Imaging strategies for low-back pain: systematic review and meta-analysis

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CRD summary
This review found that immediate, routine lumbar imaging does not improve pain, function or other clinical outcomes in patients with low-back pain with no indication of a serious underlying condition. The authors recommended that routine immediate lumbar imaging should not be performed in such patients. This was a well conducted review and the authors’ conclusions are likely to be reliable.

Authors’ objectives
To investigate the effects of immediate routine lumbar imaging compared with usual clinical care on clinical outcomes in patients with low-back pain and no indication of a serious underlying condition.

Searching
The authors searched MEDLINE from inception to August 2008 and the Cochrane Central Register of Controlled Trials (third quarter 2008) without language restrictions. Search terms were reported. Reference lists of retrieved articles were reviewed to identify additional studies.

Study selection
Randomised controlled trials (RCTs) that compared immediate routine lumbar imaging (or routine provision of imaging findings) with usual clinical care without imaging (or not routinely providing results of imaging) in patients with low-back pain with no indication of a serious underlying condition were eligible for the review. Trials had to assess pain, function (primary outcomes), mental health, quality of life, patient satisfaction or overall patient-reported improvement. Included studies used radiography, magnetic resonance imaging or computed tomography. Participants mainly had acute (< 4 weeks) or subacute (4-12 weeks) low-back pain. All trials were performed in primary care or urgent care settings. Included studies varied in the percentage of patients with nerve root compression entrapment or spinal stenosis.

Two reviewers independently selected studies for inclusion; disagreements were resolved by consensus.

Assessment of study quality
Validity was assessed using a modified version of the Cochrane Back Review Group criteria covering randomisation, allocation concealment, similarity of treatment groups, blinding of outcome assessment, compliance, drop-outs, timing of outcome assessment and intention-to-treat analysis. Trials meeting four of the eight criteria were classed as higher quality.

Two independent reviewers assessed validity, with disagreements being resolved by discussion and consensus.

Data extraction
For continuous outcomes, group means and standard deviations (SDs) were used to calculate standardised mean differences (SMDs) of changes between baseline and follow-up scores. The correlation between baseline and follow-up scores was obtained from one trial and used to estimate SDs for the other trials. If a study assessed pain or function on more than one scale, the short-form-36 bodily pain score (for pain) and the Roland disability questionnaire (for functionality) were used for primary analyses. Authors were contacted for additional data if necessary.

Data were extracted by two independent reviewers.

Methods of synthesis
Studies were pooled by meta-analysis using a DerSimonian-Laird random effects model. Statistical heterogeneity was assessed using Cochran’s Q test and the $I^2$ statistic. Short-term (3 months or less) and long-term (6-12 month) follow-up
results were analysed separately, as were results with different types of imaging. Tests for publication bias were not performed because of the small numbers of trials available for pooling.

**Results of the review**

Six trials (n = 1804) were included, of which five met four or more quality criteria.

There was no significant difference between the imaging and usual care groups for pain or function at either short-term (SMD 0.19, 95% confidence interval (CI): -0.01, 0.39 for pain and 0.11, 95% CI: -0.29, 0.5 for function) or long-term (SMD -0.04, 95% CI: -0.15, 0.07 for pain and 0.01, 95% CI: -0.17, 0.19 for function) follow-up. Statistical heterogeneity was significant for short-term changes in function (I^2 72%, p = 0.03).

Trial quality, use of different imaging methods and duration of low-back pain did not affect the results. Results for other outcomes also did not differ between groups.

**Authors’ conclusions**

Immediate, routine lumbar imaging for low-back pain without indications of serious underlying conditions does not improve clinical outcomes.

**CRD commentary**

This review had clear inclusion criteria for participants, interventions, study designs and outcomes. The authors searched two relevant databases without language restrictions. Limiting the search to two databases may have resulted in the omission of other relevant studies. Unpublished studies were not sought and publication bias was not assessed, so there may be a risk of publication bias affecting the review. Validity was assessed using appropriate criteria and the results were used in the analysis. Appropriate methods were used to minimise errors and bias in study selection, validity assessment and data extraction. Relevant details of included studies were provided. Studies were pooled by meta-analysis; this appears generally appropriate although statistical heterogeneity was significant in some analyses. This was a generally well-conducted review and the authors’ conclusions appear reliable and clinically relevant.

**Implications of the review for practice and research**

Practice: The authors stated that routine, immediate lumbar imaging should not be performed in patients with acute or subacute low-back pain and no indication of a serious underlying condition.

Research: The authors stated that research is needed to determine the best imaging strategies for patients with chronic low-back pain, symptoms of radiculopathy or spinal stenosis and those being assessed in referral settings.

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