Evaluation of gastric polyps in patients with upper gastrointestinal endoscopy

lie zheng

department of gastro

xinli wen (✉ 492688049@qq.com)

Yan-Cheng Dai

digestion

Xiao-Xiao QianTu

digestion

Hai-Feng He

digestion

Ya-Li Zhang Ya-Li Zhang

digestion

Research article

Keywords: Endoscopic polypectomy; hyperplastic polyp; gastric polyp.

Posted Date: July 27th, 2020

DOI: <https://doi.org/10.21203/rs.2.18874/v3>

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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

Most gastric polyps are found accidentally when an upper gastrointestinal endoscopy is performed for other reasons^[1]. Although there are no specific clinical manifestations, these lesions typically cause discomfort such as indigestion, gastric pain, abdominal pain, or gastrointestinal bleeding^[2]. Due to the anatomical differences in different regions, polyps in the cardia may cause difficulty in swallowing, whereas polyps (especially pedicled polyps) in the pylorus can lead to outflow tract obstruction^[3]. An extremely small proportion of patients may have large polyps, which cause gastrointestinal bleeding when the lesions become eroded and ulcerated^[4]. Larger polyps have high malignant potential, and some of them are actually malignant tumors^[5]. Although polyps can induce symptoms, few patients seek medical treatment merely for this disease^[6]. Clinically, polyps are mostly accompanied by a variety of disorders such as gastritis or peptic ulcer, and some polyps or even the normal mucosa or mucosal lesions around a polyp may develop atypical hyperplasia, intestinal metaplasia, and other conditions^[7]. As a result, the symptoms in a patient with polyp may not be caused by the polyp itself. The treatment options for gastric polyps include endoscopic polypectomy, removal with biopsy forceps, endoscopic mucosal resection, endoscopic submucosal stripping, and even partial or total gastrectomy, depending on the location and size of the polyp and the presence or absence of pedicle^[8]. Endoscopic technique is simple and minimally invasive and has been widely used^[10].

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. 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.

Inclusion criteria: a) without contraindications for gastroscopy; b) adequate gastric preparation before the examination; and c) detailed and complete examinations of esophagus, cardia, gastric fundus, gastric body, pylorus, and other areas.

Exclusion criteria: a) previous gastric surgery for other reasons; b) with a history of gastric cancer, Peutz-Jeghers syndrome, familial adenomatous polyposis (FAP), and/or juvenile polyposis; c) difficulty in observing the gastric mucosa due to poor gastric preparation and/or incomplete exploration of the gastric cavity due to interrupted examination; d) with inflammatory bowel disease; and e) lack of pathological results.

Histopathological examination

Appropriate treatment strategy was adopted in patients who had no contraindications for surgery and agreed to receive endoscopic resection. Single gastric polyps with a diameter of <3 mm were directly removed by electrocoagulation after biopsy, and those with a diameter of >3mm were partially sampled for pathology. For multiple polyps, only the polyp with the largest diameter was partially sampled for pathological examination. All the above specimens were examined in the Pathology Department of our hospital.

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 $\pm$ SD) (mm)	10.6 $\pm$ 4.1 (3–21)
Female	286 (74.5)	Distribution of polyp size (mm)	
Age (yr)		≤ 5	98 (25.5)
Male	63.8 $\pm$ 10.0 (39–75)	6–10	176 (45.8%)
Female	61.2 $\pm$ 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 $\pm$ 4.1 (range: 3–21) mm: 98 (25.5%) were $\leq$ 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

The clinical manifestations of the patients in this group mainly included retrosternal discomfort , acid reflux, heartburn, weight loss, loss of appetite ,Nausea, vomiting , abdominal pain , and abdominal discomfort were not statistically significance $P>0.05$. These clinical manifestations of gastric polyps are not specific, and these symptoms are common It's not just one symptom, it's two or more symptoms. As shown in Table 3. Since two or more symptoms can be present at the same time, the total number of cases is more than 384.

Table3. The distribution of clinical symptoms in different pathological types

	Hyperplastic polyp	Foveolar hyperplasia	Fundic gland polyp	Adenomatous polyp	Adenomatous and hyperplastic polyp	Inflammatory fibroid polyp	Fibrotic polyp	Adenocarcinoma	Carcinoid tumor
on	104	12	3	2	1	1	1	1	1
	92	6	2	2	1	0	0	0	0
	70	6	1	1	0	1	1	0	0
	15	0	0	0	0	0	0	0	0
	8	1	0	0	0	0	0	0	0
iting	16	1	0	0	0	0	0	0	0
pain	31	10	0	1	0	0	0	0	0
	8	4	2	2	0	0	0	0	0

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 4. 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. The increasing incidence of gastric polyps in recent years may be attributed to the following reasons: a) an increasing number of people undergo endoscopy for health check-ups^[10]; b) environment and diet components have changed with socioeconomic development; and c) advances in endoscopic technology and its wide application have increased the positivity rate. The detection rate of gastric polyps was reported to be 6.35% in a population in the United States^[11,12]; in China, it ranges from 1% to 4.3%. Literature has shown that gastric polyps are more common in females^[13]. It has been reported that the male : female ratio was 1:1:22 in a population (n=440) in Sichuan Province^[13], 1:1.58 in an analysis including 36,650 patients^[14], and 1:2.1 in 2643 patients in Guangdong Province^[15].

Helicobacter pylori (*H. pylori*) infection can cause an inflammatory reaction of the mucosa, and a polyp may form due to overgrowth of cells during the recovery period^[16,17]. In fact, hyperplastic polyps are by-products of the damaged mucosa during its healing^[18]. According to literature, the vast majority of fundic gland polyps occur in patients who are not infected with *H. pylori*^[19,20]. In addition, long-term duodenal reflux can cause chronic inflammation, gastric pit cell hyperplasia, atypical hyperplasia, polyps, and other lesions^[21,22]. Large amounts of gastric reflux can cause inflammatory changes in the mucosa^[23]; also, it can alter the acid-base balance in the stomach, leading to excessive secretion of gastrin, which, to a certain extent, promotes cell proliferation and thus triggers the forming of hyperplastic polyps^[24,25].

Use of PPI can affect the course of FGP^[26]. Prolonged PPI administration results in the increased number and volume of FGP^[27], whereas PPI reduction and withdrawal are associated with gradually decreased number and volume of FGP^[28]. It has been found patients taking PPI for less than 1 year will not develop FGP^[29]; however, long-term PPI therapy increases the risk of polyps (in particular, it is associated with a 4-fold increased risk for FGP)^[30]. This phenomenon is considered to be a cystic change caused by the chronic stimulation of gastric mucosa by a high level of gastrin^[31]. Animal experiments have revealed that gastrin can promote the growth of parietal cells by increasing

their height and size^[32]. When the parietal cells in the neck of gland are enlarged, they may block the opening of the gland and increase the pressure inside the gland, leading to the development of cystic changes and eventually the forming of polyps^[33].

In recent years, the incidence of FGP has markedly increased in Western countries, accounting for more than 70% of GP^[34]. It has been reported that FGP is not associated with *H. pylori* but with PPI therapy^[35]. FGP may be resolved with the withdrawal of PPI^[36], and therefore it is speculated that the pathogenesis of FGP may be related to the inhibition of gastric acid secretion^[37]. Long-term PPI use can lead to hypergastrinemia, which promotes the cystic dilatation of gastric glands to form polyps^[38].

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.

Declarations

Ethics 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.

***FundingSupported by** Shaanxi province natural science basic research program-general project[NO: 2019JM-580],Project of shaanxi administration of traditional Chinese medicine[NO.2019-ZZ-JC010],Shaanxi provincial hospital of traditional Chinese medicine[NO.2018-04].

*** Authors' contributions:** Z L and DYC contributed equally to this work, who performed the majority of experiments. DYC, QTX and HHF 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.

*** Acknowledgements**We would like to thank our colleagues in the Institute of Digestive Disease for their help and support in this research.

List Of Abbreviations

GPs:gastric polyps; HP:hyperplastic polyps ; FGP:gastric polyps;

APS:adenomatous polyps ;PPI:proton pump inhibitor;

IFP:inflammatory fibrin;

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