



Letter

Perceptions regarding injection number and technique

Local cutaneous reactions are a common occurrence during allergen immunotherapy.^{1–4} Patients can experience pain and discomfort from the immunotherapy injections. Because of this pain and discomfort, physicians may attempt to limit the number of injections per visit. Published data are lacking to support the practice of minimizing the number of immunotherapy injections for patient comfort or therapy adherence. The goals of this study were to survey patients and learn their perceptions with regard to the number of immunotherapy injections received per visit.

A survey was provided to all patients on allergen immunotherapy at the Wilford Hall Ambulatory Surgical Center Allergy Clinic. The parents of patients younger than 18 years were asked to complete the survey for their child. The survey was approved by the Wilford Hall Ambulatory Surgical Center Institutional Review Board. The survey consisted of 12 questions (Table 1).

A total of 344 of 363 immunotherapy patients (94.8%) completed surveys (363 was the total number of patients receiving immunotherapy). The age range of the patients of the study population was 4 to 80 years, which is the age range of our immunotherapy population. Of the 338 patients (6 of the 344 patients did not respond), 276 (81.7%) were receiving aeroallergen immunotherapy, 51 (15.1%) were receiving venom immunotherapy, and 11 (3.2%) were receiving both. Patients were receiving 1 (135/341 [39.6%]), 2 (143/341 [41.9%]), 3 (57/341 [16.7%]), or more than 3 (6/341 [1.8%]) injections at each visit (3 of the 344 patients did not respond).

Of the 343 patients who answered the question regarding length of immunotherapy, 103 (30.0%) had been receiving immunotherapy for less than 12 months, 76 (22.2%) for 12 to 23 months, 52 (15.2%) for 24 to 35 months, 40 (11.7%) for 36 to 47 months, 19 (5.5%) for 48 to 59 months, and 53 (15.5%) for more than 59 months. Of the 323 patients who responded to the question regarding improvement of symptoms since starting immunotherapy, 36 (11.1%) believed that their symptoms had not improved at all, 40 (12.4%) had slightly improved symptoms, 71 (22.0%) had moderately improved symptoms, 113 (35.0%) had mostly improved symptoms, and 63 (19.5%) reported completely improved symptoms with immunotherapy. Most patients (218/312 [70.0%]) surveyed were receiving immunotherapy in the red 1:1 vol/vol (maintenance) vial.

Before starting immunotherapy, 305 of the 355 allergists (88.7%) informed their patients of the number of injections they would be receiving. Of the 55 pediatric patients (respondents aged 4–17

years), 48 (87.2%) were receiving aeroallergen immunotherapy, 4 (7.2%) were receiving venom immunotherapy, and 3 (5.5%) did not answer. None of the patients aged 4 to 17 years were receiving both aeroallergen and venom immunotherapy.

For the 247 patients who were receiving 1 injection, 234 (94.7%) reported that they would not decline immunotherapy or that it did not matter to them if they had to get 2 or 3 injections. Of the 241 patients receiving 2 injections, 226 (93.8%) would not decline immunotherapy or it did not matter if they had to get 3 injections. Of the 234 patients receiving 2 or 3 injections, 16 (6.8%) would not prefer to receive fewer injections, 141 (60.3%) thought that it did not matter, and 77 (32.9%) would prefer at most receiving 1 or 2 injections. Of the 44 pediatric patients receiving 1 injection, 39 (88.6%) reported that they would not decline immunotherapy or that it did not matter to them if they had to get 2 or 3 injections. Of the 44 patients receiving 2 injections, 37 (84.1%) would not decline immunotherapy or it did not matter if they had to get 3 injections. Of the 45 receiving 2 or 3 injections, 4 (8.9%) would not prefer to receive fewer injections, 21 (46.7%) thought that it did not matter, and 20 (44.4%) would prefer receiving at most 1 or 2 injections. The denominators are different because not all patients answered every question.

When asked what the *maximum* number of injections they would be willing to receive (1, 2, 3, 4, 5, or >5), 174 patients responded. Of these, 15 (8.6%), 33 (19.0%), 40 (23.0%), 45 (25.9%), 14 (8.0%), and 27 (15.5%) responded with a maximum number of 1, 2, 3, 4, 5, or more than 5 injections, respectively. Most patients (126/174 [72.4%]) were willing to receive 3 or more injections.

Regarding pediatric patients, when asked about the *maximum* number of injections they would be willing to receive (1, 2, 3, 4, 5, or >5), 38 patients responded. Of these 38 patients, 5 (13.2%), 12 (31.6%), 7 (18.4%), 10 (26.3%), 2 (5.3%), and 2 (5.3%) responded with a maximum number of 1, 2, 3, 4, 5, or more than 5 injections, respectively. Most pediatric patients (21/38 [55.3%]) were willing to receive 3 or more injections.

The main reason we conducted this study was to evaluate patient perceptions with regard to the number of immunotherapy injections. Physicians at times try to limit the number of injections given to patients because of concern for patient discomfort and pain.⁵ This is especially true for subcutaneous immunotherapy given to children who tend to have more needle phobia.⁶

According to this survey, most patients believed that the number of immunotherapy injections received did not matter. Most patients would be willing to receive up to 3 or more immunotherapy injections if this treatment would help their allergy-related symptoms. This number was lower in the pediatric patient group ($P = .04$).

On occasion, allergists may be inclined to limit the number of allergens for subcutaneous immunotherapy because of patient discomfort. However, this survey indicates that patients want to

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Table 1

Questionnaire given to immunotherapy patients regarding injection number and technique

1. Patient age: _____
2. What are you getting allergy shots (immunotherapy) for? (circle all that apply a or b)
 - a. Aeroallergens (egg, trees, grasses, weeds, dust mites, dog, cat, cockroach, molds)
 - b. Venom (eg, honey bee, Mixed vespids, wasp, fire ant)
3. How many shots do you receive at each visit? _____
4. How many years have you been on immunotherapy?
 - a. <12 months
 - b. 12–23 months
 - c. 24–35 months
 - d. 36–47 months
 - e. 48–59 months
 - f. >59 months
5. Do you feel your symptoms have improved since starting immunotherapy?
 - a. Not improved at all yet (0% improvement)
 - b. Slightly improved (1%–25% improvement)
 - c. Moderately improved (26%–50% improvement)
 - d. Mostly improved (51%–75% improvement)
 - e. Completely improved (76%–100% improvement)
6. What color vial and volume/dose did you receive today? (silver/green/blue/yellow/red and 0.1 mL, 0.2 mL ... 0.5 mL)
7. Did your allergist inform you how many injections you would be getting before you started your allergy shots?
 - a. Yes (skip question 7)
 - b. No (answer question 7)
8. If you answered No to #6, if you had been told you would need 2 or 3 injections to include all your allergens, would you have started allergy shots?
 - a. Yes for 2, no for 3 injections
 - b. Yes for either 2 or 3 injections
 - c. No for 2 or 3 injections (would proceed with allergy shots if only 1 injection needed)

For patients getting venom immunotherapy, skip questions 8–10 and go to question 11.
For patients receiving aeroallergen immunotherapy, please continue to answer rest of questions:

Now that you are on allergy shots...

9. If you are getting 1 injection currently, would you decline allergy shots if you had to get 2 or 3 injections?
 - a. Yes
 - b. No
 - c. Does not matter
10. Or, if you are getting 2 injections currently, would you decline allergy shots if you had to get 3 injections?
 - a. Yes
 - b. No
 - c. Does not matter
11. If you are getting 2 or 3 injections currently, would you prefer at most getting 1 or 2?
 - a. Yes
 - b. No
 - c. Does not matter
12. Is there a maximum number of injections you would be willing to receive at each visit to improve your allergy symptoms?
 - a. Yes
 - b. No
 - c. As many as it takes
13. If yes, what is the maximum number of injections you would be willing to receive?
 - a. 1
 - b. 2
 - c. 3
 - d. 4
 - e. 5
 - f. >5, fill in the number _____

receive all clinically relevant allergens for their immunotherapy despite having to receive potentially more immunotherapy injections. Consequently, allergists should include their patients in the decision regarding the number of immunotherapy injections per visit.

Other interesting information from this survey is that most allergists in this practice are good at communicating to their patients the number of injections they would be receiving. Eighty-nine percent of patients knew how many injections they would receive per visit before starting their immunotherapy.

In addition, most immunotherapy patients are receiving 2 or more immunotherapy injections per visit. This is because patients are typically receiving multiallergen immunotherapy in this practice. To dose these extracts effectively while separating pollen from extracts with high proteolytic activity (mold or cockroach) as recommended by the immunotherapy practice parameter, a higher number of injections is required.⁷

Our survey has some limitations. One of the limitations that we did not address is the cost of immunotherapy. Our immunotherapy patients are members of the military (active duty, dependents, and retirees), and they pay no additional money to receive allergen immunotherapy at our clinic. Cost of immunotherapy may be a factor that limits patients' preference when deciding to start immunotherapy or to receive multiple injections of immunotherapy. Another limitation of our study is that we did not survey patients who declined the recommendation to receive immunotherapy. This is a good idea for a follow-up study. Several studies have evaluated why patients discontinued immunotherapy, and inconvenience and logistical constraints were listed as the major factors in nonadherence to immunotherapy.^{8–10} We also did not ask patients to specify their sex in this research survey.

In conclusion, this is the first survey to investigate patient preference regarding number of injections for immunotherapy. Most immunotherapy patients are willing to receive 3 or more injections per visit, and allergists should include their patients in the decision involving the number of immunotherapy injections per visit.

Christopher A. Coop, MD

Sandy K. Yip, MD

Michael S. Tankersley, MD

Department of Allergy and Immunology

Wilford Hall Ambulatory Surgical Center

Joint Base San Antonio-Lackland

San Antonio, Texas

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