

Colombian Consensus on the Diagnosis and Management of Eosinophilic Esophagitis in the Pediatric Population: Diagnosis. Part 1

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Abstract

Introduction: Eosinophilic esophagitis (EoE) is a chronic immune-mediated condition characterized by esophageal dysfunction, which may progress to fibrosis or stricture formation without appropriate treatment. **Objective:** To develop evidence-based recommendations through expert consensus for the diagnosis of EoE in individuals younger than 18 years. **Methods:** A multidisciplinary panel of 16 national experts from COLGAHNP—including allergists, pathologists, and adult gastroenterologists—together with four international specialists, formulated 18 clinical questions (8 related to diagnosis and 10 to treatment). A literature search was conducted analyzing clinical practice guidelines, randomized clinical trials, and systematic reviews published over the past decade. Twenty-seven recommendations were developed (12 for diagnosis and 15 for treatment) and submitted for voting using a modified Delphi method across two rounds. The project was sponsored by COLGAHNP. **Results:** All recommendations achieved >90% agreement. EoE should be suspected in patients presenting with esophageal dysfunction and personal or family history of allergic disease. Endoscopy may or may not reveal inflammatory or fibrotic changes (EREFS). At least six esophageal biopsies should be obtained, in addition to initial gastric and duodenal biopsies, given the potential coexistence of other eosinophilic gastrointestinal disorders. Histology typically demonstrates eosinophilic infiltration (≥ 15 eosinophils per high-power field). Allergy testing should not be routinely used to identify EoE-triggering allergens. A barium esophagram is more sensitive than endoscopy for detecting narrowing or strictures. pH-impedance monitoring, transnasal endoscopy, high-resolution manometry, EndoFLIP, and endoscopic ultrasound have specific indications. **Conclusion:** This consensus provides evidence-based diagnostic recommendations for EoE tailored to patients, families, and healthcare decision-makers within the Colombian and Latin American context.

Keywords

Eosinophilic esophagitis, endoscopy, biopsy, dietary therapy, proton pump inhibitors, budesonide, biologics.

INTRODUCTION

Eosinophilic esophagitis (EoE) is a chronic immune-mediated disease characterized by intense eosinophilic inflammation associated with esophageal dysfunction, which may progress to tissue remodeling accompanied by subepithelial fibrosis and stricture formation. The estimated incidence ranges from 5 to 10 cases per 100,000 individuals, with a reported prevalence of 0.5–1 per 1,000 inhabitants⁽¹⁾. Clinical manifestations vary according to age. In children, EoE typically presents with vomiting, heartburn, chest pain, and failure to thrive, whereas in adolescents and adults it is more commonly characterized by dysphagia and food impaction⁽²⁾. Colombia is considered a country with a high prevalence of EoE, with reported rates of 18.2 per 1,000 outpatients and 57.7 per 1,000 pediatric patients undergoing endoscopy, ranking as the second highest prevalence in Latin America⁽³⁾. According to data collected in 2024 through the REDCap database, 124 patients from nine centers across Colombia were included (male-to-female ratio: 2:1). Age at diagnosis ranged from 3 months to 16 years. The distribution of symptom onset was as follows: <6 months, 17.9%; 6–12 months, 28.2%; and >12 months, 31.6%. The duration of symptoms prior to diagnosis was <1 month in 4.1%, 1–3 months in 15.5%, 3–6 months in 22.7%, and >6 months in 57.7% of cases. Associated factors included a history of atopy—specifically allergic rhinitis (32.9%), asthma (28.2%), food allergy (15.9%), and atopic dermatitis (15.3%)—as well as antibiotic exposure during infancy (41.8%). The most frequent clinical manifestations were abdominal pain (67.7%), nausea (62%), and vomiting (51.2%). Endoscopic findings commonly included longitudinal furrows (76.4%) and whitish exudates (70.5%). The primary treatments administered were proton pump inhibitors (PPIs) in 58.2% of patients, topical corticosteroids in 9.8%, and dupilumab in 0.5%⁽⁴⁾. This consensus is intended for pediatricians, gastroenterologists, allergists, nutritionists, and healthcare payers. Its primary objective is to provide evidence-based recommendations for the diagnosis and management of EoE within the Colombian and broader Latin American context.

METHODOLOGY

A comprehensive literature search was conducted, prioritizing the highest level of available evidence, including clinical practice guidelines (CPGs) assessed using the AGREE II instrument, randomized controlled trials (RCTs), systematic reviews (SRs), and meta-analyses. Searches were performed in PubMed, MEDLINE, Embase, Cochrane Library, and LILACS databases, in both English and Spanish, covering the period from 2014 to 2024. MeSH

terms used included *eosinophilic esophagitis, guidelines, pediatric, and evidence*. Three clinical practice guidelines were selected as the foundational references for the development of this consensus: two focused on the pediatric population—the guideline jointly issued by the British Society of Gastroenterology (BSG) and the British Society of Pediatric Gastroenterology, Hepatology and Nutrition (BSPGHAN)⁽⁵⁾, and the guideline of the European Society for Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN)⁽⁶⁾—as well as the Italian consensus on the diagnosis and management of EoE in adults⁽⁷⁾. Additionally, two recent systematic reviews were included: one addressing swallowed topical corticosteroids⁽⁸⁾ and another focused on dietary management⁽⁹⁾, along with a meta-analysis evaluating pharmacological medical management⁽¹⁰⁾. These studies were selected based on their methodological rigor and the relevance of their updated evidence.

A multidisciplinary panel comprising 16 experts was convened, including members of the Colombian College of Pediatric Gastroenterology, Hepatology, and Nutrition (COLGAHNP), allergists from the Colombian Association of Allergy, Asthma, and Immunology (ACAAI), national pathologists, adult gastroenterologists from the Colombian Association of Gastroenterology (ACG), and four international experts. The panel formulated 18 clinical questions, eight related to diagnosis and ten related to treatment. Panel members were selected based on their clinical and research expertise in gastroenterology, allergology, and pediatrics, with a minimum of five years of professional practice and affiliations with academic institutions, referral hospitals, and national scientific societies. Four epidemiologists additionally supported the methodological process. All participants conducted a critical appraisal of the available literature to inform the development of the statements and recommendations.

Each statement was accompanied by an assessment of the quality of evidence and the strength of recommendation (strong or weak), following the U.S. Preventive Services Task Force framework (**Table 1**)⁽¹¹⁾. A modified Delphi method was applied, consisting of an initial electronic voting round followed by a second hybrid, in-person round. Each recommendation was subjected to voting with three possible responses: disagree, agree, or agree with modifications. Consensus approval required a minimum agreement of 80%, corresponding to a strong recommendation⁽¹²⁾. The response rate was 100% in both rounds. During the first round, agreement exceeding 90% was achieved for all statements. Statements receiving an “agree with modifications” response were discussed collectively, reformulated, and resubmitted for voting during the hybrid meeting until consensus was reached. An update of this consensus is recommended within five years. This

Table 1. Levels of evidence and grades of recommendation

Levels of evidence	
Type I	Evidence obtained from at least one well-designed randomized controlled trial or from a systematic review of randomized clinical trials.
Type II	II-1 Evidence obtained from well-designed prospective controlled studies without randomization. II-2 Evidence obtained from well-designed cohort or case-control observational studies, preferably conducted at multiple centers. II-3 Evidence obtained from case series.
Type III	Opinions of authorities based on clinical experience, expert committee reports, or case reports.
Grades of recommendation	
A	The consensus strongly recommends the intervention. This recommendation is supported by high-quality evidence demonstrating a clear benefit that outweighs potential risks.
B	The consensus recommends routine clinical use of the intervention. This recommendation is supported by moderate-quality evidence demonstrating that the benefits outweigh the risks.
C	The consensus neither recommends for nor against the intervention. No categorical recommendation is made, as the available evidence does not demonstrate a satisfactory risk-benefit relationship. Decisions should be made on a case-by-case basis.
D	The consensus recommends against the intervention or service. This recommendation is supported by at least moderate-quality evidence showing no benefit or indicating that the risks or harms outweigh the benefits.
I	The consensus concludes that the available evidence is insufficient, due to low-quality studies, heterogeneous results, or an inability to determine the balance between risks and benefits.

Adapted from: Harris RP, et al. *Am J Prev Med.* 2001;20(3 Suppl):21-35⁽¹¹⁾.

study was sponsored by COLGAHNP, and no conflicts of interest were reported.

DEFINITION OF EOSINOPHILIC ESOPHAGITIS

1. What is the current definition of EoE?

Statement 1

Eosinophilic esophagitis (EoE) is defined as a chronic immune-mediated disease, clinically characterized by esophageal dysfunction and, if left untreated, potentially resulting in fibrosis and stricture formation. Endoscopically, EoE may or may not exhibit signs of inflammation or fibrosis, as assessed by the Endoscopic Reference Score (EREFs). Histologically, it is characterized by esophageal inflammation with eosinophilic infiltration (≥ 15 eosinophils per high-power field [HPF] or approximately 60 eosinophils/mm²), along with additional histologic features of esophageal inflammation. EoE may coexist with other eosinophilic gastrointestinal disorders, constituting two associated disease entities. To establish the diagnosis, other causes of esophageal eosinophilia must be excluded. Response to proton pump inhibitors (PPIs) **should not** be considered a diagnostic criterion^(5-7,13).

Level of evidence: II-1

Grade of recommendation: A

Level of agreement: 100%

Good Practice Points

The diagnosis of EoE is established by the presence of symptoms of esophageal dysfunction and ≥ 15 eosinophils per high-power field on esophageal biopsy specimens in at least one histologic sample⁽¹³⁾. Response to PPI therapy is no longer considered a diagnostic criterion and is recommended solely as a tool to guide treatment decisions⁽¹³⁾. Other conditions associated with esophageal eosinophilia but distinct from EoE (non-EoE) must be excluded, including hypereosinophilic syndrome, drug toxicity and hypersensitivity reactions, connective tissue disorders such as Marfan syndrome type II, Netherton syndrome, Loeys-Dietz syndrome, eosinophilic granulomatosis with polyangiitis (Churg-Strauss syndrome), and graft-versus-host disease⁽¹⁾.

2. What risk factors have been identified as being associated with EoE?

Statement 2

Genetic, gestational, perinatal, and early-life factors have been identified as being associated with the development of EoE. These include maternal use of antibiotics or PPIs, family history of atopy, preterm birth, cesarean delivery, male sex, esophageal atresia, use of PPIs and antibiotics during childhood, the presence of atopic diseases, and autism spectrum disorder. Conversely, *Helicobacter pylori*

infection, pet ownership, and breastfeeding in patients carrying CAPN14 mutations may exert a protective effect. These findings underscore the need for comprehensive and multifactorial approaches to the prevention and management of EoE (Table 2)^(7,14-35).

Level of evidence: I to II-1

Grade of recommendation: B

Level of agreement: 100%

Good Practice Points

Genetic variants such as CAPN14 and certain genes linked to the 1q21 locus^(7,17,18) have been associated with EoE. Environmental factors, including aeroallergens and exposure to pollutants, may contribute to disease relapse. Breastfeeding has demonstrated a protective effect in individuals with genetic susceptibility. The association between EoE and both celiac disease and inflammatory bowel

Table 2. Risk factors associated with eosinophilic esophagitis

Risk factor	OR	Reference
Family history of EoE (first-degree relative)	7.19 (5.65–9.14)	(35)
Family history of EoE (second-degree relative)	1.99 (1.49–2.65)	(35)
CAPN14 mutations	1.98–2.22	(18)
TSLP mutations	1.37, 1.52, 1.85	(18)
Maternal fever	3.18 (1.27–7.98)	(22)
Pregnancy complications	1.4 (1.0–1.9)	(17)
Maternal antibiotic use (increased risk with higher frequency of use)	1.5 (1.2–1.9)	(17)
Maternal proton pump inhibitor use	1.7 (1.0–2.8)	(17)
Preterm birth at 32 weeks	3.2 (1.5–7.1)	(23)
Preterm birth at 33 weeks	3.6 (1.8–7.4)	(23)
Preterm birth at 34 weeks	2.8 (1.7–7.6)	(23)
Cesarean delivery	Ohio: 1.77 (1.01–3.09) Massachusetts: 3.21 (1.2–8.6)	(22)
Neonatal intensive care unit admission	2.8 (1.2–6.6)	(24)
Breastfeeding in patients with CAPN14 polymorphism	0.08 (0.01–0.59)*	(17)
Long-gap esophageal atresia	11.8 (2.5–56.1)	(25)
Allergic rhinitis	5.09 (2.9–8.9)	(26)
Asthma	3.01 (1.9–4.6)	(26)
Food allergy	1.3 (1.2–1.3)	(27)
Celiac disease	0.52 (0.36–0.79)	(28)
Inflammatory bowel disease	7.8 (CD)**, 5.0 (UC)** 11.2 (CD)**, 8.7 (UC)**	(29) (30)
Antibiotic use during childhood	6.0 (1.7–20.8)	(23)
Autism spectrum disorder	3.7 (2.7–5.7)	(31)
Proton pump inhibitor use during childhood	15.9 (9.1–27.7)	(32)
Male sex	2.22 (2.00–2.46)	(33)
<i>Helicobacter pylori</i> infection	0.63 (0.51–0.78)*	(20)
Regions with poorer environmental quality index	1.25 (1.04–1.50)	(34)
Pet ownership	0.58 (0.34–0.97)*	(22)
Achalasia	32.9 (95% CI: 24.8–42.8; $p < 0.001$)***	(19)

* Protective factors for EoE. ** Prevalence ratio (PR). *** Relative risk (RR). CD, Crohn disease; UC, ulcerative colitis; EoE, eosinophilic esophagitis; 95% CI, 95% confidence interval; OR, odds ratio; NICU, neonatal intensive care unit. Table prepared by the authors.

disease suggests potential shared pathogenic mechanisms, although the available evidence remains limited⁽¹⁴⁻¹⁶⁾. EoE has been described as a cause of achalasia or as a condition associated with achalasia; therefore, exclusion of this diagnosis is strongly emphasized⁽¹⁹⁾. A potential protective role of *Helicobacter pylori* infection in the development of EoE has been investigated; however, the evidence remains controversial. A systematic review and meta-analysis demonstrated a significant association between *H. pylori* exposure and a reduced likelihood of EoE, with a 37% reduction in risk (odds ratio [OR]: 0.63; 95% confidence interval [CI]: 0.51–0.78)^(20,21). A recent systematic review with meta-analysis has also demonstrated an association between EoE and autism spectrum disorder⁽³¹⁾.

CLINICAL MANIFESTATIONS

3. What are the clinical features of patients with EoE?

Statement 3

The symptoms of EoE result from esophageal dysfunction, are nonspecific, and vary in presentation according to patient age and disease phenotype (Table 3). Diagnosis requires a high index of suspicion and the active identification of compensatory behaviors, which can be systematically assessed using the IMPACTS acronym (Table 4)⁽³⁶⁻³⁸⁾.

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Good Practice Points

EoE should be suspected in any patient presenting with symptoms of esophageal dysfunction and a personal or

family history of atopy. Detection depends on the patient's and family's ability to recognize and report symptoms, as well as on a high index of clinical suspicion by the treating physician (Table 5)^(36,37). Symptoms do not always correlate with histologic findings and may be explained by fibrotic remodeling or by psychological and food-avoidance behaviors⁽³⁶⁾.

4. How should symptoms and disease severity in EoE be assessed?

Statement 4

In addition to endoscopic and histologic findings, nutritional status should be assessed, and validated tools should be incorporated to evaluate symptom severity and frequency, such as the Pediatric Eosinophilic Esophagitis Symptom Score (PEESSv2) and the Index of Severity for Eosinophilic Esophagitis (I-SEE), both of which are increasingly used in clinical practice. Periodic assessment of nutritional status and systematic application of these tools allow for longitudinal follow-up and evaluation of clinical response to treatment. Ideally, these instruments should be validated for the Ibero-Latin American context⁽³⁹⁻⁴⁴⁾.

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Good Practice Points

A linguistically validated Spanish-language tool is available for estimating the severity and frequency of EoE symptoms: PEESSv2, which consists of 20 items assessing four domains—dysphagia, gastroesophageal reflux, nausea or vomiting, and pain⁽⁴⁰⁾. It is available for self-report

Table 3. Clinical presentation of eosinophilic esophagitis according to age and phenotype

Phenotype	Inflammatory	Inflammatory + fibrotic	Fibrotic
Age group	Infant	Preschool/school-age	Adolescent/adult
Symptoms	Feeding difficulties, vomiting and regurgitation, failure to thrive, postprandial cough, abdominal pain	Abdominal, chest, and epigastric pain; GERD-like symptoms; vomiting; dysphagia; food impaction	Dysphagia, food impaction
Endoscopy	Edema, erythema, exudates, linear furrows	Edema, erythema, exudates, non-fixed esophageal rings with longitudinal furrows, strictures	Fixed esophageal rings, strictures
Histology	Mucosal eosinophilia, eosinophilic aggregates, basal zone hyperplasia	Mucosal eosinophilia, eosinophilic aggregates, basal zone hyperplasia, lamina propria fibrosis	Lamina propria fibrosis, basal zone hyperplasia, eosinophilic aggregates, mucosal eosinophilia
Treatment	Medical and dietary	Medical and dietary, esophageal dilation	Esophageal dilation, medical and dietary

Adapted from: Votto M, et al. *Front Pediatr.* 2022;9:820192⁽³⁷⁾.

Table 4. Adaptive behaviors that mask symptoms (IMPACTS acronym)

Sigla	Significado	Traducción
I	Imbibe fluids with meals	Drinking liquids with meals
M	Modify food	Modifying food consistency (e.g., cutting into small pieces, pureeing)
P	Prolong meal times	Prolonging meal duration
A	Avoid hard-texture foods	Avoiding hard or solid foods
C	Chew excessively	Excessive chewing
T	Turn away pills and tablets	Refusal of pills or tablets
S	Social avoidance	Reduced social interaction

Adapted from: Hirano I, et al. *Gastroenterology*. 2020;158(4):840–851⁽³⁸⁾.

Table 5. Index of Severity for Eosinophilic Esophagitis (I-SEE)

Characteristics	1 point	2 points	4 points	15 points
Symptoms and complications				
Symptoms	Weekly	Daily	Multiple times per day or interfering with social functioning	--
Complications	--	Food impaction requiring emergency department visit or endoscopy (≥ 18 years)	Food impaction requiring emergency department visit or endoscopy (< 18 years) Hospitalization due to esophagitis	Esophageal perforation Malnutrition, failure to thrive Persistent inflammation requiring elemental formula, systemic corticosteroids, or immunomodulators
Inflammatory features				
Endoscopy (edema, furrows, exudates)	Localized	Diffuse	--	--
Histology	15–60 eos/HPF	> 60 eos/HPF	--	--
Fibrostenotic features				
Endoscopy (rings, strictures)	Present with easy passage of the endoscope	Present, requiring dilation	--	Endoscope cannot be passed Repeated dilations (≥ 18 years) At least one dilation (< 18 years)
Histology	--	Basal zone hyperplasia or lamina propria fibrosis	--	--

Adapted from: Dellon ES, et al. *Gastroenterology*. 2022;163(1):59–76⁽⁴³⁾.

in patients aged 8 to 18 years and for parent-report in patients aged 2 to 18 years⁽⁴¹⁾. PEESV2 has been translated and undergone linguistic validation, allowing its use in Spanish; however, cultural validation remains pending⁽⁴²⁾. The full version is available for download at: <https://eprovide.mapi-trust.org/instruments/pediatric-eosinophilic-esophagitis-symptom-severity-module-version-2.0>

The Index of Severity for Eosinophilic Esophagitis (I-SEE) comprises three domains: (1) symptom frequency and presence of complications; (2) inflammatory features, including edema, furrows, or exudates on endoscopy, or marked eosinophilia on biopsy; and (3) fibrostenotic features, either macroscopic (presence of rings or strictures) or microscopic (basal zone hyperplasia or lamina propria fibrosis) (**Table 5**). Based on the total score, disease severity

rity is classified as inactive (<1), mild (1–6), moderate (7–14), or severe⁽⁴³⁾. Higher I-SEE scores (i.e., greater disease severity) have been associated with longer disease duration (8.2 vs. 12.1 years; $p = 0.003$). Additionally, total I-SEE scores have been shown to correlate with genes involved in inflammatory and fibrotic pathways⁽⁴⁴⁾.

DIAGNOSIS AND EVALUATION OF THE DISEASE

5. How can the diagnosis of EoE be confirmed by endoscopy?

Statement 5

Esophagogastroduodenoscopy (EGD) should be performed in all patients presenting with symptoms of esophageal dysfunction, such as food impaction and dysphagia (Tables 3 and 4), and with a personal or family history of atopy. It is recommended to obtain at least six biopsies in total from the proximal and distal esophagus, even in the absence of macroscopic abnormalities. During the initial endoscopic evaluation, additional biopsies of the stomach and duodenum are advisable to rule out associated eosinophilic gastritis or enteritis. The EoE Endoscopic Reference Score (EREFS) tool should be used to ensure consistent reporting of macroscopic endoscopic findings (Table 6)^(6,7,38,45-50).

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Good Practice Points

The use of proton pump inhibitors (PPIs) and corticosteroids may alter eosinophil counts and mask histologic findings; therefore, these medications should be discontinued

3–4 weeks prior to endoscopic evaluation⁽⁷⁾. A minimum of six biopsies is recommended—2 to 4 from the proximal esophagus and 2 to 4 from the distal esophagus and areas of greatest inflammation—even when macroscopic abnormalities are not identified, as 32% to 39% of patients may present with a normal-appearing esophagus, and esophageal eosinophilia exhibits a patchy distribution⁽⁴⁵⁾. Diagnostic sensitivity reaches up to 100% after five biopsies^(6,46,47).

The EREFS scoring system allows assessment of macroscopic findings associated with EoE, including inflammatory features such as exudates, edema, and furrows—more frequently observed in young children—and fibrostenotic changes such as rings and strictures, which are typically seen in adolescents and adults (Table 6)^(38,48). The presence of eosinophils in other segments of the gastrointestinal tract does not exclude the diagnosis of EoE⁽⁶⁾. Endoscopy plays an important role in the management of esophageal strictures; however, when compared with barium esophagram, it has demonstrated low sensitivity (25%) for their detection⁽⁴⁹⁾.

6. What is the role of histology in the diagnosis and follow-up of pediatric patients with EoE?

Statement 6

An intraepithelial eosinophil count of ≥ 15 eosinophils per high-power field (HPF) (or approximately 60 eosinophils/ mm^2) in at least one HPF on esophageal biopsy represents the reference standard, with a sensitivity of 100% and a specificity of 96% for the clinical diagnosis of EoE in patients not previously receiving PPI therapy. Eosinophil activation and other inflammatory features should be assessed through the active use of the Eosinophilic Esophagitis Histology Scoring System (EoEHSS) to provide a more

Table 6. Endoscopic EREFS Score (EoE Endoscopic Reference Score)

	Grade 0	Grade 1	Grade 2	Grade 3
Edema (loss of vascular pattern)	Absent	Loss of clarity or absence of vascular pattern		
Rings (trachealization)	Absent	Mild: ridges	Moderate: distinct rings that do not impair passage of a standard adult diagnostic endoscope (outer diameter 8–9.5 mm)	Severe: rings preventing passage of the endoscope
Exudates (white plaques, exudates)	Absent	Mild: <10% of surface area	Severe: >10% of surface area	
Furrows (vertical lines, grooves)	Absent	Present		
Stricture	Absent	Present		

Adapted from: Hirano I, et al. Gut. 2013;62(4):489–495⁽⁵⁰⁾.

comprehensive histologic evaluation of EoE, which has demonstrated a sensitivity of 87%–100% and a specificity of 11%–36%^(6,51–53).

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Good Practice Points

The EoEHSS evaluates eight histologic features: eosinophil density, basal zone hyperplasia, eosinophilic abscesses, eosinophilic surface layering, dilated intercellular spaces, epithelial surface alterations, dyskeratotic epithelial cells, and lamina propria fibrosis. Scoring is based on a 4-point scale, where 0 indicates normal findings or absence of abnormalities and 3 represents the most marked or extensive abnormality⁽⁵²⁾. Features may be reported as present or absent; however, a more detailed scoring approach facilitates assessment of improvement, deterioration, and response to therapeutic changes⁽⁵¹⁾. The EoEHSS is both sensitive and reliable, with scores correlating with clinical symptoms and endoscopic findings⁽⁶⁾. Histopathology reports are encouraged to convert eosinophil counts from eosinophils per HPF to eosinophils per mm² or to a standardized HPF, such as that recommended by the Consortium of Eosinophilic Gastrointestinal Disease Researchers (CEGIR)⁽⁵³⁾, to allow comparability across different microscopes and for collaborative research or consultation: $\text{eos/HPF} \times 1/(\text{HPF area in mm}^2) = \text{eos/mm}^2$ ^(51,52). An area of 0.27 mm² has been used as the standardized HPF area in CEGIR studies⁽⁶⁾.

7. What is the role of barium esophagram, esophageal pH/impedance monitoring, unsedated transnasal endoscopy, high-resolution manometry, EndoFLIP, and esophageal endoscopic ultrasound in the diagnosis and evaluation of EoE?

Statement 7.1

In patients with EoE and dysphagia, barium esophagram can identify esophageal narrowing or strictures with greater sensitivity than EGD. Although it is not diagnostic for EoE, it is useful for identifying remodeling sequelae, including ring formation, diffuse mucosal irregularity, fixed strictures, and particularly narrow-caliber esophagus, as well as for excluding other conditions such as achalasia^(6,7,49,54,55).

Level of evidence: II-2 and II-3

Grade of recommendation: B

Level of agreement: 100%

Clinical Practice Points

Retrospective studies in patients with EoE and dysphagia have shown that barium esophagram is more sensitive than

EGD for identifying esophageal narrowing. It is also useful for assessing alterations in esophageal caliber, detecting strictures, and determining the severity and length of luminal narrowing in areas inaccessible to endoscopy. Although standardized protocols for performing barium esophagram have not been established, reference values for esophageal diameter according to age are available. Its use should be reserved for patients with dysphagia and a reasonable suspicion of stricture in order to avoid unnecessary radiation exposure^(6,7,49,54,55).

Statement 7.2

Esophageal pH/impedance monitoring is not recommended for the diagnosis of EoE; however, it may be used in selected cases to identify associated gastroesophageal reflux disease, particularly in symptomatic patients who have achieved histologic remission^(6,56,57).

Level of evidence: II-2

Grade of recommendation: C

Level of agreement: 100%

Clinical Practice Points

In esophageal pH/impedance monitoring, increased esophageal acid exposure time and lower baseline impedance have been associated with eosinophilic esophageal infiltration; however, these findings do not correlate with eosinophil counts. Gastroesophageal reflux may play a role in the pathogenesis of EoE, and these tests may help identify patients who require or are more likely to respond to proton pump inhibitor (PPI) therapy. Recent studies in adults suggest that pH/impedance monitoring may serve as a predictive tool for therapeutic response to PPIs^(6,56,57).

Statement 7.3

Unsedated transnasal endoscopy is an alternative method for evaluating the esophageal mucosa that reduces costs, procedure time (<2 hours), and risks associated with EGD performed under anesthesiologist-assisted anesthesia. This technique allows assessment of endoscopic findings using a small-caliber endoscope (1.2–2 mm working channel), including EREFS scoring, and permits the acquisition of adequate esophageal biopsies. However, it is operator-dependent^(58,59).

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Clinical Practice Points

Unsedated transnasal endoscopy may serve as an alternative method for long-term follow-up, as it does not require anesthesia, is shorter in duration, more cost-effective, and associated with fewer adverse effects, with visual and his-

tologic results comparable to those of conventional endoscopy. Nevertheless, esophageal visualization is more challenging, and examination of the stomach and duodenum is not feasible; therefore, it is generally used exclusively for esophageal biopsy acquisition. Its use is considered necessary in clinical trials^(58,59).

Statement 7.4

High-resolution manometry is a diagnostic tool that allows evaluation of esophageal body motility and function. Its use is recommended in patients with EoE who have persistent dysphagia despite histologic remission and no evidence of fibrostenotic disease or strictures, as esophageal hypomotility patterns—including ineffective esophageal motility, aperistalsis, and frank achalasia—have been described in this population⁽⁶⁰⁾.

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Clinical Practice Points

High-resolution manometry plays a crucial role in patients who remain symptomatic despite adequate control of EoE, as it identifies esophageal motor abnormalities that may require alternative therapeutic approaches. Additionally, high-resolution manometry may increase clinical suspicion of EoE in patients with previously negative endoscopic findings, prompting repeat endoscopy with esophageal biopsies⁽⁶⁰⁾.

Statement 7.5

The functional luminal imaging probe (EndoFLIP) is a complementary tool used during endoscopy that allows assessment of esophageal distensibility. A lower distensibility index (DI) measured by EndoFLIP enables differentiation of the fibrostenotic phenotype of EoE from the inflammatory phenotype, although it does not correlate with eosinophil counts^(6,61).

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Clinical Practice Points

EndoFLIP has been evaluated in prospective studies involving patients with a distensibility index <4.5 mm²/mmHg, where it has been shown to predict ring development within the EREFS classification, abnormal contractility patterns, and ring severity. Furthermore, it enables detection of structural and functional esophageal changes not visible with other diagnostic modalities, such as food impaction^(6,61).

Statement 7.6

Esophageal endoscopic ultrasound represents a promising alternative for evaluating pathologic findings and sequelae of EoE using a standard radial endoscope. However, it is not useful for the diagnosis of EoE. Its most relevant role may be the early identification of fibrostenotic phenotypes, although additional studies are required before its routine use can be recommended^(6,62-64).

Level of evidence: II-2

Grade of recommendation: B

Level of agreement: 100%

Clinical Practice Points

Ultrasound measurement of the distal esophageal muscle layer and total distal esophageal wall thickness has demonstrated a significant correlation with the EREFS endoscopic score; however, experience in pediatric populations remains limited. In the future, this technique may be useful for assessing treatment effectiveness and phenotype identification when combined with fine-needle biopsy. In adults, distal esophageal wall thickness has been identified as an important factor associated with symptom presence, suggesting that the submucosal layer is the initial site of inflammatory involvement. Regarding cutoff values, thresholds of 2.3 mm for the distance from the mucosal surface to the muscular layer and 3.13 mm for total esophageal wall thickness have been described. In pediatric patients, a case-control study demonstrated significant differences in total esophageal wall thickness between patients with EoE and controls (2.8 mm vs. 2.1 mm; $p = 0.043$), as well as increased combined mucosal and submucosal thickness (1.6 mm vs. 1.1 mm; $p = 0.001$) and muscularis propria thickness (1.2 mm vs. 1.0 mm; $p = 0.043$). Limitations included the need for sedation, lack of equipment appropriately sized for pediatric patients, and the absence of validated standards for measuring esophageal wall thickness and its layers^(6,62-64).

8. What is the role of allergy testing in the diagnosis and evaluation of EoE?

Statement 8

Allergy testing—including serum-specific IgE, skin prick testing, and atopic patch testing for foods—should not be used to identify EoE-triggering allergens. Their primary value lies in identifying patients sensitized to foods and those with immediate IgE-mediated hypersensitivity, in order to ensure safe food reintroduction following elimination diets^(6,65-67).

Level of evidence: I

Grade of recommendation: C

Level of agreement: 100%

Good Practice Points

Skin testing, food-specific IgE measurements, and atopic patch testing have limited value in identifying triggering allergens, with a positive predictive value below 50%, according to a meta-analysis⁽⁶⁶⁾. These tests have demonstrated utility in guiding elimination diets, achieving an effectiveness of 45.7% in children; when all three tests (serum-specific IgE, skin prick testing, and patch testing)

are combined, effectiveness increases to 52.7%⁽⁶⁶⁾. They may also identify sensitized patients at risk of immediate hypersensitivity reactions during food reintroduction (6), as well as associations with other allergic comorbidities such as asthma, rhinitis, conjunctivitis, urticaria, and dermatitis⁽⁶⁶⁾. Serum concentrations of food-specific IgG4 may have potential as a noninvasive biomarker, although further studies are required⁽⁶⁷⁾.

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