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Relations between alcohol consumption and gastric perforation at Haji Adam Malik general hospital Medan-Indonesia



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ABSTRACT

Background: Gastric perforation may develop into chemical peritonitis due to gastric acid leakage into abdominal cavity. Perforation is one case of a surgery emergency. One of the most important risk factor of gastric perforation is alcohol consumption. To date there is no report concerning relations between gastric perforation and alcohol consumption at Haji Adam Malik General Hospital Medan, therefore we aimed to investigate it.

Methods: This was an analytical study with case control design at Haji Adam Malik General Hospital Medan. Population in this study was all patients of digestive surgery division at emergency department from January 2013 until December 2015. Research's subjects were digestive surgery patient who underwent operation due to gastric perforation, as many as 35 patients. Inclusion criteria were patients with gastric

perforation and medical records data were recorded at emergency department of Haji Adam Malik General Hospital Medan. Exclusion criteria were incomplete medical records data and peritonitis caused by trauma. Bivariate analysis with chi-square test was used.

Results: A total of 70 subjects were enrolled, consisted of 35 patients with gastric perforation and without gastric perforation, respectively. Mean of age was 43.69 ± 15.14 years old, majority of the subjects was male (67.14%). There were no significant differences on age and gender between gastric perforation and without gastric perforation group. Alcohol consumption had significant statistical difference with $p = 0.015$ and OR 3.431 (95% CI: 1.25-9.44).

Conclusions: There was a relation between alcohol consumption and gastric perforation.

Keywords: Alcohol, perforation, gaster.

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INTRODUCTION

Peptic ulcer suffered by approximately 4 million people worldwide annually.¹ Complications occur in 10-20% of people with peptic ulcer, and 2-14% may develop into perforation.² More than half of all cases occurred in woman.^{2,3}

Gastric perforation may develop into chemical peritonitis due to gastric acid perforation into abdominal cavity. All form of perforation that occurs at digestive tract is an emergency.

The main factors that lead to gastric perforation is alcohol consumption, non-steroidal anti-inflammatory drug (NSAID), smoking, and H. Pylori infection. All these factor generally involved in the development of gastric ulcer.

One of the important risk factor of gastric perforation is alcohol consumption. Previous research showed that batak ethnic is the most frequent ethnic group with gastric perforation at Haji Adam Malik General Hospital Medan. Batak ethnic often consume tuak, a traditional palm liquor and the most widely alcohol beverage in North Sumatra. Tuak is a liquor (class A) since it contains alcohol as many as 4%.⁴ To date there is no report which investigates relations between gastric perforation and alcohol consumption at Haji Adam Malik

General Hospital Medan, therefore we aimed to investigate it.

METHODS

Case control study was conducted to investigate the relations between gastric perforation and alcohol consumption at Haji Adam Malik General Hospital Medan. All patients of digestive surgery division at emergency department of Haji Adam Malik General Hospital who underwent operation due to gastric perforation on January 2013 until December 2015 were used as population in this study. The inclusion criteria were patients with peritonitis who underwent operation due to gastric perforation at emergency department of Haji Adam Malik General Hospital Medan and medical record data recorded at emergency department of Haji Adam Malik General Hospital Medan. Those with incomplete medical record data and peritonitis due to trauma were excluded. Alcohol consumption was defined as patients who consume alcoholic beverages at least one day in the last 30 days.

All data were analyzed statistically with univariate and bivariate analysis. Data were presented descriptively in table and diagram. Normally

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distributed data was presented in mean \pm standard deviation (SD). Chi-square analysis was used if the requirements were met.

RESULT

A total of 70 subjects were enrolled in this study, consisted of 35 subjects with and without gastric perforation, respectively, who treated at emergency department Haji Adam Malik General Hospital Medan. The mean age was 43.69 ± 15.14 years old. Majority of subjects was male (67.14%). Complete data of subjects' characteristics presented in [table 1](#).

There were no significant statistical differences on age and gender between gastric perforation and without gastric perforation group. Alcohol consumption had significant statistical difference

in each group with $p = 0.015$. More complete data between each group presented in [table 2](#).

[Table 2](#) showed that alcohol consumption had statistical significant relations with gastric perforation. Chi-square analysis gives P value of 0.015 ($p < 0.05$). Analysis bivariate was performed and gives odds ratio of 3.431 (CI 95%: 1.25-9.44). It indicates that alcohol consumption increased the risk of gastric perforation by 3-fold.

DISCUSSIONS

Majority of the subjects in this study was male (67.14%), while 23 subjects were female (32.86%). As many as 26 subjects (74.2%) with gastric perforation were male. These results similar with previous research conducted in India which found that comparison between male and female with gastric perforation was 4:1.⁵ Gupta et al found that comparison between male and female with gastric perforation was 10:1.⁶

Mean of age in group with gastric perforation was 45.46 ± 14.08 . This result is in accordance with previous theory which stated that gastric ulcer rarely occurs before 40 years old, and the peak of incidence is in 55-65 years old. Gastric ulcer more often occurs in low socio-economic status. The exact pathogenesis of benign gastric ulcer is still remains unknown. Several conditions may become predisposing factors to gastric ulcer, for instance age of more than 40 years old.⁷ All patients treated at Haji Adam Malik General Hospital were aged more than 40 years old. This may be caused by consumption of the most frequent alcohol.

This study found that alcohol consumption had statistically significant relations with gastric perforation. Chi-square analysis found that p value of 0.015 ($p < 0.05$). The odds ratio was 3.431 (95% CI: 1.25-9.44). It indicates that a person who consumes alcohol are more at risk to develop gastric perforation by 3-fold.

Numerous factors contributed to the development of peptic ulcer. It has been believed that duodenal and gastric ulcer caused by alcohol consumption. Theoretically, the end pathway of the development of ulcer is injury caused by acid toward gastroduodenal mucosal barrier. The decrease in consumption of alcohol is important for optimal healing and it may be more important for

Table 1 Characteristics of Subjects

Characteristics	N	%
Age (mean \pm SD)	43.69 \pm 15.14	
Gender		
Male	47	67.14
Female	23	32.86
Alcohol consumption		
Alcohol (+)	28	40
Alcohol (-)	42	60
Disease status		
Gastric perforation (+)	35	50
Gastric perforation (-)	35	50

Table 2 Characteristic of subjects and gastric perforation

Characteristics	Gastric perforation (+) (n = 35)	Gastric perforation (-) (n = 35)	P
Age (mean \pm SD)	45.46 \pm 14.08	41.91 \pm 16.129	0.331*
Gender, n (%)			
Male	26 (74.2)	21 (60)	0.203**
Female	9 (25.8)	14 (40)	
Alcohol, n (%)			
Alcohol consumption (+)	19 (54.3)	9 (25.8)	0.015**
Alcohol consumption (-)	16 (45.7)	26 (74.2)	

*Independent t-test **Chi-square

Table 3 Diagnostic test of alcohol consumption with gastric perforation

	Gastric perforation (+) (n = 35)	Gastric perforation (-) (n = 35)	OR	95% CI	P
Alcohol consumption (+)	19 (54.3)	9 (25.8)	3.431	1.25-9.44	0.015
Alcohol consumption (-)	16 (45.7)	26 (74.2)			

the prevention of recurrent ulcer and/or its complications. Other diseases that lead to peptic ulcer are Zollinger-Ellison syndrome (gastrinoma), hyperfunctioning of antrum G cells and/or hyperplasia, systemic mastocytosis, trauma, burns injury, and severe psychological stress.^{8,9}

There is significant increase of stimulated gastrin in patients who consume alcohol, and it may be a secondary process of antrum D cells reduction. After all, association between acid secretion and alcohol consumption is not occur directly. Peptic ulcer also strongly associated with antral gastritis. In most cases, infection begins from antrum and resulting in antral inflammation.⁵

Acute gastroduodenal lesion commonly occurs in 1 until 2 weeks of alcohol consumption, from just mucosal hyperemia until superficial mucosal erosion. While chronic injury occurs generally after 1 month and may visible at gaster as erosion or ulceration at antrum or duodenal.⁶

There is change in gastric acid secretion in patient with upper gastrointestinal tract problem. Normally, gastric acid secretion rate is 1-8 mmol/hour and with response to pentagistrin is 6-40 mmol/hour. In several diseases like pernicious anemia, gastric atrophy, and gastric malignancy both of basal secretion rate and pentagistrin are decreased. On the contrary, gastric acid secretion rate is increased in patients with duodenal ulcer and gastrinoma. In type I and IV gastric ulcer which not associated with a lot of acid secretion, acid works as an important cofactor, worsen ulcer and decrease gastric capability to recover. In patients with type II or III gastric ulcer, gastric acid hypersecretion is more frequent. Ulcus also caused by non-gastric acid disorders such as crohn's disease, syphilis, candida infection or malignancy.⁷

The limitation of this study is other factors as the cause of gastric perforation such as smoking, NSAID use, and so forth are not shown.

CONCLUSIONS

This study concludes that there was a relation between alcohol consumption and gastric perforation. Furthermore, alcohol consumption increased the risk of gastric perforation by 3-fold. However, further research with more accurate instrument is needed to control risk factor of alcohol consumption toward gastric perforation. Multivariate research method also needed to control other risk factors.

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