Patch test practices and perceptions of Chinese dermatologists: results of a cross-sectional survey

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Summary

Background. Patch testing is the most valuable tool for diagnosing allergic contact dermatitis. Whereas previous surveys have evaluated patch test practices and perceptions of dermatologists worldwide, no such information is available relating to Chinese dermatologists.

Objectives. We surveyed Chinese dermatologists by using questionnaires to investigate their patch test practices and the prevalence of patch testing.

Methods. A cross-sectional survey of Chinese dermatologists was conducted at the National Congress of Dermatology in December 2006.

Results. Of the 1116 questionnaires distributed, 1089 (97.6%) were returned. Eighty-six per cent of dermatologists reported performing patch testing. Dermatologists from regional hospitals were significantly more likely to perform patch testing (p < 0.001). The majority (80.8%) used the baseline (standard) allergen series made in China. Eighty-seven per cent of testers performed only a single patch test reading. The dermatologists’ perceptions of the patch test indicated that 43.1% of the respondents thought that patch testing could be used to diagnose irritant contact dermatitis, and only 30.3% of the respondents made the correct choice when asked to read a patch test reaction.

Conclusions. Patch testing is widespread among Chinese dermatologists, but further improvement and education regarding the procedure is required.

Key words: China; contact dermatitis; patch testing; questionnaire; survey.
we found that some dermatologists in China misunder-
stood the patch test procedure and its purpose. In the
literature, 22.8% of patch tests were used to diagnose
non-type IV hypersensitivity reactions. In addition, more
than half of the papers had faults in the description of
the patch test methodology. Therefore, to examine the preva-
lence and practice of patch testing by dermatologists in
China, we conducted a cross-sectional survey of Chinese
dermatologists.

Materials and Methods
A questionnaire was distributed to dermatologists who
attended the Chinese Dermatologists Association Annual
Congress on 20 December, 2006 in Shanghai. The
participants completed the questionnaire on site. The
questionnaire consisted of basic demographic information
and 10 multiple-choice questions.

The multiple-choice questions consisted of two
categories. The first category included the following
questions on patch test practices and methodologies:
Q1. Do you perform patch testing in your practice?
Q2. Which kind of chamber do you use when you
practise patch testing?
Q3. Which kind of ‘standard’ series do you use when
you practise patch testing?
Q4. How long do you leave the patch on during patch
testing?
Q5. When do you perform patch test readings?

The second category included the following questions
related to perceptions of patch testing:
Q6. Which diseases could patch testing be used to
diagnose?
Q7. When is the most suitable time to perform patch
testing?
Q8. Where is the most suitable site for patch testing?
Q9. What is the reaction of a patch test scoring ++?
Q10. Who would read the patch test reactions?

Data were recorded on a standardized computer entry
form, and statistical analysis was performed with SPSS™
11.5 (SPSS, Chicago, IL, USA). Pearson $\chi^2$-tests were
used to test for associations between some demographic
characteristics of the respondents and patch test practices
or perceptions. A significance level of 0.05 was used for
all of the analyses.

Results

Respondents
We distributed 1116 questionnaires, and 1089 (97.6%)
were returned completed. Of the respondents, 25.0%
were chief dermatologists, 11.5% were associate chief
dermatologists, 15.6% were attending dermatologists,
4.1% were residents, 18.9% were trainees, and 24.9%
were clinical technicians. The results showed that 54.6%
of the respondents were working in a regional hospital,
40.7% were working in a district hospital, and 3.8% were
working in a community hospital.

Patch test practices
Eighty-six per cent (936 of 1089) of respondents stated
that they performed patch testing in their practice. Of
those who did, 83.3% stated that they patch-tested at
least once a month (Table 1).

Patch test methodologies
The majority of dermatologists who performed patch
testing used chambers made in China of aluminium on
adhesive tape. Approximately 27.3% of testers used Finn
Chambers® or plastic chambers. Most (80.8%) testers
used allergens made in China as the baseline series (termed
‘standard’ series in the United States). Only 12.7% of
dermatologists used the thin-layer rapid use epicutaneous
TRUE Test™ series or the Chemotechnique Diagnostics®
series. The results indicated that 57.4% of testers left the
patches on for the recommended 2 days, and 29.4% left
the patches on for 1 day. The majority of testers (87.6%)
performed only one patch test reading at 0.5, 24, 48 or
72 hr, or 7 days after removal (Table 2).

Perception of patch testing
The responses to the five questions (Q6–Q10) about the
patch test technique are shown in Table 3.

Association with patch testing
Dermatologists from regional hospitals were significantly
more likely to perform patch testing (Table 4). The
perception of patch testing did not significantly vary by
the grade of dermatologist (Table 5).

Discussion
The on-site survey design can avoid the response bias
of mailed or electronic surveys. In mailed or electronic

<table>
<thead>
<tr>
<th>Table 1. Frequency of patch testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>At least once a week</td>
</tr>
<tr>
<td>One to three times a month</td>
</tr>
<tr>
<td>Less than once a month</td>
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</tbody>
</table>

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surveys, dermatologists interested in patch testing may be more motivated to complete and return the survey than those who are not interested in this subject (5, 6).

This survey demonstrates that patch testing is widely practised in China by dermatologists (86.0%). This prevalence rate is similar to the 83% of US dermatologists who reported patch testing in 2002 (5), but lower than the 100% reported by the Scottish Dermatology Society in 2000 (7). Dermatologists from district hospitals were less likely to perform patch testing, and the dermatologists from community hospitals performed the procedure at the lowest rate. These findings may be attributable to a lack of dermatology experts and fewer patients with dermatosis at community hospitals in China.

There are currently no nationally agreed baseline allergen series in China. In this study, 80.8% of the testers used one of two kinds of baseline series made in China. The Peking Medical University baseline series contains 26 allergens, and has been widely used in China. It is most similar to the ‘standard’ series of the North American Contact Dermatitis Group (NACDG) (8, 9). The Nanjing Medical University baseline series contains 20 allergens, similar to the ‘standard’ series of the North American Contact Dermatitis Group (NACDG) (8, 9). The Nanjing Medical University baseline series contains 20 allergens, and has been widely used in China. It is most suitable for use in routine clinical practice in China (10).

Table 2. Patch testing methodologies

<table>
<thead>
<tr>
<th>Chambers used</th>
<th>No.</th>
<th>Percentage (n = 936)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chambers made in China</td>
<td>584</td>
<td>62.4</td>
</tr>
<tr>
<td>Finn Chambers</td>
<td>230</td>
<td>24.6</td>
</tr>
<tr>
<td>Self-made filter papers</td>
<td>123</td>
<td>13.1</td>
</tr>
<tr>
<td>Plastic chambers (I.Q.)</td>
<td>25</td>
<td>2.7</td>
</tr>
<tr>
<td>Others</td>
<td>34</td>
<td>3.6</td>
</tr>
<tr>
<td>Baseline (standard) series used</td>
<td>407</td>
<td>43.5</td>
</tr>
<tr>
<td>Peking Medical University baseline (Beijing, China)</td>
<td>349</td>
<td>37.3</td>
</tr>
<tr>
<td>Nanjing Medical University baseline (BIANMIN, Kangning Medical Development Company, Nanjing, China)</td>
<td>78</td>
<td>8.3</td>
</tr>
<tr>
<td>TRUE Test</td>
<td>41</td>
<td>4.4</td>
</tr>
<tr>
<td>Chemotechnique Diagnostics</td>
<td>82</td>
<td>8.8</td>
</tr>
</tbody>
</table>

Patch test reading schedule (after removal)

- 0.5 hr only: 191, 20.4%
- 24 hr only: 281, 30.0%
- 48 hr only: 230, 24.6%
- 72 hr only: 116, 12.4%
- 7 days only: 2, 0.2%
- 0.5 and 24/48 hr: 19, 2.0%
- 24 and 48 hr: 11, 1.2%
- 48 and 72 hr: 13, 1.4%
- More than two times: 15, 1.6%
- Others: 58, 6.2%

Table 3. Perception of patch testing

<table>
<thead>
<tr>
<th>Answers to questions</th>
<th>No.</th>
<th>Percentage (n = 1089)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6</td>
<td>Allergic dermatosis</td>
<td>792</td>
</tr>
<tr>
<td>Chronic eczema of uncertain cause</td>
<td>559</td>
<td>51.3</td>
</tr>
<tr>
<td>Irritant contact dermatitis</td>
<td>469</td>
<td>43.1</td>
</tr>
<tr>
<td>Allergic contact dermatitis</td>
<td>668</td>
<td>61.3</td>
</tr>
<tr>
<td>Q7</td>
<td>Acute stage</td>
<td>116</td>
</tr>
<tr>
<td>Chronic stage</td>
<td>139</td>
<td>12.8</td>
</tr>
<tr>
<td>Immediately after lesions resolved</td>
<td>83</td>
<td>7.6</td>
</tr>
<tr>
<td>Two weeks after lesions resolved</td>
<td>628</td>
<td>57.7</td>
</tr>
<tr>
<td>Others</td>
<td>123</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Table 4. Associations of hospital level and patch test practice

<table>
<thead>
<tr>
<th>Hospital level</th>
<th>Regional hospital (%)</th>
<th>District hospital (%)</th>
<th>Community hospital (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patch test</td>
<td>534 (89.7)</td>
<td>359 (81.0)</td>
<td>33 (80.5)</td>
</tr>
<tr>
<td>Do not patch test</td>
<td>61 (10.3)</td>
<td>84 (19.0)</td>
<td>8 (19.5)</td>
</tr>
<tr>
<td>n = 1079</td>
<td>( \chi^2 = 16.83, \text{d.f.} = 2, p &lt; 0.001 )</td>
<td></td>
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</tr>
</tbody>
</table>

Data were analysed with the Pearson \( \chi^2 \)-test with two degrees of freedom (d.f.).

This survey demonstrated that patch testing is widely practised in China by dermatologists (86.0%). This prevalence rate is similar to the 83% of US dermatologists who reported patch testing in 2002 (5), but lower than the 100% reported by the Scottish Dermatology Society in 2000 (7). Dermatologists from district hospitals were less likely to perform patch testing, and the dermatologists from community hospitals performed the procedure at the lowest rate. These findings may be attributable to a lack of dermatology experts and fewer patients with dermatosis at community hospitals in China.

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whereas the TRUE Test™ is the most common ‘standard’ series used by US dermatologists and allergists (5, 13). Thus, the term ‘standard’ is perhaps a misnomer, because the ‘standard’ series is far from standardized.

In our study, only 8.3% of the testers used the TRUE Test™, although it is easy to apply. The reason may be that the TRUE Test™ was approved for use in China only 2 years ago, and its use is not yet widespread. Another possible reason for its low level of use is that the TRUE Test™ is approximately twice as expensive as the series produced in China.

It is discouraging that 87.6% of those who perform patch testing read tests on only one occasion. This rate is much higher than that reported in the United States, where approximately 33% of allergists and 27% of general dermatologists perform a single patch test reading (5, 13). Only 14% of those in the American Contact Dermatitis Society perform single readings (14). It is generally accepted that two readings should be performed, and a third reading on day 5 may give further positive results (15). A single day 2 reading is associated with the loss of up to one-third of positive reactions, and irritant reactions can be mistaken for allergic reactions (16, 17). Although the majority of dermatologists in China are performing patch testing, we must focus future educational efforts on the importance of performing second patch testing readings.

When we assessed the perceptions of patch testing among dermatologists in China, we found that some dermatologists did not have a comprehensive understanding of patch testing. Forty-three per cent of the respondents thought that patch testing could be used to diagnose irritant contact dermatitis. This rate is higher than the 22.8% reported in the CNKI database obtained in our previous statistical analysis (4). This difference may be because the authors of the CNKI publications were more interested in patch testing than the respondents in this survey. Forty-two per cent of our questionnaire respondents made a wrong choice when they were asked, “When is the most suitable time to apply patch testing?” Patch testing should be avoided in those with acute dermatitis, as false-positive results are possible.

In terms of reading patch test results, half of the respondents believed that a trained dermatologist should perform readings. It is surprising that only 30.3% of the respondents made a correct choice about reading the patch test. This result might be explained by the fact that most dermatologists did not perform patch testing by themselves, as specialized doctors in China perform the majority of patch tests. Another possible explanation is the lack of patch test training for dermatologists in China. Although there is a long-established trainee rotation in China, a significant number of dermatologists do not learn the patch test technique during their general dermatology rotation. Our survey did not include questions regarding patch test training, and there is a lack of accurate information in the medical literature on whether Chinese dermatologists receive formal patch test training and how they receive this training. Patch testing is relatively easy to perform.

### Table 5. Association of grade of dermatologist and patch test perception

<table>
<thead>
<tr>
<th>Patch test perception</th>
<th>Chief dermatologist (%)</th>
<th>Associate chief dermatologist (%)</th>
<th>Attending dermatologist (%)</th>
<th>Resident (%)</th>
<th>Trainee (%)</th>
<th>Technician (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases to diagnose</td>
<td>117 (43.0) 60 (48.0)</td>
<td>63 (37.1) 20 (44.4) 92 (44.7) 117 (43.2)</td>
<td>n = 1089 ( \chi^2 = 3.99, \text{d.f.} = 5, p = 0.550 )</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not ICD</td>
<td>155 (57.0) 65 (52.0)</td>
<td>107 (62.9) 25 (55.6) 114 (55.3) 154 (56.9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suitable time to perform</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Right answer</td>
<td>146 (53.7) 62 (49.6)</td>
<td>103 (60.6) 29 (64.4) 120 (58.3) 168 (62.0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong answer</td>
<td>126 (46.3) 63 (50.4)</td>
<td>67 (39.4) 16 (35.6) 86 (41.7) 103 (38.0)</td>
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</tr>
<tr>
<td>n = 1089</td>
<td>( \chi^2 = 8.65, \text{d.f.} = 5, p = 0.124 )</td>
<td></td>
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<tr>
<td>Patch test reaction reading</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right answer</td>
<td>79 (29.0) 48 (38.4)</td>
<td>43 (25.3) 12 (26.7) 60 (29.1) 88 (32.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrong answer</td>
<td>193 (71.0) 77 (61.6)</td>
<td>127 (74.7) 33 (73.3) 146 (70.9) 183 (67.5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 1089</td>
<td>( \chi^2 = 7.12, \text{d.f.} = 5, p = 0.212 )</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Staff reading reactions</td>
<td></td>
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</tr>
<tr>
<td>Trained dermatologist</td>
<td>131 (48.2) 59 (47.2)</td>
<td>88 (51.8) 24 (53.3) 102 (49.5) 139 (51.3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>141 (51.8) 66 (52.8)</td>
<td>82 (48.2) 21 (46.7) 104 (50.5) 132 (48.7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 1089</td>
<td>( \chi^2 = 1.36, \text{d.f.} = 5, p = 0.928 )</td>
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</table>

ICD, irritant contact dermatitis.

Data were analysed with the Pearson \( \chi^2 \)-test with five degrees of freedom (d.f.).
but accurate interpretation requires experience and knowledge. As Albert Kligman said, ‘Everybody can apply a patch test. Reading requires an expert’ (18). Education and experience are necessary to interpret patch test readings accurately and to provide correct information for patients (19).

We found that there was no association between the grade of dermatologist and the perceptions of patch testing. The similar distribution rates suggest that dermatologists in each grade of their careers are not fully familiar with patch testing.

In conclusion, this study has shown that patch testing is performed widely by Chinese dermatologists, but further education should be provided. The findings of this survey may form the basis for future studies and education efforts.

Acknowledgements
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References