

# Spinal Injection Expert Witness: Risks, Complications, and Standard of Care (2025 Update)

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Epidural steroid injections and other spinal injections are now routine procedures in interventional pain management. For most patients, they provide meaningful relief with an excellent safety profile. At the same time, rare but catastrophic complications—including spinal cord infarction, paralysis, stroke, infection, and death—continue to generate high-exposure malpractice claims.

For attorneys and claims professionals, the challenge in these cases is not just proving what happened, but clarifying whether the technique, indications, and peri-procedural management met the evolving standard of care. That is where a spinal injection expert witness becomes essential.

## How Often Do Serious Complications Occur?

Large claims-database studies and registry data confirm that serious complications remain uncommon, but not zero. A 2025 analysis of more than 448,000 cervical epidural steroid injections (CESIs) found:

- Overall complications in about 1.7% of cases at 7 days, increasing to 8% by 90 days.
- Procedural complications in roughly 0.6% of cases at 7 days.
- Neurologic complications in about 0.5% of cases at 7 days.

Most events were minor or medical (e.g., dysrhythmias, urinary tract infections), but the study also confirmed that transforaminal injections carry higher odds of neurologic and procedural complications than interlaminar approaches. Other risk factors included existing neurologic deficits, obesity, anxiety, and the use of anticoagulant or antiplatelet medications.

These data reinforce what many clinicians and expert witnesses already see: spinal injections are generally safe, but the small risk of serious harm is real, and it is heavily influenced by patient selection and technique.

## What the FDA and Consensus Guidelines Say

In 2014, the U.S. Food and Drug Administration (FDA) issued a Drug Safety Communication warning that epidural corticosteroid injections can, in rare cases, cause stroke, paralysis, vision loss, and death. The FDA also noted that corticosteroids are not formally approved for epidural use, underscoring the importance of careful technique and informed consent.

In response, a multidisciplinary working group coordinated through the FDA Safe Use Initiative and 13 specialty societies published a consensus paper on safeguards to prevent neurologic complications after epidural steroid injections. Key safety principles that now influence the standard of care include:

- Routine use of fluoroscopic or other image guidance for cervical and lumbar epidural injections.
- Test doses of contrast to confirm epidural spread and avoid intrathecal or intravascular injection.
- Avoiding particulate steroids for cervical transforaminal injections and favoring non-particulate agents.
- Limiting cervical interlaminar injections to levels where there is adequate epidural space (typically C6-7 or below) based on pre-procedure imaging.
- Reviewing MRI or CT imaging before cervical procedures to confirm a safe trajectory and adequate canal diameter.
- Using light rather than deep sedation so the patient can report new neurologic symptoms during the procedure.
- Strict sterile technique, including mask and sterile gloves, to minimize infectious complications.

Subsequent guidelines from professional societies, including evidence-based practice parameters for epidural interventions, have largely reinforced these safeguards while refining indications, dosing, and follow-up.

## **Major Categories of Risk**

From a medico-legal perspective, complications after spinal injections generally fall into several categories:

1. Neurologic injury
  - Spinal cord infarction or direct cord trauma (more often with cervical or thoracic injections).
  - Spinal cord or nerve-root ischemia from inadvertent arterial injection of particulate steroid.
  - New or worsening radiculopathy from hematoma, misplacement, or excessive volume in a tight canal.
2. Spinal infection
  - Epidural abscess or meningitis following a breach of sterile technique or contaminated injectate.
  - Discitis or vertebral osteomyelitis after transdiscal needle passage or unrecognized infection.

### 3. Dural puncture and CSF leak

- Post-dural puncture headache and, in some cases, chronic CSF leak with positional symptoms.

### 4. Systemic and medication-related events

- Steroid-related effects (hyperglycemia, fluid retention, adrenal suppression).
- Allergic reactions to contrast, local anesthetic, or preservatives.
- Cardiopulmonary events, especially in frail patients or those receiving excessive sedation.

Understanding which of these mechanisms is most likely in a given case is a core task for the expert witness.

## How an Expert Witness Adds Value for the Defense

In defense cases, the central questions are typically whether the procedure was indicated, whether it was performed using accepted safeguards, and whether the alleged injury is causally related to the injection.

A spinal injection expert can help by:

- Reviewing imaging to determine whether the patient had pre-existing spinal cord or nerve-root compromise.
- Analyzing the fluoroscopic images, procedure note, and medication choices to assess adherence to consensus safeguards (contrast use, needle trajectory, choice of steroid, level selection, sedation strategy, and sterile technique).
- Distinguishing between complications that are recognized risks even with appropriate care versus events suggesting a deviation from standard practice.
- Explaining to the trier of fact how rare events can still occur despite meticulous adherence to guidelines.

## How an Expert Witness Assists Plaintiff Counsel

In plaintiff matters, the focus is often on identifying preventable errors and clearly linking them to the patient's neurologic or infectious outcome.

A spinal injection expert can:

- Identify high-risk decisions, such as using particulate steroids in high-risk cervical transforaminal injections, performing procedures without appropriate imaging, or proceeding at unsafe levels in a severely stenotic canal.
- Evaluate whether anticoagulant or antiplatelet agents were managed appropriately around the time of the procedure.
- Correlate the timing and evolution of symptoms with the procedure, imaging findings, and laboratory data.

- Educate the jury about how specific deviations from consensus safeguards increase the likelihood of catastrophic outcomes.

By translating technical details into clear, understandable explanations, the expert helps the jury appreciate both what went wrong and why it mattered.

## Key Questions Attorneys Should Ask in Spinal Injection Cases

Whether you represent the plaintiff or the defense, a structured approach to record review and deposition can be invaluable. Useful questions include:

- Indication and alternatives
  - Was the injection clearly indicated based on the patient's symptoms, exam, and imaging?
  - Were conservative measures tried first, and documented?
- Technique and safeguards
  - Was the procedure performed under real-time imaging with appropriate contrast?
  - Was a non-particulate steroid used where recommended (especially in the cervical region)?
  - Were level selection and needle trajectory appropriate given the canal size and pathology?
  - Was sedation minimal enough to allow patient feedback?
- Peri-procedural risk management
  - How were anticoagulant and antiplatelet medications managed?
  - Was the patient screened for infection, bleeding risk, and uncontrolled comorbidities?
- Recognition and response
  - How quickly were new neurologic symptoms or red-flag signs recognized?
  - Were emergent imaging, neurosurgical consultation, or hospital transfer initiated in a timely manner?

An experienced expert can help counsel refine these questions and interpret the answers in the context of current guidelines and literature.

## About the Author

Anthony Guarino, MD is a board-certified interventional pain management physician with more than 25 years of experience performing advanced spinal injections and minimally invasive procedures. Based in the St. Louis area, he is nationally recognized for his clinical work, teaching, and extensive experience as a medical-legal consultant and expert witness in cases involving epidural steroid injections and other spine procedures.

Dr. Guarino has reviewed and testified in cases for both plaintiff and defense across the United States. He is available to consult with attorneys and claims professionals on matters involving spinal injections, chronic pain management, and spine-related complications.