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Prevalence of Eosinophilic Esophagitis in Adult Patients with Upper Gastrointestinal Symptoms in a Locality in Upper Egypt

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Background/Aims: Eosinophilic esophagitis (EoE) is gaining importance in the diagnosis of upper gastrointestinal (UGI) symptoms. Diagnosis is based on the clinical presentation of esophageal dysfunction and pathological findings in the absence of other causes of tissue eosinophilia. Our study was designed to evaluate EoE prevalence in patients with UGI symptoms in our locality (El-Minia, Egypt).
Methods: This single-center, cross-sectional study recruited all patients with UGI symptoms who agreed for endoscopic evaluation. Esophageal biopsy samples were obtained and histological evaluation for the presence of eosinophils was performed for every patient. EoE was defined when at least 15 eosinophils were present in a single high-power field, in the absence of other causes of esophageal eosinophilia.
Results: Between 2013 and 2015, 218 of 476 adult patients with UGI symptoms underwent upper endoscopy after giving consent. Among the 218 patients, only 4 (1.87%) had the diagnosis of EoE based on the presence of eosinophils in esophageal biopsies and exclusion of other causes of esophageal eosinophilia. Three patients with EoE presented mainly with dysphagia (75%) and/or other UGI symptoms, such as heartburn.
Conclusions: We observed a low prevalence of EoE in our locality. The diagnosis of EoE should be considered in patients with dysphagia and/or heartburn. **Clin Endosc 2018;51:357-361**

Key Words: Eosinophilic esophagitis; Endoscopy; Upper gastrointestinal symptoms; Egypt, El-Minia

INTRODUCTION

The definition of eosinophilic esophagitis (EoE) is based on the detection of an infiltrate with at least 15 eosinophils/high-power field (HPF) in a biopsy of esophageal mucosa, combined with symptoms of esophageal dysfunction and exclusion of other causes of eosinophilia.[1-3]

The increasing prevalence of EoE may be partly explained by recent research aimed at diagnosis or a change in pathogenic mechanisms.[4-6] The highly-variable prevalence appears to be dependent on study population characteristics. The overall prevalence of EoE is low (0.05%–0.4%), but is reportedly as high as 15% in patients with dysphagia and 48% in patients with food bolus impaction.[7-13]

Symptoms frequently associated with EoE are food impaction, dysphagia, and allergic disorders such as bronchial asthma. Endoscopic findings associated with EoE include mucosal edema, vertical furrows, concentric rings, whitish exudates and/oresophageal strictures.[14,15] Moreover, EoE can be associated with manifestations similar to gastroesophageal reflux disease (GERD), such as heartburn and regurgitation, in nearly 30% of cases.[15]

The aim of our work was to determine EoE prevalence in patients with upper gastrointestinal (UGI) symptoms in our locality.

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MATERIALS AND METHODS

This study included 218 of 476 patients with various UGI symptoms who received proton-pump inhibitor therapy for 2 months with no improvement and agreed to undergo esophagogastroduodenoscopy after providing written informed consent. Patients with collagen diseases (such as scleroderma) or Crohn's disease were excluded; all patients stopped proton-pump inhibitors and H_2 blockers1month before endoscopy. Athorough medical history was recorded with emphasis on demographic data and UGI symptoms (e.g., dysphagia, heartburn, vomiting, anorexia, and epigastric pain, in addition to a history of weight loss). Complete blood testing, liver and renal function testing, and urine and stool analyses were performed in all patients. Upper endoscopies were performed in the endoscopy unit of our gastroenterology department. A special endoscopic information sheet prepared for our research was completed. Examination was performed by well-trained endoscopists for the detection of findings associated with EoE (exudate, edema, rings, furrows, and strictures). Endoscopic findings of other esophageal, gastric, or duodenal diseases were also reported.

Multiple biopsy samples were obtained from the upper, middle, and lower third of the esophagus, i.e., at 5, 10, and 15 cm above the gastroesophageal junction. Gastric and duodenal biopsy samples were obtained when indicated in patients with gastric lesions for the diagnosis of the cause of UGI symptoms and detection of other causes of EoE.

Pathological examination was performed using hematoxylin and eosin staining. Biopsies were processed and examined by a pathologist who was blinded to endoscopic and clinical data.

Diagnosis of EoE was defined as the presence of ≥15 eosinophils/HPF at any part of the esophagus.[1] In addition, the diagnosis was made in the presence of eosinophilic abscess, edema of the lamina propria, elongated papillae, and fibrosis in the absence of another cause for EoE. SPSS statistical software (Version 20.0) was used for analysis. $p<0.05$ was considered statistically significant. Comparison between the study groups was performed using the chi-squared (χ^2) test.

Ethics approval of the study

The study was approved by the Ethics Committee of El-Minia University; all protocols were in accordance with the 1975 Declaration of Helsinki.

RESULTS

The mean age of all patients was 36.77±12.41 years (21–67 years); 128 (58.7%) were men and 90 (41.3%) were women. Fifty-three (24.3%) were smokers (Table 1).

Epigastric pain was reported in 138 patients (63.3%), vomiting in 105 (48.2%), dysphagia in 25 (11.5%), anorexia in 80 (36.7%), and heartburn in 109 (50%). A history of weight loss was reported by 34 patients (15.6%; Table 1).

Endoscopic findings were as follow: esophagitis, gastritis, and duodenitis in 28 patients (12.8%); esophagitis and gastritis in 28 (12.8%); non-GERD esophagitis in 37 (17%); gastritis in 34 (15.6%); GERD esophagitis in 21 (9.6%); esophageal mass in 5 (2.3%); hiatal hernia in 7 (3.2%); gastric mass in 4 (1.8%); gastric or duodenal ulcer in 10 (4.6%); and endoscopically diagnosed EoE in 6 (2.8%). Normal endoscopic findings were present in 38 patients (17.4%; Table 2).

The esophageal pathological findings were as follows: nonspecific esophagitis in 47 (21.6%), GERD esophagitis in 34 (15.6%), and esophageal dysplasia in 6 (2.8%). Only 4 of 6 patients (1.8%) endoscopically diagnosed with EoE matched the histopathological findings of EoE (15 eosinophils/HPF), and

Table 1. Demographic and Clinical Data of Patients

Patients with UGI symptoms (*n*=218)		
Age	Range	(21–67)
	Mean±SD	36.77±12.41
Age groups	20–30 yr	90 (41.3%)
	30–40 yr	53 (24.3%)
	40–50 yr	30 (13.8%)
	50–60 yr	31 (14.2%)
	>60 yr	14 (6.4%)
Sex	M	128 (58.7%)
	F	90 (41.3%)
Smoking	No	165 (75.7%)
	Yes	53 (24.3%)
Dysphagia	No	193 (88.5%)
	Yes	25 (11.5%)
Heart burn	No	109 (50%)
	Yes	109 (50%)
Vomiting	No	113 (51.8%)
	Yes	105 (48.2%)
Epigastric pain	No	80 (36.7%)
	Yes	138 (63.3%)
Weight loss	No	184 (84.4%)
	Yes	34 (15.6%)
Anorexia	No	138 (63.3%)
	Yes	80 (36.7%)

UGI, upper gastrointestinal; SD, standard deviation.

127 (58.3%) showed normal esophageal pathology (this number included many patients with non-esophageal findings). The diagnosis of EoE is based on clinicopathological findings in the absence of other causes of esophageal eosinophilia; we found EoE in 4 (1.8%) patients with UGI symptoms (Table 2).

The association of endoscopic findings and esophageal histopathology with the presenting UGI symptoms is shown in Tables 3 and 4.

Table 2. Endoscopic and Oesophageal Histopathological Findings of Patients

Patients with UGI symptoms (*n*=218)		
Endoscopic findings	Normal	38 (17.4%)
	Oesophagitis, gastritis and duodenitis	28 (12.8%)
	Oesophagitis and gastritis	28 (12.8%)
	Non-GERD oesophagitis	37 (17%)
	Gastritis	34 (15.6%)
	GERD oesophagitis	21 (9.6%)
	Oesophageal mass	5 (2.3%)
	Hiatus hernia	7 (3.2%)
	Gastric mass	4 (1.8%)
	Gastric or duodenal ulcer	10 (4.6%)
	EoE	6 (2.8%)
Oesophageal pathological findings	Normal	127 (58.3%)
	Non-specific oesophagitis	47 (21.6%)
	GERD oesophagitis	34 (15.6%)
	Oeosophageal carcinoma	6 (2.8%)
	EoE	4 (1.8%)

UGI, upper gastrointestinal; GERD, gastroesophageal reflux disease; EoE, eosinophilic esophagitis.

The mean age of EoE patients (3 men and 1 woman) was 34.3±6.0 years. None were smokers and all had normal stomach and duodenal endoscopic findings. Among these 4 patients, 3 (75%) complained of dysphagia, and 2 (50%) complained of heartburn with or without vomiting, anorexia, or epigastric pain. Dysphagia as a presenting symptom occurred more significantly in patients with EoE than in those without EoE (p<0.001; Table 5).

DISCUSSION

EoE is likely when symptoms of esophageal dysfunction are present and is confirmed by an eosinophilic infiltrate in any part of the esophagus. A minimum of 15 eosinophils/HPF is required for a diagnosis of EoE.[3] The epidemiology of EoE varies; several studies have suggested that this is due to increasing incidence or more frequent recognition.[5,16]

The purpose of our study was to determine EoE prevalence in adults complaining of UGI symptoms in our locality and to identify the clinical manifestations.

Endoscopy identified 6 patients with EoE out of 218 with various UGI symptoms (2.8%), but only 4 of these 6 showed histopathology matching the diagnosis (1.8%). EoE prevalence ranges from 0.4% to 1.1% in the general population[12,17] and to 3.3% in patients presenting with UGI symptoms[18] and is further increased to 10%–15% in patients presenting with dysphagia.[19-21]

Male predominance of EoE was noted in >75% of adult and child cases.[22] In our research, all EoE patients were younger

Table 3. Association between Presenting Symptoms & Smoking and the Endoscopic Findings in the Examined Patients

Endoscopy finding	Smoking		Dysphagia		Heart burn		Vomiting		Epigastric pain		Weight loss		Anorexia	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	11/38	28.9	3/38	7.9	13/38	34.2	18/38	47.4	20/38	52.6	2/38	5.3	10/38	26.3
Oesophagitis, gastritis and duodenitis	10/28	35.7	3/28	10.7	16/28	57.1	15/28	53.6	25/28	89.3	7/28	25	14/28	50
Oesophagitis, gastritis	7/28	25	1/28	3.6	14/28	50	13/28	46.4	17/28	60.7	0/28	0	7/28	25
Non-GERD oesophagitis	3/37	8.1	5/37	13.5	20/37	54.1	17/37	45.9	19/37	51.4	1/37	2.7	9/37	24.3
Gastritis	9/34	26.5	0/34	0	12/34	35.3	7/34	20.6	30/34	88.2	4/34	11.8	15/34	44.1
GERD	8/21	38.1	2/21	9.5	18/21	85.7	16/21	76.2	12/21	57.1	4/21	19	7/21	33.3
Oesophagitis, mass	1/5	20	4/5	80	1/5	20	3/5	60	1/5	20	4/5	80	3/5	60
Hiatus hernia	1/7	14.3	3/7	42.9	7/7	100	6/7	85.7	1/7	14.3	2/7	28.6	2/7	28.6
Gastric mass	1/4	25	0/4	0	0/4	0	1/4	25	3/4	75	4/4	100	4/4	100
Gastric ulcer	1/10	10	0/10	0	4/10	40	7/10	70	9/10	90	6/10	60	6/10	60
EoE	1/6	16.7	4/6	66.7	4/6	66.7	2/6	33.3	1/6	16.7	0/6	0	3/6	50

GERD, gastroesophageal reflux disease; EoE, eosinophilic esophagitis.

Table 4. Association between Presenting Symptoms & Smoking and the Oesophageal Pathological Findings in the Examined Patients

Oesophageal pathological findings	Smoking		Dysphagia		Heart burn		Vomiting		Epigastric pain		Weight loss		Anorexia	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Normal	32/127	25.2	6/127	4.7	59/127	46.5	59/127	46.5	83/127	65.4	18/127	14.2	49/127	38.6
Non-specific oesophagitis	11/47	23.4	6/47	12.8	27/47	57.4	21/47	44.7	29/47	61.7	6/47	12.8	15/47	31.9
GERD oesophagitis	8/34	23.5	5/34	14.7	20/34	58.8	20/34	58.8	23/34	67.6	5/34	14.7	11/34	32.4
Oesophageal carcimona	2/6	33.3	5/6	83.3	1/6	16.7	4/6	66.7	2/6	33.3	5/6	83.3	4/6	66.7
EoE	0/4	0	3/4	75	2/4	50	1/4	25	1/4	25	0/4	0	1/4	25

GERD, gastroesophageal reflux disease; EoE, eosinophilic esophagitis.

Table 5. Comparison between Patients with and without EoE

Oesophageal pathology	Smoking		Dysphagia		Heart burn		Vomiting		Epigastric pain		Weight loss		Anorexia	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Without EoE	53/214	24.8	22/214	10.3	107/214	50	104/214	48.6	137/214	64	34/214	15.9	79/214	36.9
With EoE	0/4	0	3/4	75	2/4	50	1/4	25	1/4	25	0/4	0	1/4	25
p-value	0.253		<0.001		1.0		0.349		0.109		0.386		0.624	

EoE, eosinophilic esophagitis.

than 40 years, and EoE was found in more men than women (3 men and 1 woman). These findings were similar to those reported by Veerappan et al.,[13] who found that EoE is more common in men younger than 50 years. Another study found that among 41 EoE patients, the male:female ratio was 4:1, with average age at diagnosis of 45 years.[23]

Endoscopic features of EoE may include mucosal edema, concentric rings, longitudinal furrows, strictures, white exudates or plaques, and pallor or decreased vasculature.[16,24] We endoscopically diagnosed 6 patients with EoE, but only 4 (66.6%) had confirmed EoE on histopathology. One of the other 2 cases was diagnosed histopathologically with non-GERD esophagitis and the other was normal. In contrast, no EoE cases diagnosed histologically had conflicting endoscopic diagnoses.

EoE may be underestimated or missed on endoscopic examination.[25,26] One study of histologically confirmed EoE reported that 8.8% of patients had no detectable endoscopic findings of EoE.[16] Another study reported normal endoscopic findings in 17% of histologically confirmed EoE cases.[27] Moreover, a study by Hunter et al.[18] found a normal esophageal endoscopic appearance in 2 of 3 histologically diagnosed EoE cases. Mackenzie et al.[10] found that 13/31 (42%) EoE patients did not have typical findings on endoscopy and might have been missed unless biopsies were taken.

Thus, even with a high index of suspicion, the presence or absence of endoscopic findings of EoE is inadequate to make a definitive diagnosis. Mucosal biopsy samples should be obtained routinely from any patient with EoE symptoms (unexplained dysphagia, refractory heartburn, or chest pain), regardless of the endoscopic findings. Histological examination of a mucosal biopsy is essential for the diagnosis of EoE.[27,28]

Although the small number of cases in our study may have prevented a definitive conclusion, the combined endoscopic and histopathologic findings are extremely important in the diagnosis of EoE.

Common presenting symptoms of EoE in adults include dysphagia, food impaction, and heartburn.[28] In our study, we similarly found that dysphagia was the most common presenting symptom of EoE, found in 3 patients (75%; $p<0.001$). No EoE patients complained of weight loss. Similarly, other studies found that dysphagia was present in 64.0%[13] and in up to 89% of EoE patients.[25] Another study showed that the most common endoscopy indication in adults with EoE was dysphagia (70.1%), followed by GERD/heartburn (27.1%).[29] The prevalence of EoE was 1.8% among patients presenting with UGI symptoms in El-Minia, Egypt. Dysphagia and refractory heartburn were the main presenting symptoms of EoE.

Combined endoscopic and histopathologic evaluation is important in the diagnosis of EoE.

Conflicts of Interest

The authors have no financial conflicts of interest.

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REFERENCES

1. Dellon ES, Gonsalves N, Hirano I, Furuta GT, Liacouras CA, Katzka DA. ACG clinical guideline: evidenced based approach to the diagnosis and management of esophageal eosinophilia and eosinophilic esophagitis (EoE). Am J Gastroenterol 2013;108:679-692; quiz 693.
2. Dellon ES. Diagnosis and management of eosinophilic esophagitis. Clin Gastroenterol Hepatol 2012;10:1066-1078.
3. Liacouras CA, Furuta GT, Hirano I, et al. Eosinophilic esophagitis: updated consensus recommendations for children and adults. J Allergy Clin Immunol 2011;128:3-20.e6; quiz 21-22.
4. Prasad GA, Alexander JA, Schleck CD, et al. Epidemiology of eosinophilic esophagitis over three decades in Olmsted County, Minnesota. Clin Gastroenterol Hepatol 2009;7:1055-1061.
5. Straumann A, Simon HU. Eosinophilic esophagitis: escalating epidemiology? J Allergy Clin Immunol 2005;115:418-419.
6. Whitney-Miller CL, Katzka D, Furth EE. Eosinophilic esophagitis: a retrospective review of esophageal biopsy specimens from 1992 to 2004 at an adult academic medical center. Am J Clin Pathol 2009;131:788-792.
7. Kerlin P, Jones D, Remedios M, Campbell C. Prevalence of eosinophilic esophagitis in adults with food bolus obstruction of the esophagus. J Clin Gastroenterol 2007;41:356-361.
8. Prasad GA, Talley NJ, Romero Y, et al. Prevalence and predictive factors of eosinophilic esophagitis in patients presenting with dysphagia: a prospective study. Am J Gastroenterol 2007;102:2627-2632.
9. Ramakrishnan R, Chong H. Eosinophilic oesophagitis in adults. Histopathology 2008;52:897-900.
10. Mackenzie SH, Go M, Chadwick B, et al. Eosinophilic oesophagitis in patients presenting with dysphagia--a prospective analysis. Aliment Pharmacol Ther 2008;28:1140-1146.
11. Foroutan M, Norouzi A, Molaei M, et al. Eosinophilic esophagitis in patients with refractory gastroesophageal reflux disease. Dig Dis Sci 2010;55:28-31.
12. Almansa C, Devault KR, Achem SR. A comprehensive review of eosinophilic esophagitis in adults. J Clin Gastroenterol 2011;45:658-664.
13. Veerappan GR, Perry JL, Duncan TJ, et al. Prevalence of eosinophilic esophagitis in an adult population undergoing upper endoscopy: a prospective study. Clin Gastroenterol Hepatol 2009;7:420-426, 426.e1-e2.
14. Spechler SJ, Genta RM, Souza RF. Thoughts on the complex relationship between gastroesophageal reflux disease and eosinophilic esophagitis. Am J Gastroenterol 2007;102:1301-1306.
15. Antonioli DA, Furuta GT. Allergic eosinophilic esophagitis: a primer for pathologists. Semin Diagn Pathol 2005;22:266-272.
16. Sgouros SN, Bergele C, Mantides A. Eosinophilic esophagitis in adults: a systematic review. Eur J Gastroenterol Hepatol 2006;18:211-217.
17. Ronkainen J, Talley NJ, Aro P, et al. Prevalence of oesophageal eosinophils and eosinophilic oesophagitis in adults: the population-based Kalixanda study. Gut 2007;56:615-620.
18. Hunter SS, Helmy DO, Zayed NA, El-Tayeb TM, El-Serafy MA. Eosinophilic esophagitis in Egyptian adult patients presenting with upper gastrointestinal symptoms. Open Journal of Gastroenterology 2014;4:88-95.
19. Gupta SK, Fitzgerald JF, Chong SK, Croffie JM, Collins MH. Vertical lines in distal esophageal mucosa (VLEM): a true endoscopic manifestation of esophagitis in children? Gastrointest Endosc 1997;45:485-489.
20. Moy N, Heckman MG, Gonsalves N, Achem SR, Hirano I. Inter-observer agreement on endoscopic esophageal findings in eosinophilic esophagitis (EoE). Gastroenterology 2011;140(5 Suppl 1):S236.
21. Peery AF, Cao H, Dominik R, Shaheen NJ, Dellon ES. Variable reliability of endoscopic findings with white-light and narrow-band imaging for patients with suspected eosinophilic esophagitis. Clin Gastroenterol Hepatol 2011;9:475-480.
22. Fox VL, Nurko S, Furuta GT. Eosinophilic esophagitis: it's not just kid's stuff. Gastrointest Endosc 2002;56:260-270.
23. Parfitt JR, Gregor JC, Suskin NG, Jawa HA, Driman DK. Eosinophilic esophagitis in adults: distinguishing features from gastroesophageal reflux disease: a study of 41 patients. Mod Pathol 2006;19:90-96.
24. Dellon ES, Gibbs WB, Fritchie KJ, et al. Clinical, endoscopic, and histologic findings distinguish eosinophilic esophagitis from gastroesophageal reflux disease. Clin Gastroenterol Hepatol 2009;7:1305-1313; quiz 1261.
25. Croese J, Fairley SK, Masson JW, et al. Clinical and endoscopic features of eosinophilic esophagitis in adults. Gastrointest Endosc 2003;58:516-522.
26. Attwood SE, Smyrk TC, Demeester TR, Jones JB. Esophageal eosinophilia with dysphagia. A distinct clinicopathologic syndrome. Dig Dis Sci 1993;38:109-116.
27. Kim HP, Vance RB, Shaheen NJ, Dellon ES. The prevalence and diagnostic utility of endoscopic features of eosinophilic esophagitis: a meta-analysis. Clin Gastroenterol Hepatol 2012;10:988-996.e5.
28. Furuta GT, Liacouras CA, Collins MH, et al. Eosinophilic esophagitis in children and adults: a systematic review and consensus recommendations for diagnosis and treatment. Gastroenterology 2007;133:1342-1363.
29. Kapel RC, Miller JK, Torres C, Aksoy S, Lash R, Katzka DA. Eosinophilic esophagitis: a prevalent disease in the United States that affects all age groups. Gastroenterology 2008;134:1316-1321.