Effectiveness of dermoscopy in skin cancer diagnosis

Sydney Davis MD  Cleveland Piggott MD MPH  Corey Lyon DO  Kristen DeSanto MSLS MS RD AHIP

Clinical Inquiries question
Does dermoscopy improve the effectiveness of skin cancer diagnosis when used for skin cancer screening?

Evidence-based answer
Dermoscopy added to visual inspection is more accurate than visual inspection alone in the diagnosis of melanoma and basal cell carcinoma (BCC). However, there is insufficient evidence to draw conclusions on the effectiveness of dermoscopy in the diagnosis of squamous cell carcinoma (SCC; strength of recommendation B: based on systematic reviews of randomized controlled trials [RCTs], and prospective and retrospective observational studies).

Evidence summary
A 2018 Cochrane meta-analysis of 24 prospective observational studies, retrospective observational studies, and RCTs (15 660 lesions) examined whether dermoscopy improves the accuracy of BCC or SCC diagnosis compared to visual inspection alone. Diagnostic accuracy was evaluated in 2 types of encounters: in-person assessment and remote assessment of clinical images. Similar to the previous Cochrane meta-analysis, the reference standard was histopathologic diagnosis with follow-up of benign-appearing lesions. As well, estimates of sensitivity and specificity were calculated by finding the points on the receiver operating characteristic curve with 80% specificity and sensitivity, respectively. Dermoscopy for the diagnosis of BCC was more accurate than visual inspection alone for in-person and for remote image-based evaluations (Table 1). The improved sensitivity and specificity of dermoscopy led to a significant increase in the relative diagnostic odds ratio (RDOR) for dermoscopy plus visual inspection (RDOR = 4.7; 95% CI 3.0 to 7.5) and for dermoscopy plus image-based assessment (RDOR = 5.6; 95% CI 3.7 to 8.5).

A 2019 systematic review and meta-analysis, published after the searches were done in the Cochrane meta-analyses, examined the accuracy of dermoscopy with and without visual inspection in the diagnosis of BCC. This review included 17 prospective observational studies and RCTs (9747 skin lesions) that assessed both in-person evaluations and dermoscopy added to visual inspection alone for in-person evaluations, and dermoscopy added to image-based inspection was better than image-based inspection alone (Table 1). The improved sensitivity and specificity of dermoscopy led to a significant increase in the relative diagnostic odds ratio (RDOR) for dermoscopy plus visual inspection (RDOR = 4.7; 95% CI 3.0 to 7.5) and for dermoscopy plus image-based assessment (RDOR = 5.6; 95% CI 3.7 to 8.5).

Table 1. Accuracy of dermoscopy in the detection of melanoma in adults

<table>
<thead>
<tr>
<th>DETECTION METHOD</th>
<th>SENSITIVITY, %</th>
<th>SPECIFICITY, %</th>
<th>POSITIVE LIKELIHOOD RATIO</th>
<th>NEGATIVE LIKELIHOOD RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual inspection alone (in person)</td>
<td>76</td>
<td>75</td>
<td>3.04</td>
<td>0.32</td>
</tr>
<tr>
<td>Dermoscopy with visual inspection (in person)</td>
<td>92</td>
<td>95</td>
<td>18</td>
<td>0.08</td>
</tr>
<tr>
<td>Image-based visual inspection alone (not in person)</td>
<td>47</td>
<td>42</td>
<td>0.81</td>
<td>1.3</td>
</tr>
<tr>
<td>Dermoscopy with image-based visual inspection (not in person)</td>
<td>81</td>
<td>82</td>
<td>4.5</td>
<td>0.23</td>
</tr>
</tbody>
</table>

ROC—receiver operating characteristic.
*Estimated sensitivity calculated on the summary ROC curve at a fixed specificity of 80%.
†Estimated specificity calculated on the summary ROC curve at a fixed sensitivity of 80%.
Data from Dinnes et al.
and remote image-based evaluations. The reference standard for BCC was histopathologic diagnosis. Overall pooled sensitivity and specificity of dermoscopy for the diagnosis of BCC was 91.2% (95% CI 90.0% to 92.4%) and 95% (95% CI 85% to 99%), respectively. Compared to naked eye examination alone, adding dermoscopy to naked eye examination improved sensitivity from 67% to 85% (5 trials; 4455 lesions; \( P = .0001 \)) and improved specificity from 97.2% to 98.2% (3 trials; 3721 lesions; \( P = .006 \)). These results were limited by considerable heterogeneity among studies.

Dr Davis is a resident family physician, Dr Piggott is Assistant Professor and Director of Diversity & Health Equity for Family Medicine, Dr Lyon is Associate Professor in the Department of Family Medicine, and Ms DeSanto is Clinical Librarian in the Strauss Health Sciences Library, all at the University of Colorado in Denver.

Competing interests
None declared

Correspondence
Dr Cleveland Piggott; e-mail cleveland.piggott@cuanschutz.edu

References