

Effectiveness of dermoscopy in skin cancer diagnosis

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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 104 prospective observational studies, retrospective observational studies, and RCTs (42 788 lesions, 5700 melanomas) evaluated the diagnostic accuracy of dermoscopy with visual inspection (either in-person evaluation or image-review inspection) compared to visual inspection alone for the detection of cutaneous invasive melanoma and atypical intraepidermal melanocytic variants in adults.¹ Diagnostic accuracy was evaluated by in-person assessment (face to face) or remote assessment of clinical images (not face to face) by primary care providers or specialists in a variety of settings. The reference standard was histopathologic diagnosis, but it also included follow-up of benign-appearing lesions because not all benign-appearing lesions were biopsied. As the studies used different methods and timing to determine if lesions were melanoma or not, we calculated illustrative examples of sensitivities and specificities at the points on the receiver operating characteristic curve with 80% specificity and sensitivity, respectively; we chose 80% because it was the value used for most of

the analyses. Dermoscopy added to visual inspection was more accurate in detecting melanocytic lesions than 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).

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.² 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 image-based evaluations (Table 2). The improved sensitivity and specificity of dermoscopy led to a significant increase in the RDOR for dermoscopy plus in-person assessment (RDOR=8.2; 95% CI 3.5 to 19.3) and for dermoscopy plus remote image-based evaluations (RDOR=3.9; 95% CI 1.2 to 5.0). Insufficient data were available to draw conclusions on the accuracy of dermoscopy for the detection of SCC.

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.³ This review included 17 prospective observational studies and RCTs (9747 skin lesions) that assessed both in-person evaluations

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

DETECTION METHOD	SENSITIVITY,* %	SPECIFICITY,† %	POSITIVE LIKELIHOOD RATIO	NEGATIVE LIKELIHOOD RATIO
Visual inspection alone (in person)	76	75	3.04	0.32
Dermoscopy with visual inspection (in person)	92	95	18	0.08
Image-based visual inspection alone (not in person)	47	42	0.81	1.3
Dermoscopy with image-based visual inspection (not in person)	81	82	4.5	0.23

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.¹

Table 2. Accuracy of dermoscopy in the detection of basal cell carcinoma


DETECTION METHOD	SENSITIVITY,* %	SPECIFICITY, [†] %	POSITIVE LIKELIHOOD RATIO	NEGATIVE LIKELIHOOD RATIO
Visual inspection alone (in person)	79	77	3.4	0.27
Dermoscopy with visual inspection (in person)	93	99	93	0.07
Image-based visual inspection alone (not in person)	85	87	6.5	0.17
Dermoscopy with image-based visual inspection (not in person)	93	96	23	0.07

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.²

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. 

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Competing interests

None declared

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