Caudal epidural injections in the management of chronic low back pain: a systematic appraisal of the literature
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CRD summary
This review concluded that there was good evidence for short-term and long-term pain relief with local anaesthetic and steroids for chronic pain emanating as a result of disc herniation or radiculitis and fair evidence for pain relief with local anaesthetic only. These conclusions reflect the evidence presented and are likely to be reliable.

Authors’ objectives
To assess the effect of caudal epidural injections with or without steroids in the management of various types of chronic low back pain with or without lower extremity pain emanating as a result of disc herniation or radiculitis, post lumbar laminectomy syndrome, spinal stenosis and chronic discogenic pain.

Searching
PubMed, EMBASE, The Cochrane Library, National Guideline Clearinghouse and ClinicalTrials.gov were searched from 1966 to December 2011 without language restrictions. Search terms were reported. Reference lists of relevant publications were screened.

Study selection
Randomised controlled trials (RCTs) and non-randomised observational studies that evaluated caudal epidural injections for management of chronic low back and/or lower extremity pain in adults (≥18 years) with at least three months duration of pain were eligible for inclusion. Eligible patients had to fail previous pharmacotherapy and exercise therapy prior to initiating the pain management techniques. Observational studies were included only if they had at least 50 patients in total or at least 25 patients in each group if they were comparison groups and must have been performed under fluoroscopic guidance. Case reports for the evaluation of adverse effects were included. The primary outcome was pain relief. Secondary outcomes were functional improvement, change in psychological status, return to work, reduction or elimination of opioid use or other drugs and complications.

Most of the included studies were RCTs. The type and dose of steroids used in caudal epidural injections varied between included studies. The number of injections ranged from one to five. The controls in included studies were either placebo or an active control. The duration of follow-up ranged from six weeks to four years. Most studies evaluated long-term outcomes with follow-up of at least six months. The included patients had conditions of disc herniation or radiculitis, post lumbar laminectomy syndrome, spinal stenosis and chronic discogenic pain; disc herniation or radiculitis were the most common conditions.

Two reviewers assessed studies for inclusion.

Assessment of study quality
The quality of RCTs were assessed using the Cochrane review criteria (12 relevant criteria were reported). RCTs that scored at least 9 were judged as high quality. The quality of observational studies was assessed using the Newcastle-Ottawa Scale for cohort studies (13 criteria) and case-control studies (10 criteria); cohort studies that scored at least 10 and case-control studies that scored at least 8 were judged as high quality. To be included in the analysis, cohort studies had to meet at least seven criteria and case-control studies had to meet at least five criteria. Only RCTs that met at least six criteria were included for analysis.

The level of evidence was graded as good, fair or poor on the basis of the quality of evidence developed by the US Preventive Services Task Force.

Two reviewers independently performed quality assessment. Any disagreements were resolved by a third reviewer.

Data extraction
Data were extracted on the percentage of patients who achieved pain relief and functional improvement. The authors used pain relief of at least a three-point change on an 11-point scale or 50% pain relief from baseline to define clinically significant improvement.

Two reviewers independently performed data extraction. Any disagreements were resolved by discussion or in consultation with a third reviewer.

Methods of synthesis
Studies were combined in a narrative synthesis grouped by different disease conditions.

Results of the review
Eleven RCTs and five non-randomised studies were included in the review. Most studies evaluated long-term response of at least six months; only two RCTs evaluated short-term response of less than six months. Seven RCTs were judged as high quality. All five non-randomised studies were judged as moderate quality.

Disc herniation and radiculitis (six RCTs and two non-randomised studies, 794 participants):
Four of the six RCTs that evaluated caudal epidural steroid injections assessed long-term outcomes. Three out of the four RCTs that evaluated long-term response showed positive results in pain relief and/or improvement in functional status for caudal epidural steroid injections compared with controls. One RCT showed negative or unclear results. Two RCTs that evaluated short-term response showed positive results for local anaesthetic and steroids. Two non-randomised studies evaluated long-term response and only one study showed positive response for caudal epidural injections.

Axial pain (one RCT and one non-randomised study, 217 participants):
One RCT that evaluated caudal epidural steroid injections in axial or discogenic pain showed positive long-term results for local anaesthetic with steroid compared with local anaesthetic only. One non-randomised study showed negative long-term results for caudal epidural steroid injections.

Spinal stenosis (one RCT and two non-randomised studies, 411 participants):
One RCT showed positive long-term results for caudal epidural steroid injections compared with control. Only one out of two non-randomised studies showed positive long-term results for caudal epidural steroid injections.

Post surgery syndrome (three RCTs, 238 participants):
One RCT showed equivalent long-term results for local anaesthetic and steroids compared with local anaesthetic only. One RCT assessed forceful epidural injections with steroid and sodium chloride solution and showed positive results in the forceful group and negative results with injection of only methylprednisolone. One RCT assessed hypertonic sodium chloride solution and hyaluronidase and showed positive long-term results when hyaluronidase was used.

Authors’ conclusions
There was good evidence for short-term and long-term pain relief with local anaesthetic and steroids for chronic pain emanating as a result of disc herniation or radiculitis and fair evidence for pain relief with local anaesthetic only. This review also indicated fair evidence for caudal epidural injections in the management of chronic axial or discogenic pain, spinal stenosis and post surgery syndrome.

CRD commentary
This review's inclusion criteria were clear. A number of relevant databases were searched. Limited attempts were made to find unpublished studies and may have increased potential for publication bias. No language restriction was applied in the search, which reduced the risk of language bias. Efforts were made to minimise errors and biases in the review process. Appropriate criteria were used to assess study quality. A narrative synthesis was appropriate given the high level of clinical heterogeneity across studies in terms of participants, interventions and study design.

The review was generally well conducted. The authors' conclusions reflect the evidence presented and are likely to be
reliable.

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

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