of the patients was 52 years and the proportion of women was 56.4%. In 57.2% of patients, polyp size was < 5 mm^[28]. In a study by Karaman *et al*, 69 (0.59%) patients had a GP in 11 598 EGD procedures. Although 69% of polyps are HP, 10% are FGPs^[29]. Buyukasik *et al* found that 66.7% of polyps were HPs in 55 887 EGD procedures^[30]. Vatansever *et al* found that the incidence of GPs was 2.22%, and the highest frequency of HPs was 36.2%^[31]. In our study, the most common type of polyp was HP. However, HP frequency was higher than in other studies. In addition, FGP frequency was significantly lower than in other studies. However, in a study conducted by Demiryilmaz *et al*, GPs were found in 66 (1.95%) patients in 3375 EGD procedures^[32]. A total of 88 polypoid wound lesions were detected in these patients. Histopathological examination of polyps showed that HPs accounted for 80.7%, inflammatory polyps 17%, and APs 2.3%^[33]. FGP was not detected. In some studies, FGP was the most common type of polyp.

The frequency of polyps increases due to the frequency of *H. pylori* infection and increased use of PPIs . Many studies have shown an increase in the frequency of FGPs in patients using PPIs^[34]. This relationship can cause anxiety among doctors and patients who need to use PPIs for a long time. In a study by Jalving *et al*, there was no increase in FGP frequency in patients using PPIs for < 1 year ^[35]. However, it has been found that long-term use of PPIs increases the risk of developing FGP fourfold. However, the risk of displacement did not increase. When subgroup analysis was performed, a significant increase in the risk of developing FGPs was observed in patients who had used PPIs for > 5 years. Patients with omeprazole and patients with other PPIs are at increased risk for developing FGPs due to long-term use of PPIs ^[7]. However, no increase in FGP frequency in patients using PPIs has been observed in some other studies ^[36]. A total of 30 347 *H. pylori*-negative patients were evaluated and FGP frequency was similar to that in 28 096 patients without PPIs and 2251 using PPIs, and PPI users had no increased risk of polyps ^[37]. This may be due to short-term use of PPIs . In a study by Choudhry *et al*, patients with PPIs had the highest risk of developing FGPs after an average of 37 mo ^[38]. Hongo *et al*/prospectively studied the development of FGPs and HPs in patients with long-term PPI use, which was associated with an increase in GFP frequency in *H. pylori*-negative patients. The formation of FGPs was not related to hypergastrinemia.

However, HP development is associated with *H. pylori* infection and hypergastrinemia ^[39]. In our study, FGPs were found in eight patients. It is known that *H. pylori* infection reduces FGP formation, and these polyps are common in *H. pylori*-negative patients . This low incidence may be related to high rates of *H. pylori* infection in China. However, even in countries with high *H. pylori* infection rates, FGP frequency may be high, but these polyp have not been observed in several studies ^[40]. Frequency of FGPs is related to long-term PPI use. No increased risk of short-term use has been observed. The most common reason for EGD surgery is complaints of indigestion. The frequency of FGPs in our patients was low; probably because they had been treated with PPIs for a short time. Also, because these polyps are so small, they may be missed during EGD surgery or may be neglected due to their indistinct endoscopic appearance.

In our study, 20 (5.2%) patients had FHPs. These lesions are considered to be precursors of HPs, although it is unclear how long FHPs take to change to HPs. The lesions may be stable or may grow or shrink. However, whether they are HP precursors is still controversial. It has been shown that the basic structure and cytological criteria of FHPs and HPs can be easily distinguished by biopsy material obtained by endoscopic forceps. These lesions are not the result of HP precursors ^[41]. FHPs are common lesions in research. In our study, APs were detected in eight patients. Aps have been shown to account for 2.1% of GPs . These polyps are more common in patients with stomach cancer and have high malignant potential of 6.8–55.3% ^[42]. Lesion size, height of atypical hyperplasia and presence of intestinal epithelium are risk factors for malignant tumor development. Even adenomas with low displacement during long-term follow-up have malignant potential. Therefore, it is recommended to remove these lesions ^[26]. In addition, IFP was detected in one patient in our study. These polyps are not always

diagnosed as endoscopic biopsies because they are local ^[33]. Because our case was not diagnosed by endoscopic biopsy, it was diagnosed after surgical removal ^[34].

A total of 128 patients (33.3%) underwent snare polypectomy in our study. One patient required endoscopic control of bleeding. Low rates of hemorrhage caused by endoscopic polypectomy can be treated by sclerotherapy, endoclip or endoloop procedures. No death or perforation occurred in any patient. Snare polypectomy is a safe and effective way to diagnose and treat polyps.

In conclusion, the GP frequency in our study was low (3.84%). HP polyps were the most common types of gastric polyps. Of note, as GPs may have a risk of developing adenocarcinoma or precancerous lesions, we suggest that appropriate GP resection technology (such as biopsy forceps or mesenchymal resection) should be applied.

Conclusions

Gastric polyp (GP) is a common clinical disease. In recent years, with the change of the diet habit, the incidence of GP is increasing in China. GP is usually found by gastroscopy. Some GPs may have malignant potential and are associated with hereditary diseases. Therefore, early detection and biopsy examination are important in clinical practice. In current study, GPs frequency was low (0.38%), and HP frequency may be high due to high frequency of *Helicobacter pylori* (HPy) infection in China. Due to the high frequency of HPy infection and the short-term use of proton pump use, FGP frequency may be low.

List Of Abbreviations

GPs:gastric polyps; HP:hyperplastic polyps ; FGP:gastric polyps; APS:adenomatous polyps ;PPI:proton pump inhibitor;IFP:inflammatory fibrin;

Declarations

Ethics approval and consent to participate

This study was performed in compliance with the Declaration of Helsinki. The investigation location and source of the participants in this investigation was Shaanxi Hospital of Traditional Chinese Medicine., where institutional Review Board and Ethics Committee approved the study, granted ethical approval, and all patients provided written informed consent to participate in this prospective study.

Consent for publication

Written informed consent was obtained from the patients and any accompanying images. Patients gave consent for their personal or clinical details along with any identifying images to be published in this study. all authors have read and approved the manuscript.

Availability of data and material No additional data are available

Competing interests The authors declare that there are no conflicts of interest related to this study.

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Authors' contributions: Z L and DYC contributed equally to this work, who performed the majority of experiments ☐DYC☐QTXX☐HHF and ZYL analyzed the data and coordinated the research; Z L and WXL designed the research; Z L wrote and revised the paper.all authors have read and approved the manuscript.

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