A review of prognostic factors for surgical outcome of ossification of the posterior longitudinal ligament of cervical spine

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CRD summary
This review concluded that there was evidence that a number of factors had predictive value for the surgical outcome of cervical ossification of the posterior longitudinal ligament (OPLL); the evidence for others was inconclusive or absent. These conclusions reflected the results of the review, but poor reporting made it impossible to determine their reliability.

Authors' objectives
To determine the clinical factors predictive of the surgical outcome of cervical ossification of the posterior longitudinal ligament (OPLL).

Searching
PubMed was searched from 1975 to April 2007. Search terms were reported. An unspecified handsearch was conducted. The search was limited to published studies reported in English.

Study selection
Studies of at least 10 patients which focused on the assessment of predictors for surgical outcome of cervical OPLL cases and reported statistical analysis were eligible for inclusion in the review.

The mean age of patients in included studies ranged from 51.3 to 62.6 years. Most patients in all studies were male. Both anterior and posterior approaches were used in surgeries. Factors assessed in included studies were age, sex, ossification type (based on the Investigative Committee on OPLL of the Japanese Ministry of Public Health), duration of preoperative symptoms, surgical level, spinal cord evoked potentials, diabetes, preoperative neurological score, radiographic assessments and history of trauma.

One reviewer selected the papers for the review.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
Two reviewers independently performed the data extraction; disagreements were resolved through consensus or consultation with a third reviewer.

Methods of synthesis
The studies were combined in a narrative synthesis grouped by prognostic factor and supported by evidence tables.

Results of the review
Nineteen studies (n=948) were included in the review. Mean follow-up ranged from one to 14.7 years. There were some discrepancies between the text and tables (results from the text reported here).

Older age was a predictor of poorer outcome in five of the six studies where a posterior approach without fusion was adopted, but not in two studies that used an anterior approach or one that used a posterior approach with the lateral mass plate. Eight studies assessed ossification type (continuous, segmental, mixed or other) and two found that segmental ossification was a predictor of poor outcome. Six of nine studies that assessed a relationship with symptom duration found that shorter duration was associated with better outcomes. Preoperative neurological score showed a correlation with outcome in six of 11 studies.
Various types of radiographic assessment were considered: those that assessed compression in the spinal cord found a relationship only between the transverse area of the cord (three out of three studies); kyphosis showed inconclusive evidence for a relationship with outcome; increase in range of motion in the cervical spine was predictive of outcome; and intramedullar high signal intensity had predictive value in two of three studies. Three studies assessed history of trauma and all found that it affected clinical outcome. Progression of OPLL was linked to deterioration of long term outcome in six of 11 studies. The onset of ossification of the ligamentum flavum was linked to poorer long-term outcome in all three studies that assessed this. One study reported a correlation between diabetes and outcome. One study reported a relationship between changes in spinal cord evoked potentials (SCEPs) and outcome. There was no evidence of a relationship between sex or surgical level and outcome.

**Authors’ conclusions**
Clinical factors that could predict the surgical outcome of OPLL included transverse area of the spinal cord, spinal cord evoked potentials, increase in range of motion of the cervical spine, diabetes, history of trauma, onset of ossification of the ligamentum flavum in the thoracic spine, incomplete decompression, and age. Conflicting results made the influence of several factors unclear; these include neurological score, OPLL type, duration of symptoms, intramedullar high signal intensity, progression of OPLL, and kyphosis and expansion of the spinal canal. Factors such as sex, involved levels and many imaging measurements were not likely to be predictive of operative outcome.

**CRD commentary**
The review question was clear, but the inclusion criteria were broad. The authors searched only one database and limited the review to published studies reported in English. This increased the likelihood that some relevant studies were omitted from the review, and that language or publication biases were introduced. The authors reported that they used methods designed to reduce reviewer bias and error in the extraction of data, but not in the selection of studies. They did not report that they assessed the validity of the included studies and the design of these studies was not clear, which made it difficult to determine the reliability of the data. The decision to adopt a narrative synthesis was probably correct, but results of statistical tests were not reported and so it was hard to assess the results on which the synthesis was based. The authors’ conclusions appeared to reflect the results of the review, but their reliability could not be determined.

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

**Research:** The authors stated that extensive research on the pathology of cervical myelopathy due to OPLL and the aetiology of OPLL would be helpful. They further stated that the use of uniform neurological scores and appropriate statistical analysis should be adopted and the surgical approach as well as patient factors should be considered in further analyses.

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