Posterior inter-body fusion in lumbar spine surgery: a systematic review

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CRD summary
This review's results suggested that posterior lumbar interbody fusion had a higher fusion rate and better correction of certain radiographic aspects of deformity than posterolateral fusion, but these results should be interpreted with caution due to the limitations in the methods of the available studies. These conclusions reliably reflect the limited evidence available up to 2006.

Authors' objectives
To determine whether posterior lumbar interbody fusion was more effective than posterolateral fusion, in improving the clinical and radiological outcomes for adults with degenerative lumbar spine conditions.

Searching
MEDLINE and EMBASE were searched to February, 2006. Three relevant journals were handsearched, and reference lists of identified studies and reviews were checked.

Study selection
Studies comparing posterior or transforaminal lumbar interbody fusion (with or without medical instruments) with posterolateral fusion (with or without instruments), for adults with degenerative conditions of the lumbar spine, were eligible. Studies had to report functional outcome, and have a minimum follow-up of two years. Patients with tumour, trauma or infection were excluded.

In the included studies, isthmic spondylolisthesis was the most common preoperative diagnosis; other diagnoses were degenerative disc disease, recurrent disc herniation, spondylolisthesis and spinal stenosis. Most patients were aged between 30 and 74 years. The outcome measures varied across the studies.

The author did not state how many reviewers selected studies.

Assessment of study quality
Study quality was evaluated using the Newcastle-Ottawa scale. The author did not state how many reviewers assessed quality.

Data extraction
The data were extracted to calculate relative risks or weighted mean differences, with 95% confidence intervals. Surgical results were predefined as satisfactory, if the patient had a score of less than 40 on the Oswestry index or more than 7 on the Prolo scale, or more than a 40% gain in Beaujon score, or if the final outcome was rated as excellent or good.

The author did not state how many reviewers extracted the data.

Methods of synthesis
Meta-analyses were performed to calculate the pooled estimates using a random-effects model. Heterogeneity was assessed using I².

Results of the review
Five studies were included, with a total of 307 patients (range 35 to 100). Four studies were retrospective; one was prospective and non-randomised. None of the studies met the criteria for high quality. The prospective study did not adequately describe its study design, statistical analysis, and group baseline data. Validated outcome assessment scales were used in only one study. Follow-up lasted from two to six years.

Compared with posterolateral fusion, statistically significant, more favourable results were found with posterior lumbar interbody fusion, for non-union rates (RR 0.21, 95% CI 0.08 to 0.56; five studies, I²=0), disc height (WMD 3.2mm,
95% CI 1.9 to 4.4; four studies), and residual percentage slippage (WMD 6.3%, 95% CI 3.9 to 8.7; four studies). No significant differences were found for complications, functional outcomes, and segmental or total lumbar lordosis.

Authors' conclusions
This review suggested that posterior lumbar interbody fusion produced a higher fusion rate and was better at correcting some radiographic aspects of deformity than posterolateral fusion, but the results should be interpreted with caution due to limitations in the methods of the available studies.

CRD commentary
The review addressed a clear question and was supported by reproducible eligibility criteria. Several methods were used to identify studies; it was unclear if there were any language restrictions. It was also unclear why the author did not search for studies published after 2006. The author did not report any methods to minimise the risks of reviewer error and bias, such as independent study selection and data extraction by two people. Since the review had only one author, it is likely that the processes were not duplicated. Study quality was assessed appropriately, and the results were used to interpret the review outcomes. Appropriate methods were used to pool the data and to assess heterogeneity.

The author’s conclusions were suitably cautious in reflecting the limited evidence available, and are likely to be reliable.

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

Research: The author stated a need for sufficiently large, methodologically sound studies to assess clinically relevant end-points.

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