Role of ultrasonography in the diagnosis of temporal arteritis

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CRD summary
This review concluded that duplex ultrasonography was relatively accurate for diagnosing temporal arteritis and should become the first-line investigation, with biopsy reserved for patients with negative scans. These conclusions should be interpreted with caution due to the possibility of missing studies, limitations with the quality assessment and analysis and a lack of data on the clinical significance of the findings.

Authors' objectives
To evaluate the accuracy of colour duplex ultrasonography for the diagnosis of temporal arteritis.

Searching
MEDLINE, EMBASE and Cochrane Central Register of Controlled Trials (CENTRAL) were searched to July 2009. Search terms were reported. Reference lists of retrieved articles were screened. The review was restricted to English-language studies.

Study selection
Studies that assessed duplex or Doppler ultrasonography (index test) against temporal artery biopsy alone or combined with American College of Rheumatology (ACR) criteria (reference standard) for diagnosis of temporal arteritis were eligible for inclusion. Studies had to include at least five patients.

Some studies used both the temporal artery biopsy and ACR criteria as the reference standard; others used temporal artery biopsy alone. Mean age was 72 years. The ratio of men to women was 1:2. Some studies administered steroids before testing.

Two reviewers independently assessed studies for inclusion.

Assessment of study quality
Study quality was assessed using the 14-item QUADAS criteria. Studies were assigned a summary score based on the number of criteria met.

The authors did not state how many reviewers performed the quality assessment.

Data extraction
Data were extracted to construct 2x2 tables of test performance. These were used to estimate sensitivity and specificity and their 95% confidence intervals (CIs). Data were extracted separately for different imaging findings (halo alone or halo, stenosis or occlusion) and for the different reference standards (temporal artery biopsy or ACR criteria) and for whether or not steroids were administered prior to imaging.

Methods of synthesis
Summary estimates of sensitivity and specificity together with 95% CIs were estimated using DerSimonian and Laird random-effects models. Summary receiver operating characteristic curves (SROC) were estimated using the Moses-Littenberg model and the area under the SROC curve (AUC) was calculated. Summary diagnostic odds ratios (DORs) were calculated. Heterogeneity was assessed using $I^2$.

Results of the review
Seventeen studies were included (n=998 participants). Two studies met all 14 QUADAS criteria; other studies fulfilled between six and 13 criteria. Items for which studies scored poorly were reporting of time between index test and reference standard and blinding of the reference standard interpreter to the index test results.
The combination of halo, stenosis or occlusion present was more sensitive than the presence of halo alone, but specificity was similar. In studies that used temporal artery biopsy alone as the reference standard, summary sensitivity for presence of halo, stenosis or occlusion was 83% (95% CI 77% to 89%) and summary specificity was 82% (95% CI 77% to 87%) based on nine studies. Compared to ACR criteria, sensitivity was slightly lower (78%, 95% CI 72% to 84%) and specificity was increased (88%, 95% CI 84% to 91%) based on seven studies. There was evidence of heterogeneity for both analyses ($I^2=82\%$ for temporal artery biopsy and $I^2=80\%$ for ACR criteria). Whether or not steroids were administered before imaging had little impact on summary estimates.

Authors’ conclusions
Duplex ultrasonography was relatively accurate for diagnosing temporal arteritis. It should become the first line investigation, with biopsy reserved for patients with a negative scan.

CRD commentary
The review addressed a clear question. Inclusion criteria were defined in terms of index test and reference standard. Details on patients, study design and outcomes were lacking. The literature search was adequate for studies published in English, but no specific attempts were made to locate unpublished data and so there was a risk that studies were missed. Appropriate steps were taken to minimise bias and errors when selecting studies; it was unclear whether similar steps were taken during data extraction and study quality assessment. Study quality was assessed with appropriate criteria, but results were reported only as summary quality scores which have been shown to be inappropriate for these criteria. Only limited details of included studies were reported, which made it difficult to determine the generalisability of results (especially in terms of participants). Methods used to pool data were adequate, but were not based on the most statistically rigorous models.

The results of the review showed reasonable but not excellent accuracy for ultrasonography. It would have been helpful to have included estimates of likelihood ratios together with possible scenarios that showed how results modify the pre-test probability of temporal arteritis. Without such data it was difficult to determine whether the authors recommendations that duplex ultrasonography should become the first-line investigation were justified.

The authors’ conclusions should be interpreted with caution due to the possibility of missing studies, limitations with the quality assessment and analysis, a lack of details of the included studies and lack of data on the clinical significance of the findings.

Implications of the review for practice and research
Practice: The authors stated that duplex ultrasonography should become the first-line investigation for patients with possible temporal arteritis, with biopsy reserved for patients with a negative scan.

Research: The authors did not state any implications for research.

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