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Characteristic of gastric perforation type and the histopathology at Haji Adam Malik general hospital Medan-Indonesia



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ABSTRACT

Background: According to BPPK of health department in 2008, gastric ulcers ranks 10 in cause of mortality on male with age group 45-54 at Indonesia. To date, there is no report of gastric perforation characteristic at Haji Adam Malik General Hospital Medan.

Methods: This is a non-experimental study with descriptive retrospective design. Data retrieved from patients' medical record with diagnosis of gastric perforation at Haji Adam Malik General Hospital Medan on January 2011-December 2014.

Results: Majority of patients involved in this study was male with 44 subjects (78.6%), while female was 12 subjects (21.4%). The most frequent age group with gastric perforation was 47-53 and 61-67

years old and the least frequent age group was 40-46 years old and 75-81 years old. 28 subjects were patients with type 3 gastric perforation and no type 2 gastric perforation was found. Histopathology examination revealed that no malignancy was found. Majority of subjects both in male and female use NSAID.

Conclusions: Majority of subjects was male. The most frequent age group with gastric perforation was 47-53 and 61-67 years old. The most frequent type of gastric perforation was type 3. Histopathology examination showed that all subjects were with chronic inflammation.

Keywords: perforation, gastric.

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INTRODUCTION

Nearly 4 million people worldwide are diagnosed with peptic ulcer every year.¹ Complications occur in 10-20% of patients, while 2-14% of the patients will progress to perforation.² More than half of cases are female.^{2,3}

Gastric perforation may develop to chemical peritonitis caused by leakage of gastric acid into abdominal cavity. All form of perforation in gastrointestinal is a surgical emergency case. Perforation is not a frequent complication in patients with gastric ulcers.⁴ It occurs as a result of broad anti-inflammatory drugs usage.⁵

The most frequent etiology of gastric perforation is peptic ulcer and 10-15% of patients with peptic ulcer may develop into perforation. In perforation of gastric ulcer, 6-14% of cases are caused by malignancy, in contrast with duodenal ulcer where the incidence of malignancy is found in almost zero cases.⁶

The major factors include the use of nonsteroidal anti-inflammatory drugs (NSAID), *helicobacter pylori* infection, and malignancy. At Indonesia, gastric ulcer ranks 10 as mortality cause on male with age of 45-54 years old, according to BPPK of health department on 2008.⁷

Perforation most often found at pre-pyloric (40%), duodenum (28%), and antrum (5%).⁸ Gastric perforations which caused by gastric carcinoma rarely occur. The incidence of gastric perforation caused by gastric carcinoma is 5%. Majority of the patients are in advanced stage (64-88%).⁹ Perforation which caused by gastric malignancy generally found at greater curvature (77%).¹⁰ To date, there is no report concerning characteristic of gastric perforation type at Haji Adam Malik General Hospital.

METHODS

Non-experimental study with retrospective descriptive design was conducted at surgery department, digestive surgery division of Haji Adam Malik General Hospital Medan. All data obtained from patients' medical record with diagnosis of gastric perforation at Haji Adam Malik General Hospital Medan from January 2011 until December 2014. Population in this study was all patients with gastric perforation at Haji Adam Malik General Hospital Medan from January 2011 until December 2014. Total sampling method was used for sample selection in this study. Inclusion

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criteria was all medical record data with diagnosis of gastric perforation with histopathology examination results at digestive surgery division of Haji Adam Malik General Hospital Medan from January 2011 until December 2014. Patients with gastroduodenal perforation caused by trauma and without histopathology examination result were excluded.

All data obtained from patients' medical record. Type of gastric perforation divided into 4 types. Type 1 or primary type located on lesser curvature between fundus and antrum of gastric. Type 2 is a combination of gastric ulcer and duodenal ulcer which located at lesser curvature and duodenal. Type 3 located at pre-pyloric. Type 4 located at juxtaesophageal which higher from lesser curvature close to gastroesophageal junction. Histopathology examination was done at pathology anatomy division. Malignancy was determined if microscopically recognized as adenocarcinoma with various degree of differentiation, linitis plastica which known as anaplastic with manifestation of bizarre cells surrounded by fibrosis, signet-ring cell carcinoma. History of NSAID use defined as history of all nonsteroidal anti-inflammatory drug consumed by patients.

All data were analyzed descriptively and presented in tables and diagram. Tables and diagram were explained in narrative.

RESULTS

A total of 56 patients with gastric perforation, obtained from patients' medical record at Haji Adam Malik General Hospital from January 2011 until December 2014, were enrolled in this study. The characteristics which we analyzed in this study were gender, age, perforation type, and histopathology. The results are shown in [table 1](#).

Majority of subjects in this study was male (78.6%), while female was 21.4%. The most frequent age group with gastric perforation was 47-53 and 61-67 years old and the least frequent age group was 40-46 years old and 75-81 years old. The most frequent ethnic group with gastric perforation was Batak ethnic with 20 subjects (35.7%). 28 subjects (50%) were diagnosed with type 3 gastric perforation and no type 2 gastric perforation was found. Histopathology examination found that all subjects were with chronic inflammation (100%), no malignancy was found.

Majority of both male and female was using NSAID (37 subjects and 10 subjects, respectively), as major risk factor of gastric ulcers. The results presented in [table 2](#).

Table 1 Characteristics of subjects

Characteristics	Frequency	%
Gender		
Male	44	78.6
Female	12	21.4
Age		
40-46	4	7.1
47-53	13	23.2
54-60	10	17.9
61-67	13	23.2
68-74	12	21.4
75-81	4	7.1
Ethnic		
Batak	20	35.7
Javanese	14	25
Malays	6	10.7
Aceh	9	16.1
Karo	6	10.7
Minang	1	1.8
Type of perforation		
Type 1	24	42.9
Type 2	0	0
Type 3	28	50
Type 4	4	7.1
Histopathology		
Chronic inflammation	56	100
Malignancy	0	0

Table 2 Frequency of NSAID usage both in male and female

Variable	Male (n=44)	Female (n=12)
NSAID usage, n (%)		
NSAID (+)	37 (84.1)	2 (16.7)
NSAID (-)	7 (15.9)	10 (83.3)

DISCUSSIONS

Majority of subjects in this study was male (78.6%), while female was 12 subjects (21.4%). This result similar with previous research in India which showed that comparison of male and female with gastric perforation was 4:1.² Other study by Gupta et al found similar result in which comparison of male and female with gastric perforation was 10:1.¹¹

The most frequent age group with gastric perforation was 47-53 and 61-67 years old and the least frequent age group was 40-46 years old and 75-81 years old. It is in accordance with previous theory which stated that gastric ulcer rarely occurs below 40 years old, and its peak incidence is between 55 and 65 years old. Gastric ulcer often occurs in people with low socioeconomic status. Pathogenesis of benign gastric ulcer is remains unknown. Several conditions may become predisposing factor for

gastric ulcer, for instance age more than 40 years old.¹² All patients treated in Haji Adam Malik General Hospital are more than 40 years old. It may be caused by NSAID consumption, which often used as pain killer medicine by people.

This study found that 28 subjects had type 3 gastric perforation (50%) and no subjects had type 2 gastric perforation. This result is in accordance with previous theory. Gastric ulcer may develop anywhere in gastric. Perforation divided into 4 types. Type 1 (primary) located on lesser curvature between fundus and antrum of gastric, commonly occur in elderly and associated with hyposecretion of gastric acid. Type 2 is the combination of gastric ulcer and duodenal ulcer which located at lesser curvature and duodenal and it is very rare. Type 2 and type 3 occur in younger patients with high secretion of acid. More than 30% of gastric ulcer associated with duodenal ulcer. H. pylori infection is associated with type 2, while NSAID associated with type 3.¹³ Perforation most often found at pre-pyloric (40%), duodenum (28%), and antrum (5%).⁸ Several ulcers may locate at greater curvature of gastric, but its incidence is less than 5%.

Histopathology examination found that all subjects had chronic inflammation and no subjects had malignancy. Risk factors such as consumption of drugs which damage gastric barrier such as aspirin or NSAID, impairment of acid secretion and pepsin, gastric static when gastric emptying, duodenal ulcer which already exist, gastritis, and H. pylori infection may lead to chronic inflammatory process in gastric. NSAIDs inhibit cyclooxygenase enzyme activity on arachidonic acid, hence suppressing prostaglandin production. Mucosal damage, caused by inhibition of prostaglandin production on the use of NSAIDs, occurs through 4 phase: First, decrease in mucus secretion and bicarbonate which produced by epithelial cells in gastric and duodenum leads to reduction of gastric and duodenal defense. Second, use of NSAIDs caused impairment of acid secretion and mucous cells proliferation. Third, decreased mucosal blood flow since inhibition of COX-1 lead to vasoconstriction, resulted in decrease of blood flow and epithelial cells necrosis. Fourth phase is microvascular damage aggravated by platelet and coagulation mechanism. Inhibition of COX-2 resulted in increase adhesion of PMN leucocytes on gastroduodenal and mesentery vascular endothelial, starts

with protease release. Oxygen free radicals resulted in epithelial and endothelial damage which caused stasis of microvascular flow, lead to ischemia and peptic ulcer. The incidence of gastric perforation was reported as 5%, and majority of patients was in advance stage (64-88%).⁹

CONCLUSIONS

Majority of patients was male. The most frequent age group with gastric perforation was 47-53 and 61-67 years old. The most frequent type of gastric perforation was type 3. Histopathology examination shows that all subjects were with chronic inflammation.

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