The Prevalence and Risk Factors of Gastric Polyp in Endoscopy Unit at Prof. Dr. R.D. Kandou Hospital

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ABSTRACT

Background: *Gastric polyps are usually asymptomatic; they are often incidentally discovered during an esophagogastroduodenoscopy (EGD) for other indication. Most of gastric polyps are benign, however, some have malignant potential. Therefore, identifying gastric polyp risk factors are crucial. This article aims to determine the prevalence and risk factor of gastric polyp in Endoscopy Unit at Prof. Dr. R.D. Kandou Hospital between April 2021–2022.*

Method: *The retrospective study was using medical record data of all patients who underwent EGD between April 2021–2022. Data regarding patient's characteristic, endoscopic finding, and risk factors were collected. Data was analyzed using SPSSv25.0 with Mann-Whitney, Chi-square-test, and logistic-regression.*

Results: *There were 241 patients included, 56.4% were males. The median age was 53 years old. The most common symptom was epigastric pain (69.3%). The main indication of EGD was dyspepsia with alarm symptoms (79.25%). We found 24.1% of patients had gastric polyps. Most polyps were found in corpus (93.1%) and 70.7% were fundic gland polyp. We found that older age (p = 0.001), female (p = 0.003), gastritis (p = 0.037), active-smoker (p = 0.000), and one-year-PPI-usage (p = 0.000) were significantly associated with gastric polyp. Logistic-regression analysis showed active smoking was the most significant risk factor (OR = 9.3), followed by female gender (OR = 6.4), and PPI-usage (OR = 3.4). We found no significant association between esophagitis, bile-reflux, gastric ulcer, H. pylori infection, NSAID use, and alcohol abuse with gastric polyp.*

Conclusion: *We found 24.1% gastric polyp prevalence with significant risk factors such as older age, female gender, gastritis, smoking, and long-term-PPI-usage.*

Keywords: *gastric polyps, risk factors, prevalence, esophagogastroduodenoscopy*

ABSTRAK

Latar belakang: *Polip gaster biasanya asimtomatik; mereka sering ditemukan secara kebetulan selama esophagogastroduodenoscopy (EGD). Identifikasi faktor risiko diperlukan karena beberapa polip gaster memiliki potensi keganasan. Oleh karena itu, penentuan faktor resiko polip gaster sangat penting. Penelitian ini bertujuan untuk mengetahui prevalensi dan faktor risiko polip gaster di RS Prof. Dr. R.D. Kandou selama April 2021–2022.*

Metode: *Penelitian retrospektif menggunakan data rekam medis seluruh pasien yang menjalani EGD antara April 2021–2022. Data mengenai karakteristik pasien, temuan endoskopi, dan faktor risiko dikumpulkan. Data dianalisis menggunakan SPSSv25.0 dengan Mann-Whitney, uji Chi-square, dan regresi logistik.*

Hasil: *Terdapat 241 pasien dalam studi ini, 56,4% diantaranya adalah laki-laki. Median usia adalah 53 tahun. Gejala yang paling umum adalah nyeri epigastrium (69,3%). Indikasi EGD adalah dispepsia dengan tanda bahaya (79,25%). Kami menemukan 24,1% pasien memiliki polip gaster. Polip terbanyak terdapat pada korpus (93,1%) dan polyp gland fundus 70,7%. Kami menemukan bahwa usia yang lebih tua (p = 0,001), wanita (p = 0,003), gastritis (p = 0,037), perokok aktif (p = 0,000), dan penggunaan PPI satu tahun (p = 0,000) secara signifikan berhubungan dengan polip gaster. Analisis regresi logistik menunjukkan bahwa perokok aktif merupakan faktor risiko yang paling signifikan (OR = 9,3), diikuti oleh jenis kelamin perempuan (OR = 6,4), dan penggunaan PPI (OR = 3,4). Kami tidak menemukan hubungan yang signifikan antara esofagitis, refluks empedu, tukak lambung, infeksi H. pylori, penggunaan NSAID, dan konsumsi alkohol dengan polip gaster.*

Simpulan: *Kami menemukan prevalensi polip gaster 24,1% dengan faktor risiko yang signifikan seperti usia yang lebih tua, jenis kelamin perempuan, gastritis, merokok, dan penggunaan PPI jangka panjang.*

Kata kunci: *polip gaster, faktor risiko, prevalensi, esofagoduedenoskopi*

INTRODUCTION

Esophagogastroduodenoscopy (EGD) have become a standard practice for evaluating upper gastrointestinal disease. Increased rate of incidental gastric mucosal lesion finding, such as gastric polyp is also increasing in linear with volume of EGD being performed.[1] Gastric polyps have a wide spectrum of diseases, ranging from benign to malignant lesion. The majority of cases were benign and asymptomatic, but large sized polyps may cause abdominal pain and other symptoms. Endoscopic appearance may give clue regarding the malignancy status of polyp, however histopathology examination is required to dysplasia degree. Stratifying and assessing dysplastic degree of gastric polyp is essential. Early detection of premalignant or malignant gastric polyp lesion may lead to early management and cancer surveillance, therefore lead to better prognosis.[2,3]

Many factors may lead to gastric polyp development, which include intrinsic and extrinsic factors. Some of well-known gastric polyp risk factors are older ages, genetic, proton pump inhibitor (PPI) usage, *Helicobacter pylori* infection, and others. Many studies generated different gastric polyp's risk factors.[4] The prevalence of gastric polyp type was also reported variably between countries, it is though that ethnicity and geographic may play role.[4–6]

There was great variation being reported regarding type and risk factors of gastric polyps.[7] Therefore, we conducted this retrospective study to determine the risk factors and prevalence of gastric polyps at Prof. Dr. R.D. Kandou Hospital, Manado, Indonesia between April 2021–2022.

METHOD

The cross-sectional retrospective study was using medical record data of all patients who underwent EGD at endoscopy unit of Prof. Dr. R.D. Kandou Hospital, Manado, Indonesia between April 2021–2022. Data were processed using statistical program for social sciences (version 25: Armonk; NY: IBM Corp). Data regarding patient's characteristic, endoscopic finding, and gastric polyp risk factors were collected. Long term usage of PPI was defined as regular or irregular PPI usage more than 1 year. Regular nonsteroidal anti-inflammatory drugs (NSAID) usage was defined as NSAID use for at least 1 year. The presence of *H. pylori* was proved by histopathological examination. Missing required data from medical record were obtained through direct interview with the subjects. We excluded patients without histopathological examination result. The normality test of data distribution was tested using the Kolmogorov-Smirnov normality test. The comparison test for the variable was using the Chi-square-test. To determine the most significant risk factors was tested using the logistic-regression test. *P* value lower than 0.05 was considered significant.

RESULTS

Between April 2021 and April 2022, a total of 241 patients that underwent EGD were enrolled in this study. All data that required was obtained, therefore no excluded patients. We found that the median age was 53 (20–83) years old and 56.4% were male. The clinical finding for the most common symptom was epigastric

pain (69.3%). The main indication for EGD in those patients was dyspepsia with alarm symptoms (79.25%). Gastric cancer was found in 5 patients. The prevalence of gastric polyp in this study was 24.1%. Among those with gastric polyps, 72.4% complained epigastric pain, 98.3% had gastritis, 19% was positive for *H. pylori* (Table 1). Most polyps were found in corpus (93.1%), 67.2% were multiple, 67.2% had diameter less than 1 cm, and 70.7% was fundic gland polyp (FGP) (Table 2). On the statistical analysis with Chi-square, we found that risk factors such as older age ($p = 0.001$), female ($p = 0.003$), gastritis ($p = 0.037$), active smoker ($p = 0.000$), and long term PPI usage ($p = 0.000$) were significantly associated with gastric polyp occurrence. With the multivariate logistic-regression analysis, the results showed active smoking was the most significant risk factor (OR = 9.3), followed by female gender (OR = 6.4), and PPI usage (OR = 3.4). We found no significant association between esophagitis, bile reflux, gastric ulcer, *H. pylori* infection, NSAID use, and alcohol abuse with gastric polyp.

DISCUSSION

The prevalence of gastric polyp in our study was in line with study by Wang et al, which found that the incidental gastric polyp finding among asymptomatic patients receiving health examination in Taiwan was 29.8%, with most of polyps were fundic gland (59.4%), hyperplastic (18.2%), and adenomatous (3.5%).[8] However, much lower prevalence was reported by Carmack et al, who conducted nationwide one year survey in 2007–2008 which enrolled more than 120,000 patients. They found the prevalence of gastric polyps was 6.35%, with 77% were fundic gland polyps, followed by hyperplastic polyps (17%) and adenomas (0.69%).[9] Lower prevalence rate of gastric polyp was also reported by other countries, such as in Brazil (0.6%), Greece (1.2%), and Northern China (1%).[10–12] Lesmana et al conducted case-control study in an Indonesian private hospital, found that from 125 dyspeptic patients that underwent EGD, the prevalence of gastric polyp was 22.4%, most of the polyps (42.9%) was located in fundus.[13] The wide differences between

Table 1. Patient's characteristic

Variable	Total (n = 241)	Gastric polyp (n = 58)	Non-gastric polyp (n = 183)	*p* value
Age, median (IQR)	53 (21)	57 (18.25)	50 (22)	0.001
Female, n (%)	105 (43.6)	35 (60.3)	70 (38.3)	0.003
Symptoms, n (%)				
Epigastric pain	167 (69.3)	42 (72.4)	125 (68.3)	
Melena	36 (14.9)	7 (12.1)	29 (15.8)	
Others	38 (15.8)	9 (15.5)	29 (15.8)	
Clinical diagnosis, n (%)				
Dyspepsia syndrome with alarm symptoms	191 (79.25)	47 (81.0)	144 (78.7)	
GERD	24 (9.9)	7 (12.1)	17 (9.3)	
Others	26 (10.78)	4 (6.7)	22 (12.02)	
Endoscopic diagnosis, n (%)				
Esophagitis	186 (77.2)	48 (82.8)	138 (75.4)	0.245
Gastritis	221 (91.7)	57 (98.3)	164 (89.6)	0.037
Gastric tumor	5 (2.1)	1 (1.7)	4 (2.2)	
Bile reflux	46 (19.1)	12 (20.7)	34 (18.6)	0.722
Gastric polyp	58 (24.1)	58 (100)	0 (0)	
Gastric ulcer	33 (13.7)	10 (17.2)	23 (12.6)	0.367
H. pylori infection, n (%)	42 (17.4)	11 (19)	31 (16.9)	0.723
Risk factor, n (%)				
NSAID	59 (24.5)	12 (20.7)	47 (25.7)	0.441
PPI	115 (47.7)	43 (74.1)	72 (39.3)	0.000
Active smoking	96 (39.8)	15 (25.9)	81 (44.3)	0.000
Alcohol	91 (37.8)	19 (32.8)	72 (39.3)	0.367

IQR: interquartile range; GERD: gastroesophageal reflux disease; NSAID: nonsteroidal anti-inflammatory drugs; PPI: proton pump inhibitor

Table 2. Gastric polyp's characteristics

Characteristic	N (%)
Location	
Corpus	54 (93.1)
Antrum	4 (6.9)
Fundus	3 (5.2)
Numbers	
Single	19 (32.8)
Multiple	39 (67.2)
Size	
< 1 cm	39 (67.2)
≥ 1 cm	19 (32.8)
Pathological type	
Fundic gland polyp	41 (70.7)
Hyperplastic	16 (27.6)
Adenomatous	1 (1.7)

that report may be explained due to great variability of population being studied. In our study, the population was patients with upper gastrointestinal symptoms that warranted EGD evaluation. While other study might include asymptomatic patients that underwent health examination. Therefore, direct comparison of prevalence may not be feasible. Especially, study showed possibility of ethnic and geographical influence in gastric polyp influence [14]

Fundic gland polyp was the most common polyp type in our study, followed by hyperplastic polyp, and adenomatous polyp. As stated before, our finding was similar to study by Carmak and Wang et al.[9,14] As general rule, fundic gastric polyp is more commonly associated with PPI usage, while hyperplastic polyp is associated with *H. pylori* infection, this may explain the variety of report between region regarding the most common gastric polyp type. Fundic gland polyp is associated with low neoplastic potential, while the neoplastic potential of hyperplastic polyp is minimal but associated with synchronous cancers. Therefore, fundic gland polyp may not need EGD follow up, if no dysplasia. However, hyperplastic polyp should be monitored by repeat EGD in 1 year and performed test and treat for *H. pylori*.[15] In our study, adenomatous polyp is the least common polyp type, however study showed that adenomatous polyp is associated with high neoplastic potential.[15]

The median age of patients with gastric polyp in our study was 57 years old, this finding was in line with study by Yacoub et al which found the mean age of 58.1 years old.[16] Study by Jeong et al in South Korea, also found that the median age of FGP patients was 54 years old and for hyperplastic polyp was 58 years old.[17] We found that older patients was significantly associated with more prevalent of gastric polyp, this finding is supported by Park et al.[18] Therefore, older age may become risk factor of gastric polyp.

We found that female gender was associated with 6.4 times higher risk for having gastric polyp. Zheng et al also reported that gastric polyp is more prevalent among female patients compared to male patients (3.9% vs. 2.3%; $p < 0.01$).[19] Cao et al also reported similar findings.[12] Significant association between female gender with gastric polyp occurrence also reported by Takeuchi et al. They found that male gender was associated with decreased risk (OR = 0.76; $p < 0.0001$). Our finding was different with Wang et al finding that no significant different of gastric polyp prevalence between gender.[14] The underlying mechanism of gastric polyp prevalence different between gender is unclear. Zheng et al suggested that female patient experienced higher number of duodenal fluid reflux, which then may elevate the gastrin level and followed by gastric gland hyperplasia and polyp development. [19]

Almost of our patients (98.3%) with gastric polyps were also found to have gastritis during EGD examination. The association between hyperplastic polyp type with gastritis and gastric atrophy have been well studied. Chronic inflammation may lead to cycle of cell regeneration and proliferation. Atrophic gastritis which mainly caused by *H.pylori* infection also lead to hypergastrinemia as compensation method. The hypergastrinemia condition may act as positive trophic environment, therefore stimulating cell and developing gastric polyp.[20–22]

In this study, we found that long term PPI usage, which termed as more than one year usage, was associated with 3.4 times higher risk for developing gastric polyp. Several studies have shown that long term PPI usage as significant gastric polyp risk factor especially FGP type. However, to be noted that the duration of time to describe long term PPI usage was varied between studies, ranging from 6 to 48 months usage.[23–25] The reported incidence of fundic gland polyp due to PPI usage more than 1 year was ranging from 1 to 36%.[25,26] Study by Lesmana et al in 2017 in a private Indonesian hospital showed that use of PPI was associated with 12.3 times risk for having gastric polyp.[13] Study showed that long term PPI usage was associated 4 times higher risk for gastric polyp development, and the fundic gland polyp may regress after PPI discontinuation.[27] Study showed that PPI usage more than 3 months was associated with increased gastrin level. Persistently high level of serum gastrin may exert trophic effect and lead to parietal and enterochromaffin-like-cell (ECL) hyperplasia. Hyperplasia may cause protrusion and then obstructing the isthmus, blood vessel flow, forming cyst, and funding gland polyps.[28]

We found that active smoking status was the most significant risk factor for developing gastric polyp. This finding is in line with Wang et al study which stated that active smoking was independent predictor for gastric polyp which determined for 1.59 times increased risk.[14] Study by Giulio et al found that smoker had 2.8 times more likely to develop gastric polyp compared to non-smoker patients.[22] The mechanism of gastric polyp development by cigarette smoking was still unclear. The mechanism may be similar to colorectal polyp development, which cigarette smoke contained many

carcinogenic compounds such as nitrosamines and aromatic hydrocarbons. Those agents were generally though as carcinogenic agents, which may induce polyp-adenoma-cancer development. Genetic and enzymatic interference by cigarette smoking was also thought to be playing role.[29]

Study showed that *H. pylori* infection may induce atrophic gastritis and lead to hyperplastic polyp, but not FGP.[30] Study by Elhanafi et al showed that patients with *H. pylori* infection had 4.6 times for having hyperplastic polyp.[31] Eradication of *H. pylori* was associated with polyp regression.[6] However in this study, we did not find *H. pylori* infection as significant risk factors of gastric polyp. It may be explained due to most of the polyps in our study was FGP and limited number of *H. pylori* infected patients.

Based on our finding, we can see that gastric polyp was quite prevalent and most commonly found during EGD procedure for dyspepsia syndrome with alarm symptoms. Several traditional risk factors have been found to be positively associated with gastric polyp occurrence. Our finding supported that long-term PPI usage is significantly associated with gastric polyp occurrence; therefore physicians should be judicious when prescribing PPI and also educate the patients regarding the possible adverse effect of long term PPI self-medication. We found only 1 patient that had adenomatous gastric polyp in our study, however the potential risk of becoming malignant should not be ignored.

Our study used cross-sectional retrospective study design, therefore the direct causal relationship between investigated variables and the gastric polyp occurrence cannot be established. Another limitation is regarding the potential recall bias of PPI usage duration, because not all PPI usage was documented in medical record and possible self-medication. In order to overcome those limitations, we propose a multi-center prospective cohort study in Indonesia.

CONCLUSION

In this study we found that 24.1% gastric polyp prevalence with significant risk factors such as older age, female gender, gastritis, smoking, and long-term PPI usage. However, we found no significant association between esophagitis, bile reflux, gastric ulcer, *H. pylori* infection, NSAID use, and alcohol abuse with gastric polyp. Judicious of PPI prescribing is encouraged and physicians should educate the patients regarding the nature and modifiable gastric polyp risk factors.

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