



# The Eosinophilic Esophagitis Patient with Multiple Atopic Conditions: Clinical Characteristics and Treatment Response to Topical Steroids

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## Introduction

- Patients with eosinophilic esophagitis (EoE) commonly have other atopic conditions, but the impact of multiple allergic diseases is unknown.
- This study aimed to determine whether EoE patients with multiple atopic conditions have differences in presentation or response to topical corticosteroid (tCS) treatment.

## Methods

- Study design:** Retrospective cohort study
- Study site:** University of North Carolina (UNC) EoE Clinicopathologic Databases
- Cases:** The total number of atopic comorbidities were calculated and EoE patients with  $\geq 2$  atopic conditions (not including allergic rhinitis given its high prevalence in our region) were defined as having multiple atopic conditions.
- Data** were extracted from electronic medical records and from the UNC EoE Clinicopathologic Database. Data included patient demographics, clinical characteristics, treatment, and procedural data.
- Analysis:** For those with tCS treatment and follow up-endoscopy/biopsy, histologic response ( $<15$  eos/hpf), global symptom response, endoscopic response, EREFS, and an endoscopic severity score (ESS) were assessed. Patients with and without multiple atopic conditions were compared at baseline, and also before and after treatment.

## Results

- Of 1,020 EoE patients with atopic disease information, 426 (42%) had no atopy, 235 (23%) had 1 atopic comorbidity, 211 (21%) had 2, 113 (11%) had 3, and 34 (3%) had 4.

**Table 1: Baseline characteristics of EoE patients with either  $<2$  or  $\geq 2$  atopic conditions (not including allergic rhinitis in the requirement for  $\geq 2$  atopic conditions)**

	$<2$ atopic conditions (n = 840)	$\geq 2$ atopic conditions (n = 180)	p
Age at diagnosis (mean years $\pm$ SD)	31.1 $\pm$ 19.9	22.0 $\pm$ 1.4	$< 0.001$
Children $<18$ (n, %)	217 (32)	94 (52)	$< 0.001$
Male (n, %)	563 (67)	128 (71)	0.29
White (n, %)	729 (86)	143 (80)	0.005
Atopic conditions (n, %)			
Allergic rhinitis	294 (35)	146 (81)	--
Asthma	116 (14)	142 (79)	--
Eczema	46 (5)	102 (57)	--
Food allergy	137 (16)	153 (85)	--
Symptom length prior to diagnosis (mean years $\pm$ SD)	7.4 $\pm$ 8.4	7.8 $\pm$ 8.8	0.58
Symptoms (n, %)			
Dysphagia	638 (76)	129 (72)	0.29
Food impaction	298 (36)	51 (29)	0.07
Heartburn	304 (36)	63 (35)	0.79
Chest pain	92 (11)	15 (8)	0.31
Abdominal pain	156 (19)	21 (12)	0.03
Nausea	76 (9)	21 (12)	0.27
Vomiting	184 (22)	56 (31)	0.007
Endoscopic findings (n, %)			
Normal	77 (9)	16 (9)	0.89
Exudates	329 (39)	96 (54)	$< 0.001$
Rings	446 (53)	73 (41)	0.002
Edema	326 (39)	91 (51)	0.004
Furrows	565 (67)	133 (74)	0.10
Stricture	236 (29)	51 (29)	0.96
Narrowing	139 (17)	29 (16)	0.86
Crepe-paper mucosa	34 (4)	6 (3)	0.64
Dilation	259 (31)	44 (24)	0.08
Total EREFS (mean $\pm$ SD)*	3.7 $\pm$ 1.9	3.8 $\pm$ 2.1	0.85
Total ESS (mean $\pm$ SD)*	2.3 $\pm$ 1.5	2.5 $\pm$ 1.6	0.12
Peak eosinophil count (mean eos/hpf $\pm$ SD)	62.6 $\pm$ 41.4	73.4 $\pm$ 52.8	0.003

\* EREFS data available for n=492; ESS = endoscopic severity score, for which all data are available

**Table 2: Treatment outcomes of topical corticosteroid by atopic status (n = 465)**

	$<2$ atopic conditions (n = 368)	$\geq 2$ atopic conditions (n = 97)	p
Type of steroid used (n, %)			0.79
Fluticasone	111 (30)	27 (28)	
Budesonide	256 (70)	70 (72)	
Ciclesonide	1 ( $<1$ )	0 (0)	
Mean steroid dose (mcg $\pm$ SD)	1735 $\pm$ 667	1726 $\pm$ 838	0.91
Symptom response (n, %)*	111 (80)	32 (67)	0.06
Post-treatment peak eosinophil count (mean eos/hpf $\pm$ SD)	23.2 $\pm$ 34.3	29.0 $\pm$ 46.2	0.17
p value vs baseline	$< 0.001$	$< 0.001$	
Histologic response (n, %)			
$<15$ eos/hpf	209 (57)	57 (59)	0.73
$\geq 6$ eos/hpf	185 (50)	50 (52)	0.80
$<1$ eos/hpf	113 (31)	29 (30)	0.88
Post-treatment endoscopic findings (n, %)			
Normal	66 (18)	32 (33)	0.001
Exudates	89 (25)	23 (24)	0.87
Rings	173 (48)	32 (38)	0.07
Edema	100 (28)	30 (31)	0.51
Stricture	122 (34)	29 (30)	0.51
Narrowing	67 (19)	14 (15)	0.35
Crepe-paper mucosa	4 (1)	0 (0)	0.30
Dilation	115 (32)	30 (31)	0.90
Candida	25 (7)	8 (8)	0.66
Endoscopic response (n, %)	263 (72)	67 (69)	0.59
Post-treatment endoscopic severity (mean scores $\pm$ SD)			
ERFES**	2.3 $\pm$ 1.9	2.2 $\pm$ 2.2	0.77
p value vs baseline	$< 0.001$	$< 0.001$	
ESS	1.8 $\pm$ 1.4	1.6 $\pm$ 1.6	0.27
p value vs baseline	$< 0.001$	$< 0.001$	

\* Available for n=187; \*\* Available for n=258

- The mean age of EoE diagnosis varied by associated atopic condition. EoE in patients with eczema was diagnosed at 18.5 yrs, with food allergy at 24.5 yrs, asthma at 27 yrs, allergic rhinitis at 28 yrs.

- The 180 (18%) patients with  $\geq 2$  atopic diseases were younger (22 vs 31 yrs;  $p < 0.001$ ) and had more vomiting, less abdominal pain, more exudates and edema on endoscopy, and higher peak eosinophil counts (73.4 vs 62.6;  $p = 0.003$ ) (Table 1).
- On multivariate analysis, younger age, lack of abdominal pain, exudates, and higher eosinophil counts were independently associated with multiple atopy.
- In 465 patients treated with tCS, there was no difference in histologic response in patients with and without multiple atopic conditions (Table 2), and response rates were between 56%-63% for patients with 0-4 concomitant atopic conditions.

## Conclusions

- EoE patients commonly have multiple atopic diseases.
- At time of diagnosis, patients with  $\geq 2$  atopic diseases were younger, less likely to have abdominal pain, and more likely to have exudates on endoscopy and a higher eosinophil count on biopsy.
- There were no major differences in histologic treatment response to corticosteroids, though a non-response rate of ~40% was seen regardless of atopic status.

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