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Gastroesophageal reflux symptoms in Turkish people: a positive correlation with abdominal obesity in women

Sergul Karayaka[1], Banu Mesci[2], Aytekin Oguz[2], Gonca Tamer[3]

[1]Department of Family Medicine, Istanbul Medeniyet University, Goztepe Training and Research Hospital, Istanbul, Turkey;
[2]Department of 2nd Internal Medicine Clinic, Istanbul Medeniyet University, Goztepe Training and Research Hospital, Istanbul, Turkey;
[3]Department of Endocrinology, Istanbul Medeniyet University, Goztepe Training and Research Hospital, Istanbul, Turkey

ABSTRACT

OBJECTIVE: Metabolic syndrome (MetS) is increasing around the world due to abdominal obesity with altered eating habits and decreased physical activity. The aim of this study was to determine the risk factors for gastroesophagial reflux disease (GERD) symptoms and the prevalence of GERD in patients with MetS.

METHODS: Five hundred patients (MetS, n=300 and the control group, n=200) were enrolled in the study. A detailed questionnaire reflux symptoms and behavioral habits was performed.

RESULTS: Sixty percent of the subjects were with MetS. GERD rate was significantly higher in the group with MetS compared to subjects without MetS (50.7% vs 26%). Women were more likely to have GERD in both groups (62.6% of women and 28.6% of men ın the MetS group while corresponding rates were 37% vs 16.7% in the control group). Waist circumferences were found to be higher in female MetS patients with GERD.

CONCLUSION: GERD is present approximately in every one of the two patients with MetS. Every patient who has MetS should be evaluated in terms of GERD symptoms.

Key words: Abdominal obesity; gastroesophageal reflux; metabolic syndrome; obesity; Turkish population.

Gastroesophagial reflux disease (GERD) is frequently observed together with MetS [1]. Prevalence of metabolic syndrome (MetS) is increasing around the world due to abdominal obesity with altered eating habits and decreased physical activity. GERD worsens quality of life, and may cause diseases involving esophagus such as esophagitis, Barret esophagus, adenocarcinoma, and many additional diseases such as laryngitis, morning hoarseness and aspiration syndrome as a result of regurgitation of the stomach contents into the pharynx and the mouth [2, 3]. These kinds of chronic complications can be prevented with active questioning of GERD symptoms in patients with MetS.

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Correspondence: Dr. Banu MESCI. Istanbul Medeniyet Universitesi, Goztepe Egitim ve Arastirma Hastanesi, 2. Dahiliye Klinigi, Istanbul, Turkey.
Tel: +90 216 - 416 03 45 e-mail: banualpaslan@gmail.com

Table 1. Demographic data of the patients

	MetS group	Control group	
Female	67.9%	50.7%	
	Mean±SD	Mean±SD	p
Age	52.83±9.85	51.86±12.71	0.21
BMI (kg/m^2)	32.43±4.88	23.42±2.69	0.001
Waist circumference (cm)	107.89±10.45	82.86±7.88	0.001

The aim of the present study was to determine the risk factors and the prevalence of GERD symptoms in patients with MetS.

MATERIALS AND METHODS

The study was conducted in Goztepe Training and Research Hospital outpatient clinics between 2008 and 2009. Five hundred patients (MetS, n=300 and the control group, n=200) were enrolled in the study. MetS was identified according to the criteria of The International Diabetes Federation (IDF) [4]. Exclusion criteria were pregnancy, hormone replacement therapy, history of gastric surgery. The study protocol was designed in accordance with the relevant criteria of Helsinki Declaration and was approved by the local ethics committee of Goztepe Training and Research Hospital. Subjects provided their written informed consent. Demographic and clinic data were recorded. Their physical examination was performed; height, weight, and waist circumference measurements were performed. Body mass index (BMI) was calculated by dividing weight in kg by height in m^2. Systolic and diastolic blood pressures (BP) were recorded. Waist circumferences were measured at the plane between anterior superior iliac spines and lower costal margins at the narrowest part of the waistline while patients were standing during slight expiration. Waist circumferences >80 cm for women and >94 cm for men were accepted as abdominal obesity according to IDF. A detailed questionnaire asking reflux symptoms and behavioral habits was performed. GERD symptoms were defined as a 'yes' response to all three of the following components: the presence or absence of heartburn, indigestion or pain in your stomach, a tender point palpated on the upper abdomen and relief with antacid. Related risk factors such as tobacco smoking, alcohol intake, eating habits, physical activity and the sleeping position were investigated in both groups.

Table 2. Reflux prevalence in groups

	MetS		Control		
	n	%	n	%	p
Reflux					
+	152	50.7	52	26.0	0.001**
-	148	49.3	148	74.0	

Statistical analysis

NCSS (Number Cruncher Statistical System), 2007&2008 Statistical Software PASS (Utah, USA) program were used. Student's t test was used for comparison of descriptive statistical data (mean, standard deviation, frequency) as well as quantitative parameters showing normal distribution of data between groups. The chi-square test was used to compare qualitative data.

TABLE 3. Reflux prevalence in groups according to the gender of the patients

	Reflux	Female		Male		p
		n	%	n	%	
MetS						
	+	122	62.6	30	28.6	0.001**
	–	73	37.4	75	71.4	
Control group						
	+	34	37.0	18	16.7	0.001**
	–	58	63.0	90	83.3	

TABLE 4. Reflux prevalence according to waist circumference

	Reflux				p
	+		–		
	n	%	n	%	
Waist circumference (women)					
<80 cm (31.5 in)	34	21.8	58	44.3	
80-88 cm (31.5-34.6 in)	5	3.2	0	0	0.001**
>88 cm (34.6 in)	117	75.0	73	55.7	
Waist circumference (men)					
<94 cm (37 in)	18	37.5	90	54.5	
94-102 cm (37-40.2)	7	14.6	21	12.7	0.100
>102 cm (40.2)	23	47.9	54	32.7	

RESULTS

The study was completed with 500 patients (213 M, 287 F). Sixty percent of the subjects were diagnosed with MetS (Table 1). GERD rate was significantly higher in the group with MetS as compared to the group without MetS (50.7% vs 26%) (Table 2). Women were more likely to have GERD in both groups (MetS, and the control groups, women: 62.6 vs 37% and men, 28.6 vs 16.7%) (Table 3). Waist circumferences were found to be higher among female MetS patients with GERD (Table 4). Smoking rate was lower in the group with metabolic syndrome. GERD prevalence was found to be higher in nonsmokers. Alcohol consumption rates were similar between subjects with and without GERD. Subjects with GERD were found out to eat larger sized meals. A habit of eating three hours before bedtime was associated with GERD. Physical activity level at work was not correlated with GERD while lesser physical activity during leisure times was significantly correlated with GERD. There was no relation between the type of lying position and GERD (Table 5).

Table 5. Reflux prevalence in groups according to daily habits

	Reflux				p
	+		-		
	n	%	n	%	
Smoking status					
Nonsmoker	123	46.4	142	53.6	0.045*
Irregular smoker	37	36.3	65	63.7	
Former smoker	25	30.9	56	69.1	
Current smoker	19	36.5	33	63.5	
The number of cigarettes smoked daily by current smokers (n=52)					
<5	4	80.0	1	20.0	0.098
5-20	12	30.8	27	69.2	
>20	3	37.5	5	62.5	
Alcohol consumption					
+	5	33.3	10	66.7	0.550
-	199	41.0	286	59.0	
The size of meals					
Small	43	27.7	112	72.3	0.001**
Medium	81	41.1	116	58.9	
Large	80	54.1	68	45.9	
Eating 3 hours before bedtime					
Never	34	23.6	110	76.4	0.001**
Rare	99	40.2	147	59.8	
Often	56	59.6	38	40.4	
Very often	15	93.8	1	6.3	
Physical activity at work					
Minimal	64	41,8	89	58.2	0.086
Average	108	44.1	137	55.9	
Heavy	32	31.4	70	68.6	
Physical activity at leisure time					
Minimal	128	56.6	98	43.4	0.001**
Average	67	32.1	142	67.9	
Heavy	9	13.8	56	86.2	
Sleeping position					
Right side	130	43.0	172	57	0.542
Left side	47	39.5	72	60.5	
Supine position	12	34.3	23	65.7	
Prone position	15	34.1	29	65.9	

DISCUSSION

This study showed that waist circumference is the most important factor for GERD in female patients with MetS. It is well documented that obesity increases the risk of GERD [5, 6]. With the growing interest in MetS similar recent studies were performed on coexistence between GERD and MetS [1]. In a

study conducted with 2457 people in Korea, abdominal obesity was found as a more important factor in the development of erosive gastritis than body mass index [7]. In another study, metabolic syndrome and increased insulin resistance were found to increase the risk of development of erosive esophagitis [8].

Visceral obesity increases intragastric pressure and leads to reflux esophagitis. Visceral fat is metabolically active and it has been associated with low serum levels of protective cytokines, such as adiponectin, and high levels of inflammatory cytokines, such as tumor necrosis factor (TNF)-α, interleukin (IL)-1β and IL-6 [9, 10].

In the present study, GERD prevalence was found to be higher in women in contrast to the prevalence rates reported for a Japanese cohort [1].

In a large cross-sectional study on abdominal obesity, GERD symptoms and ethnicity of 80110 members of a health organization were investigated. It was found that increased abdominal circumference adjusted for BMI, was an independent risk factor for reflux symptoms (OR, 1.85; 95% CI, 1.55-2.21) in the white population but not among blacks and Asians which was not influenced by gender [11]. Higher GERD prevalence in Turkish women with MetS in the present study as compared to Japanese women [12] can be related to higher waist circumference of the former group.

Cigarette smoking and alcohol consumption are well known risk factors for GERD [13-16].

We did not find a correlation with smoking or alcohol consumption and GERD, possibly because of higher nonsmoking rate in subjects with metabolic syndrome and very limited alcohol consumption in our population.

Although eating larger- sized meals and eating especially three hours before bedtime were associated with GERD in accordance with the results of other studies [10], we haven't observed any correlation between GERD and physical activity level at work and observed a negative correlation between GERD, and the intensity of leisure time activity. Accumulating information about GERD indicates that GERD coexists with vigorous rather than moderate exercise [17, 18]. Since gastric fullness increases the possibility of GERD [19], leisure time is more convenient for exercises. Investigating sleeping position, any of lying position did not show association with GERD.

Present study is based on a questionnaire survey. An endoscopic evaluation of the study population would be more enlightening.

Conclusion: GERD is present approximately in every one of the two patients with MetS. Every patient who have MetS should be evaluated in terms of GERD symptoms.

Conflict of Interest: No conflict of interest was declared by the authors.

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