

Vascular Changes in Eosinophilic Esophagitis (EOE), Report of an Unusual Case

Fatemeh Elham Mahjoub, Gholam Hossein Fallahi & Nakisa Niknejad

To cite this article: Fatemeh Elham Mahjoub, Gholam Hossein Fallahi & Nakisa Niknejad (2019): Vascular Changes in Eosinophilic Esophagitis (EOE), Report of an Unusual Case, Fetal and Pediatric Pathology, DOI: [10.1080/15513815.2019.1675109](https://doi.org/10.1080/15513815.2019.1675109)

To link to this article: <https://doi.org/10.1080/15513815.2019.1675109>



Published online: 11 Oct 2019.



Submit your article to this journal [↗](#)



Article views: 3



View related articles [↗](#)



View Crossmark data [↗](#)



Vascular Changes in Eosinophilic Esophagitis (EOE), Report of an Unusual Case

Fatemeh Elham Mahjoub^a, Gholam Hossein Fallahi^b, and Nakisa Niknejad^c

^aBahrami Children Hospital Affiliated With Tehran University of Medical Sciences, Roshan Azma Pathobiology Laboratory, Pediatric Gastro- Enterology Research Center, Tehran, Iran; ^bMarkaze Tebbi Koodakan Affiliated With Tehran University of Medical Sciences, Pediatric Gastro- Enterology Research Center, Tehran, Iran; ^cHamedan University of Medical Sciences, Hamedan, Iran

ABSTRACT

Background: Submucosal or lamina propria arteries are not often included in esophageal biopsies. We report an esophageal biopsy with eosinophilic esophagitis (EOE) overlying small arteries with medial hypertrophy to the point of obstruction. **Case presentation:** A two-year-old boy with a 1-year history of asthma frequently vomited after coughing. Esophageal biopsy showed EOE. Within the lamina propria there were small arteries with markedly thickened media to the point of luminal obstruction next to a hyperplastic lymphoid aggregate. There was no significant inflammatory infiltrate in the arterial walls. Subsequent biopsies did not show these vascular changes. **Conclusion:** Small artery changes in EOE have not previously been reported, and although the significance is unknown, in this case may be incidental to eosinophilic esophagitis.

ARTICLE HISTORY

Received 2 August 2019
Revised 10 September 2019
Accepted 18 September 2019

KEYWORDS

esophagitis; eosinophilic;
vessel; obstructive
vasculopathy

Introduction

Eosinophilic esophagitis is a rather common finding in esophageal biopsies in pediatric age group in more recent years. Criteria for the diagnosis of EOE is the presence of at least 15/HPF eosinophils in the epithelium, diffuse distribution of eosinophils within the epithelium and lack of restriction of intra-epithelial eosinophils to the gastro-esophageal junctional area [1–3]. We report these cases as esophageal eosinophilia/eosinophilic esophagitis in our center, while the former is responsive to proton pump inhibitor (PPI) therapy. If eosinophil count is still above 15/HPF after eight weeks of PPI therapy, then the term eosinophilic esophagitis is used.

Some investigators introduce immunohistochemical markers for better assessment of esophageal specimens, such as Protheroe et al., who introduced a novel histologic scoring system for assessment of EOE with the use of a monoclonal antibody against eosinophil peroxidase (EPX) which shows intact and degranulating eosinophils readily [4–6], but none of them addressed vascular changes in lamina propria of patients with eosinophilic esophagitis.

In a recent article written by Collins et al., histologic findings in EOE is described in detail but again there is no mention of vascular changes. They suggested that using

eosinophilic count as the sole criteria is not sufficient for assessment of patients, so they developed a scoring system to diagnose and monitor EOE, consisting of eight parameters: eosinophil density, basal layer hyperplasia, eosinophilic abscesses, layering of eosinophils on surface epithelium, dilatation of intercellular spaces (DIS), surface epithelial changes, dyskeratotic epithelial cells, and fibrosis of lamina propria [7].

They concluded that this scoring system is more strongly associated with the treatment status of patients [7]. Seema et al. assessed vascular remodeling in esophagus of patients with EOE. They used immunohistochemical stains for transforming growth factor beta 1 (TGF- β 1), phospho-SMAD2/3, and vascular cell adhesion molecule 1 [8]. They concluded that expression of these markers is increased in EOE, however there was no mention of obstructive vasculopathy in this article.

We did not find any mention of obstructive vasculopathy in eosinophilic esophagitis after a thorough search of the literature. We report on a patient with EOE and occlusive vascular changes.

Report of the case

A two-year-old boy who frequently vomited after coughing underwent upper endoscopy. The history included asthma since 1 year of age, partially responsive to therapy, and allergies to egg whites. The child had normal growth (weight: 12.400 gr, height: 87 cm).

Strong family history of allergy was present and mother was being treated for asthma after diagnosis a year before.

The child had no other vascular abnormalities anywhere else in the body.

Upper endoscopy revealed esophagitis in lower third of esophagus, other parts were normal (according to endoscopy report) and no restriction, obstruction or narrowing was seen grossly. Two pieces of biopsy were taken from lower third of esophagus (type of endoscopy instrument: Pentax EG-2790K).

Esophageal biopsy of the child showed marked infiltration of eosinophils in epithelium (up to 70/HPF) alongside severe basal layer hyperplasia and papillary elongation up to upper third of epithelium. Up to 48/HPF eosinophils were seen in lamina propria.

Several large lymphoid follicles were seen in lamina propria, however the prominent feature of the biopsy were vessels with thickened media (medial hypertrophy) underneath epithelium. There was no inflammation in the wall of these vessels and no significant endothelial reaction but the luminae were almost completely occluded. Whether this is a herniation artifact or true occlusion should be further confirmed but only small amount of tissue left in the paraffin block precluded further staining, however, the mere presence of such vessels in lamina propria of esophagus close to epithelium is very unusual.

No necrosis nor apoptosis was seen. No significant fibrosis was seen in lamina propria (Figs. 1–4).

The patient underwent treatment for EOE (corticosteroid and proton pump inhibitor) after first upper endoscopy. Gastro-intestinal symptoms improved with treatment. Three months later another biopsy from lower third of esophagus was sent to our lab. In this biopsy moderate esophagitis with up to 73/HPF intra-epithelial eosinophils were seen (up to 28/HPF eosinophils seen in lamina propria). Two lymphoid aggregates, one small

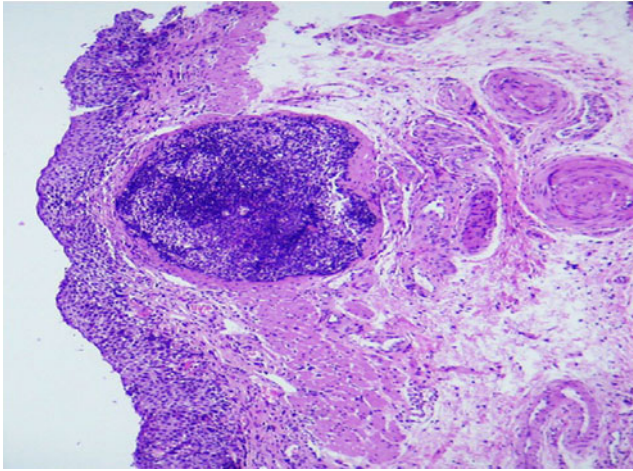


Figure 1. Esophageal mucosa with basal layer hyperplasia, presence of thick walled vessels, and a large lymphoid follicle in lamina propria (H&E stain, 100 $\times$).

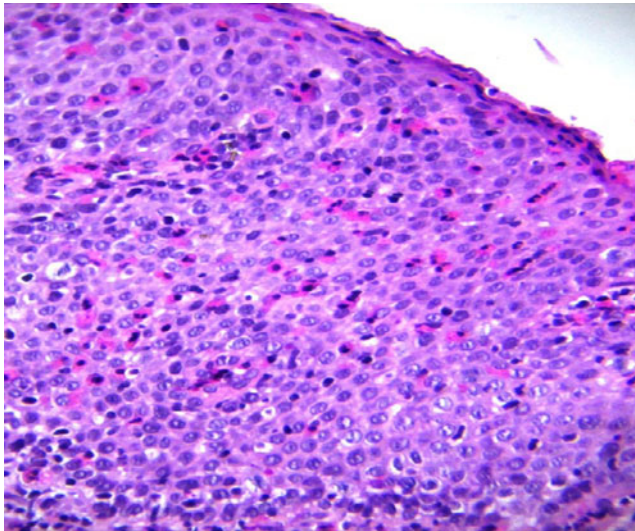


Figure 2. Esophageal epithelium with severe basal layer hyperplasia, papillary elongation, and marked diffuse infiltration of eosinophils (up to 70/HPF) (H&E stain, 400 $\times$).

and one medium in size, were seen in lamina propria. No vessels with medial hypertrophy were present in this biopsy.

While eosinophil count increased despite treatment, another upper endoscopy was performed 3 months later. In the third biopsy only up to 6/HPF intra-epithelial eosinophils were seen.

Two lymphoid follicles, one large and one small, were seen in lamina propria. Again no vascular changes were present in the third biopsy.

The medications were discontinued after third upper endoscopy. He has no gastrointestinal problems in the past 2.5 years (he is five years old now). Asthma is under control and respiratory symptoms have improved dramatically.

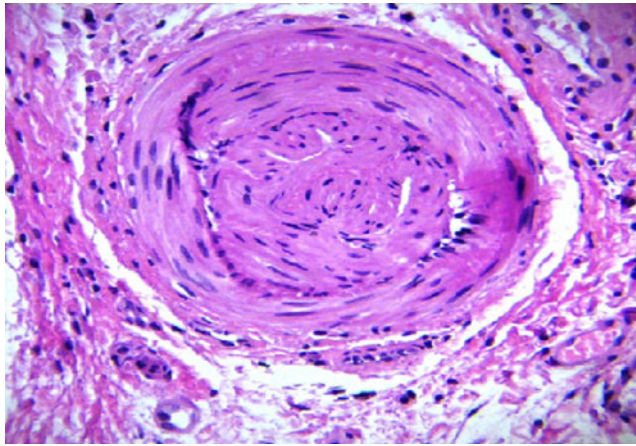


Figure 3. Thick walled vessels with marked hypertrophy of media and obstruction of luminae were seen. No inflammatory process was seen in the wall. Lamina propria shows no significant fibrosis (H&E stain, 400×).

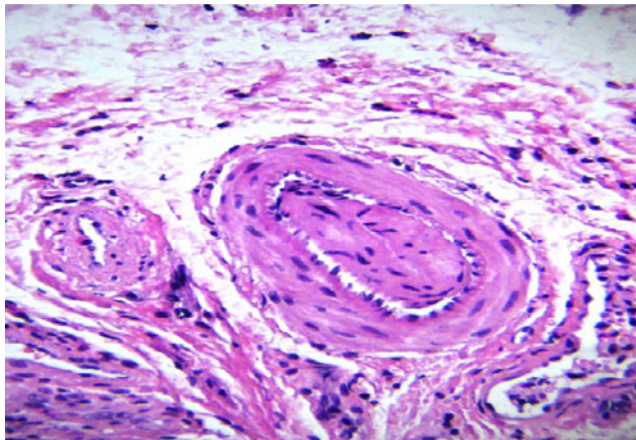


Figure 4. Another vessel with above mentioned changes (H&E stain, 400×).

Discussion

Vascular remodeling (increased angiogenesis) or inflammatory process of the vessel wall such as Churg-Strauss syndrome is discussed in asthma and chronic obstructive pulmonary disease (COPD) in several articles [9,10]. There was no mention of an obstructive vasculopathy without an accompanying inflammatory process involving the vessel wall in either of these articles.

In only one article vascular remodeling is assessed in esophageal biopsies [8] by means of immunohistochemistry and increased angiogenesis and fibrosis of lamina propria and also increased expression of several markers such as TGF- β 1 was seen in biopsy of patients with EOE. There was no mention of vascular changes seen in our case in this article.

The importance of such a finding in EOE is unknown. Our patient had a history of early onset asthma and strong family history of allergic diseases. He had no other vascular abnormalities anywhere else in the body.

Gastro-intestinal symptoms were not taken seriously in this child and no treatment was instituted for him, which may have contributed to the formation of prominent vascular changes.

Although there was almost complete obstruction of vascular luminae in the esophagus, there was no necrosis or apoptotic changes in esophagus.

Patient underwent treatment for EOE. No vascular changes were seen in the two other esophageal biopsies taken 3 months and 6 months after treatment.

Vascular changes may have resolved after successful treatment, or these changes may have been incidental to the eosinophilic esophagitis. The vascular changes however are unusual, and it will be interesting to see if others occasionally encounter similar findings. The clinical significance in this case is unclear.

Acknowledgements

Hereby we want to thank Professor M.H Collins for reviewing the case and Alireza Nourbakhsh for his kind technical support.

Disclosure statement

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

References

- [1] Furuta GT, Liacouras CA, Collins MH, Gupta SK, Justinich C, Putnam PE, et al. Eosinophilic esophagitis in children and adults: a systematic review and consensus recommendations for diagnosis and treatment. *Gastroenterology*. 2007;133:1342–63. doi:[10.1053/j.gastro.2007.08.017](https://doi.org/10.1053/j.gastro.2007.08.017).
- [2] Liacouras CA, Furuta GT, Hirano I, Atkins D, Attwood SE, Bonis PA, et al. Eosinophilic esophagitis: updated consensus recommendations for children and adults. *J Allergy Clin Immunol*. 2011;128:3–20. doi:[10.1016/j.jaci.2011.02.040](https://doi.org/10.1016/j.jaci.2011.02.040).
- [3] 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;108:679–92. doi:[10.1038/ajg.2013.71](https://doi.org/10.1038/ajg.2013.71).
- [4] Protheroe C, Woodruff SA, de Petris G, Mukkada V, Ochkur SI, Janarthanan S, et al. A novel histologic scoring system to evaluate mucosal biopsies from patients with eosinophilic esophagitis. *Clinical gastroenterology and hepatology: the official clinical practice journal of the Am Gastroenterol Assoc*. 2009;7:749–55. doi:[10.1016/j.cgh.2009.03.022](https://doi.org/10.1016/j.cgh.2009.03.022).
- [5] Kato M, Kephart GM, Talley NJ, Wagner JM, Sarr MG, Bonno M, et al. Eosinophil infiltration and degranulation in normal human tissue. *Anat Rec*. 1998;252:418–25. doi:[10.1002/\(SICI\)1097-0185\(199811\)252:3<418::AID-AR10>3.0.CO;2-1](https://doi.org/10.1002/(SICI)1097-0185(199811)252:3<418::AID-AR10>3.0.CO;2-1).
- [6] Kephart G, Alexander J, Arora A, Romero Y, Smyrk T, Talley N, Kita H. Localization of eosinophil-derived neurotoxin in esophageal tissues: a potential biomarker for eosinophilic esophagitis. *J Allergy Clin Immunol*. 2008;121:S44–S45. doi:[10.1016/j.jaci.2007.12.180](https://doi.org/10.1016/j.jaci.2007.12.180).
- [7] Collins MH, Martin LJ, Alexander ES, Boyd JT, Sheridan R, He H. et al. Newly developed and validated eosinophilic esophagitis histology scoring system and evidence that it outperforms peak eosinophil count for disease diagnosis and monitoring. *Dis Esophagus*. 2017;30:1–8. doi:[10.1111/dote.12470](https://doi.org/10.1111/dote.12470).

- [8] Aceves SS, Newbury RO, Dohil R, Bastian JF, Broide DH. Esophageal remodeling in pediatric eosinophilic esophagitis. *J Allergy Clin Immunol.* 2007;119:206–12. doi:[10.1016/j.jaci.2006.10.016](https://doi.org/10.1016/j.jaci.2006.10.016).
- [9] Harkness LM, Kanabar V, Sharma HS, Westergren-Thorsson G, Larsson-Callerfelt AK. Pulmonary vascular changes in asthma and COPD. *Pulmon Pharmacol Therapeut.* 2014; 29:144–55. doi:[10.1016/j.pupt.2014.09.003](https://doi.org/10.1016/j.pupt.2014.09.003).
- [10] Avdalovic M. Pulmonary vasculature and critical asthma syndromes: a comprehensive review. *Clin Rev Allerg Immunol.* 2015;48:97–103. doi:[10.1007/s12016-014-8420-4](https://doi.org/10.1007/s12016-014-8420-4).