

Complications of Cervical Epidural Blocks Attract Insurance Company Attention

By Ann S. Lofsky, MD

The Doctors Company has noted an alarming incidence of major claims relating to cervical epidural steroid blocks. In fact, the number of claims for these blocks consistently exceeds the combined total of claims for steroid blocks performed at all other levels.

Epidural steroid injections are widely used in the United States to treat chronic and acute pain. It is commonly accepted that these procedures have risks, although the general perception is that their incidence is low. Recent discussions in the anesthesia literature regarding complications of epidural steroid injections include an article in the *Anesthesia Patient Safety Foundation (APSF) Newsletter*¹ and a report of the American Society of Anesthesiologists Closed Claims Project.² The closed claim study reported that 114 out of the 276 claims for invasive pain procedures concerned epidural steroid blocks. Both articles, however, included epidurals performed at all levels (cervical, thoracic, lumbar, and caudal) in their discussions and conclusions.

While malpractice data naturally suffer from the handicap of missing denominators, discussions with our selected anesthesiologists indicate that cervical blocks may not be performed at a substantially higher rate than blocks at other levels and, therefore, may have a true higher incidence of significant complications. The narrowing of the epidural space in the cervical area and its increased proximity to the spinal cord are factors that might lead to higher injury rates when the dural space is unintentionally entered.

Several articles in the literature include prospective and retrospective reviews of large numbers of cervical epidural steroid blocks. These have all reported low complication rates with minimal or no permanent morbidity or mortality.³⁻⁶ Articles that have described serious complications have largely been isolated case reports referring to 1 or 2 instances of cord trauma causing permanent injury.^{7,8}

The Doctors Company recently collected and reviewed 13 anesthesiology claims involving allegations of arachnoiditis, paralysis, anoxic brain damage, or death following cervical epidural steroid injections. These claims were accumulated over a 3-year period and were generated by approximately 2,800 insured anesthesiologists, only 64 of whom self-identified as full-time pain management physicians. Those claims are discussed with the goals of delineating the risks involved with cervical epidural steroid blocks and identifying possible loss prevention strategies that might help to avoid similar patient injuries.

Claim Characteristics

The patients ranged in age from 31 to 81 and included slightly more females than males. The blocks were all performed at either C5-6 or C6-7 and were done in either the sitting or prone positions with the necks flexed. The needles used, when described in the records, were either #22 or #18 gauge epidural needles. Fluoroscopy was used in all but 1 case, with epidurograms obtained in most cases unless the procedures were aborted. Cord trauma with resulting neurologic injury occurred in 7 claims. Respiratory arrests occurred in 3 claims with either anoxic brain injuries or death. There was 1 claim each for epidural hematoma with cord compression, persistent headaches with neck spasms, and infarction of the spinal cord with quadriplegia.

Spinal Cord Injury

The 7 claims for spinal cord injury resulting from cervical epidural steroid injections all had MRI evidence of trauma to the cord at or near the level of the attempted epidurals. Imaging descriptions included cord edema, abnormal signals consistent with blood, fluid or contrast material within the cord, cord syrinx, or scarring. Most of these patients had pre-procedure MRIs or CT scans, proving that the findings were new.

Medical records showed that the patients complained immediately, or in recovery, of varying degrees of pain, weakness, or numbness in 1 or both arms and hands and, in 2 cases, 1 arm and the ipsilateral leg. Most patients were treated with steroids. None had surgical interventions. The symptoms tended to improve with time, but all patients alleged some permanent residual disability.

Four of the patients received intravenous sedation before the block—usually a combination of midazolam and fentanyl, with propofol added in 2 of the claims. The issue of conscious sedation during epidural steroid blocks remains controversial. While many anesthesiologists use sedation to increase patient comfort and relieve anxiety, it has been suggested by some authors that sedation might leave some patients unable to complain about pain or paresthesias, which are early warning signs of nerve irritation, before more serious damage is done.^{3,8}

One study reported a series of 5,400 epidural steroid blocks (including 669 cervical procedures) performed without intravenous sedation, with the exception of 5 patients who complained of extreme preoperative anxiety. Only 4 complications were seen in the entire study, none of which involved permanent injury. Many patients commented that the procedure was relatively painless. The authors of this study concluded that intravenous sedation is unnecessary and “heavily sedated patients are unable to respond with the expected pain and paresthesias due to spinal cord irritation in the event of errant needle placement.”³

Sudden patient movement during needle placement or injection of dye or medication was reported in 4 of these claims, including 2 of the 3 patients who were not sedated. The remaining unsedated patient complained of severe pain when the needle was first inserted, but it resolved as the injection proceeded to completion. In the claims involving sudden patient movements, it was the conclusion of some reviewers that the sudden movement had caused the needle to dislocate and perforate the cord. One reviewer commented that the patient should have been sedated to prevent movement. Since cord trauma is reportedly quite painful, however, other reviewers suggested an alternative explanation that the patients might have moved because of the needle injury and not just prior to it.

It should be noted that in 3 of the claims, when the patient moved or complained of severe pain, the injections were still performed, resulting in dye or fluid visible by MRI within the cord. Reviewers suggested that, in retrospect, it would have been preferable to remove the needles entirely and reinsert them or to have aborted the procedures.

Respiratory Arrest

All 3 of the patients who had respiratory arrests received intravenous sedation, 2 with midazolam and fentanyl and 1 with the addition of propofol. Fluoroscopy was used in every one of these procedures. All of the patients were given cervical epidural injections of bupivacaine and steroids. Interestingly, in the study of 669 uneventful cervical epidurals, the authors used lidocaine for anesthetizing the skin, and then injected only steroids into the epidural space. The authors explained: “Anesthetic agent is not injected into the cervical epidural space to avoid the risk of respiratory suppression resulting from high cervical anesthesia.”³ While it is customary for many anesthesiologists to inject local anesthesia in order to provide more

immediate pain relief, possibly extra attention should be given to the monitoring of those patients who might be at a higher risk for difficulties in the event of accidental dural puncture.

Two of the cases involved respiratory arrests in the recovery period, when the physicians were no longer in attendance. One of these patients had a post-procedure brain CT scan demonstrating contrast within the ventricles. Nurses recalled that this patient had “moved violently” during the injection. The third case had sedation administered by a second anesthesiologist while the first performed the epidural steroid block. This patient was noted to be cyanotic and in arrest on being turned to the supine position while still in the operating room, the monitor alarms apparently having been deactivated.

Epidural Hematoma

The literature seems to suggest that hematomas following cervical epidural steroid blocks are rare. There have been a handful of cases reported, not all of which involved patients on known anticoagulating drugs.¹ In 1 patient the medical record reported no prior medications known to be associated with clotting difficulties. The procedure note reported that it was difficult to locate the epidural space with the needle under fluoroscopy and that this necessitated “multiple” attempts. During the evening following the block, the patient noted progressive weakness of all 4 extremities, and an MRI demonstrated a large epidural hematoma compressing the cord. Surgical decompression was accomplished with substantial improvement in neurological function.

Headaches

Headaches were reported by many of the patients with spinal cord injuries, as might be expected post-dural puncture. It was not the primary complaint, however, and was overshadowed by the more alarming symptoms of weakness and numbness. In the 1 patient involving a primary complaint of persistent headaches, the procedure report stated that the #18-gauge Tuohy needle was advanced into the epidural space under fluoroscopy using loss of resistance. At the time of the “pop” through the ligamentum flavum, the patient moved unexpectedly, and CSF returned through the needle. The needle was then slowly withdrawn until the flow of CSF stopped and once contrast injection demonstrated epidural spread, triamcinolone was injected through the needle. In recovery, the patient complained of severe headache and over the next several days complained of neck and back pain and stiffness and numbness of the face. An MRI was unchanged over the pre-procedure studies. A neurologist attributed the symptoms to probable arachnoiditis from steroids entering into the subarachnoid space.

Spinal Cord Infarction

The only claim involving a vascular injury to the spinal cord occurred in a patient who had had a prior successful cervical epidural steroid block by the same anesthesiologist. During the second block, the patient complained of pain and “tingling” on needle insertion. The needle was withdrawn 2 mm, and the injection of local anesthetic and steroid was given. The patient immediately complained of ringing in the ears, but, according to the anesthesiologist, the block was already complete. On arrival in recovery, the patient could not move either arms or legs. An MRI showed ischemia and infarction of the spinal cord in the cervical area, and the neurological diagnosis was probable intra-arterial injection with spasm or occlusion of a vertebral artery branch.

Possible Steps to Decrease the Risk of Injury

One striking finding in reviewing these claims is that most of them included patients complaining of severe pain or moving suddenly during needle placement. This is in stark contrast to a literature report that “hundreds of our patients have commented on the relatively painless nature of the procedure.”³ Pain, paresthesias, and “jerking” movements should be considered significant warning signs of potential nerve injury, and consideration should be given to removing and repositioning the needle before proceeding with any injections, including epidurography. The possible risks of continuing with the block after a known wet-tap should also be considered.

Injections should be given slowly enough to allow patients to report symptoms, such as tinnitus or abnormal “tingling,” or pain sensations in response to questioning. Aspiration for possible blood or CSF should always be performed before injecting and ideally should be clearly documented in the procedure note.

Fluoroscopy, while advocated as a safety measure by a number of authors,^{3,9} clearly cannot alone prevent neurologic injury and, while quite valuable, should not provide a false sense of security. Cadaver evidence has shown that the ligamentum flavum, the landmark for the loss-of-resistance technique, frequently fails to fuse in the midline over the cervical interspaces, and that midline gaps were observed in more than 50% of specimens.^{9,10} This might lead to increased difficulty in localizing the space using loss of resistance as a guide.^{9,10} The authors of the study with 669 uncomplicated cervical epidurals performed almost all of their blocks at C7-T1, explaining that “the epidural space above this level is diminutive and associated with higher risk of dural puncture.”³

The monitoring of patients undergoing cervical epidural blocks is important both during the procedure and in the recovery period, especially when sedation or local anesthetics are used. Some authors suggest routine monitoring for 30 to 45 minutes after completion of the block.³ Vital signs should be recorded in the patient’s chart. Resuscitation equipment and drugs should be readily available, as should personnel trained in their use. This would include the ability to manage the airway and initiate ventilation, if necessary.

The informed-consent process for cervical epidural steroid blocks should be given sufficient time and attention. Procedures performed for chronic pain are, by definition, elective, and patients must understand and accept the risks involved before proceeding. While not all of the risks need to be enumerated, the remote possibilities of neurologic injury or death should at least be mentioned as rare but possible occurrences. That discussion should be documented in the patient’s medical record.

Documentation of the procedure itself is also important. Important information includes the patient’s position, the interspace selected, the needle size, use of fluoroscopy, the drugs and dosages administered, and the presence or absence of patient complaints or movement.

The use of intravenous sedation in these cases remains controversial. The standard of care remains broad, leaving it up to an anesthesiologist’s own judgment and discretion. Physicians should at least be aware of the issues involved and consider them in making decisions regarding the appropriate dosages and desired levels of consciousness for any given patient.

Practicing pain management physicians offered their own advice for avoiding patient injury when performing cervical epidural injections as follows:

- Try to use the C7-T1 space whenever possible. Epidurally injected substances spread up to 4 interspaces above the site of injection, so most of the cervical discs may be reached from this level while lessening the risk of cord damage.
- Use fluoroscopy to ensure accurate identification of the spinal level.
- Using the prone position may help to avoid unnecessary patient movement, decreasing the risk of

dural puncture.

- Avoid particulate steroid injections through the transforaminal approach.
- Limit sedation when possible.
- Encourage patients to communicate unusual symptoms during the procedure, and question them if they appear uncomfortable
- Avoid injecting the drug or contrast material if neuropathic pain is encountered during needle placement.

As baby boomers age, the incidence of back pain is increasing, and the demand for cervical epidural steroid injections will likely continue to increase.¹¹ As with any invasive procedure, the risks must be weighed against the potential benefits to patients in deciding its appropriateness. We are hopeful that open discussion of clinical experiences, including reviews of medical malpractice claims, will serve to make this a more informed decision for both physicians and their patients.

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