

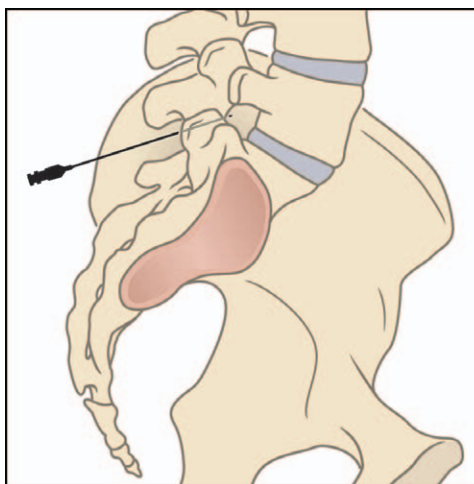
The Proper Role for Epidural Injection of Corticosteroids

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THE use of epidural injection of corticosteroids for treating painful spinal disorders has skyrocketed in the United States in recent years.¹ Despite dramatic increases in the use of epidural steroids, diagnostic imaging, and spinal surgery, it is difficult to discern any improvements in patient outcomes or reduction in back pain–related disability rates.¹ Yet, the effectiveness of epidural steroid injections has been the subject of few rigorous clinical trials. Indeed, the use of epidural steroid injections for treating many spinal disorders is by extrapolation from the modest improvements seen in speeding resolution of acute radicular pain in patients with lumbar intervertebral disc herniations.² We are learning that the use of this modality is not a panacea, and its effectiveness is closely related to the cause and duration of radicular pain.³ In this issue of *ANESTHESIOLOGY*, Cohen *et al.*⁴

present the results of a well-designed, real-life, comparative effectiveness trial that helps to clarify the role for epidural steroid injections in the treatment of cervical radicular pain. Given the emergence of so much new evidence on both risk and benefit, it is entirely appropriate to reassess the role for epidural injection of corticosteroids.

In 1901, two French physicians separately described the first use of epidurals to treat radicular pain using dilute solutions of cocaine.⁵ The mechanisms by which steroids exert their analgesic effects remain uncertain. Preclinical work has demonstrated that an intense inflammatory reaction involving the adjacent spinal nerve occurs in the hours and days following disc herniation⁶; the logical extension was to place a depot formulation of a potent steroid in direct proximity to the affected spinal nerve to reduce the inflammatory response and thereby reduce the associated pain. Initially, their use remained fairly infrequent and largely limited to treating acute lumbar radicular pain or “sciatica.” During the 1980s, a number of randomized controlled trials appeared and reported conflicting results.⁷ The technique used was variable, with some practitioners injecting corticosteroids alone and others injecting large doses of local



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less common in women during labor and delivery. The injectate itself is a steroid rather than a local anesthetic or opioid; the technique for administering the medication now typically uses radiographic guidance and a small dose of an iodinated radiographic contrast agent to confirm epidural location of the needle; and the approach to the epidural space has been modified in efforts to deliver the steroid in high concentration directly to the site of inflammation within the neural foramen, called transforaminal injection. The technique has also been adapted for delivering steroids to the thoracic and cervical epidural space to treat painful disorders at those levels. All of these changes have emerged in clinical practice with little rigorous experimentation to validate the safety or effectiveness of new indications and techniques.

In recent years, the widespread use of epidural steroid injections has been linked with devastating complications. In late 2012, a series of serious fungal infections appeared in association with use of contaminated steroid and led to dozens of patient deaths and hundreds of other serious illnesses, many with catastrophic neurologic sequelae.⁸ This outbreak was eventually traced to a contaminated drug supply, but brought this treatment to the attention of the medical community and

anesthetic; nearly all of the early studies were conducted by administering the medications using a blind loss-of-resistance technique without radiographic guidance. During the 1990s and through the following decade, the use of epidural steroids climbed dramatically¹ and the use of radiographic guidance became widespread.

Experience with epidural injections came largely with the rise in popularity of this technique for providing labor analgesia. Our obstetric anesthesiology colleagues have established a tremendous record of safety and effectiveness for epidural analgesia. In the pain clinic, use of epidural steroids has little in common with use of the same technique in obstetrics. Patients with spinal pain are typically older than parturients and have a wide range of anatomic abnormalities, prior spinal surgeries, and coexisting diseases that are far

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the public for scrutiny. During the last decade, we have also seen that devastating neurologic sequelae, although uncommon, can follow either transforaminal or interlaminar injections of epidural steroids.⁹ Given the questions about efficacy and the significant risk associated with their use, what then is the proper role for use of epidural steroids?

It is clear that injection of epidural steroids is not a broadly effective treatment for spinal pain. Rather, the efficacy of the treatment appears to be closely related to the cause of the pain. The best evidence of efficacy comes from a number of high-quality randomized controlled trials in patients with acute radicular pain associated with lumbar disc herniations where the pain could be directly correlated with the pathology seen on spinal imaging.⁵ In this population, it appears that epidural steroid injections can speed the resolution of leg pain when administered in the early weeks after injury. This population is made up of patients in their 30s and 40s often without major comorbidities and many without any prior back pain. By extrapolation, epidural steroids have been used to treat symptomatic spinal stenosis, both for patients with radicular pain associated with foraminal narrowing caused by degenerative changes and those with neurogenic claudication associated with central canal stenosis. In this group, a recent high-quality trial failed to show any improvement when epidural steroids were compared with epidural injection of local anesthetic alone: both groups showed modest improvement, and it is unclear what role the epidural administration of local anesthetic in the control group *versus* steroid in the active treatment group had in that improvement.⁷ What is clear is that the treatment effect was modest: a small but significant reduction in pain and improvement in disability. In this issue of *ANESTHESIOLOGY*, Cohen *et al.*⁴ have demonstrated similar significant but modest improvement in cervical radicular pain. Conservative treatment with neuropathic medications alone was as effective as epidural steroid injection alone or the combination of the two treatments. Thus, the need for or benefit of the epidural injection was not at all clear. In the group who received both neuropathic medications and the epidural steroid injection, a secondary outcome that examined both pain reduction and the patients' global perceived effect seemed to suggest that multimodal therapy was superior. When we go on to examine the larger population of patients with chronic neck and low back pain without radicular symptoms, the role for epidural steroid injections has not been examined in any rigorous way; this is true despite their ongoing and widespread use in this population.

So, what is the correct way to use epidural steroids based on the available evidence; what is their proper role in the treatment of spinal pain? Well, it depends. Using epidural steroids to treat patients with acute radicular pain associated with lumbar intervertebral disc herniations when the pain is severe or has persisted for more than a few weeks seems to be reasonable, safe, and supported by the available evidence. However, patients need to clearly understand that all that

these injections do for them is to speed the resolution of pain. With several additional weeks of watchful waiting, they are more likely than not to recover without injection. In patients with radicular pain or neurogenic claudication associated with lumbar spinal stenosis, the usefulness of epidural steroid injections is less clear. Limited evidence suggests that epidural injection of steroid or local anesthetic leads to similar, modest reductions in pain, but we do not know if conservative care without injection is equivalent. Thus, selective use of epidural steroid injections in this population, particularly those that have had recent onset of their symptoms, would seem prudent and acceptable until more evidence emerges to guide us. As for the observations of Cohen *et al.*⁴ in this issue of *ANESTHESIOLOGY*, it seems that the use of epidural steroids for treating cervical radicular pain has little added benefit over conservative treatment with medications alone, care that can be easily delivered in a primary care setting; if patients do receive epidural injections, they should be done only as a part of multimodal therapy in combination with physical therapy and an oral neuropathic pain treatment regimen. And so we are finally defining the proper role for a much overused technique: we are moving from their accepted, conventional, and well-established role in treating virtually any form of spinal pain to their correct, disorder-specific role based on rigorous clinical trials. The proper role for epidural steroids will undeniably be more limited than in recent years, and this treatment should be effective for a greater proportion of patients when they are properly selected.

Competing Interests

Dr. Rathmell is a Director for the American Board of Anesthesiology and is involved in preparation of the subspecialty board certification examination for physicians in the United States specializing in Pain Medicine.

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