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Association of metabolic syndrome with erosive esophagitis and Barrett's esophagus in a Chinese population

Shou-Wu Lee [a,b,*], Han-Chung Lien [a,c], Chi-Sen Chang [a,b], Teng-Yu Lee [a,b], Yen-Chun Peng [a,c], Hong-Zen Yeh [a,c]

[a] *Division of Gastroenterology, Department of Internal Medicine, Taichung Veterans General Hospital, Taichung, Taiwan, ROC*
[b] *Department of Internal Medicine, Chung Shan Medical University, Taichung, Taiwan, ROC*
[c] *Department of Internal Medicine, National Yang-Ming University School of Medicine, Taipei, Taiwan, ROC*

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Abstract

Background: Metabolic syndrome has been highlighted as a risk factor for several gastrointestinal diseases, including gastroesophageal reflux disease and Barrett's esophagus (BE). The aim of this study was to investigate the association of metabolic syndrome with erosive esophagitis (EE) and BE.

Methods: Data were retrospectively collected from patients who visited the Medical Screening Center at Taichung Veterans General Hospital, Taichung, Taiwan from January 2006 to December 2009. All patients underwent an open-access transoral upper gastrointestinal endoscopy, and serum laboratory data were collected. The exclusion criteria included prior gastric surgery, or presence of esophageal varices or peptic ulcers. These patients were assigned to groups according to their endoscopic findings as follows: (1) normal group; (2) EE group; and (3) BE group. Metabolic syndrome was diagnosed based on the International Diabetes Federation criteria.

Results: There were 560/6499 (8.6%) patients, 214/1118 (9.6%) patients, and 19/95 (20%) patients with metabolic syndrome in the normal, EE, and BE groups, respectively. There was a significantly higher percentage of cases with hypertriglyceridemia in the EE group (67%) compared with the other groups. The BE group had significantly higher rates of central obesity (33%) and hypertension (29.5%) compared with rates in the normal and EE groups. After adjusting for confounders, the positive association with metabolic syndrome still existed in both the EE group (adjusted odds ratio = 2.43; 95% confidence interval = 1.02−3.44) and the BE group (adjusted odds ratio = 2.82; 95% confidence interval = 2.05−3.88).

Conclusion: Our research indicated that in fact there is a greater risk of concurrent metabolic syndrome in patients with EE or BE.

Keywords: Barrett's esophagus; erosive esophagitis; metabolic syndrome

1. Introduction

Metabolic syndrome is described in association with cardiovascular disease and type 2 diabetes, where the usual screening variables are waist circumference, circulating levels of triglyceride (TG), high-density lipoprotein (HDL) cholesterol, fasting glycemia, and blood pressure.[1] Metabolic syndrome has become a major public health challenge worldwide. In Taiwan, the prevalence rate of metabolic syndrome is 20%.[2,3] Metabolic syndrome has been highlighted as a risk factor for some gastrointestinal diseases, including gastroesophageal reflux disease (GERD) and Barrett's esophagus (BE).[4] Patients with GERD may present with a broad range of troublesome symptoms that can damage quality of life, and BE is associated with the presence of premalignant lesions that lead to adenocarcinoma of the esophagus and gastroesophageal junction. BE is defined by the pathological phenotype of

Conflicts of interest: The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

* Corresponding author. Dr. Shou-Wu Lee, Division of Gastroenterology, Department of Internal Medicine, Taichung Veterans General Hospital, 1650, Section 4, Taiwan Boulevard, Taichung 407, Taiwan, ROC.
E-mail address: ericest@vghtc.gov.tw (S.-W. Lee).

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specialized intestinal metaplasia.[5] The aim of this study was to investigate the association between metabolic syndrome and erosive esophagitis (EE) or BE in a Chinese population.

2. Methods

Data from patients who visited the Medical Screening Center at Taichung Veterans General Hospital, Taichung, Taiwan were retrospectively collected from January 2006 to December 2009. The general data of enrolled patients were recorded, including age, gender, body weight, body mass index (BMI), waist circumference, blood pressure, fasting glucose, TG, and HDL. All patients underwent an open-access transoral upper gastrointestinal endoscopy, and the findings of each case were collected. The exclusion criteria included prior gastric surgery, or presence of esophageal varices or peptic ulcers.

All endoscopic procedures were performed by experienced endoscopists. The patients were assigned to groups according to whether upper gastrointestinal endoscopy showed normal appearance (normal group), EE, or BE. BE was defined as endoscopically suspected esophageal metaplasia with specialized intestinal metaplasia documented by biopsy pathology.

Metabolic syndrome was diagnosed based on the 2005 International Diabetes Federation criteria with ethnicity-specific values: central obesity (waist circumference $\geq$ 90 cm for men and $\geq$ 80 cm for women), combined with any two of the following four conditions: (1) TG levels $\geq$ 150 mg/dL); (2) HDL levels < 40 mg/dL for men and < 50 mg/dL for women; (3) fasting glucose levels > 100 mg/dL); and (4) systolic blood pressure $\geq$ 130 mmHg or diastolic blood pressure $\geq$ 85 mmHg.

Data are expressed as standard deviation of the mean for each of the measured parameters. Gender, positive ratio of metabolic syndrome and its associated components are expressed as a percentage of the total patient number. Statistical comparisons were made using Pearson's χ^2 test to compare the effects of gender and positive ratio of metabolic syndrome and individual components. Independent t test was used to analyze age, body weight, and BMI. A p value < 0.05 was considered statistically significant. Multivariate Cox's regression was used to examine the strength of association between metabolic syndrome and EE or BE, and odds ratios (OR) with 95% confidence interval (CI) were reported.

3. Results

Among all 7712 enrolled patients, there were 6499 (84.3%), 1118 (14.5%), and 95 (1.2%) in the normal, EE, and BE groups, respectively. The characteristics of these patients are summarized in Table 1. The mean ages of the three groups were similar. The patients in the EE group (69.52 kg, 25.1 kg/m^2) had significantly higher body weight and BMI than patients in the normal group (64.3 kg, 24.07 kg/m^2) and BE group (65.38 kg, 23.92 kg/m^2). The male predominance was significant in the EE (80.2%) and BE (64.2%) groups. The propotion of patients with EE L.A. Grades A/B and C/D were 81.7% (913 cases) and 18.3% (205 cases), respectively.

Among all of the enrolled cases, there were 686 individuals (8.9%) with metabolic syndrome; the associations of normal cases, EE, and BE with metabolic syndrome are displayed in Table 2. There were 560 (8.6%) cases, 214 (9.6%) cases, and 19 (20%) cases with metabolic syndrome in the normal, EE and BE groups, respectively. The difference was significant ($p = 0.001$). Among individuals in the BE group, there were significantly higher percentages of abnormal waist circumference (33%) and hypertension (29.5%) compared with those of the other groups. The EE group had the highest prevalence of hypertriglyceridemia (61.7%), which was statistically significant.

The strength of the association between each group and metabolic syndrome is disclosed in Table 3. After adjustment for measured potential confounders, including age, sex, and body weight, a significant positive association with metabolic syndrome was found in the EE group (adjusted OR = 2.43; 95% CI = 1.02−3.44) and BE group (adjusted OR = 2.82; 95% CI = 2.05−3.88).

4. Discussion

Among all 7712 enrolled cases in our study, the rates of EE and BE were 14.5% and 1.2%, respectively. According to the results of a large series reported in an epidemiological study, the frequency of EE in Western countries was in the upper range, with rates between 7% and 22%; but in Eastern

Table 1
The characteristics of enrolled patients.

	Normal (n = 6499, 84.3%)		EE (n = 1118, 14.5%)		BE (n = 95, 1.2%)		p
	Mean ± SD	n %	Mean ± SD	n %	Mean ± SD	n %	
Age	52.34 ± 11.81		52.48 ± 12.17		53.00 ± 12.87		0.649
BW	64.30 ± 11.70		69.52 ± 11.58		65.38 ± 12.22		0.001
BMI	24.07 ± 3.39		25.10 ± 3.35		23.92 ± 3.20		0.001
Gender							
M		3447 (53.0)		897 (80.2)		61 (64.2)	0.001
F		3052 (47.0)		221 (19.8)		34 (35.8)	

* p values were analyzed with Pearson's χ^2 test; independent t test.
BE = Barrett's esophagus; BMI = body mass index; BW = body weigh; EE = erosive esophagitis; F = female; M = male; n = number of patients; SD = standard derivation.