Diagnostic Capacity of Commercial Extracts vs Prick-by-Prick in the Study of Sensitization to Peanut: Which Technique Should We Use?

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Peanut is a well-known allergen that can cause severe reactions. Skin tests are usually the first step when confirming IgE-mediated sensitization owing to their simplicity and reliability [1]. There is currently no consensus on whether the skin prick test (SPT) using commercialized allergen extracts or the prick-by-prick test with fresh food is preferable for detecting allergen sensitization [2-4]. We aimed to compare the diagnostic capacity of SPT with that of prick-by-prick testing in the detection of sensitization to peanut and to investigate the association between the results of these tests and the molecular sensitization profile.

The study population comprised 42 patients (aged >6 years) who were prospectively recruited from 5 allergy departments in Spain. All patients had a history of objective symptoms (digestive, respiratory, urticaria, or anaphylaxis) immediately after ingestion of peanut during the previous 2 years and a positive SPT result with commercial peanut extract (ALK-Abelló, Bial-Aristegui, Diater, or Leti, as used in each allergy service). All patients signed the informed consent document (Investigational Ethics Committee [060-2013]) and filled out the study questionnaire on symptoms presenting with peanut and the frequency of consumption of other foods.

SPTs were performed with 4 commercial peanut extracts (ALK-Abelló, Bial-Aristegui, Diater, Leti), peach extract (30 mg/mL of Pru p 3, ALK-Abelló), profilin (ALK-Abelló), peanut lipid fraction extract (Diater), and apple extract...
Abbreviations: CE, commercial extract; PBP, prick-by-prick; SPT, skin prick test.

Table. Skin Test Results in the Studied Population

<table>
<thead>
<tr>
<th>Commercial Extract/Allergen</th>
<th>Diater</th>
<th>Leti</th>
<th>ALK-Abelló</th>
<th>Bial</th>
<th>Roasted Peanut</th>
<th>Peanut Butter</th>
<th>Lipid Fraction (Diater)</th>
<th>Peach Extract (30 mg/mL of Pru p 3, ALK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%) of positives</td>
<td>30 (90.5)</td>
<td>37 (88)</td>
<td>36 (85.7)</td>
<td>33 (78.6)</td>
<td>22 (52.4)</td>
<td>26 (61.9)</td>
<td>8 (19)</td>
<td>29 (96)</td>
</tr>
<tr>
<td>Mean wheal size, mm</td>
<td>32 (8;77)</td>
<td>38.1 (8;103)</td>
<td>35.6 (7;161)</td>
<td>26.6 (7;95)</td>
<td>33.7 (7;143)</td>
<td>31.5 (7;88)</td>
<td>33.7 (7;143)</td>
<td>43.8 (8;102)</td>
</tr>
</tbody>
</table>

Abbreviations: CE, commercial extract; PBP, prick-by-prick; SPT, skin prick test.

The mean value of specific IgE against peanut was 5.57 kU/L. Higher concentrations were found in patients sensitized exclusively to storage proteins than in those who were sensitized exclusively to LTP (median sIgE, 14.89 vs 2.94 kU/L, respectively; Mann-Whitney, P < .034).

According to our results, the commercial extracts studied were better able to detect sensitization to peanut than the prick-by-prick technique, in contrast to the findings of Rancé et al [6], who found superior diagnostic capacity with raw extracts than commercial extracts and hypothesized that this difference may be due to the loss of peanut oil and hydrophobic agents in the commercial extracts. However, we only found positive SPT results with the lipid fraction—the isolated oily fraction—in 19% of the population, and neither monosensitization nor negative SPT results with commercial extracts were observed in these patients.

Although the allergenic composition of commercial food extracts may be highly variable [6,7], we hypothesize that mechanical or chemical procedures during the preparation of the extracts may favor the availability of the different allergenic components, especially LTP, to which most of the patients were sensitized. Moreover, we consider that the presence of other components may be affected by cooking or presentation of the food in prick-by-prick testing, which is often used because of its simplicity and low cost but is not standardized [8]. Therefore, it is important to consider the possibility of obtaining false-negative results. Additionally,
performance of prick-by-prick testing may vary according to the total amount of allergen tested, its state of preservation, and its exposure to the skin. However, the skin tests were performed by allergology nurses to minimize these factors. The commercial extracts we used demonstrated better diagnostic performance in detecting sensitization to peanut than the prick-by-prick approach, although these results varied according to the molecular sensitization profile.

A potential limitation of the present study was the impossibility of determining specific sIgE against all the available peanut allergens and the fact that not all the patients underwent oral food challenge. Our data point to the usefulness of performing SPT to peanut using commercial extracts. However, commercial peanut extracts must be standardized in order to guarantee the presence of all allergenic components and thus improve diagnostic accuracy.

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Conflicts of Interest

The authors declare that they have no conflicts of interest.

References