

The Argument for Use of Epidural Steroid Injections in Management of Acute Radicular Pain

By James P Rathmell, MD

Overview

Low back pain is the fifth most common problem that leads patients to seek medical attention, comprising 2.8% of physician office visits in an analysis of the National Ambulatory Medical Care Survey data.¹ The only more frequent problems were hypertension (5.5%), pregnancy care and complications (5.2%), general medical exams and well care (4.1%), and acute upper respiratory infections (3.3%). The majority of episodes of acute low back pain with or without radicular pain will resolve without specific treatment. Overall, 60% to 70% of those affected recover by six weeks and 80% to 90% recover by 12 weeks.² Epidural injection of steroids has been used to treat low back pain for many decades and now is in widespread use in many countries. There have been numerous randomized trials examining the efficacy of this approach. The rationale behind injecting glucocorticoid into the epidural space adjacent to the spinal nerve is that it will combat the inflammatory response associated with acute disc herniation and thus reduce pain.^{3,4} This inflammation can lead to direct neuronal activity, as well as swelling and mechanical compression of the nerve within the intervertebral foramen.

Systematic Reviews

Recent reviews of studies of epidural steroid injection have yielded contradictory results, although there was considerable overlap between the trials included in these reviews.^{5,6} Koes et al⁵ reviewed 12 randomized clinical trials on the efficacy of epidural steroid injections for low back pain and sciatica. Half of the trials reported positive outcomes; half reported negative outcomes. There were significant flaws in the design of most studies included in this analysis, although there appeared to be no relationship between the trials' methodologic quality and their reported outcomes. Koes et al concluded that the efficacy of

epidural injections had not yet been established.

Watts et al⁶ performed a meta-analysis of 11 placebo-controlled trials on the efficacy of injections in the treatment of sciatica (nine of the same trials were considered by Koes et al⁵). The quality of the trials was generally good. A clinically relevant response to treatment was at least 75% reduction in pain. With respect to short-term pain relief (1–60 days), the pooled odds ratio (OR) (based on ten trials) was 2.61 (95% confidence interval [CI], 1.80–3.77); with respect to long-term pain relief (12 weeks to one year), the pooled OR (based on five trials) was 1.87 (95% CI, 1.31–2.68). Watts et al concluded that epidural steroid injections are effective in the management of sciatica.

In 1999, Nelemans et al⁷ performed another systematic review of randomized clinical trials on the efficacy of injection therapy. This review differed from the previous reviews because

- It was not restricted to epidural steroid injections; it also considered epidural injections with anesthetics and other injection sites, such as facet joint and local injections.
- There is an 80% to 90% probability that patients with low back pain will recover spontaneously within three months.² The review by Nelemans et al was restricted to randomized clinical trials, which included patients with low back pain that had lasted longer than one month.

Twenty-one randomized trials, all involving patients with low back pain persisting more than one month, were included in this review. Eleven studies compared injection therapy with placebo injections. The methodologic quality of many studies was low. There were only three well-designed explanatory clinical trials: one concerning injections into the facet joints, with a short-term OR of 0.89 (95% CI, 0.65–1.21) and a long-term OR of 0.90 (95% CI, 0.69–1.17); one concerning epidural injections with a short-term OR of 0.94 (95%



James P Rathmell, MD, is the Director of the Pain Center in the Department of Anesthesia and Critical Care at Massachusetts General Hospital and Associate Professor of Anesthesia at Harvard Medical School in Boston, MA. E-mail: jrathmell@partners.org.

CI, 0.76–1.15) and a long-term OR of 1.00 (95% CI, 0.71–1.41); and one concerning local injections with a long-term OR of 0.79 (95% CI, 0.65–0.96).

Within the six subcategories of explanatory studies, the pooled ORs with 95% CIs were facet joint, short-term: 0.89 (0.65–1.21); facet joint, long-term: 0.90 (0.69–1.17); epidural, short-term: 0.93 (0.79–1.09); epidural, long-term: 0.92 (0.76–1.11); local, short-term: 0.80 (0.40–1.59); and local, long-term: 0.79 (0.65–0.96).

Nelemans et al⁷ concluded that convincing evidence is lacking regarding the effects of injection therapies for low back pain, pointing to the need for more well-designed explanatory trials in this field.

All three systematic reviews are now significantly outdated, and the Cochrane Database review performed by Nelemans et al in 1999 was withdrawn in January 2005 because database staff members noted the need for an update. Where does that leave us? Is there new evidence that can help clarify the role of steroid injections in the treatment of back pain?

Newer Studies

Several more recent randomized, controlled trials have been performed that point to a limited role for epidural corticosteroid injections in reducing the duration of acute pain.

The efficacy of injections in the conservative management of sciatica was examined by Buchner et al.⁸ Thirty-six patients with lumbar radicular pain due to herniated nucleus pulposus were randomized to receive either epidural steroid injections or no injection. At two weeks after injection, those receiving injections had superior improvement in their ability to do a straight-leg raise. There were no differences in pain reduction or functional status at six weeks or six months after injection. The authors concluded that epidural steroid injections should be recommended only in the acute phase for the conservative management of lumbosciatic pain.

Wilson-MacDonald et al⁹ conducted a prospective randomized trial of epidural steroid injection compared with intramuscular steroid injection in 93 patients with pain due to lumbar nerve root compression. All patients had been categorized as potential candidates for surgical nerve root decompression before treatment. There was a significant early (at 35 days) reduction of pain in those receiving an injection but no difference in the longer-term effects (determined at a two-year follow-up examination). Eighteen percent of patients in the epidural group and 15% of those in the control group underwent surgical decompression during the two-year follow-up period ($p =$ not significant).

In 2005, the WEST study, a large multicenter trial of epidural corticosteroid injections for sciatica, was reported.¹⁰ Two hundred twenty-eight patients with unilateral sciatica of 1 to 18 months' duration were randomized to receive either three epidural steroid injections or three interligamentous injections over a three-week period. At three weeks, those receiving epidural steroids demonstrated a significantly greater reduction in pain, but no difference between groups was seen from six to 52 weeks of follow-up monitoring. The authors concluded that epidural steroid injections afforded patients earlier relief of pain but no long-term decrease in pain or the need for surgery.

When earlier studies are reexamined, similar early reduction in pain can be seen despite the lack of long-term benefit from epidural steroid injections. Indeed, the much-cited trial performed by Carrette et al¹¹ examined the effectiveness of epidural steroid injections as compared with saline for the treatment of acute radicular pain due to disc herniation and concluded that there were no long-term benefits of epidural steroid injection. In that randomized, controlled trial involving 158 patients, although there were no demonstrable differences between epidural steroid and placebo treatment groups at three months after injection, there was significantly earlier reduction in pain and decrease in sensory deficits (three weeks after treatment) in those receiving epidural steroid injections.

Injection route has also been much debated recently. The transforaminal approach to placing epidural steroids has been advocated as a means of delivering the steroid in high concentration directly to the inflammation site near the spinal nerve within the lateral epidural space. A recent randomized trial¹² compared the efficacy of transforaminal versus interspinous corticosteroid injection in treating radicular pain in 31 patients. Thomas et al found significantly better pain reduction in the transforaminal group at 30 days.¹² Results of a mailed questionnaire also revealed significantly better pain relief and increased daily activity levels six months after injection. This small study warrants further validation by a larger controlled trial. We are still lacking studies that compare the transforaminal route to the interlaminar route.

Conclusion

Collectively, numerous studies examining the usefulness of epidural steroids for the treatment of acute radicular pain due to herniated nucleus pulposus have failed to show that injection reduces long-term pain or obviates the need for surgery. However, most of the

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studies did demonstrate more rapid resolution of pain in those who received epidural steroid injections versus those who did not. Thus, the role of epidural steroid injections in the conservative management of radicular pain is simply to facilitate earlier pain relief and return to full function. ♦

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Addendum

Since the preparation of this presentation in early 2006, several additional publications regarding epidural steroid injections have appeared. This article would not be complete without at least brief mention of two of these new articles. Earlier this year, Young et al¹ published a comprehensive review of epidural steroid injections for treating spinal disease and concluded that "... lumbar epidural steroid injections are a reasonable nonsurgical option in select patients," particularly for providing earlier resolution of pain in patients with lumbar radicular pain. Also this year, The American Academy of Neurology's Technology Assessment Subcommittee published a focused assessment of the use of epidural steroid injections to treat radicular lumbosacral pain.² This group concluded that, "... 1) epidural steroid injections may result in some improvement in radicular lumbosacral pain when assessed between two and six weeks following the injection, compared to control treatments (Level C, Class I–III evidence). The average magnitude of effect is small and generalizability of the observation is limited by the small number of studies, highly selected patient populations, few techniques and doses, and variable comparison treatments; 2) in general, epidural steroid injection for radicular lumbosacral pain does not impact average impairment of function, need for surgery, or provide long-term pain relief beyond three months." Both of these new analyses support the conclusions reached in the analysis above done last year: the role for epidural steroid injections in the conservative management of radicular pain is simply to facilitate earlier pain relief and return to full function.

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