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The Children's Hospital
of Philadelphia®

Gastrointestinal side effect of food oral immunotherapy

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Disclosures

Medical Advisory Board, Speaker

- Regeneron, Sanofi

OIT side effects

1. Most participants experience adverse events (AEs) during OIT

- GI tract, skin, and respiratory system
- These are usually mild-moderate & manageable

2. **Symptoms lead to withdrawal in 10-20%: usually GI, & within 6-8 wks**

3. Adverse events but can be **severe**

- **Anaphylaxis**: 15-20% of patients or more
- **Eosinophilic esophagitis (EoE)**: 2-5%,
- Unclear yet how to predict these more significant events

4. Importance of “augmentation,” or “co-” factors, even in maintenance

- **Infections; post-dose activity/exercise; NSAIDs; empty stomach; menses; sleep deprivation/stress**; likely others – e.g. still “unexplained” cases

5. Dose may be important

Virkud et al JACI 2016

Vickery et al NEJM 2018

Blumchen et al JACI:Pract 2019

C Mills, et al CEA 2019

Milk/Egg/Peanut/Sesame OIT and GI side effects

- 794 patients on OIT
 - 614 milk, 130 peanut, 41 egg, and 9 sesame
 - 8.2% (65/794) recurrent gastrointestinal symptoms (milk, 9.0% [55/614]; peanut-, 6.9% [9/130]; egg, 2.4% [1/41]).
 - 72.3% had multiple episodes of vomiting
 - 27.7%, milder symptoms of abdominal pain were (27% of patients during milk-OIT and 33% during peanut-OIT).
 - No other symptoms associated with anaphylactic reactions were observed.
 - Symptoms appeared early in the course of OIT 38.5% within the first month of home treatment and 86% occurring within the first 3 months.
 - The cessation of dosing led to improvement in symptoms.
- In all cases in which the dosage was reduced or stopped, symptoms subsided, and AECs significantly decreased
- 45 restarted OIT
 - 90% restarted up dosing without restarting

Milk/Egg/Peanut/Sesame OIT and GI side effects

TABLE I. Symptoms and vomiting as a function of maximum peripheral blood eosinophil count

Parameter	Max-AEC-based groups (eosinophils/ μ L blood)			
	Group 1 (<900) (n = 371)	Group 2 (900-1500) (n = 213)	Group 3 (1501-2500) (n = 88)	Group 4 (>2500) (n = 15)
Baseline AEC,* median (25% to 75% IQR)	400 (300-600)	755 (480-1000)	1070 (610-1603)	1000 (450-1780)
Symptoms ^{†,‡}	0.5%	15.0%	27.3%	46.7%
Vomiting ^{§,}	0.0%	12.2%	18.2%	33.3%

After applying Bonferroni correction, differences are considered significant for $P < .0083$.

- There were no complaints of dysphagia or clinical evidence for food impaction in any of these patients.
- In 3/3 patients evaluated by us by esophageal biopsy, increased esophageal eosinophilic counts pathognomonic for eosinophilic esophagitis (EoE) were noted (30, 170, 65/hpf)
- OITIGER= OIT-induced gastrointestinal and eosinophilic responses (OITIGER).
- symptoms developed within the first 2 months of initiating OIT. In classically described EoE, on the other hand, patients may consume a food for years

Oral Immunotherapy Program



Contact us
215-590-2549

Medical Director

Antonella Cianferoni, MD, PhD



2000 patients different stages
of OIT, 2300 on waitlist

12 Allergists

5 NPs

2 Admin

2 lead Nurses



OIT clinic: overview

OIT clinic

-Referred only by clinician in our clinic

-Intake visit focused on possible OIT with personalized plan to OIT vs OFC foods

-Initiation of OIT in Oral food challenge space (first 3 doses of OIT)

Up-dosing in office (Buerger-BGR), Updosing in BGR, King of Prussia (KOP), Princeton, NJ (PNJ), Brandwine , Abington

-Billed to patients as Oral food challenge (initiation) or Clinic Visit (Up-dosing and follow up)

-Patients receive free supplies and spoons to measure

-24 hours/7 days a week coverage of patient call (Office hours OIT team- after hours fellow/physician on call)

Center for Pediatric Eosinophilic Disorders



4000 patients with biopsy confirmed EoE

5 GI Doctors

6 Allergists

1 NP



Contact us

215-590-7644



See our 4 locations for care

GI symptoms management

- Dose reduction/stopping OIT-restart OIT
- Slower updose
- Pretreatment with antihistamines (anti H1-anti H2)

OIT clinic: CHOP



EoE side effect

- Clinical data were collected on 1084 patients undergoing standardized OIT to 1-5 foods from September 2019 to July 2024. Patients with persistent enteric symptoms (i.e. nausea, vomiting, change in appetite, dysphagia, weight loss) not responsive to dose modification and pretreatment with anti-histamines were referred to Gastroenterology (GI) in the Center of Pediatric Eosinophilic Disorders at the Children's Hospital of Philadelphia.
- **Fifty-one patients (4.7%) were seen by GI for persistent enteric symptoms, 33 (3%) underwent an endoscopy (EGD), 8 (0.74%) were diagnosed with EoE (0.25 year).**

Buckey et al Ann Allergy 2026

OIT clinic CHOP EoE as a side effects: Demographics

Table 1

Characteristics of the 51 Symptomatic Patients Who Were Referred for Gastroenterology Evaluation

Characteristic	All patients	Patients determined to not have EoE	Patients diagnosed with EoE	<i>P</i> value ^a
Referred to gastroenterology	51	43	8	
Male	27 (53)	22 (51)	5 (63)	.555
Female	24 (47)	21 (49)	3 (37)	.555
Mean age $\pm$ SD, y (min-max)	8.5 $\pm$ 4.5 (2-18)	8.3 $\pm$ 4.5 (2-18)	9.7 $\pm$ 4.4 (3-16)	.845
Atopic dermatitis	27 (53)	25 (58)	2 (25)	.085
Allergic rhinitis	35 (68)	29 (67)	6 (75)	.672
Asthma	33 (65)	29 (67)	4 (50)	.343
No other food allergies	11 (22)	8 (19)	3 (37)	.233
Multiple food allergies	40 (78)	35 (81)	5 (63)	.233
No other OIT	21 (41)	18 (42)	3 (37)	.818
Multiple OIT	30 (59)	25 (58)	5 (63)	.888

Buckey et al Ann Allergy 2026

OIT clinic CHOP EoE as a side effects: Symptoms

Table 2

Symptoms of 51 Patients Who Were Referred for Gastroenterology Evaluation

Symptom	EoE (n = 8)	Persistent GI symptoms No EoE (n = 43)	P value ^a
Mean number of symptoms ± SD (min-max)	3.9 ± 1.5	2.3 ± 1.1	.021 ^b
Vomiting	4 (50)	25 (53)	.67
Recurrent gagging	3 (38)	4 (9)	.033
Cough after eating	1 (12)	4 (9)	.78
Throat clearing	0 (0)	3 (8)	.48
Food impaction	3 (38)	0 (0)	<.0001
Reduced appetite	4 (50)	9 (21)	.083
Weight loss	3 (38)	1 (2.3)	.001
Reflux-like symptoms	1 (12)	2 (5)	.386
Persistent nausea	1 (12)	0 (0)	.019
Globus sensation	0 (0)	1 (2.3)	.663
Diarrhea	0 (0)	1 (2.3)	.663

Buckey et al Ann Allergy 2026

OIT clinic CHOP EoE as a side effects: Type of OIT Food

Table 3

OIT Foods of the 51 Symptomatic Patients Who Were Referred for Gastroenterology Evaluation

Food	All patients on OIT	Patients who underwent EGD	Patients found to have EoE (≥ 15 eos/hpf)	Among patients with EoE mean $\pm$ SD eos/hpf (max-min)
All patients	51	33	8	57.5 $\pm$ 32.2 (27-100)
Multiple food OIT	30	20	5	61 $\pm$ 30.5 (30-100)
Single food OIT	21	13	3	52.3 $\pm$ 41.3 (27-100)
Peanut	36	26	6	59.5 $\pm$ 35.1 (27-100)
Baked milk	2	0	NA	NA
Milk	14	9	0	0
Baked egg	8	4	2	30 $\pm$ 0 (30-30)
Egg	24	13	4	40 $\pm$ 20 (30-70)
Wheat	0	0	0	NA
Soy	0	0	0	NA
Cashew/pistachio	13	10	2	72.5 $\pm$ 3.5 (70-75)
Walnut/pecan	9	4	1	100
Almond	0	0	0	NA
Hazelnut	7	5	2	52.5 $\pm$ 31.8 (30-75)
Sesame	7	3	1	30
Sunflower	1	1	1	100
Coconut	0	0	0	NA
Other Legumes	0	0	0	NA

Buckey et al Ann Allergy 2026

OIT clinic CHOP EoE as a side effects: Type of OIT Food

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Peanut	36	26	6	59.5 $\pm$ 35.1 (27-100)
Baked milk	2	0	NA	NA
Milk	14	9	0	0
Baked egg	8	4	2	30 $\pm$ 0 (30-30)
Egg	24	13	4	40 $\pm$ 20 (30-70)
Wheat	0	0	0	NA
Soy	0	0	0	NA
Cashew/pistachio	13	10	2	72.5 $\pm$ 3.5 (70-75)
Walnut/pecan	9	4	1	100
Almond	0	0	0	NA
Hazelnut	7	5	2	52.5 $\pm$ 31.8 (30-75)
Sesame	7	3	1	30
Sunflower	1	1	1	100
Coconut	0	0	0	NA
Other Legumes	0	0	0	NA

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OIT clinic CHOP EoE as a side effects: Premedication

Table 4

Management of 51 Patients Who Were Referred for Gastroenterology Evaluation

Intervention	EoE (n = 8)	Persistent GI symptoms but no EoE (n = 43)	<i>P</i> value ^a
Started Zyrtec	4 (50)	38 (88)	.009
Started Famotidine	5 (62)	38 (88)	.065
Stopped all OIT	6 (75)	21 (49)	.112
Stopped some OIT	0 (0)	3 (8)	.48

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OIT clinic CHOP EoE as a side effects: EoE cases

eTable 1
Clinical Course and Description of the 8 Patients Diagnosed With EoE

Sex, age	OIT protocol(s)	History symptoms suggestive of EoE before starting OIT	Other comorbidities	Dose when experienced symptoms	Clinical course	Management and concomitant biopsy (eos/hpf)
Male, 12 y	• Baked and native egg • Peanut	• Failure to thrive • Consumed supplement to maintain weight • Picky eater • Lack of appetite	• Depression • Anxiety	• 999.9 mg egg protein • 300 mg peanut protein	• December 2019: started egg OIT • January 2020: started peanut OIT • May 2020: developed abdominal pain; pretreatment with famotidine and cetirizine started • February 2021: stopped OIT • EoE diagnosis: March 2021 EGD: 30 eos/hpf	• Stopped OIT: 30-65 eos/hpf • PPI: 20 eos/hpf • Mometasone furoate inhaler 220 2 puffs twice/d plus PPI: 1-2 eos/hpf
Female, 4 y	• High-dose native egg	• Picky eater • Underwent OT/PT to reduce gag reflex		• 3.3 mg egg	• Early June 2021: emesis after first dose; reduced to half-dose OIT (1.6 mg), started pretreatment with cetirizine and famotidine • Late June 2021: stopped OIT • EoE diagnosis: August 2021 • 30 eos/hpf	• Stopped OIT: 30 eos/hpf • PPI: 65 eos/hpf • Budesonide 1 mg: 30 eos/hpf • Budesonide plus PPI plus elimination of milk and egg: >15 eos/hpf • PPI plus milk elimination diet: 30 eos/hpf • Family declined dupilumab • PPI 40 mg twice daily and stopped OIT: 1 eos/hpf • PPI 40 mg once/d 15 eos/hpf
Male, 15 y	• Cashew • Hazelnut	• Esophageal symptoms for many years preceding OIT. Frequently experiencing foods "getting stuck" in his throat, particularly with meats (chicken and steak). This would usually happen within the first few bites of eating and would get better after he drank water or milk and needed to drink with all meals and snacks. No nausea, vomiting, heartburn, respiratory symptoms, or chest/abdominal pain with foods.	• Diabetes mellitus type 1 • Uveitis treated with methotrexate (age 5 y)	• Maintenance: 1 cashew, 1 hazelnut	• August 2021: started OIT (experienced abdominal pain for both foods, improved with pretreatment) • February 2022: reached hazelnut maintenance • May 2022: reached cashew maintenance • January 2023: food impaction with steak; EGD revealed focal narrowing and underwent dilation • Diagnosed with EoE: 75 eos/hpf	
Male, 10 y	• Peanut • Baked egg • Hazelnut • Sesame	• Maternal grandfather with history of esophageal dilation • Father chronic abdominal pain responsive to gluten free diet • Slow eater, noted to always drink with eating		• Baked egg 200 mg • Peanut 112 mg • Hazelnut 9 mg • Sesame 6 mg	• September 2019: started OIT; of note had mild abdominal pain with sesame OIT, received cetirizine and ranitidine • Early February 2020: developed abdominal pain and gagging on updose of baked egg • Late February 2020: OIT to baked egg stopped • February 2020 to June 2020: symptoms of abdominal pain, reflux, gagging, continued after stopping baked egg OIT; updosings delayed due to COVID-19 • July 2020: EGD and EoE diagnosed 30 eos/hpf	• Stopped OIT and PPI: symptoms resolved but 100 eos/hpf • Fluticasone 220 mcg 2 puffs twice/d: 30 eos/hpf no symptoms • Family declined dupilumab
Female, 7 y	• Peanut • Cashew	• Father with EoE • Autism • Feeding difficulties in therapy and nutrition evaluation • Had been noted to chew on meat and spit it out • Abdominal pain with many foods		• Peanut 8 mg • Cashew 3.2 mg	• February 2023: started OIT (no symptoms with OIT initiation) • During OIT, noted to have intermittent abdominal pain; however, this was outside of dosing • Started on premedication with cetirizine and famotidine • February/March 2023: Evaluated by gastroenterology due to dysphagia with meats and pills • May 2023: Endoscopy revealed EoE (70 eos/hpf in esophagus, 60 eos/hpf in stomach)	• Stopped OIT with no improvement of symptoms • Received prednisone for dysphagia but without improvement • Received PPI without improvement • Budesonide 1 mg once/d resolution of symptoms and EGD showed: 1 eos/hpf

(continued)

eTable 1 (Continued)

Sex, age	OIT protocol(s)	History symptoms suggestive of EoE before starting OIT	Other comorbidities	Dose when experienced symptoms	Clinical course	Management and concomitant biopsy (eos/hpf)
Female, 16 y	• Peanut		• Idiopathic short stature	• Maintenance: 1 peanut	• January 2021: started OIT (no symptoms with initiation and no premedication) • June 2022: patient reported to OIT team that dysphagia had been occurring since April/May 2022. Patient noted dysphagia after starting acne oral therapy • July 2022: underwent gastroenterology evaluation • August 2022: EoE diagnosed (27 eos/hpf) and severe stricture requiring dilation	• Stopped OIT • Received PPI without improvement • Budesonide 1 mg 2 times/d: no eos/hpf • Required periodic dilation
Male, 5 y	• Peanut • Walnut • Sunflower seed	• Trouble with weight gain in infancy • Speech delay • History of dysphagia with liquids; cough after liquids. • NPL May 2021 with normal appearing larynx with good vocal fold movement and little evidence of reflux.		• Maintenance: 1 peanut, 1 walnut • Sunflower 7 mg	• September 2021: started OIT • November 2023: started sunflower and after 2 wk had nausea, emesis, and dysphagia (of note, no symptoms until started sunflower) • December 2023: evaluated by gastroenterology, sunflower dose reduced • January 2024: endoscopy and EoE diagnosed 100 eos/hpf	• Continued OIT but stopped updosings of sunflower, resumed sunflower when EoE under control • PPI symptoms resolved but Eos > 100 • Budesonide 1 mg once/daily: with resolution of symptoms and subsequent EGD: 1 eos/hpf
Male, 13 y	• Peanut		• Laryngomalacia	• Peanut 16 mg	• April 2021: started OIT • May 2021: dysphagia with some foods and famotidine and cetirizine started • June 2021: evaluated by gastroenterology • July 2021: EoE diagnosed with endoscopy 100 eos/hpf	• Continued OIT • Passed 1-y OIT milestone • Did not respond to PPI (35 eos/hpf) • Fluticasone 4 puffs twice daily: 1-2 eos/hpf • Fluticasone 4 puffs once daily: 40 eos/hpf • Switched to budesonide: 0 eos/hpf

Buckey et al Ann Allergy 2026

Case 1

6 year old female with a history of IgE mediated allergy to egg

He has always been a picky eater

She is in feeding therapy with no improvement

She has recurrent belly pain

Dad has EoE

BMI: 1th percentile

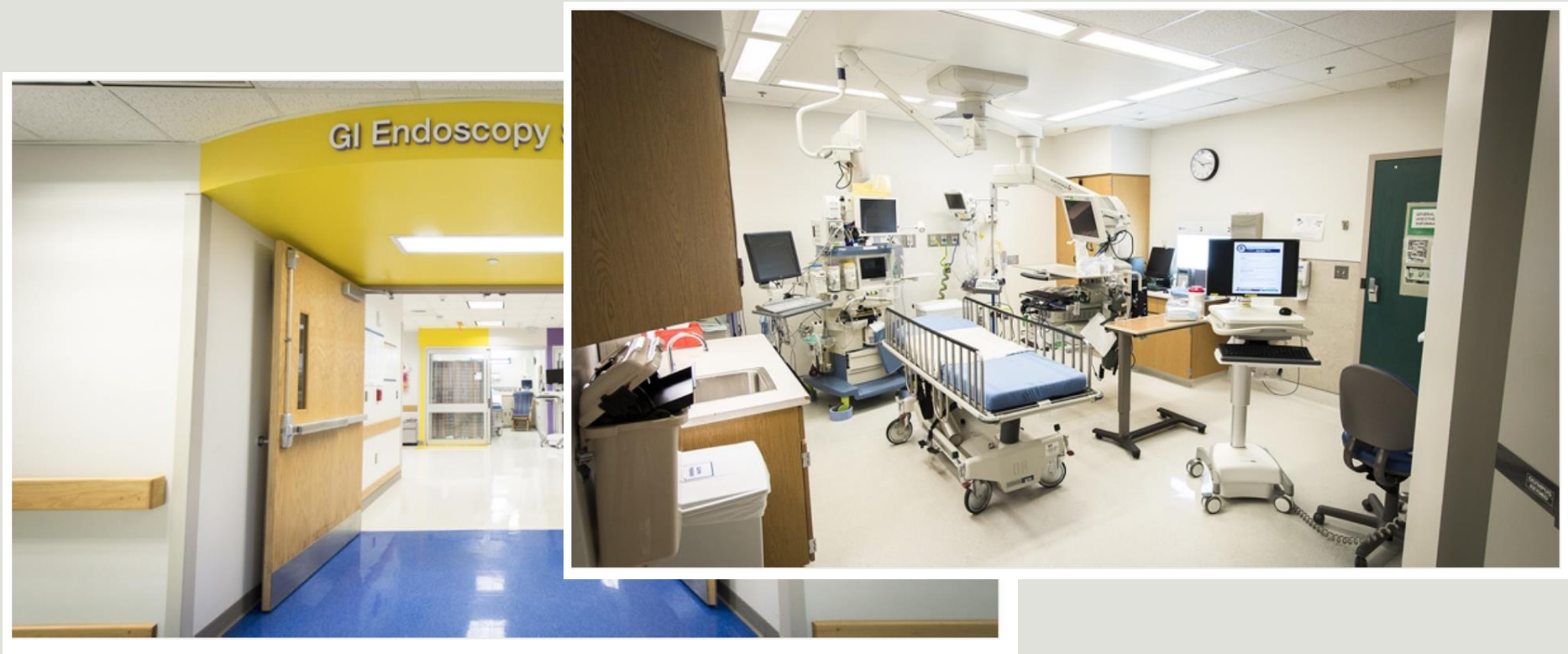
Started OIT for Egg and immediately belly pain 2 What do you do

Case Report

Referral to Gastroenterologist

Scope performed

EGD >100 eos/hpf



What is EoE?

IT ALL BEGAN WITH AN OBSERVATION...

EoE definition

Clinicopathologic diagnosis

-Presence of clinical symptoms related to esophageal dysfunction

- Dysphagia, vomiting, abdominal pain, heartburn, feeding difficulty, etc.

-Isolated esophageal eosinophilia

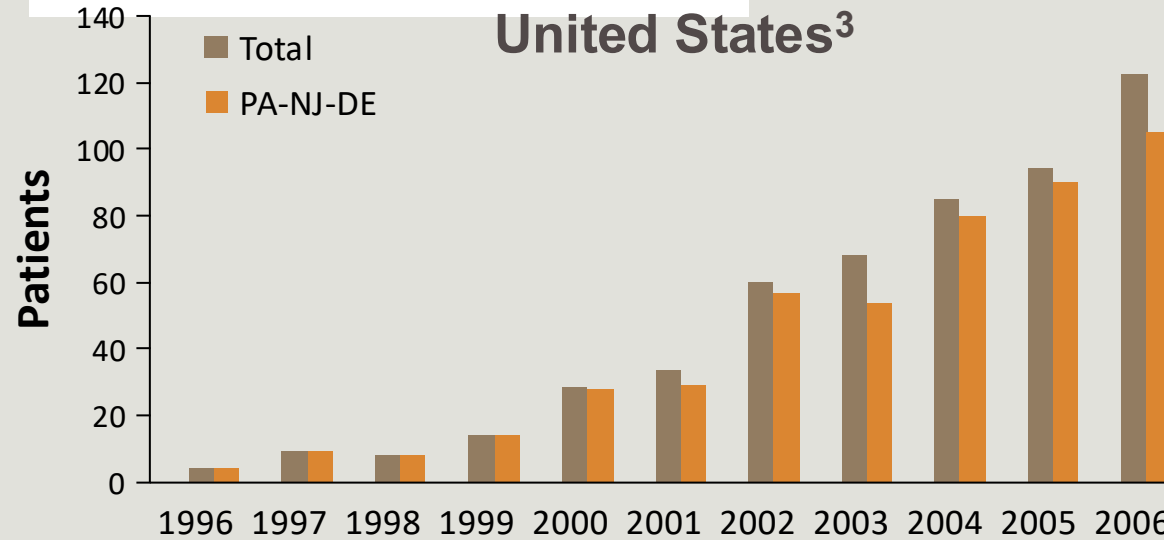
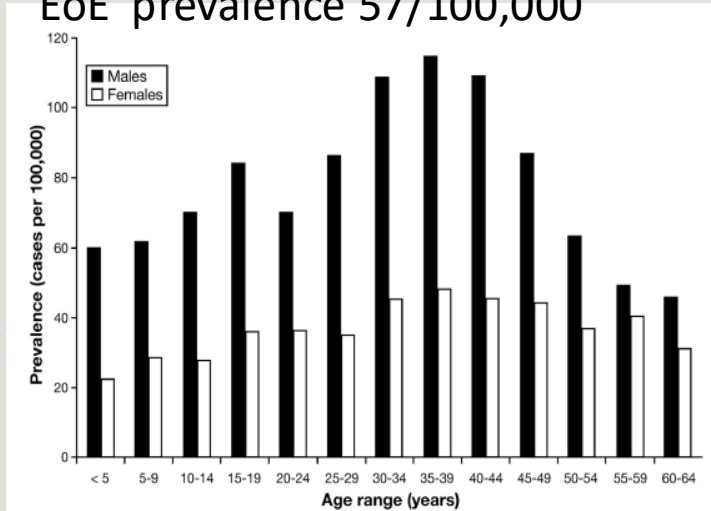
- 15 or more eosinophils per hpf in at least 1 esophageal biopsy**

- Histology of remainder of GI tract normal**

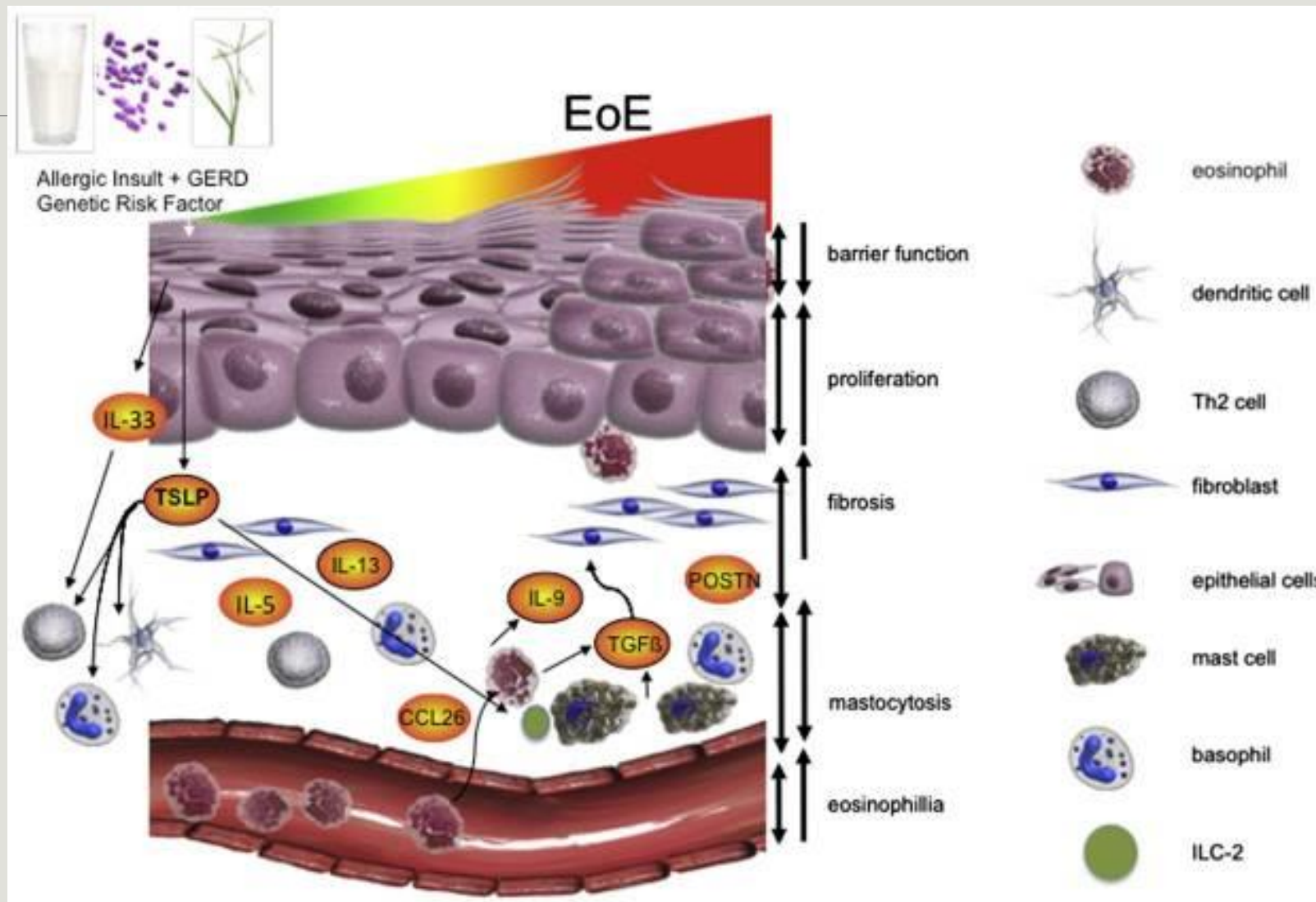
DIAGNOSIS AND FOLLOW UP BASED ON REPETITIVE EGDs

EoE: Epidemiology

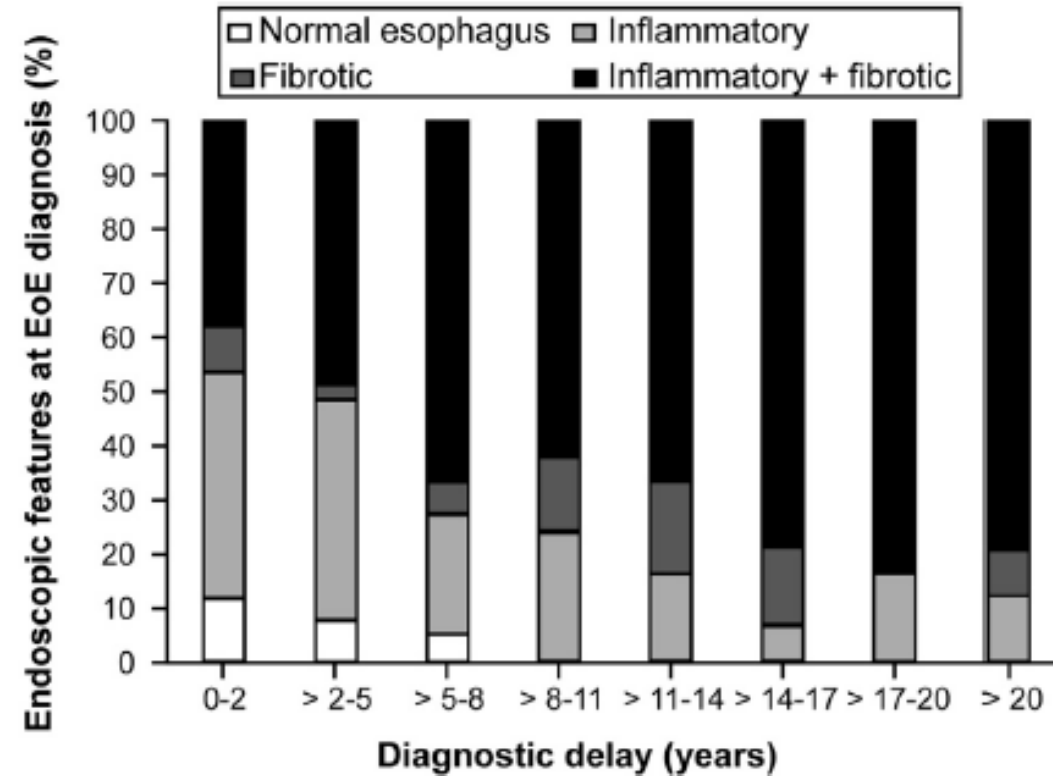
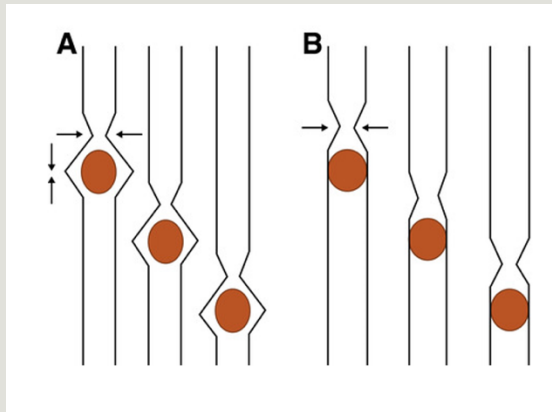
EoE prevalence 57/100,000

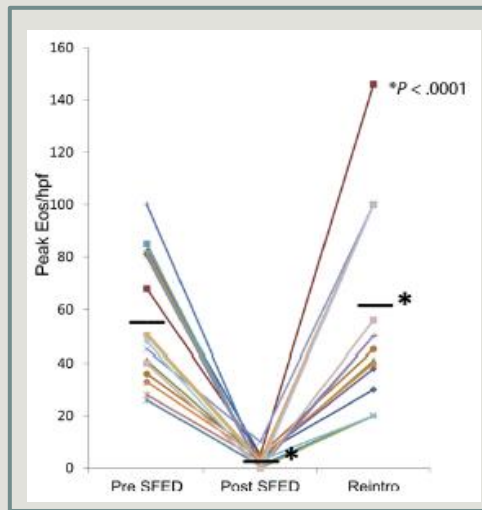


Pathophysiology

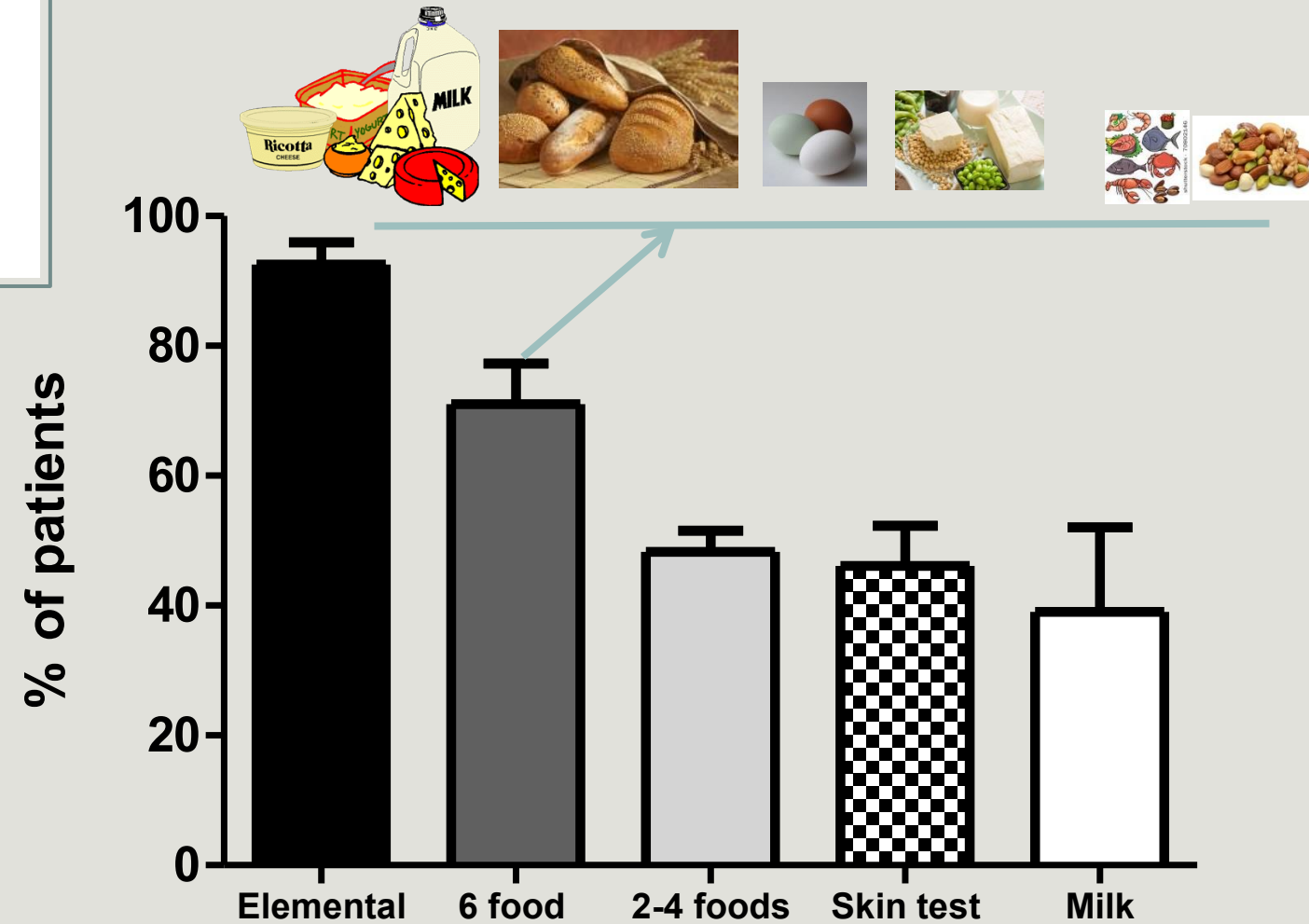


Fibrosis: major long term risk of inflammation in EoE





Diet Efficacy in EoE



Symptoms of EoE

Vomiting

Feeding refusal

Failure to thrive

Abdominal pain

Heart burn

Dysphagia

Food impactions

Inflammation



Younger children

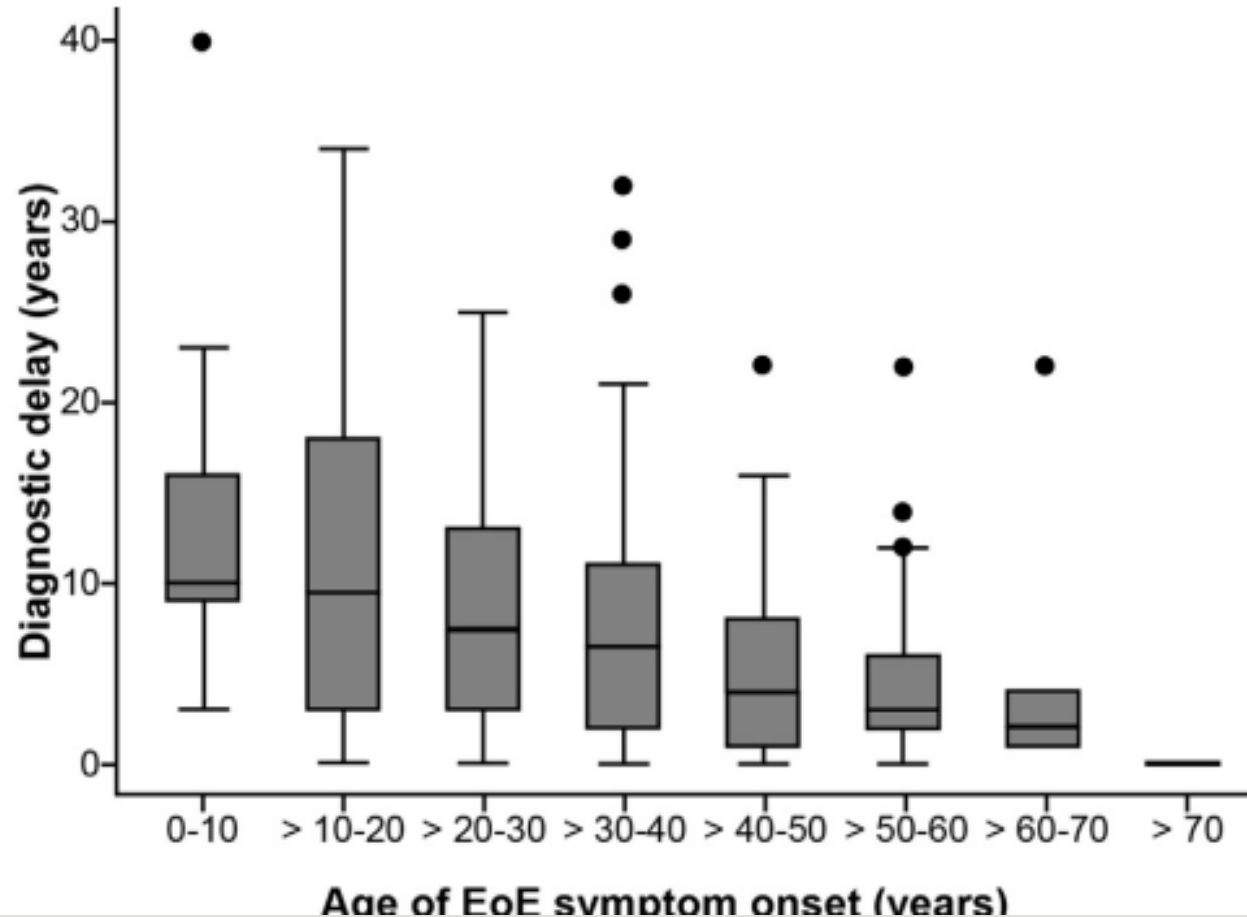
Fibrosis



Adolescents or Adults

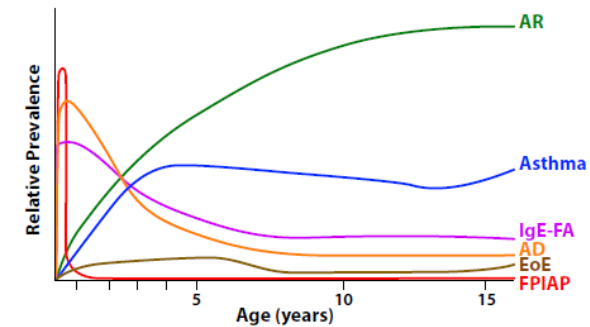
Delayed diagnosis can be 10 years in children and 20 years in young adults

SCHOEPFER, AM 2018



Eosinophilic Esophagitis prevalence is increased in Atopic patients

	% among those with EoE	% among those without EoE	P value
Children			
Lifetime			
IgE-FA	32.44 (20.48-47.22)	7.59 (7.11-8.10)	<.001
FPES	19.11 (9.32-35.20)	0.48 (0.39-0.59)	<.001
Asthma	26.83 (14.92-43.41)	12.17 (11.37-13.01)	.008
Atopic dermatitis/ eczema	27.53 (15.81-43.44)	5.8 (5.25-6.48)	<.001
Allergic rhinitis	43.48 (28.62-59.61)	12.74 (11.97-13.56)	<0.001
Insect sting allergy	2.83 (0.69-10.85)	2.23 (1.93-2.57)	.74
Medication allergy	3.94 (1.57-9.58)	4.15 (3.71-4.65)	.91
Biological parental reported history of atopy			
IgE-mediated food allergy	59.54 (44.52-72.96)	19.32 (18.24-20.46)	<.001
Asthma	36.17 (23.37-51.28)	18.30 (17.19-19.46)	.003
Atopic dermatitis/ eczema	41.31 (27.50-56.64)	15.54 (14.50-16.63)	<.001
Allergic rhinitis	59.73 (4.47-73.31)	40.02 (38.52-41.54)	.009
Adults			
Physician-diagnosed comorbid atopic conditions			
Lifetime			
IgE-mediated food allergy	37.28 (26.16-49.95)	10.72 (10.36-11.09)	<.001
FPES	13.31 (6.75-24.56)	0.19 (0.15-0.25)	<.001
Asthma	47.82 (34.93-61.01)	1.19 (11.74-12.65)	<.001
Atopic dermatitis/eczema	22.99 (13.13-37.10)	6.70 (6.36-7.05)	.001
Allergic rhinitis	41.66 (29.35-55.10)	21.39 (20.84-21.95)	<0.001
Insect sting allergy	7.40 (2.61-19.26)	3.82 (3.57-4.08)	.2
Medication allergy	13.41 (12.98-13.87)	11.63 (5.50-22.96)	.7
Biological parental reported history of atopy			
IgE-mediated food allergy	29.97 (18.87-44.05)	12.82 (12.34-13.33)	.003
Asthma	30.24 (19.83-43.17)	13.50 (13.03-13.99)	.0002
Atopic dermatitis/ eczema	34.05 (22.04-48.52)	9.53 (9.11-9.97)	<.001
Allergic rhinitis	47.78 (34.11-61.79)	28.68 (28.01-29.37)	0.004

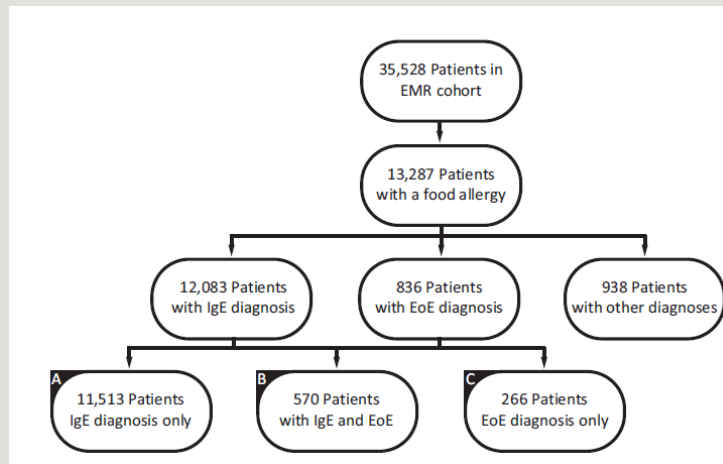


Cianferoni A, et al Allergy 2020

Kuan-Wen Su et al Ann Allergy 2021

Children with IgE - FA are at risk of developing EoE

4.7% of children with IgE mediated FA develop EoE



Hill DA 2017

Characteristic	Odds ratio	95% CI	P value
Gender			
Male vs Female	2.27	1.89-2.78	<.0001
Race			
White vs Black	1.99	1.55-2.56	<.0001
Ethnicity			
Hispanic vs Non-Hispanic	0.99	0.67-1.47	ns
Specific food allergens			
Peanut	1.07	0.90-1.27	ns
Egg	2.27	1.91-2.64	<.0001
Tree nut	1.04	0.88-1.23	ns
Milk	4.19	3.52-4.97	<.0001
Shellfish	1.55	1.24-1.92	<.0001
Number of food allergies			
2 foods	2.93	2.16-4.05	<.0001
3+ foods	5.29	3.82-7.32	<.0001

EMR, Electronic medical record; EoE, eosinophilic esophagitis; ns, nonsignificant.

High prevalence of gastrointestinal symptoms and undiagnosed eosinophilic esophagitis among allergic adults

TABLE I. Questionnaire responses from atopic subjects

Survey questions	Subjects (n = 101)
PROMIS questionnaire	
How often do you have belly pain?	
Once or more in the past 7 d	42 (42.0%)
Never	58 (58.0%)
How often do you have nausea or vomiting?	
Once or more in the past 7 d	18 (18.6%)
Never	79 (81.4%)
How often do you have reflux?	
Once or more in the past 7 d	43 (43.0%)
Never	57 (57.0%)
Difficulty swallowing solid foods	
Once or more in the past 7 d	37 (38.5%)
Never	59 (61.5%)
Brief Esophageal Dysphagia Questionnaire	
Trouble eating solid food	26 (26.8%)
Once or more in the past 14 d	71 (74.0%)
Never	
Coughing or choking while swallowing food	
Once or more in the past 14 d	41 (41.8%)
Never	57 (58.2%)
Pain or discomfort with eating solid food	
Once of more in the past 14 d	32 (32.6%)
Never	66 (67.4%)
Food stuck in throat >30 min in the past y	
Once	3 (3.0%)
Twice	4 (4.0%)
More than twice	3 (3.0%)

Relying solely on Cytosponge data (one of five positive), of EoE prevalence was **8.8%**

When we included those who also underwent esophagogastroduodenoscopy the weighted estimated increased to **16.5%**

Eid R 2022

Pre-existing Esophageal Eosinophilia is common in adult patients undergoing OIT

- EGD 21 adults before undergoing peanut OIT.
- Subjects completed a detailed gastrointestinal symptom questionnaire.
- Endoscopic findings were assessed using the Eosinophilic Esophagitis (EoE) Endoscopic Reference Score (EREFS) and biopsies were obtained from the esophagus, gastric antrum, and duodenum.
- Esophageal biopsies were evaluated using the EoE
- All subjects were asymptomatic.
- 24% (5/21) had >5 eos/hpf]
- **14% (3/21) had >15 eos/hpf associated with mild endoscopic findings (edema, linear furrowing, or rings; median EREFS = 0, IQR 0-0.25).** Some subjects also demonstrated basal cell hyperplasia, dilated intercellular spaces, and lamina propria fibrosis.
- Increased eosinophils were noted in the gastric antrum (>12 eos/hpf) or duodenum (>26 eos/hpf) in 9 subjects (43%). EPX/mm² correlated strongly with eosinophil counts ($r = 0.71$, $p < 0.0001$).

FA-OIT and risk of developing Eosinophilic Esophagitis (EoE)

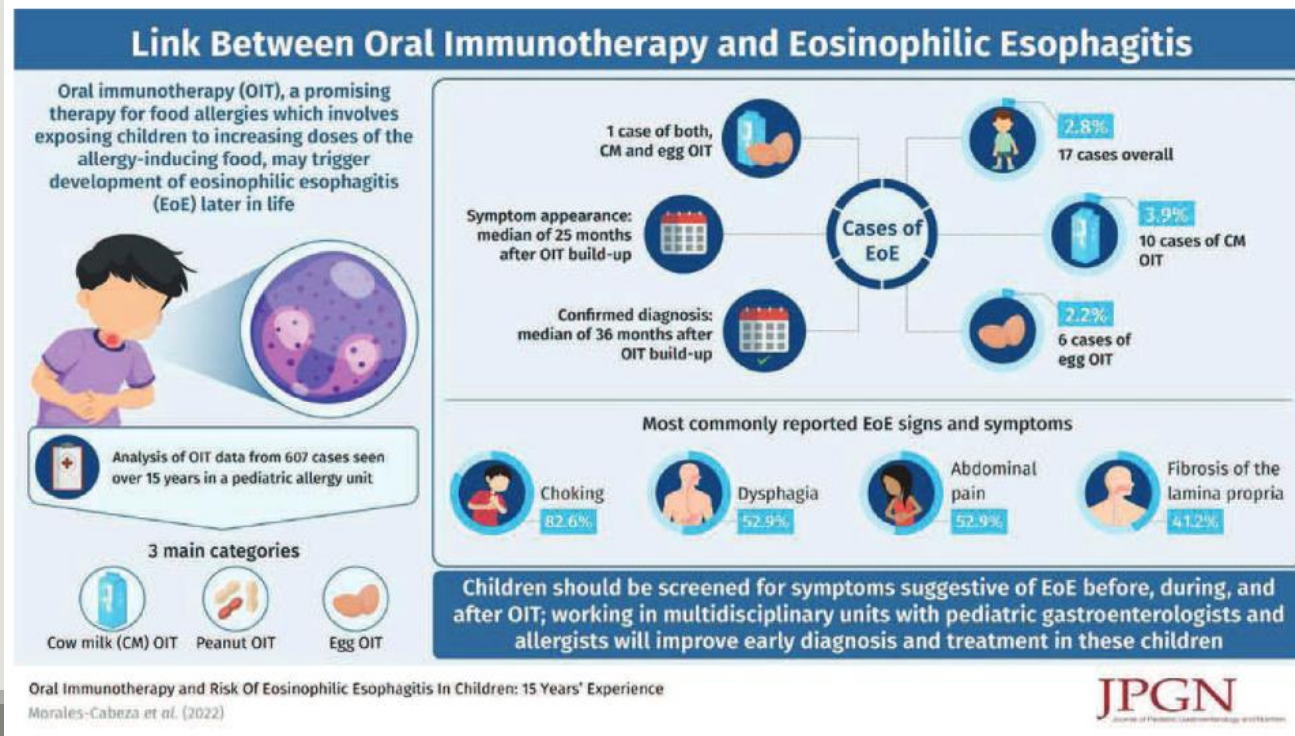
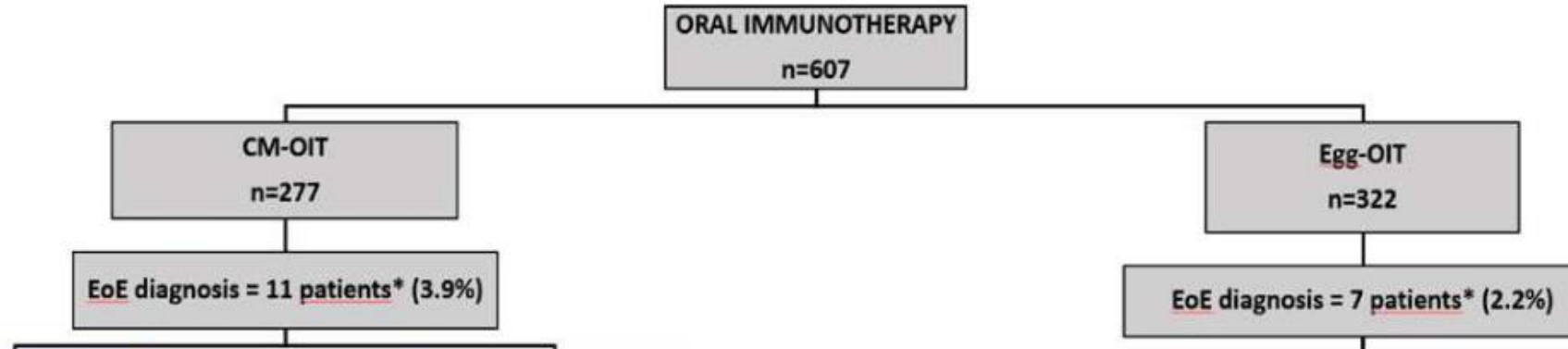
Data collected from 110 studies on FA OIT = EoE 5.7% (3-8)

Rate	Discontinuation (any reason), %	SPR-EoE, %			EoE (biopsy), %	Discontinuation cause, %	
		Organ system	Specific symptom			SPR-EoE	EoE or SPR-EoE
		GI symptoms	Abdominal pain	Vomiting			
Overall	14	34	32	12	5.3	4.7	5.6
Egg	11	ND ^b	28	17	4.2	2.7	3.1
Milk	12	18	30	1	5.4	3.9	4.6
Peanut	16	56	40	20	5.2	6.7	8.5

Author	year	Food	Dose	Total pts	EoE	%
Babaie D	2017	Milk	120cc	18	1	5.55556
Burk CM	2017	Peanut+X	4 g	13	2	15.38462
Echeverría-Zudaire	2015	Milk and egg	8 g	128	8	6.25
MacGinnitie	2017	Peanut+X	4g	37	1	2.702703
Palisade	2018	Peanut	300 mg	372	1	0.268817
Andorf, S	2018	Multifood	1 g	45	0	0

Peroni D, 2018

FA-OIT and risk of developing Eosinophilic Esophagitis (EoE)-15 years experience



Morales-Cabeza,
2022

EoE Palforzia

The PTAH clinical trial program includes 2 phase 2 trials and 6 phase 3 trials in which 1217 participants (aged 4-55 years) received PTAH.

- 62 patients withdrew from the studies owing to gastrointestinal (GI) symptom
- 28 were referred for gastroenterology evaluation
 - a. 17 of whom underwent esophagogastroduodenoscopy (EGD)
 - b. 12 of those were diagnosed with EoE-(**0.9 per 100 patient-years**)

TABLE 1. Baseline characteristics of participants with diagnosed eosinophilic esophagitis across all PTAH studies

Study	Case no.	Age (y)/sex/race	Country	Comorbid allergic diseases	Baseline peanut-specific IgE (kU _A /L)
ARC001 (NCT01987817)	1	4/M/White	United States	Atopic dermatitis, asthma, allergic rhinitis	>100
ARC002 (ARC001 follow-on; NCT02198664)	2	8/M/White	United States	Allergic rhinitis, other food allergies	5.3
ARC003 (PALISADE; NCT02635776)	3	10/M/White	United States	Allergic rhinitis, asthma, atopic dermatitis, other food allergies	351.5
ARC004 (PALISADE follow-on; NCT02993107)	4	13/F/Other*	United States	Allergic rhinitis, atopic dermatitis, asthma, other food allergies	268
	5	33/F/White	United States	Allergic rhinitis, asthma	19.5
	6	9/M/White	United States	Asthma, other food allergies	294.5
ARC007 (RAMSES; NCT03126227)	7	9/M/White	United States	Asthma, other food allergies	277
	8	17/M/White	Canada	Allergic rhinitis, asthma, other food allergies	17.1
ARC008 (NCT03292484)	9	14/M/White	United States	Allergic rhinitis, atopic dermatitis, asthma, other food allergies	304.5
	10	17/M/White	Canada	Allergic rhinitis, atopic dermatitis, asthma, other food allergies	70.3
	11	13/F/White	United States	Allergic rhinitis, asthma, other food allergies	62.2
	12	15/M/Other*	United States	Asthma, allergic rhinitis, allergic conjunctivitis	81.3

F, Female; M, male; PTAH, peanut (*Arachis hypogaea*) allergen powder-dnfp.

*Not reported.

11/12- resolved within 1 year

75% Other FA

160 mg median dose (12-950)

2 severe/7 moderate /3mild

100% treated

-PPI (10/12)

-Budesonide (4/12)

-Stop OIT (11/12)

Nilsson C et al JACI in practice 2021

Does OIT causes EoE?

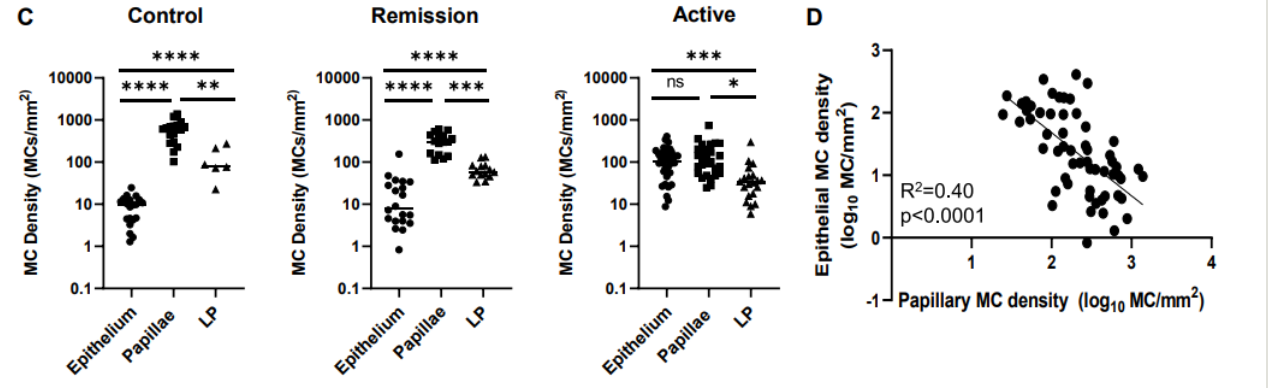
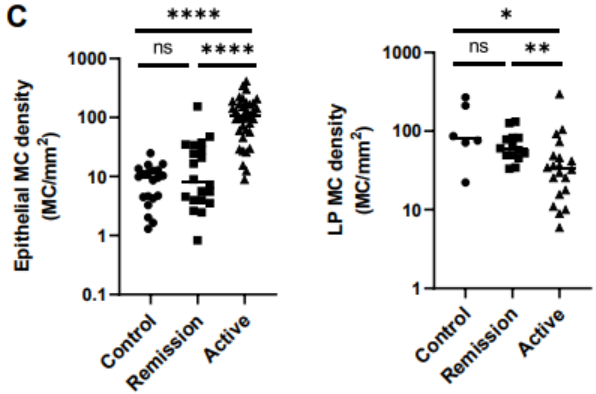
- 1) If better screening of EoE leads to less cases of EoE means that EoE may be pre-existing and OIT may just exacerbate
- 2) In some cases EoE could develop in the course of OIT but could be coincidental
- 3) In rare case OIT could be causative

Mast Cell density correlates with EoE disease activity

TABLE I. MC density (cells/mm²) by location and disease state

	Control	Remission	Active	P value
Epithelium	9 (mean)	22	124	< .0001
	10 (median)	8	104	
	0-25 (range)	1-155	9-409	
Biopsy sections, n	21	20	36	
Patients, n	20	20	34	
Papillae	536 (mean)	291	125	< .0001
	591 (median)	301	79	
	0-1,386 (range)	0-601	0-737	
Biopsy sections, n	19	18	35	
Patients, n	18	18	33	
LP	123 (mean)	68	49	.0069
	81 (median)	59	33	
	22-269 (range)	33-132	6-294	
Biopsy sections, n	6	14	20	
Patients, n	5	14	18	

Kruskal-Wallis test used for calculation of *P* value.
Active, Active EoE; *Control*, non-EoE; *Remission*, EoE in remission.



Negative correlation
between epithelial and
papillary MC density across
all disease states

Zhang, 2024

Abnormal Responses to Local Esophageal Food Allergen Injections in Adult Patients With Eosinophilic Esophagitis

January 2018

Abnormal Responses to Food Allergen Injections

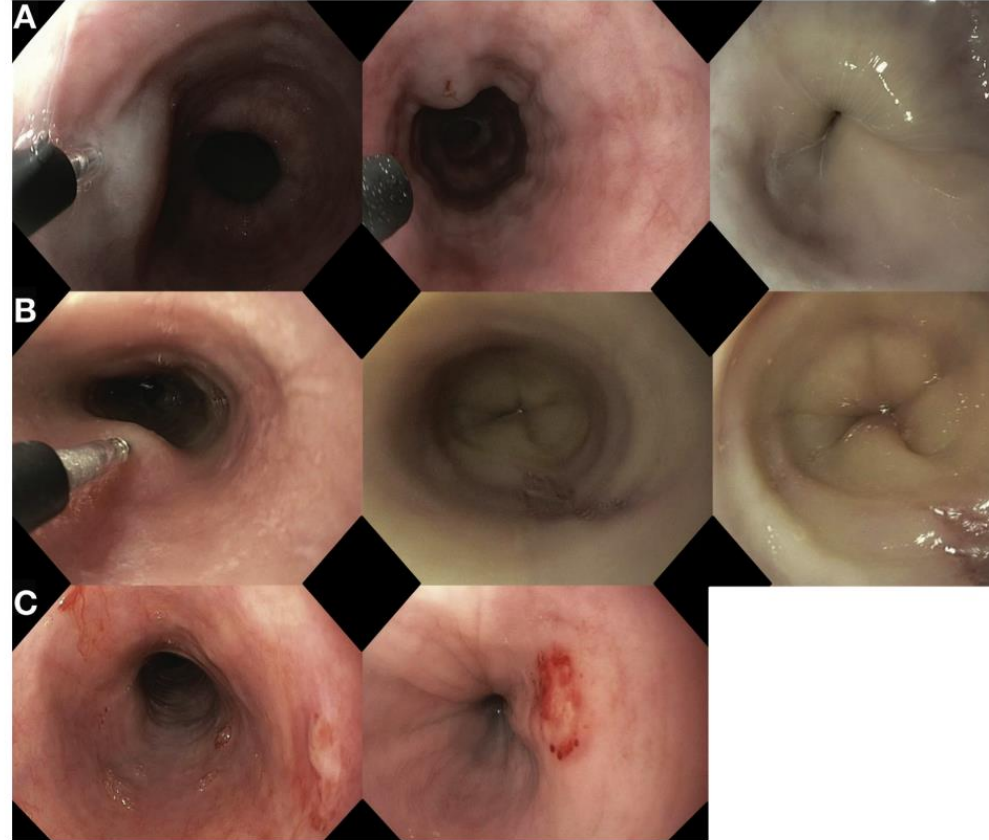
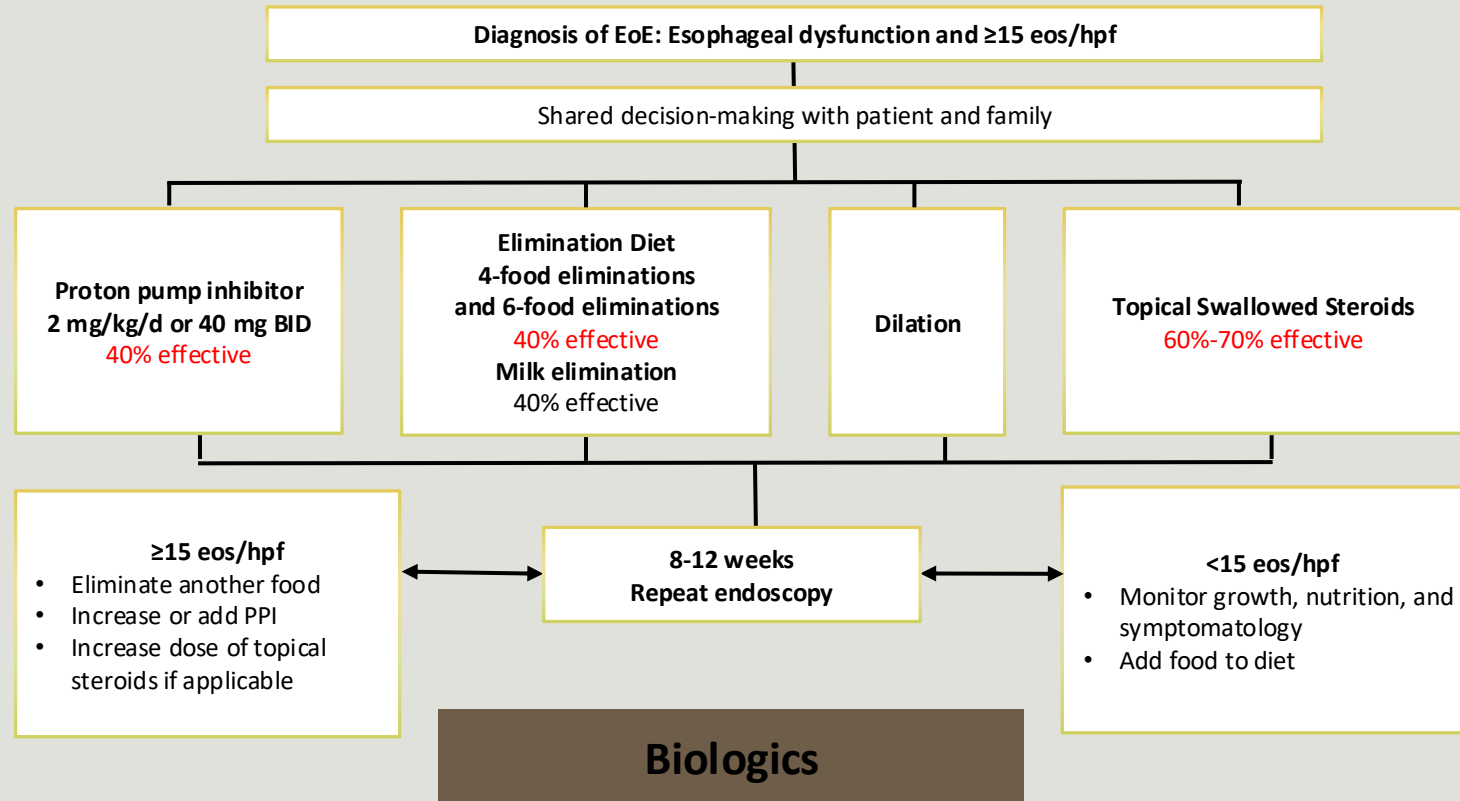


Figure 1. Acute responses to banana (1a) and soy (1b) in 2 EoE patients. From left to right, within 2 minutes after injecting 0.2 mL allergen extract, the esophageal mucosa blanches and the lumen occludes. 1c, Delayed responses to peach (left) and walnut (right) in 2 EoE patients during the next-day endoscopy, characterized by a wheal (left) or a flare (right).

Warner MJ, 2018

EoE Suggested Approach to Management Algorithm



Multi-disciplinary Approach



Patient and family

Allergy

- Role of atopy
- Recognition and treatment of other atopic conditions

Gastroenterology

- Concomitant reflux, constipation, delayed gastric emptying
- Procedures

Nutrition

- Ensure proper nutrition micro and macronutrient level

Feeding therapist

Psychologist

Case 1

6 year old female with a history of IgE mediated allergy to egg

Stopped OIT with no improvement of picky eating but improvement of belly pain (back to baseline). EGD off OIT for 2 months showed >100 eos/hpf

PPI for 2 months >100 eos/hpf

Budesonide swallowed for 3 months 3 eos/hpf, mom worried about steroid switched to dupilumab

Stopped feeding therapy, weight percentile 30%

Supplemental Table E1: Clinical course and description of the 8 patients diagnosed with EoE

History symptoms suggestive of EoE prior to starting OIT	OIT stopped	PPI	Swallowed steroid
• 6/8 • Picky eater, Underwent OT/PT to reduce gag reflex	• 6/8 • None resolved by stopping OIT	• 8/8 • 1/8- 15 eos/hpf	• 7/8 • 5/7 resolved

Buckey et 2026

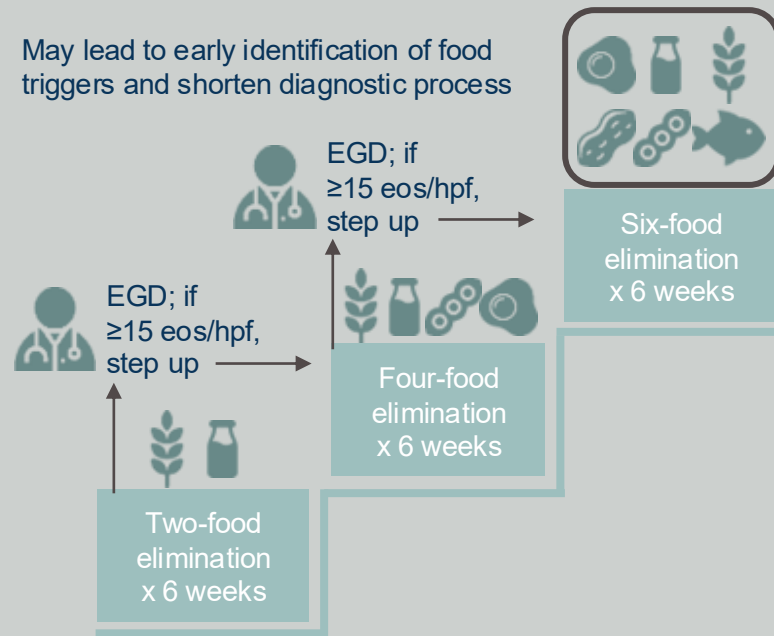
Thank you for your attention



Diet Therapy for EoE¹

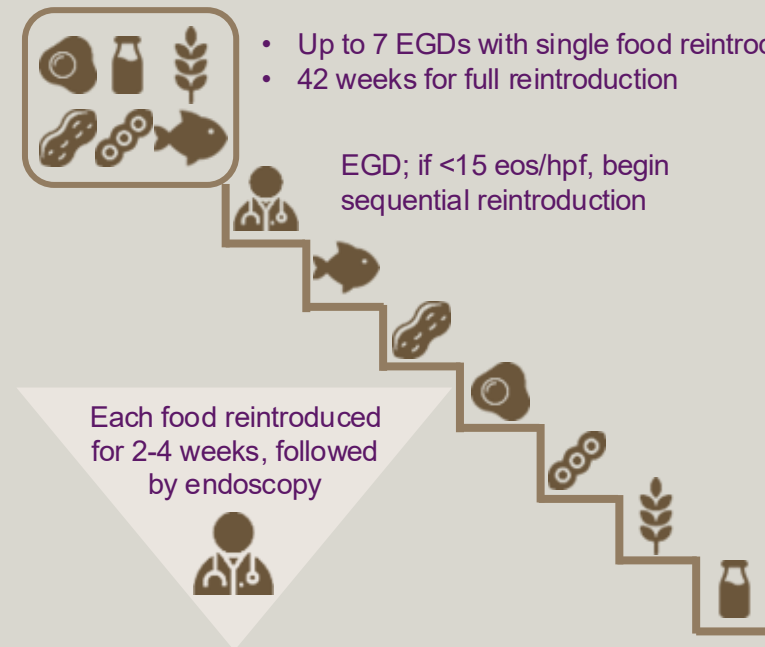
Step-Up Elimination Diet

- May lead to early identification of food triggers and shorten diagnostic process



Step-Down Six-Food Elimination Diet

- Up to 7 EGDs with single food reintroduction
- 42 weeks for full reintroduction



Eosinophilic Esophagitis and Use of Proton Pump Inhibitors

- New guidelines : 8-12 weeks of high dose proton pump inhibitors (1-2 mg/kg/day-20-40 mg up to twice daily) is an accepted monotherapy for

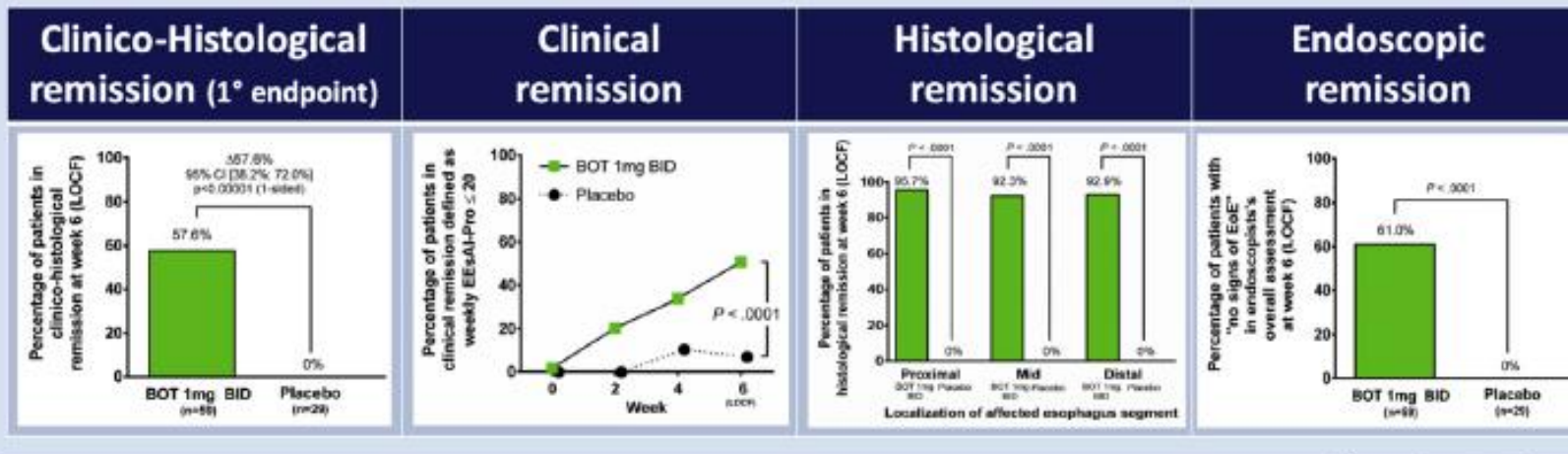
Author	Year	Population	Design	# Patients	%
Dranove	2009	Pediatric	Retro	43	40
Sayej	2009	Pediatric	Retro	36	39
Monte-Infante	2011	Adult	Prospective	35	74
Peterson	2010	Adult	RCT	12	33
Moawad	2011	Adult	RCT	20	35
Dellon	2013	Adult	Prospective	65	37
Schroeder	2013	Adult	Retro	7	71

Cianferoni A et al 2014
Dellon ES 2018

Steroid and EoE

Active eosinophilic esophagitis

A 6-weeks twice daily treatment with Budesonide 1mg orodispersible tablets (BOT) was safe and highly effective for achieving:

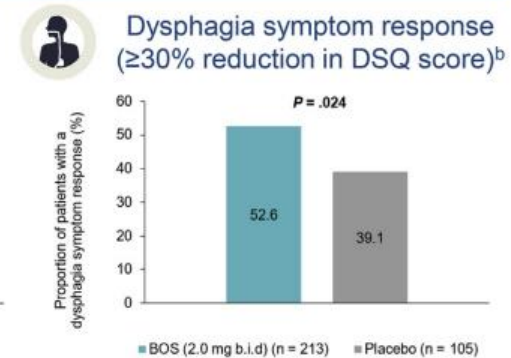
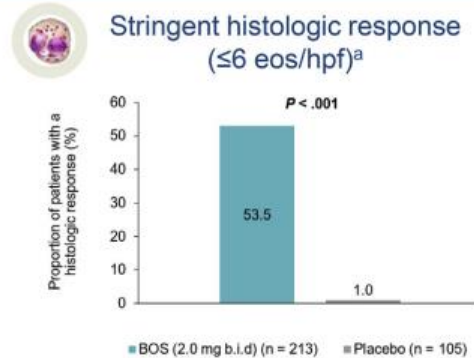
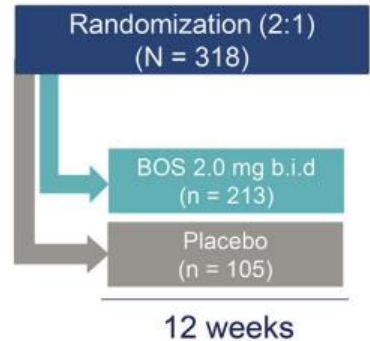


Lucendo AJ, 2019

Gastroenterology

Steroid and EoE

Patients with eosinophilic esophagitis and dysphagia (11–55 years old) were randomized 2:1 to receive either **budesonide oral suspension (BOS)** or placebo



b.i.d, twice daily; DSQ, Dysphagia Symptom Questionnaire; eos/hpf, eosinophils/high-power field

^aStringent histologic response defined as ≤ 6 eos/hpf at week 12 of therapy; ^bDysphagia symptom response defined as $\geq 30\%$ reduction in DSQ score at week 12 of therapy

Clinical Gastroenterology
and Hepatology

Topical Corticosteroids—65% effective

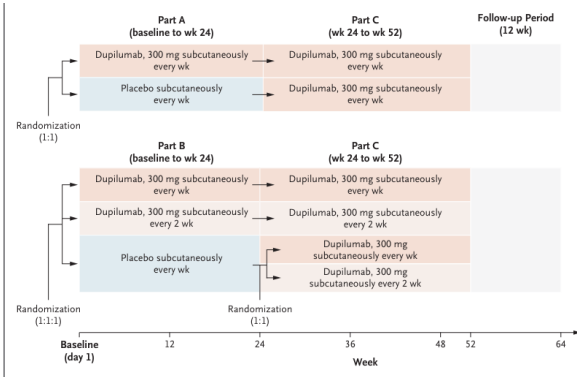
Fluticasone propionate¹

- Traditionally used from a multidose inhaler: puffed directly into the mouth and swallowed
- Recommended dose: 440-880 mcg twice daily for 8 weeks in adults
- Need strict adherence to instructions to optimize efficacy

Viscous budesonide^{2,3}

- Aqueous budesonide mixed with a thickener and swallowed
- Need strict adherence to instructions to optimize efficacy

Of note: Systemic steroids can be used short term for increased symptoms and inflammation but due to side effects not long term solution

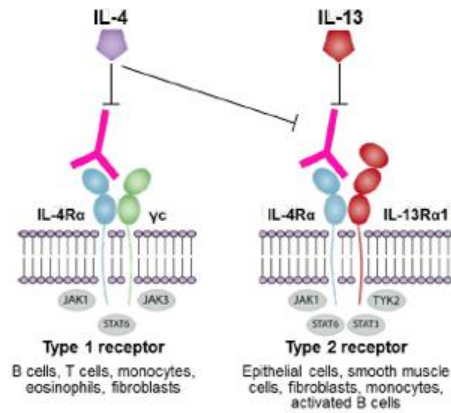


THE NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

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2022

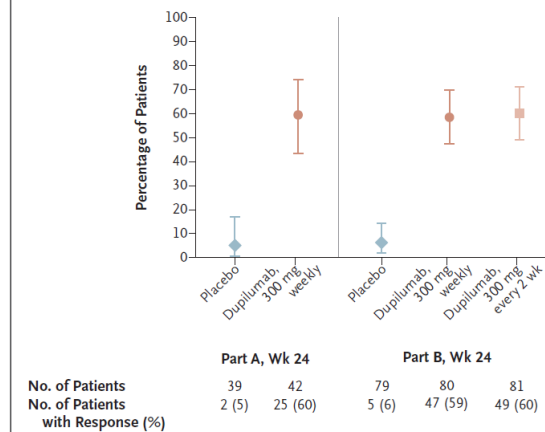
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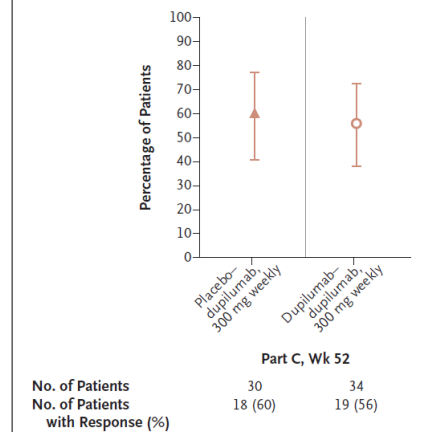
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A Histologic Remission at Wk 24 in Parts A and B



B Histologic Remission in the Part A–C Group Wk 52 in Part C

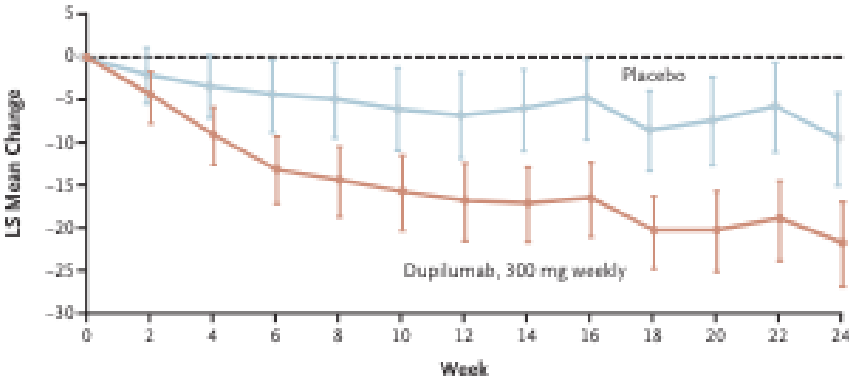


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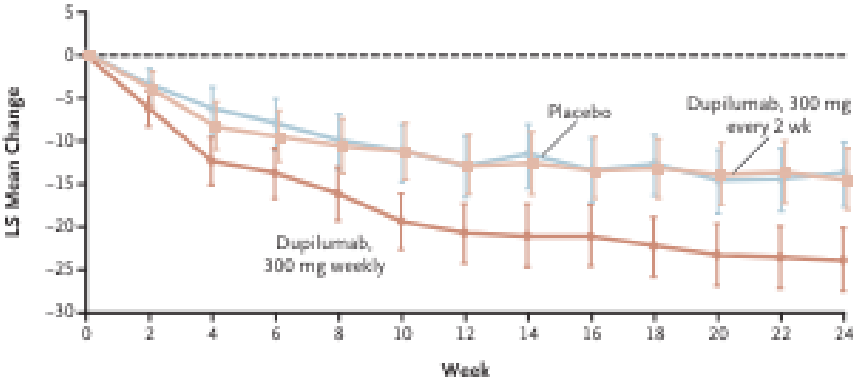
A Change from Baseline in DSQ Score in Part A



No. of Patients/No. with Imputed Values

Placebo	39/0	37/2	35/4	33/6	34/5	33/6	33/6	30/9	27/12	29/10	29/10	26/13	28/11
Dupilumab	42/0	42/0	42/0	40/2	41/1	41/1	40/2	40/2	37/5	38/4	38/4	38/4	38/4

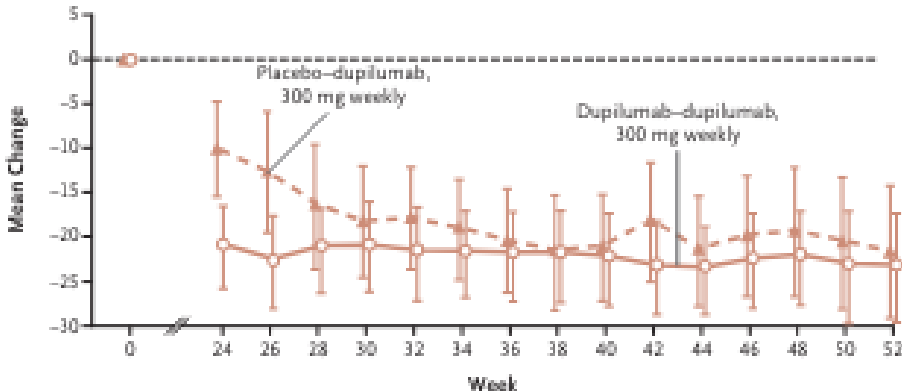
B Change from Baseline in DSQ Score in Part B



No. of Patients/No. with Imputed Values

Placebo	78/0	75/3	73/5	66/12	68/10	69/9	65/13	62/16	64/14	62/16	62/16	62/16	59/19
Dupilumab, 300 mg weekly	80/0	80/0	76/4	78/2	75/5	72/8	71/9	69/11	68/12	65/15	60/20	64/16	63/17
Dupilumab, 300 mg every 2 wk	81/0	77/4	78/3	76/5	68/13	70/11	66/15	65/16	69/12	65/16	61/20	63/18	62/19

C Change from Baseline in DSQ Score in the Part A-C Group in Part C

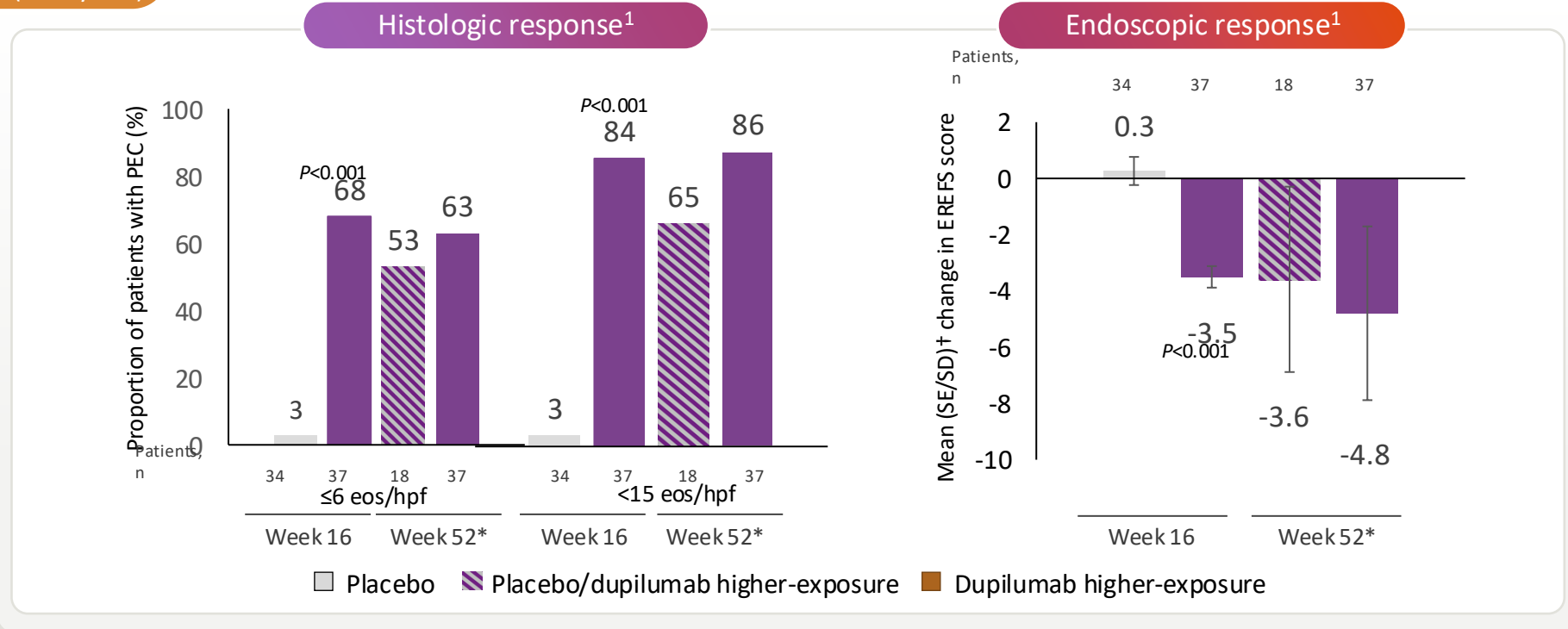


No. of Patients

Placebo-dupilumab	37	37	28	28	30	32	28	29	26	26	27	25	29	28	26	23
Dupilumab-dupilumab	40	40	34	32	32	34	38	38	38	33	34	36	33	32	27	29

Dupilumab Improved Histologic and Endoscopic Outcomes

EoE KIDS
(1-11 years)



*All analyses for Part B were descriptive. †LS mean (SE) for Part A/Week 16 and mean (SD) for Part B/Week 52. Biopsies for histology were collected from proximal, mid, and distal esophageal regions.^{1,2} EoE, eosinophilic esophagitis; eos/hpf, eosinophils per high-power field; EREFS, endoscopic reference score; LS, least squares; PEC, peak esophageal count; SD, standard deviation; SE, standard error. Chehade M, et al. *N Engl J Med*. 2024;390(24):2239-2251.

Therapy options

Offer choices

- Therapy that you pick now does not have to be your forever therapy

What **therapy** are you going to be able to adhere to?

If diet is already limited, can you feasibly limit any more?

- Feeding disorders

