Does 'canal clearance' affect neurological outcome after thoracolumbar burst fractures

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Authors' objectives
To carry out a comprehensive review of the literature concerning the surgical management of thoracolumbar burst fractures, in order to address the question 'Does spinal canal clearance affect the neurological outcome after thoracolumbar burst fractures?'

Searching
Papers were identified by a search of MEDLINE from 1966 to May 1999 using the keyword 'burst fracture', from the Cochrane Controlled Trials Register, and examination of the reference lists in retrieved articles and standard texts on spinal surgery. Only English or German language papers were included.

Study selection
Study designs of evaluations included in the review
The studies had to have at least 10 cases to be included. The specific study designs included in the review were prospective and retrospective, none of which were randomised or controlled.

Specific interventions included in the review
Procedures involved in the management of thoracolumbar burst fractures. Specific interventions examined in the studies included surgical (posterior and anterior approaches) and nonsurgical treatment.

Participants included in the review
Participants with thoracolumbar burst fractures at T12, L1 and L2. Most of the studies evaluated patients with all types of spinal fracture, with or without neurological injury.

Outcomes assessed in the review
Neurological outcomes. The studies had to examine neurological assessment of patients both before and after treatment to be included. The specific outcomes examined in the studies included neurological improvement and complications.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
The authors do not report a formal method for assessing validity. However, they do state that once full articles were retrieved, methodological quality filters were applied to ascertain their suitability for inclusion in a more detailed review.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the reviewers performed the data extraction. The categories of data extracted from studies were as follows: study type, treatment methods described, sample size (burst fractures at T12 to L2), neurological status before and after treatment, time from injury to intervention, follow-up, complications of treatment, and duration of hospitalisation.

Methods of synthesis
How were the studies combined?
Nine of the studies that gave precise neurological details before and after treatment for each patient, and evaluated neurological status in the same way, were pooled to provide mean improvement in neurological recovery. Studies were not weighted. Publication bias was not assessed.

How were differences between studies investigated?
The authors did not investigate sources of heterogeneity.

**Results of the review**

Sixty studies were included: 57 retrospective and 3 prospective. None were randomised or controlled. In these 60 studies, the outcomes for 3,986 patients were described, of which 2,060 patients had thoracolumbar burst fractures. The results in these cases were considered further.

Twelve studies gave precise details of the neurological status before and after treatment in all patients. Of these, 9 evaluated neurological status in the same way, using the Frankel grading system. The pooled mean improvement in neurological recovery in these studies was in favour of the nonsurgical group: 0.64 Frankel grades in surgical cases and 0.82 Frankel grades in nonsurgical cases. When patients with normal neurology before treatment were excluded, mean improvement remained in favour of the nonsurgical group: 0.83 and 0.97 Frankel grades for the surgical and nonsurgical groups, respectively.

Forty-five studies described complications and the remaining 15 either had no complications or did not report them. Ten studies reported persistent neurological deterioration.

**Authors' conclusions**

These results indicate that the neurological outcome after surgical treatment for burst fractures is no better than after non-operative treatment. Indeed, the trend is for better results to be obtained in the nonsurgical group, although the studies are too dissimilar statistically for this difference to be significant. This information should not be withheld from the patients.

**CRD commentary**

This was a poorly reported systematic review. The review question was stated clearly, but the predetermined inclusion criteria were limited. The literature search was limited to English and German language papers and there was no attempt to identify unpublished research. There was no formal assessment of validity. The studies were not pooled appropriately, as they were not weighted in any way and heterogeneity was not assessed. The authors did not provide any details on the review process. The authors' conclusions appear to follow from the results, although their claim that 'the studies are too dissimilar statistically' is unjustified, as heterogeneity has not been examined. The authors' conclusions should be viewed with some caution in light of the limitations highlighted.

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

Practice: The authors state 'if surgical treatment is employed, since it is not 'necessary' for neurological reasons, the patient should be adequately counselled as the assumption that apparent embarrassment of the spinal cord on the basis of a CT scan can be improved surgically, is without foundation'.

Research: The authors state that it is incumbent upon authors to describe clearly the patients and injuries treated, the surgical tactics employed, the complications encountered and the results of management and follow-up using standardised assessment methods. Editorial boards must insist upon these essential ingredients.

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