

## A case of paediatric seasonal eosinophilic oesophagitis

S. Vande Velde<sup>1</sup>, J. Willekens<sup>2</sup>, R. De Bruyne<sup>1</sup>, P. De Bruyne<sup>1</sup>, S. Van Biervliet<sup>1</sup>

(1) Pediatric gastroenterology, Ghent university hospital, Ghent, Belgium; (2) Pediatric pneumology, Ghent university hospital, Ghent, Belgium.

### Abstract

Eosinophilic esophagitis (EoE) is a chronic disorder characterized by eosinophilic inflammation of the oesophagus triggered by food allergens and possibly aeroallergens.

We present a boy with the diagnosis of EoE at the age of 4 years and the disease responded to topical steroids. When he turned 7 years old he had the concomitant diagnose of grass pollen allergy. A clear difference between both histological (October 2019: 0 eosinophils (Eo's)/High Power Field (HPF), April 2022: 80 Eo's/HPF) and clinical signs (October 2019: pediatric eoe symptom score (PEESS) 3/100, April 2022: PEESS 31/100) is evident when comparing winter to spring. The boy is currently only using topical budesonide during grass pollen season.

There are increasing arguments in favour of aeroallergens as a trigger for EoE. This information is important for determining the timing of endoscopic follow-up. And it may be beneficial to consider upgrading treatment during allergy season, or exclusively administering treatment during allergy season. (*Acta gastroenterol. belg.*, 2024, 87, 524-526).

**Keywords:** eosinophilic oesophagitis, pediatric, seasonal EoE.

### Introduction

Eosinophilic esophagitis (EoE) is a chronic immune/antigen-mediated disorder characterized by eosinophilic inflammation of the oesophagus. The disease is diagnosed when at least 15 eosinophils/high-power field (Eo/HPF) or 60 eosinophils/mm<sup>2</sup> are found on at least 1 oesophageal biopsy in patients complaining of symptoms of oesophageal dysfunction (1,2). Upon suspicion of EoE at least 6 biopsies need to be taken from different levels of the oesophagus (3). The typical presentation varies by age group. Young children often have feeding difficulties while older children commonly experience abdominal pain, vomiting, or gastroesophageal reflux disease (GERD)-like symptoms. Adolescents and adults may present with dysphagia and food impaction (1). Patients with EoE are often sensitive to environmental triggers such as food allergens and possibly aeroallergens (1). First-line treatments for EoE, after proton-pump inhibitors (PPI), include elimination dietary regimens and topical steroids due to the precipitating role of food (3).

We present a boy with a steroid-responsive EoE. The patient's symptoms changed from year-round to only occurring during pollen season.

### Case history

In 2014, a 4-year-old boy was diagnosed with EoE upon presenting at the hospital (gastroscopy showed

80 Eo/HPF). The gastroscopy was performed because of persisting vomiting and abdominal pain. Despite treatment with inhaled fluticasone, symptoms persisted. The parents opted for a steroid-free treatment. As the EoE did not respond to PPI (gastroscopy with 20 Eo/HPF), a 1 food elimination diet (FED) being cow's milk free diet was attempted. Cows milk free diet was chosen as a trial in a step-up approach together with the parents. Eosinophils were still present on endoscopy (34 and 35 Eo/HPF), but symptoms had disappeared. Gastroscopy was performed during the winter months (see table 1).

In July 2017, a repeat gastroscopy, control driven, revealed a sudden increase in eosinophils without any change in treatment (gastroscopy showed 102 and 122 Eo/HPF). Further history taking identified hay fever symptoms, and the concomitant diagnosis of grass pollen allergy was made.

The addition of topical budesonide resulted in an improvement in EoE symptoms and a decrease of eosinophil count on oesophageal biopsies (50 and 30 Eo/HPF).

A clear difference between both histological (winter: 0 Eo/HPF and summer: 80 Eo/mm<sup>2</sup>) and clinical signs (winter: Pediatric EoE symptom score (PEESS) 3/100 and summer: PEESS 31/100) is now evident when comparing winter to spring. The boy is currently only using topical budesonide during grass pollen season.

### Discussion

While it is established that food antigens trigger and sustain oesophageal eosinophilia in patients with EoE, the evidence on whether inhaled aeroallergens play a role is conflicting (4-9). Confounding factors may include difficulty in accounting for diagnostic delay, seasonal variations in eating customs (such as barbecues), and annual differences in pollen yields.

In 2015 and 2020, two studies presented comparable outcomes of seasonal exacerbation looking retrospectively in their EoE cohorts. The studies selected all EoE patients who had a change from normal to a 2-fold increase in eosinophils between two consecutive biopsies in different

Correspondence to: Saskia Vande Velde, Corneel Heymanlaan 10, 9000 Ghent, Belgium. Fax 09/3322177.  
Email: Saskia.vandavelde@uzgent.be

Submission date: 08/02/2024  
Acceptance date: 04/05/2024

Table 1. — Results gastroscopy over time

|                                            |                |                                        |                                               |                                   |                        |
|--------------------------------------------|----------------|----------------------------------------|-----------------------------------------------|-----------------------------------|------------------------|
| Gastroscopy<br>Furrows and exudate         | July 2014      | 80 Eo/HPF                              | Inhaled fluticasone 2*250 mcg/d               | Vomiting, abdominal pain          | pH/ impedance normal   |
| Gastroscopy<br>Mild furrows                | September 2014 | 5 Eo/HPF proximal<br>>50 Eo/HPF distal | Inhaled fluticasone 1*250 -> 2*250 mcg/d      | Nausea, coughing, eczema          |                        |
| Gastroscopy<br>Furrows                     | January 2015   | 10 Eo/HPF<br>20 Eo/HPF                 | Inhaled fluticasone 1*250 mcg/d               | Vomiting weekly                   |                        |
| Gastroscopy<br>Exudate                     | October 2015   | 20 Eo/HPF                              | PPI 20mg<br>Parents refuse fluticasone        | Coughing, vomiting weekly         |                        |
| Gastroscopy<br>Mild furrows                | February 2016  | 34 Eo/HPF<br>35 Eo/ HPF                | PPI stopped +<br>Cow's milk free diet         | No clinical signs                 |                        |
| Gastroscopy<br>Trachealization and exudate | July 2017      | 102 Eo/HPF<br>122 Eo/HPF               | Inhaled fluticasone +<br>Cow's milk free diet | Coughing, eczema, rarely vomiting | Grass pollen >100 kU/L |
| Gastroscopy<br>Mild exudate                | December 2017  | 50 Eo/HPF<br>30 Eo/HPF                 | Cow's milk free diet                          | No clinical signs                 |                        |
| Gastroscopy<br>Mild exudate                | January 2019   | 100 Eo/HPF<br>80 Eo/HPF                | Stop diet<br>Topical budesonide 2*1mg         | Dysphagia weekly                  |                        |
| Gastroscopy EREFS 0                        | October 2019   | 0 Eo/ HPF                              | Stop topical budesonide                       | PEESS 3/100                       |                        |
| Gastroscopy EREFS 0                        | December 2020  | 0 Eo/HPF                               | No treatment                                  | PEESS 8/100                       |                        |
| Gastroscopy EREFS 0                        | April 2022     | 0 Eo/mm2<br>80 Eo/mm2                  | Topical budesonide during grass pollen season | PEESS 31/100                      |                        |

Legend: PEES: Pediatric Eosinophilic Esophagitis Symptom Score (14) EREFS: Eosinophilic Esophagitis Reference Score (15). HPF: High Power Field = 0.3 mm<sup>2</sup>.

seasons without dietary or medication modifications (10-11). Ram et al, discovered 32 seasonal exacerbations in a population of 1180 EoE children (or 1/40) (10) while Reed et al, found that 1 in 50 EoE patients (3/782) experienced seasonal exacerbation (11).

Our case supports the results that seasonal exacerbation exists (10,11).

Hill et al determined that EoE meets the epidemiologic criteria to be considered as a late manifestation of the allergic march. The peak age for EoE diagnosis was 2.6-years, compared to 0.3 years, 1 year, 1.1 years, and 2.1 years for allergic dermatitis, IgE-food allergy, asthma, and allergic rhinitis, respectively. Moreover, allergic rhinitis and EoE are closely related. The authors suggest active screening for EoE symptoms in allergic patients (12). Again the presented case report supports these results.

Visaggi et al conducted a study comparing the effects of dietary treatment during and outside the pollen season, taking into account the amount of pollen yields. The study found that pollen-sensitized adults had a significant lesser response to the dietary treatment during the pollen season compared to outside the pollen season (13).

Taking these studies into account, there are increasing arguments in favour of aeroallergens as a trigger for EoE (10-13). This information is important for determining the timing of clinical and endoscopic follow-up of EoE, including the timing of the treatment. It may be beneficial to consider upgrading treatment during allergy season, or exclusively administering treatment during allergy season, as demonstrated in this case.

In conclusion: We described a boy with a steroid-responsive EoE. The patient's symptoms changed from year-round to only occurring during pollen season, with

accordingly treating from year-round to only during pollen season.

## References

- 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.
- VANSTAPEL A., VANUYTSEL T., DE HERTOOGH G. Eosinophilic peak counts in eosinophilic esophagitis. *Acta Gastroenterol. Belg.*, 2019, 82: 243-250.
- PAPADOPOULOU A., KOLETZSKO S., HEUSCHKEL R., et al. Management guidelines of eosinophilic esophagitis in childhood. *JPGN*, 2014;58: 107-118.
- SURYAWALA K., PALLE S., ALTAF MA. Epidemiology, clinical presentation, and seasonal variation in the diagnosis of children with eosinophilic esophagitis in Oklahoma. *South Med. J.*, 2020;113(1): 37-41.
- REED CC., IGLESIA EGA., COMMINS SP., et al. Seasonal exacerbation of eosinophilic esophagitis histologic activity in adults and children implicates role of aeroallergens. *Ann. Allergy Asthma Immunol.*, 2019;122(3): 296-301.
- WANG FY., GUPTA SK., FITZGERALD JF. Is there a seasonal variation in the incidence of allergic eosinophilic esophagitis in newly diagnosed children? *J. Clin. Gastroenterol.*, 2007;41(5): 451-453.
- SORSER SA., BARAWI M., HAGGLUND K., ALMOJANED M., LYONS H. Eosinophilic esophagitis in children and adolescents: epidemiology, clinical presentation and seasonal variation. *J. Gastroenterol.*, 2013;48(1): 81-85.
- SCLEGEL CR., QUINTANILLA NM., OLIVE AP., MINARD CG., DAVIS CM. Relationship of pediatric eosinophilic esophagitis diagnosis to pollen and mold counts. *Ann. Allergy asthma Immunol.*, 2014 Sep;113(3): 321-322.
- ELITSUR Y., ASWANI R., LUND V., DEMENTIEVA Y. Seasonal distribution and eosinophilic esophagitis: the experience in children living in rural communities. *J. Clin. Gastroenterol.*, 2013;47(3): 287-288.
- RAM G., LEE J., OTT M., et al. Seasonal exacerbation of esophageal eosinophilia in children with eosinophilic oesophagitis and allergic rhinitis. *Ann. Allergy asthma Immunol.*, 2015;115(3): 224-228.
- REED CC., IGLESIA EGA., COMMINS SP., DELLON ES. Seasonal exacerbation of eosinophilic esophagitis histologic activity in adults and children implicates role of aeroallergens. *Ann. Allergy Asthma Immunol.*, 2019; 122(3): 296-301.
- HILL DA., GRUNDMEIER RW., RAMOS M., et al. Eosinophilic esophagitis is a late manifestation of the allergic march. *J. Allergy Clin. Immunol. Pract.*, 2018;6(5): 1528-1533.

13. VISAGGI P., SAVARINO E., DEL CORSO G., et al. Six-food elimination diet is less effective during pollen season in adults with eosinophilic esophagitis sensitized to pollen. *Am. J. Gastroenterol.* 2023;118: 1957-1962.
14. MARTIN LJ., FRANCIOSO JP., COLLINS MH., et al. Pediatric Eosinophilic Esophagitis Symptom Score (PEESS ® v2.0) identify histologic and molecular correlates of the key clinical features of disease. *J. Allergy Clin. Immunol.*, 2015;135(6): 1519-1528.
15. WECHSLER JB., BOLTON S., AMSDEN K., WERSHIL BK., HIRANO I., KAGALWALLA AF. Eosinophilic Esophagitis Reference Score accurately identifies disease activity and treatment effects in children. *Clin. Gastroenterol. Hepatol.* 2018;16(7): 1056-1063.