Ultrasonography or palpation for detection of melanoma nodal invasion: a meta-analysis
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CRD summary
The authors concluded that ultrasonography detected lymph-node invasion more accurately than palpation and should probably be used routinely in patients with melanoma. This was generally a well-conducted review, but because of the unclear study quality and uncertainty regarding variability across studies the conclusions should be treated with caution.

Authors' objectives
To compare ultrasonography and palpation for the detection of lymph-node invasion in patients with melanoma.

Searching
MEDLINE, EMBASE, Pascal Biomed, BIUM and The Cochrane Library were searched without language restrictions from 1966 to December 2003. Search terms were reported. Reference lists of retrieved articles and textbooks were searched for additional studies.

Study selection
Studies in which the diagnostic performance of ultrasonography and palpation during initial investigations or follow-up of patients with American Joint Committee on Cancer (AJCC) stage I-III cutaneous or mucous-membrane melanoma were eligible for inclusion. Studies had to have at least 30 paired palpation-ultrasound lymph-node examinations. Characteristics of included patients needed to be well described with sensitivity and specificity values that were or could be calculated. Case reports and studies on ocular melanoma, development of ultrasound criteria and of primary melanoma lesions before excision were excluded.

The included studies were mostly from European radiology departments or dermatology departments that specialised in patients with melanoma. The primary sites of melanoma were the limb, trunk, head and neck or other. Where stated, the interval between palpation and ultrasonography ranged from less than 24 hours to 14 days. Frequency of the ultrasound probe varied between studies, as did the type of transducer used. Ultrasonography was undertaken by experienced operators in most studies. Where stated, individual melanomas had Breslow thicknesses of greater than 1mm; one study had more than 50% of patients with very thin melanoma lesions (<0·76mm). Most studies included patients with high-risk melanoma for whom early diagnosis of nodal invasion was justified. One study included a small number of patients with stage IV melanoma. Mean patient age ranged from 47 to 58 years of age.

Three authors independently selected studies for inclusion in the review; disagreements were resolved by consensus.

Assessment of study quality
The authors did not state that they assessed validity. Some criteria were reported, but these did not form part of a formal validity assessment: consecutive enrolment, follow-up and blinding.

Data extraction
Four reviewers independently extracted the data required to calculate sensitivity, specificity and likelihood ratios along with 95% confidence intervals (CIs). Where 2x2 tables contained cells with zero, each cell had 0.5 added to it. Disagreements were resolved by consensus.

Methods of synthesis
Data were pooled using a summary receiver operating characteristic (SROC) approach using the Moses model. Q* (point of equal sensitivity and specificity) was used and positive and negative likelihood ratios were estimated. The significance of differences was assessed using a Wilcoxon paired sample test to the variable log odds ratio (OR).

Results of the review
A total of 12 studies (n=6,642, range 33 to 2,008) were included in the review: seven prospective studies and two
retrospective; study type was not stated for three studies. Five studies were of consecutive patients, eight reported follow-up and three were blinded.

Higher discriminatory power was associated with ultrasonography (OR 1,755, 95% CI 726 to 4,238) compared to palpation (OR 21, 95% CI 4 to 111). Ultrasonography yielded a positive-likelihood ratio of 41·9 (95% CI 29 to 75) compared to 4·55 (95% CI 2 to 18) for palpation. Negative-likelihood ratios were 0·024 (95% CI 0·01 to 0·03) for ultrasonography and 0·22 (95% CI 0·06 to 0·31) for palpation.

Authors' conclusions
Ultrasonography detected lymph-node invasion more accurately than palpation and should probably be used routinely in patients with melanoma.

CRD commentary
The review question and inclusion criteria were clear. Several relevant sources were searched without language restrictions or diagnostic filters; unpublished studies were sought in two of the databases. Study selection and data extraction were carried out with sufficient attempts to minimise error and bias. The absence of any formal quality assessment of included trials limited interpretation of the reliability of the findings, although some quality criteria were reported which suggested that the included studies were not of the highest quality. Limited study details were reported and it was unclear what type of study designs were included in the review. Appropriate methods were used to pool data. There was no reporting of statistical heterogeneity. Most of the included studies were performed by experienced ultrasound operators; therefore, the findings of the review may only be valid under such circumstances.

This was generally a well-conducted review, but because of the unclear study quality and uncertainty regarding variability across studies the review conclusions should be treated with caution.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors stated that a large randomised controlled trial should be undertaken to assess whether follow-up with ultrasonography improved patient outcomes. There was a need to identify which ultrasound criteria were the most reliable and easy to recognise.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.