

Oral immunotherapy using weight by volume solutions

ABSTRACT

Adapting the subcutaneous immunotherapy methods and schedule for use in oral immunotherapy eases the implementation of oral immunotherapy by simplifying the solution creation process and potentially improves safety with dosing transparency.

(J Precis Respir Med 2:168–170, 2020; doi: 10.2500/jfa.2020.2.200036)

Dear Editor,

We read the review article entitled “Food allergy oral immunotherapy” by Sood and Scurlock.¹ We want to congratulate the authors for this successful review article and seek their expertise and opinions on the feasibility of adapting the subcutaneous immunotherapy (SCIT) schedule for use in oral immunotherapy (OIT).

OIT schedules typically start in the range of 0.001–0.01 mg of the food and build up to 100–200 mg of a food powder or liquid surrogate before transitioning to the actual food. To approximate the workflow of SCIT, we would use 500-mL vials with three to four color-coded dilutions in the build up (Fig. 1). Our intent is to desensitize up to a dose approximated by the smallest measurable unit of an actual food. Because protein allergen contents are typically unknown (one exception is peanut²), initiating doses that cater to protein content may add unnecessary complexity in making OIT treatment solutions. Therefore, we propose that 10 mg or 100 mg of each food flour be used in the initial treatment vial to standardize prescriptions and reduce error (Fig. 2).³ Clinicians may appreciate the familiarity of using a weight by volume (w/v) solution, which is the same semiquantitative concentration unit used in nonstandardized SCIT extracts. It is our hope that this

adaption (Fig. 3) eases the transition for the allergist who wants to implement OIT.

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The authors have no conflicts of interest to declare pertaining to this article

No external funding sources reported

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Figure 1. Oral immunotherapy solution treatment set vials.

Allergen Extract Content:

Bottle Name Abbreviations
 Peanut: P Egg: E
 Almond: A Milk: M
 Cashew: C
 Walnut: W

Oral Immunotherapy Prescription Form

☐ Blue Initial Vial 100 mg – Typical starting dose

☐ Green Initial Vial 10 mg

Antigen Number	Food Allergen	Manufacturer, Specific Brand			Expiration Date
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Diluent	Distilled water				
Total Volume	500ml				

*

CTD-dependent ROC thresholds at 500 mg CTD.

Food	SPT Cutoff, mm (AUC)	PPV	NPV	sIgE Cutoff, kU/L (AUC)	PPV	NPV	sIgE _r Cutoff (AUC)	PPV	NPV
Almond	12.0 (0.65 ^b)	1	0.68	12.2 (0.71 ^b)	1	0.72	0.002 (0.83)	0.68	1
Cashew	4.5 (0.96 ^b)	1	0.56	1.2 (0.83 ^b)	0.98	0.34	0.002 (0.82 ^a)	0.99	0.50
Egg	13.0 (0.67)	1	0.23	9.6 (0.80)	1	0.33	0.012 (0.86 ^b)	1	0.30
Hazelnut	7.0 (0.79)	1	0.56	14.6 (0.56)	0.73	0.38	0.022 (0.83)	1	0.59
Milk	8.0 (0.91)	1	0.47	20.1 (0.68 ^a)	0.96	0.19	0.016 (0.80 ^a)	0.97	0.36
Peanut	9.0 (0.86)	1	0.22	10.7 (0.64 ^b)	0.95	0.17	0.017 (0.77 ^b)	0.96	0.35
Pecan	7.0 (0.69 ^b)	0.95	0.19	1.8 (0.94 ^b)	1	0.46	0.011 (0.82)	1	0.14
Sesame	11.0 (0.79 ^b)	1	0.46	7.5 (0.40 ^b)	0.64	0	0.055 (0.76 ^b)	1	0.47
Walnut	4.0 (0.96)	1	0.57	13.5 (0.77)	1	0.24	0.019 (0.87)	1	0.33
Wheat	5.5 (0.90 ^b)	1	0.33	43.1 (0.89 ^a)	1	0.60	0.027 (0.77 ^{a, b})	0.88	0.67

Green Vial: 10mg in 500 ml for 0.02 mg/ml concentration
 Blue Vial: 100 mg in 500 ml for 0.2 mg/ml concentration
 Yellow Vial: 1g in 500 ml for 2 mg/ml concentration
 Red Vial: 10g in 500 ml for 20 mg/ml concentration

CTD: Cumulative Tolerated Dose
sIgE_r: specific IgE_r / total IgE_r ratio

Special Instructions:

* Sindher et al. Front Immunol.2018;9.

Figure 1. Oral immunotherapy prescription form

Figure 2. Oral immunotherapy prescription form. Adapted from ref 3.

Oral Immunotherapy Dosage Schedule

Patient Name:

Antigen

☐ Peanut	☐ Almond	☐ Cashew	☐ Walnut
☐ Egg	☐ Milk	☐	☐

Antigen: Refrigerate. Shake bottle vigorously or use magnetic stirrer. Freeze aliquot for future use.

Measure dose with syringe. Administer orally. Wait 45-60 minutes.

If systemic reaction (Flush, itch, sneeze, cough, wheeze)

-0.3 ml epinephrine IM

-dose must be dropped to a previous one which has not produced a reaction.

Give daily. Dose increased weekly. Acceptable range is 7-21 days

Standard Schedule

Blue Vial	Yellow vial	Red vial
1 ml = 0.2 mg	1 ml = 2 mg	1 ml = 20 mg
2 ml = 0.4 mg	3 ml = 6 mg	2 ml = 40 mg
5 ml = 1 mg	5 ml = 10 mg	3 ml = 60 mg
		5 ml = 100 mg

Switch to fragments or increments of actual food after 100mg

Alternate Schedule

Green Vial	Blue Vial	Yellow vial	Red vial
0.1 ml = 0.002 mg	(0.1 ml = 0.02 mg)**		
0.2 ml = 0.004 mg	0.2 ml = 0.04 mg	0.2 ml = 0.4 mg	0.2 ml = 4mg
0.5 ml = 0.01 mg	0.5 ml = 0.1 mg	0.5 ml = 1 mg	0.5 ml = 10 mg
1 ml = 0.02 mg	1 ml = 0.2 mg	1 ml = 2 mg	1 ml = 20 mg
2 ml = 0.04 mg	2 ml = 0.4 mg	2 ml = 4 mg	2 ml = 40 mg
3 ml = 0.06 mg	3 ml = 0.6 mg	3 ml = 6 mg	3 ml = 60 mg
5 ml = 0.1mg	5 ml = 1 mg	5 ml = 10 mg	5 ml = 100 mg
(7.5 ml = 0.15 mg)*	(7.5 ml = 1.5 mg)	(7.5 ml = 15 mg)	7.5 ml = 150 mg
(10 ml = 0.2mg)	(10 ml = 2 mg)	(10 mg = 20 mg)	10 ml = 200 mg

* (7.5 ml) Optional dose

** Optional dose if transitioning from Green Vial

Figure 3. Oral immunotherapy dosage schedule.