LCD - Epidural Steroid Injections for Pain Management (L33906)

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Contractor Information

CONTRACTOR NAME	CONTRACT TYPE	CONTRACT NUMBER	JURISDICTION	STATES
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First Coast Service Options, Inc.	A and B MAC	09102 - MAC B	J - N	Florida
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CMS National Coverage Policy

This LCD supplements but does not replace, modify or supersede existing Medicare applicable National Coverage Determinations (NCDs) or payment policy rules and regulations for epidural steroid injections for pain management. Federal statute and subsequent Medicare regulations regarding provision and payment for medical services are lengthy. They are not repeated in this LCD. Neither Medicare payment policy rules nor this LCD replace, modify or supersede applicable state statutes regarding medical practice or other health practice professions acts, definitions and/or scopes of practice. All providers who report services for Medicare payment must fully understand and follow all existing laws, regulations and rules for Medicare payment for epidural steroid injections for pain management and must properly submit only valid claims for them. Please review and understand them and apply the medical necessity provisions in the policy within the context of the manual rules. Relevant CMS manual instructions and policies may be found in the following Internet-Only Manuals (IOMs) published on the CMS Web site:

IOM Citations:

- CMS IOM Publication 100-02, *Medicare Benefit Policy Manual*,
    - Chapter 16, Section 180 Services Related to and Required as a Result of Services Which Are Not Covered Under Medicare
- CMS IOM Publication 100-08, *Medicare Program Integrity Manual*,
    - Chapter 13, Section 13.5.4 Reasonable and Necessary Provision in an LCD

Social Security Act (Title XVIII) Standard References:

- Title XVIII of the Social Security Act, Section 1862(a)(1)(A) states that no Medicare payment shall be made for items or services which are not reasonable and necessary for the diagnosis or treatment of illness or injury.
- Title XVIII of the Social Security Act, Section 1862(a)(7). This section excludes routine physical examinations.

Code of Federal Regulations (CFR) References:

- CFR, Title 42, Chapter IV, Sections 410.74 Physician assistants' services, 410.75 Nurse practitioners' services, and 410.76 Clinical nurse specialists' services.

Coverage Guidance

Coverage Indications, Limitations, and/or Medical Necessity

Compliance with the provisions in this LCD may be monitored and addressed through post payment data analysis and subsequent medical review audits.

History/Background and/or General Information

Low back pain is highly prevalent, with reports of 50-84% of adults experiencing back pain at some point, with a high prevalence in adults 65 and older and the highest cause of disability globally. Low back and neck pain can influence the quality of life and function and is associated with depression and anxiety.[1,2] In a 2018 National Health Interview Survey, the CDC reported 28% of men and 31.6% of women age ≥ 18 had lower back pain in the past three months.[3] There is debate and a lack of consensus on which modalities are best to treat chronic low back pain (CLBP).[4]

The epidural space lies outside the dural membrane inside the spinal canal. It runs the length of the spine and, in addition to the exiting nerve roots, contains fatty tissue and blood vessels. The spinal nerve roots can be affected by a number of processes as they travel through the epidural space, including but not limited to, compression from herniation of the nucleus pulposus of the intervertebral discs, degenerative changes involving combinations of the spinal ligaments, discs, zygapophyseal (facet) joints, intraspinal synovial cysts, osteophytes, and mechanical derangements of the spine such as spondylolisthesis. As a result of mechanical irritation, inflammation, injury to a spinal nerve root or other processes, the spinal nerve roots can become a significant and disabling source of radicular pain.[1]

Epidural steroid injections (ESIs) have been used as a non-surgical modality to treat low back and neck pain. These procedures typically involve the injection of a solution containing corticosteroids and/or anesthetic into the epidural space, although saline may be included at times.

The ESI can be performed in three ways. Interlaminar (ILESI) approaches the epidural space from the posterior spine between the two vertebral laminae near the midline. In the transforaminal approach (TFESI), the injectant is delivered through the neuroforamen dorsal to the nerve root within the intervertebral foramen. The caudal approach (caudal ESI) enters through the sacral hiatus at the sacral canal to access the epidural space.[1,4]

The treatment of individuals with spinal disorders, including pain, can be complex, and it is recommended that all individuals being considered for interventional spinal procedures undergo a thorough evaluation and be treated following development of a comprehensive care plan.

Covered Indications

1. Epidural steroid injection (ESI) will be considered medically reasonable and necessary when the following requirements are met:
   - History, physical examination, and concordant radiological image-based diagnostic testing that supports one of the following[5]:
     - Lumbar, cervical or thoracic radiculopathy, radicular pain and/or neurogenic claudication due to disc herniation, osteophyte or osteophyte complexes, severe degenerative disc disease, producing foraminal or central spinal stenosis[5] **OR**
     - Post-laminectomy syndrome,[6-8] **OR**
     - Acute herpes zoster associated pain.[6]

     AND

   - Radiculopathy, radicular pain and/or neurogenic claudication is severe enough to greatly impact quality of life or function. An objective pain scale or functional assessment must be performed at baseline (prior to interventions). The same scale* must be used at each follow-up for assessment of response.

     AND

- Pain duration of at least four (4) weeks, and the inability to tolerate noninvasive conservative care or medical documentation of failure to respond to four (4) weeks of noninvasive conservative care **or** acute herpes zoster refractory to conservative management where a four (4) week wait is not required.[6,9]

2. The ESIs must be performed under computed tomography (CT) or fluoroscopy image guidance with contrast[10] unless the patient has a documented contrast allergy or pregnancy where ultrasound guidance without contrast may be considered.
3. Transforaminal ESIs (TFESIs) involving a maximum of two (2) levels in one spinal region are considered medically reasonable and necessary. It is important to recognize that most conditions would not ordinarily require ESI at two (2) levels in one spinal region.[11]
4. Caudal ESIs and interlaminar ESIs (ILESIs) involving a maximum of one level are considered medically reasonable and necessary.[11]
5. It is considered medically reasonable and necessary to perform TFESIs bilaterally only when clinically indicated.
6. Repeat ESI when the first injection directly and significantly provided improvement of the condition being treated may be considered medically reasonable and necessary when the medical record documents at least 50% of sustained improvement in pain relief and/or improvement in function measured from baseline using SAME scale* for at least three months.[7,8] If a patient fails to respond well to the initial ESI, a repeat ESI after 14 days can be performed using a different approach, level and/or medication, if appropriate, with the rationale and medical necessity for the second ESI documented in the medical record.
7. An initial injection of contrast is required to confirm epidural placement, unless the patient has a contraindication to contrast. The subsequent ESI should include corticosteroids and may be combined with anesthetics or saline.[1]
8. The ESIs should be performed in conjunction with conservative treatments.[9]
9. Patients should be part of an active rehabilitation program, home exercise program or functional restoration program.[10,12]

*Note: The scales used to measure pain and/or disability must be documented in the medical record. Acceptable scales include, but are not limited to: Verbal rating scales, Numerical Rating Scale (NRS) and Visual Analog Scale (VAS) for pain assessment, and Pain Disability Assessment Scale (PDAS), Oswestry Disability Index (ODI), Oswestry Low Back Pain Disability Questionnaire (OLBPDQ), Quebec Back Pain Disability Scale (QBPDS), Roland Morris Pain Scale, Back Pain Functional Scale (BPFS), and the Patient-Reported Outcomes Measurement Information System (PROMIS) profile domains to assess function.

Limitations

1. Injections performed without image guidance or by ultrasound are not considered medically reasonable and necessary except in cases of documented contraindication to contrast media (e.g., allergy, pregnancy).[13-15]
2. ESIs performed with biologicals or other substances not designated by the United States (U.S.) Food and Drug Administration (FDA) for this use are considered investigational and are considered not medically reasonable and necessary.
3. It is not considered medically reasonable and necessary to perform multiple blocks (ESIs, sympathetic blocks, facet blocks, trigger point injections, etc.) during the same session as ESIs, with the exception of a facet synovial cyst and ESI performed in the same session.
4. Use of Moderate or Deep Sedation, General Anesthesia, or Monitored Anesthesia Care (MAC) is usually unnecessary or rarely indicated for these procedures and therefore, is not considered medically reasonable and necessary.[16] Even in patients with a needle phobia and anxiety, typically oral anxiolytics suffice. In exceptional and unique cases, documentation must clearly establish the need for such sedation in the specific patient.
5. ESIs to treat non-specific low back pain (LBP), axial spine pain, complex regional pain syndrome, widespread diffuse pain, pain from neuropathy from other causes, or cervicogenic headaches are considered investigational and therefore are not considered medically reasonable and necessary.[6,17,18]

6. ESIs are limited to a maximum of four (4) sessions per spinal region in a rolling twelve (12) month period.[7]
7. It is not considered medically reasonable and necessary for more than one spinal region to be injected in the same session.[11]
8. It is not considered medically reasonable and necessary to perform TFESIs at more than two (2) nerve root levels during the same session.[11]
9. It is not considered medically reasonable and necessary to perform caudal ESIs or ILESIs at more than one (1) level during the same session.[11]
10. It is not medically reasonable and necessary to perform caudal ESIs or ILESIs bilaterally.[14]
11. It is not medically reasonable and necessary to prescribe a predetermined series of ESIs.[8]
12. Steroid dosing should be the lowest effective amount. It is recommended not to exceed 80 mg of triamcinolone, 80 mg of methylprednisolone, 12 mg of betamethasone, or 15 mg of dexamethasone per session.[16]
13. It generally would not be considered medically reasonable and necessary for treatment with ESI to extend beyond 12 months.[19,20] Frequent continuation of ESIs over 12 months may trigger a focused medical review. Use beyond twelve months requires the following:

    - Pain is severe enough to cause a significant degree of functional disability or vocational disability.
    - The ESI provides at least 50% sustained improvement of pain and/or 50% objective improvement in function (using same scale as baseline).
    - Rationale for the continuation of ESIs including, but not limited to, patient is high-risk surgical candidate, the patient does not desire surgery, recurrence of pain in the same location relieved with ESIs for at least three months.
    - The primary care provider must be notified regarding continuation of procedures and prolonged repeat steroid use.

14. ESIs should not be performed when contraindicated, including but not limited to: Suspected or active localized spinal infection, significant systemic infection, compressive lesions of the spinal cord, conus medullaris or cauda equina, suspicion or major risk factors for cancer.[11]

Provider Qualifications

Medicare Program Integrity Manual states services will be considered medically reasonable and necessary only if performed by appropriately trained providers.

Patient safety and quality of care mandate that healthcare professionals who perform epidural injections/procedures are appropriately trained and/or credentialed by a formal residency/fellowship program and/or are certified by either an accredited and nationally recognized organization or by a post-graduate training course accredited by an established national accrediting body or accredited professional training program whose core curriculum includes the performance and management of the procedures addressed in this LCD.

At a minimum, training must cover and develop an understanding of anatomy and drug pharmacodynamics and kinetics as well as proficiency in diagnosis and management of disease, the technical performance of the procedure, and utilization of the required associated imaging modalities.

Notice: Services performed for any given diagnosis must meet all of the indications and limitations stated in this LCD, the general requirements for medical necessity as stated in CMS payment policy manuals, any and all existing CMS national coverage determinations, and all Medicare payment rules.

Definitions

Acute Low Back Pain - Low back pain, which is present for up to six weeks.

Caudal ESI - The administration via injection of contrast (absent allergy to contrast), followed by the introduction of corticosteroids and possibly a local anesthetic into the epidural space of the spine by inserting a needle through the sacral hiatus under fluoroscopic guidance into the epidural space at the sacral canal.

Cervicobrachialgia - Pain in the neck radiating to the arm, caused by compression of nerve roots of the cervical spine.

Chronic Pain - The temporal definition of pain occurring 12 weeks after the onset of the pain.

Conservative Therapy - Consists of an appropriate combination of medication (for example, non-steroidal anti-inflammatory drugs [NSAIDs], analgesics, etc.) in addition to physical therapy (PT), spinal manipulation therapy, cognitive behavioral therapy (CBT), home exercise program, or other therapies based on the individual's specific presentation, physical findings, and imaging results.

Disability – Activity limitations and/or participation restrictions in an individual with a health condition, disorder or disease.

Discogenic Pain – Pain originating from damaged vertebral disc, particularly, but not always, due to degenerative disc disease.

Epidural Steroid Injection (ESI) - The administration via injection of contrast (absent allergy to contrast), followed by the introduction of a corticosteroid and possibly a local anesthetic into the epidural space of the spine.

GRADE - A system developed by the GRADE Working Group to address the shortcomings of present grading systems in healthcare. The GRADE system uses a common, sensible, and transparent approach to grading the quality of evidence. The results of applying the GRADE system to clinical trial data are displayed in a table known as a GRADE profile.

Impairment – A significant deviation, loss, or loss of use of any body structure or body function in an individual with a health condition, disorder or disease.

Interlaminar ESI (ILESI) - An injection of contrast (absent allergy to contrast), followed by the introduction of a corticosteroid and possibly a local anesthetic into the epidural space of the spine either through a paramedian or midline interlaminar approach under fluoroscopic guidance.

Level - The spinal roots that enter and exit the spinal column between each of the vertebral segments cervical (C1-C8), thoracic (T1-T2), lumbar levels (L1-L5), and sacral (S1-S5).

Multidisciplinary Biopsychosocial Rehabilitation (MBR) - Targets physical as well as psychological and social aspects of LBP and involves a team of healthcare providers with different professional backgrounds and training.

Neural Foramina – (also called intervertebral foramen) The openings between each pair of vertebrae where a number of structures pass through.

Neurogenic Claudication – (also known as pseudoclaudication) The physical manifestation of leg pain, leg weakness, or leg heaviness exacerbated by walking and relieved with leaning forward or sitting down.

Non-Radicular Back Pain - The radiating non-neuropathic pain which is not causally related to a spinal nerve root irritation and does not produce reproducible neuropathic symptoms in an objective dermatomal pattern.

Nonspecific Low Back Pain - Back pain that cannot be attributed to a specific disease or spinal pathology.

Osteophyte - An exostosis or benign osteoma of the facet joints or vertebral endplates.

Osteophyte Complex – The protrusion of disc material, buckling of the ligamentum flavum, joint hypertrophy, and osteophytes.

Peripheral Neuropathic Pain – Pain is causally related to a lesion or disease of the peripheral somatosensory nerves.

Post-Laminectomy Syndrome - A group of symptoms following a lumbar laminectomy which include diffuse low back pain with associated dull and aching pain involving the legs.

Radicular Back Pain - Radicular pain is nerve root pain radiating from the affected spinal segment in a distribution concordant with the known distribution of the nerve root.

Radiculitis - Inflammation of the nerve roots which produces radicular pain without objective neurological findings on physical examination.

Radiculopathy - Radiating neuropathic pain causally related to the spinal nerve root irritation, which extends distally, producing neuropathic pain in a myotomal or dermatomal pattern.

Selective Nerve Root Block (SNRB) - A diagnostic injection of contrast (absent allergy to contrast) of a single nerve root to assist with surgical planning, followed by the introduction of a local anesthetic by inserting a needle into the neuroforamen under fluoroscopic or computed tomography (CT) guidance. The SNRBs are erroneously referred to as a Transforaminal Epidural Steroid Injection (TFESI), although technically, SNRBs involve the introduction of anesthetic only used for diagnostic purposes.

Session - A time period, which includes all procedures (i.e., medial branch blocks [MBBs], intraarticular injections [IAs], facet cyst ruptures, and radiofrequency ablations (RFAs) performed during one day.

Spinal Stenosis - The narrowing of the central spinal canal or foraminal openings, usually due to spinal degeneration that occurs with aging. It may also be the result of spinal disc herniation, osteoarthritis, or a tumor. Lumbar spinal stenosis results in low back pain and pain or abnormal sensations in the legs, thighs, feet, or buttocks, or loss of bladder and bowel control. Neurogenic claudication is often a clinical condition that results from spinal stenosis.

Spondylolisthesis - A disorder of the spinal cord in which one vertebra slips onto the vertebra below it resulting in pain in lower back or legs.

Subacute Pain - The temporal definition of pain occurring during the six to twelve-week time period.

Transforaminal ESI (TFESI) - An epidural injection performed via a paramedian approach to enter the epidural space by placing the needle in the posterior-superior quadrant of the intervertebral foramen (neuroforamen) to inject near the dorsal root ganglion and exiting spinal nerve root (previously known as a selective nerve root block).

Consultation Summary

Contractor Advisory Committee Meeting 02/11/2021

A multi-jurisdictional Contractor Advisory Committee meeting of subject matter experts (SMEs) was convened on 02/11/2021 regarding epidural injections and procedures. The transcript, voting results, and audio are available on each MACs website. The panel consisted of experts in pain management including, anesthesiology and physical

medicine and rehabilitation, as well as neuroradiology, internal medicine, and a certified nurse anesthetist with representation throughout the country and including academic and clinical experts. The panel will be referred to as SMEs, and their input incorporated throughout the review to correlate the evidence with expert input.

Summary of Evidence

Acute low back pain, defined as low back pain with less than four weeks duration, has an excellent prognosis to recover within the first four to six weeks. Initially, treatments include non-invasive therapies, including pharmacologic and non-pharmacological measures. Patients with acute or subacute nonspecific low back pain typically would not be considered candidates for interventional therapies, as they could still improve with noninvasive therapies, and there is little evidence on the efficacy of invasive therapies in this circumstance.[21] The American College of Physicians offers a strong recommendation for non-pharmacological measures as the first line treatment. Recommended non-pharmacological measures include conservative measures such as superficial heat, exercise, multidisciplinary rehabilitation, acupuncture, mindfulness-based stress reduction having moderate-quality evidence. For pharmacologic therapy, they recommend non-steroidal anti-inflammatory drugs (NSAIDs) as first line treatment, and muscle relaxants, as second-line treatment.[22] Systemic steroids may provide benefits with three randomized control trials showing benefit, especially in the short term. The benefit of anticonvulsants and antidepressants is overall low quality, but there is potential benefit in some patients.[23] A systematic review comparing ESIs to conservative treatment for patients with lumbosacral radicular pain reported that ESIs were more effective for alleviating lumbosacral radicular pain but not function in both short and intermediate terms compared to conservative treatment, however this effect was not maintained at long-term follow-up.[24] It is standard practice to utilize conservative treatment measures for the management of acute low back pain. When back pain persists over twelve weeks, it is considered chronic low back pain, and spontaneous recovery is less likely.

The SMEs voted 3/5 (range 2-5) that there is evidence to support periods of conservative management prior to treatment with epidural injections. The panel discussed time for conservative care is related stronger to the natural history of the disease than the evidence, as it has not been well studied. The panel voted low confidence 2/5 (range 1-5) in terms of evidence to support documentation of failure of at least two classes of medication prior to ESI. The use of medication is more controversial due to the risk associated with non-steroidal anti-inflammatory, specifically gastrointestinal complications, and the risk of opioid addiction with opioid use. Other medications remain available, but there is not strong evidence to support one specific category of medication.

Patients with low back pain should be evaluated for the underlying condition, and targeted treatments implemented. History and physical examination, including a neurological exam to evaluate for radicular pain, should be performed. Imaging should be targeted to identify specific differential diagnoses and is not typically indicated in the early evaluation of low back pain.[25] The American College of Radiology (ACR) offers evidence-based criteria for imaging for low back pain.[26] According to the ACR Criteria, patients who have acute, subacute, or chronic low back pain or radiculopathy with persistent or progressive symptoms during or following six weeks of conservative management are considered candidates for surgery or intervention. Imaging may be considered for patients who have had no improvement in their back pain after six weeks of medical management and physical therapy. Imaging is classified as "may be appropriate", with magnetic resonance imaging (MRI) of the lumbar spine without contrast classified as "usually appropriate and computed tomography (CT) if MRI is unavailable" as needed for diagnostics. The American College of Occupational and Environmental Medicine guidelines state that while diagnostic tests are not indicated for the majority of low back pain, the literature supports CT or MRI.[27] The ESIs are utilized as an option for a specific diagnosis, and therefore a thorough evaluation to achieve diagnosis is a necessary step prior to consideration of ESIs. In most cases, by the time ESIs are considered, imaging has been completed as part of the evaluation. Any prior imaging should be reviewed for anatomy prior to interventional procedures. The SMEs voted low confidence 2/5 (range 1-4) that radicular pain should be concordant with a radiologist's interpretation of an advanced diagnostic study demonstrating compression of the involved nerve root. The concern was that the imaging study is a static

image in a dynamic process and the compression may be missed in the supine position even if present. The SMEs felt there was benefit in obtaining imaging to aid in diagnosis, such as to reveal anatomical features that may guide treatment options or alter approach, selection of needle size and appropriate segmental level. There was also concern that imaging would not reveal non-anatomical sources like chemical radiculitis.

Safety

Epidural administration of corticosteroids has not been approved by the FDA and is classified as "off-label" use. While complications with ESIs are rare, they can be devastating. In 2014, the FDA issued a drug safety communication about the epidural injection of glucocorticoids, noting the potential for rare but serious adverse effects, and the effectiveness has not been established.[28] The warning followed two separate outbreaks of fungal meningitis in 2002 and 2012-2013 linked to ESIs and multitudes of case reports on related complications. After the FDA warning, there was a flurry of papers to document safety and provide protocols and/or guidelines to improve safety. The reported risk of ESIs includes loss of vision, stroke, dural puncture, infection, spinal cord injury, paralysis, and death. In addition to intra-arterial injections of particulate steroids, arachnoiditis, nerve damage, osteomyelitis, hemorrhage, and epidural abscess have been reported.[1,29] In a 2015 review on trends in safety and complications, the author explains the reasons for these risks stating "significant neurological complications associated with transforaminal injections include stroke and spinal cord injury, which arise due to the need to place the needle within the intervertebral foramina. This space contains radicular arteries that perfuse the spinal cord and course adjacent to the targeted spinal nerve root, creating a challenge when variations in anatomical structure are present."[1] A 2018 survey of 249 interventional pain management physicians (13.8% response rate) demonstrated a high level of variability and lack of standardized practices. They reported that in interlaminar epidural steroid injection practice patterns, there is a lack of standardization in needle sizes, use of imaging, and choice of injectant.[30] The lack of evidence-based standardized practice makes it difficult to interpret the literature since these variables exist across existing studies.

A 2015 review on key safety when administering ESIs states the FDA identified 131 neurological adverse events, including 41 cases of arachnoiditis and 700 cases of fungal meningitis following injection of contaminated steroids. They further explain that most complications were related to TFESIs, specifically cervical TFESIs. They conclude that proper technique can avoid injury, and lumbar TFESIs can be performed safely; however, they warn that cervical TFESIs "must not be performed until appropriate evidence develops and safe preparations of steroids are available." [29] A 2015 multidisciplinary workgroup stated concern regarding the injection of ESIs under sedation and without appropriate precautionary steps, such as injection of radiographic contrast medium under fluoroscopy; resulting in spinal cord injury. They also expressed concern for using particulate steroids, such as methylprednisolone, triamcinolone, or betamethasone which have been linked to cerebrovascular occlusion associated with cervical TFESIs.[14] This review called for more standardized safety protocols and research in best practices.

A 2016 multi-institutional study on adverse event rates associated with TFESI and ILESI reported no major adverse events in 16,638 consecutive procedures in all spine segments (14,956 TFESI; 1,682 ILESI). The most common adverse event was a vasovagal reaction in 1.2% of procedures (p=0.004). Dural punctures occurred in 0.06% of procedures, more commonly after ILESI (0.2% vs 0.04%, P=0.006). Central steroid response (sleeplessness, flushing, non-positional headache) was seen in 2.6% of TFESI and ILESI patients. Patients that reported increased pain included 2.1% of TFESI and 1.8% of ILESI patients. No long-term sequelae were seen from any immediate or delayed minor adverse event at the time of the procedure or follow-up.[31] A 2012 prospective study on 10,261 fluoroscopic guided epidural procedures included 2,376 cervical interlaminar epidural injections, 301 thoracic interlaminar epidural injections, 1,450 lumbar interlaminar epidural injections, 1,395 caudal epidural injections, 1,310 lumbar transforaminal epidural injections, and 839 caudal epidural adhesiolysis procedures. The authors reported an adverse rate of overall intravascular penetration of 4.3%, local bleeding of 63%, 0.5% rate of dural punctures with 0.05% post-lumbar puncture headache, 0.85% transient nerve irritation of 0.08% as well as transient spinal cord irritation and other minor complications, but no major complications.[32]

The Work Group on Infection Prevention (WIP) Benelux Work Group developed evidence-based safety guidelines

based on existing literature. In reviewing major complications, they reported that the majority involved direct nerve trauma or spinal cord injury. To reduce the risk of nerve damage, they recommended avoidance of deep sedation so the patient can alert the provider to any paresthesia during needle placement to minimize this risk.[16] The SMEs agreed that evidence supports that ESI should not be performed with moderate sedation or general anesthesia with a score of 3/5 (range 1-5).

The American Society of Anesthesiologists (ASA) provides definitions on the continuum of the depth of sedation. Minimal sedation (anxiolysis) is defined as a drug induced state during which patients respond normally to verbal commands. Although cognitive function and physical coordination may be impaired, airway reflexes, and ventilatory and cardiovascular functions are unaffected.[33] Progressing depth of sedation beyond minimal is moderate or "conscious", deep and general. Monitored Anesthesia Care or "MAC" is not a depth of sedation, but a specific anesthesia service allowing a deeper level of analgesia and sedation than can be provided by moderate sedation.

The impact of glucocorticoids injected into the epidural space is not fully defined. Evidence supports that even a single injection risk includes bone demineralization and increased risk of fractures in postmenopausal women, suppression of the hypothalamic-pituitary adrenal axis, immune dysregulation, and hyperglycemia in patients with diabetes mellitus.[1,16] A small prospective study in which 28 post-menopausal women who underwent a single ESI (triamcinolone 80 mg) had bone mineral density (BMD) measurements completed and showed a significant decline in the hip BMD of 0.018 g/cm^2 (0.028 ± 0.007, P = 0.002) at six months compared with baseline as compared to age-matched control population and concluded there is a potential deleterious effect of ESI with steroids on BMD.[34] A large retrospective cohort study matched 3,000 patients who had ESIs to 3,000 similar non-injected patients. Based on their analysis, they concluded that each successive injection increased the fracture risk by a factor of 1.21 (95% confidence interval, 1.08 to 1.30) after adjustment for covariates (p = 0.003), concluding a 21% increase risk of fracture per ESI injection.[1,35]

In contrast, a 2000 prospective study on the effect of corticosteroids and dose relationship on weight gain and BMD receiving steroids through the neuraxial block included ESI and facet joint injections. Data was collected on 123 patients divided into two groups. One received injection with local anesthetic (LA) plus steroids, and the other LA alone. A BMD study was conducted at baseline and repeated at 3, 6, and 12 months and concluded no significant change in BMD at 12 months from baseline.[36] However, the ESI doses in this study were lower than routinely used, so results must be interpreted cautiously. The lack of standardized injectant and dosing make it difficult to determine if there is a safe threshold in this population. A 2019 retrospective paper reported on 172 postmenopausal women with osteoporosis with half receiving ESIs. The mean number of ESIs was 6.2, and the mean cumulative administered dose of glucocorticoids (dexamethasone) was 31 mg. The incidence of fractures in the medication only (for back pain) and ESI groups were 22% and 24%, respectively, in the thoracolumbar spine, and 2% and 5%, respectively, in the hip joint. There was no significant difference in the incidence of osteoporotic fractures between the groups suggesting a maximum cumulative dexamethasone dose of 31 mg could be safely used in postmenopausal women with osteoporosis.[37] This was limited by retrospective design and a small sample size. The WIP Benelux Guidelines cite each ESI increases the fracture risk by 31% and recommends keeping the corticosteroid exposure to a minimum, especially for high-risk individuals such as the elderly and women with prior history of osteoporosis or osteopenia.[16]

There are reported cases of suppression of the hypothalamic-pituitary-adrenal (HPA) axis after ESI causing Cushing syndrome. While the incidence of Cushing syndrome is low, HPA access suppression is frequent and can continue for three to six weeks. A diabetic patient's elevation in glucose levels may be seen after ESI persisting for two to six days after the initial injection with a risk of hyperglycemia. There is also concern about the impact of corticosteroids on the immune system, and dose-dependent suppression of the immune system has been reported after ESI.[16] In a retrospective study, it was found that corticosteroids reduced the effectiveness of the vaccine and patients were at increased risk for developing influenza after a major joint injection with corticosteroids (relative risk, 1.52; 95% CI, 1.20-1.93).[38] This led to recommendations to avoid elective procedures and reduce steroid dosing for necessary procedures in elderly and high-risk patients during the COVID-19 pandemic.[39] Subject matter experts agreed with

high confidence 4/5 (range 2-5) that there is evidence to support a maximal steroid dose for corticosteroid limits for the injection. The precise maximum is not established, with variations in the literature, but there is consistent evidence to use the lowest effective dose.[16]

Bleeding risks are a significant concern for patients undergoing ESIs. An epidural hematoma can create an expanding volume that compresses the spinal cord and/or nerve roots and can result in potentially catastrophic neurological complications. This risk is a possibility for hematologically normal patients but significantly higher if on anti-coagulation. The practice of holding anticoagulation to perform ESIs is controversial. While holding anticoagulation may potentially reduce the risk of bleeding, there is an increased risk of thromboembolic events during the time patients are off anti-coagulants. A 2012 survey of 325 interventional pain physicians reported the number of bleeding complications after ESI was similar regardless of whether anticoagulation was held. Still, the reported number of thromboembolic events was 17-times greater when anticoagulants were held compared with when not held.[40] In the American Society for Interventional Pain Physicians (ASIPP) updated Comprehensive Evidence-Based Guidelines Part II: Guidance and Recommendations, the authors' report[41]:

- Good evidence for risk of a thromboembolic phenomenon in patients with antithrombotic therapy if discontinued, spontaneous epidural hematomas with or without traumatic injury in patients with or without anticoagulant therapy to discontinue or normalize the international normalized ratio (INR) with warfarin therapy, and the lack of necessity of discontinuation of NSAIDs, including low dose aspirin prior to performing interventional techniques.
- Fair evidence with excessive bleeding, including epidural hematoma formation with interventional techniques when antithrombotic therapy is continued, the risk of a higher thromboembolic phenomenon than epidural hematomas with discontinuation of antiplatelet therapy before interventional techniques and to continue phosphodiesterase inhibitors (dipyridamole, cilostazol, and Aggrenox).
- Limited evidence to discontinue antiplatelet therapy with platelet aggregation inhibitors to avoid bleeding and epidural hematomas and/or continue antiplatelet therapy (clopidogrel, ticlopidine, prasugrel) during interventional techniques to avoid cerebrovascular and cardiovascular thromboembolic fatalities.
- Limited evidence about dabigatran (Pradaxa) and rivaroxaban (Xarelto) to discontinue to avoid bleeding and epidural hematomas and are continued during interventional techniques to avoid cerebrovascular and cardiovascular thromboembolic events.

The American Society of Regional Anesthesia (ASRA) published a 2018 systematic review of fourteen articles for evidence regarding risks associated with either continuing or ceasing anticoagulant and antiplatelet medication in patients having image-guided interventional spine procedures using GRADE methodology. Interlaminar procedures carried a greater risk of hemorrhagic complications regardless of whether the anticoagulants were ceased or continued, while other procedures did not carry that risk and could be performed while continuing anticoagulation. Three articles reported adverse effects of ceasing anticoagulants, with serious consequences, including death.[42] However, this report was limited to case studies, case series, several observational studies, one large retrospective study, and one large prospective study with broad heterogenicity, multiple different neuraxial procedures included, and nonuniformed protocols making it difficult to draw clear conclusions.

A summary of current literature supports that withholding anticoagulation medication to reduce the risk of major bleeding such as hematoma from ESIs may increase the risk of thromboembolic events. A 2015 review concludes, "the decision should be considered in the context of a clear understanding of the patient's anatomy, established guidelines and the perspectives of the patient and prescriber of the anticoagulation medication(s)."[1]

The SME panel agreed on the absolute contraindications included in the LCD with voting of three to five for each of the listed contraindications. However, the panel had low confidence score 2/5 (range 1-4) that the evidence supports the continuation of anticoagulation for epidural injections. The wide range demonstrates the continued controversy which is not resolved among variations in societal guidance.

Image Guidance Procedures

The use of imaging during the performance of ESIs is considered standard. A 2016 systematic review to determine the effectiveness and risks of non-image-guided lumbar interlaminar ESIs reviewed 92 primary publications using GRADE methodology and concluded that these procedures should be performed with image guidance and procedures without imaging should be restricted to the rare settings where fluoroscopy is not available.[13] A 2015 multi-disciplinary workgroup to improve the safety of ESIs included a recommendation that all cervical and lumbar interlaminar ESIs should be performed with image guidance plus a test dose of contrast medium. They further state that cervical and lumbar TFESIs should be performed by injecting contrast medium under real-time fluoroscopy or digital subtraction imaging.[14] Multiple other societies also endorse imaging requirements for ESIs. The North American Spine Society (NASS) Choosing Wisely recommendations include: "Elective spinal injections, such as epidural steroid injections, should be performed under imaging guidance using fluoroscopy or CT with contrast enhancement (unless contraindicated) to ensure correct placement of the needle and to maximize diagnostic accuracy and therapeutic efficacy."[43] The NASS published guidelines suggest that while there is some evidence to support ultrasound-guided lumbar TFESI, this data is limited and, due to the risk of serious complications with ESIs, it is not considered standard care.[44,45]

Evaluation of Success

Once an ESI is performed, the patient must be assessed to determine if the injection was successful. This requires a clear definition of success. Success should include a reduction in pain symptoms and/or improvement in function. Most research protocols studying the efficacy of ESIs used the OLBPDQ or Roland-Morris Disability Questionnaire (RMDQ) to measure function, Visual Analogue Scale (VAS) or Numerical Rating Score (NRS) to measure pain, and a variety of questionnaires to measure the quality of life, depression and other outcomes. Most studies used a threshold of 50% improvement from baseline to consider the ESI successful. While questionnaires may be burdensome in clinical practice, a standard measure for improvement is important to determine if the treatment is effective. Further research for simple assessment tools is needed.

A 2020 prospective observational study for sixteen patients >65 years old with symptomatic lumbar stenosis with radiculopathy who selected ILESI or medical management were followed with the Short Physical Performance Battery (SPPB) and numeric pain score. The SPPB score includes a 4-meter walk test, chair stand time, and balance score. There was statistically significant improvement reported in SPPB score at one month for the injection group, but not in the medication group. Most studies on ESIs use metrics that include improvement in pain scores and/or questionnaires. There are few studies that measure functional outcomes. The RMDQ is a validated measure of disability and patient-reported function but does not include objective or observable measures. This study, while too small in number for conclusive results, offers a functional parameter to measure improvement after ESI, indicating that the SPPB is a quick and feasible screening tool. They state, "The SPPB is an easy-to-use tool to measure changes in physical function in older adults and could easily be integrated into the outpatient pain clinic setting. Even a 1-point change in an SPPB score and its subsets is clinically meaningful and correlates with decreased mortality and disability."[46]

Success may also be defined as avoidance of surgery. A small double-blinded randomized controlled trial (RCT) looked at twenty-one patients previously identified as operative candidates who delayed surgery; and underwent ESIs. Seventeen of the twenty-one did not undergo operative intervention at the five-year mark. The authors concluded that injections can avoid operative intervention.[47] Limitations are the very small sample size and risk of selection bias. Throughout the evidence review below there are studies which do not show a reduction in need for surgery, while others demonstrate a trend in reduction of surgical management, with no moderate or high-quality literature to confirm this observation.

The SMEs were asked about their confidence that the clinical literature supports that ESIs provided at least 50% pain relief and voted 3/5 (range 1-5). The panel expressed high confidence in using a measure of function for epidural steroid injection success with a score of 4/5 (range 2-5). The panel discussed that a clinical success must be a

combination of both improvement in pain and/or function and that standardized scales used in the setting of research may not be practical for clinical practice. The panel does acknowledge the need for some standardized measurement of successful outcomes of the procedures.

Multi-Modality Approach

A 2014 Cochrane review on multidisciplinary biopsychosocial rehabilitation (MBR) for chronic low back pain included forty-one randomized controlled trials (n=6858). It concluded there is moderate-quality evidence that patients with chronic low back pain receiving MBR are likely to experience less pain and disability than those receiving usual care or physical treatment. They also correlated a positive influence on work status.[12]

The ASA Task Force of Pain Management recommends ESIs with or without LA as part of a multimodal treatment regime to provide pain relief in selected patients with radicular pain or radiculopathy.[10]

Lumbosacral Radicular Pain

The effectiveness of ESIs has been a source of controversy. Multiple studies and systematic reviews reported favorable results, but several reports offered conflicting evidence. A 1997 RCT published in the New England Journal of Medicine with 158 patients with disc herniation and pain were randomized to ESI with glucocorticoid or placebo. At three weeks, the Oswestry score had improved by a mean of -8.0 in the methylprednisolone group and -5.5 in the placebo group (95 percent confidence interval for the difference, -7.1 to 2.2), there was an improvement in leg pain in the steroid group at six weeks, but no significant difference between the groups at three months. At 12 months, the cumulative probability of back surgery was 25.8 percent in the methylprednisolone group and 24.8 percent in the placebo group (P = 0.90). They concluded there was short-term improvement from ESIs for herniated disc but without significant functional benefits or reduction in the need for surgery.[48] In 2015, the Agency for Healthcare Research and Quality (AHRQ) released a technology report consisting of a systematic review of RCTs of patients with lumbosacral radiculopathy, spinal stenosis, non-radicular back pain, or chronic post-surgical back pain. Quality of evidence was assessed for risk of bias using Cochrane Back Review Group criteria. Meta-analysis was performed and stratified by time. Seventy-nine RCTs of epidurals were included. Thirty placebo-controlled trials evaluated epidural corticosteroid injections for radiculopathy. For radiculopathy, epidural corticosteroids were associated with a greater immediate-term reduction in pain (weighted mean difference on a scale of 0 to 100, -7.55 [95% CI, -11.4 to -3.74]; strength of evidence [SOE], moderate), function (standardized mean difference after exclusion of an outlier trial, -0.33 [CI, -0.56 to -0.09]; SOE, low), and short-term surgery risk (relative risk, 0.62 [CI, 0.41 to 0.92]; SOE, low). For ESIs compared to placebo, they concluded that the magnitude of effects on pain and function was small. They did not meet predefined thresholds for minimum clinically important differences, lacked longer-term benefit, and did not demonstrate effectiveness (SOE: insufficient to low). The authors concluded that corticosteroid injections for radiculopathy were associated with immediate but short-term benefits and did not reduce the long-term risk of surgery. Limitations of this paper included methodological shortcomings of the RCTs evaluated.[49]

A 2016 systematic review and meta-analysis included RCTs comparing TFESI with steroids (with or without LAs) to LA or saline in adults with lumbosacral radicular pain secondary to herniated intervertebral discs. They reviewed data on numerical rating scale scores for pain, validated scores for measuring physical disability and quality of life, and incidence of surgery measured at one month to two years after the interventions were meta-analyzed. Evidence was rated with GRADE. Eight studies were included, including 771 patients (336 in steroid group and 405 in the comparator group). They concluded that TFESI has no impact on physical disability or incidence of surgery. They reported the following:

- Patients who received TFESI steroids reported a significant, but clinically modest, reduction in mean pain scores (0-10 scale) compared with LA/saline (-0.97 points; 95% confidence interval, -1.42 to -0.51 points; P < 0.0001, I^2 = 90%; GRADE weak recommendation; moderate-quality evidence) at three months after the interventions.

- The TFESI with steroids did not decrease physical disability at one to three months after the intervention (GRADE strong recommendation ☐; high-quality evidence).
- The TFESI did not decrease the incidence of surgery at twelve months after the intervention (GRADE strong recommendation ☐; moderate-quality evidence) compared with LA/saline.
- The TFESI steroids provide modest analgesic benefit at three months in patients with lumbosacral radicular pain secondary to herniated intervertebral disks.

Limitations were the high degree of heterogeneity among the publications included in this meta-analysis.[50]

In the same year, a systematic review of 52 RCTs with placebo control or active-control design looked at the efficacy of ESIs in the management of chronic spinal pain. The quality of each article was assessed by Cochrane review criteria, as well as the Interventional Pain Management Techniques-Quality Appraisal of Reliability and Risk of Bias Assessment (IPM-QRB). The authors concluded there was Level II evidence for managing lumbar disc herniation or radiculitis for long-term improvement either with caudal, interlaminar, or transforaminal epidural injections with no significant difference in approaches. They challenged the methodology of the contrasting report and stated the limitations are the paucity of high-quality randomized trials literature which continues to confound the evidence.[51]

A 2016 comparative systematic review and meta-analysis included thirty-nine randomized controlled trials that compared the efficacy of ESIs for lumbar and spinal stenosis performed with saline with steroids, LA alone, or steroids with a LA. The review included nine placebo-controlled trials evaluating ESIs, either with sodium chloride solution or bupivacaine, compared to placebo injection, and twelve studies comparing LA alone to LA with steroid. The meta-analysis of five studies utilizing sodium chloride or bupivacaine with steroid showed a lack of efficacy. Comparing lidocaine to lidocaine with steroids in seven studies showed significant effectiveness from baseline to long-term follow-up, which was considered three months. Meta-analysis showed similar effectiveness for pain and function without non-inferiority of lidocaine compared to lidocaine with steroid at three months and twelve months. The duration of follow-up varied among the included trials with a minimum of three months, so the twelve-month outcome data was from the limited number of trials extended for that duration. They concluded ESIs for radiculopathy or spinal stenosis with sodium chloride solution or bupivacaine were shown to be ineffective. Lidocaine alone or lidocaine in conjunction with steroids was significantly effective.[52]

A 2017 systematic review and a meta-analysis using GRADE methodology evaluated seventy-one publications, including observational and RCTs addressing fluoroscopically guided lumbar interlaminar ESIs to determine the effectiveness and risk of a variety of etiologies, including lumbar radiculopathy. They evaluated the body of literature for specific underlying etiologies. They reported most evidence regarding lumbar ILESI was observational and low quality. They concluded radicular pain due to lumbar disc herniation provides a statistically significant short-term improvement in pain.[17] A 2019 Korean review using GRADE concluded a high level of evidence (LoE) for ESI for radicular pain with the strength of recommendation (SoR) as strong. They favored TFESI over ILESI (LoE: moderate, SoR: weak and caudal ESI (LoE: moderate, SoR: strong).[23]

Few studies address long-term outcomes, with most going to twelve months as the longest duration. A 2018 prospective cohort study contacted patients who had received single-level lumbar TFESIs for herniated nucleus pulposus to evaluate long-term outcomes. Of the original 78 patients enrolled, they could contact 39 (50%) at five years for follow-up. They found that despite a high success rate at six months, most subjects experienced a recurrence of symptoms at some time during the subsequent five years. This concludes that lumbar disc herniation is a disease that can be effectively treated in the short-term by TFESI or surgery, but long-term recurrence rates are high regardless of treatment received.[53]

In 2020, a Cochrane Database Systematic Review reported twenty-five clinical trials with 2,470 participants, comparing epidural corticosteroid injections to placebo for lumbosacral radicular pain. Using GRADE methodology, eight trials were considered high quality.[54] They report the overall body of literature ranged from very low to moderate. The study concludes there is limited evidence for the use of ESIs in people with lumbosacral radicular pain

as the treatment effects are small, mainly evident at short-term follow-up, and may not be considered clinically important by patients and clinicians (i.e., mean difference lower than 10%). No minor or major adverse events were reported at short-term follow-up. The report limitations included insufficient information on how or when adverse events were assessed for immediate and long-term follow-up.

Key findings reported include:

- The ESIs were probably slightly more effective compared to placebo in reducing leg pain at short-term follow-up (mean difference [MD] -4.93, 95% confidence interval [CI] -8.77 to -1.09 on a 0 to 100 scale; 8 trials, n = 949; moderate-quality evidence [downgraded for risk of bias]).
- For disability, epidural corticosteroid injections were probably slightly more effective compared to placebo in reducing disability at short-term follow-up (MD -4.18, 95% CI -6.04 to -2.17, on a 0 to 100 scale; 12 trials, n = 1367; moderate-quality evidence [downgraded for risk of bias]).
- The treatment effects are small, however, and may not be considered clinically important by patients and clinicians (i.e., MD lower than 10%).
- There is uncertain evidence if ESI makes no difference compared to placebo injection in the frequency of minor adverse events (risk ratio [RR] 1.14, 95% CI 0.91 to 1.42; 8 trials, n = 877; very low-quality evidence [downgraded for risk of bias, inconsistency, and imprecision]).

A 2020 systematic review by Smith et al evaluated the effectiveness of lumbar transforaminal injection of steroid for the treatment of radicular pain. This review used GRADE methodology and reviewed thirty-two observational cohort studies, nine pragmatic trials, and two explanatory trials published between 1997-2017. Using a reduction of pain of ≥50%, the authors reported the success rate across the included studies. They reported a success rate for disc herniations of 63%, 74%, 64% and 64%, at one, three, six, and twelve months, respectively. The authors stated high-quality evidence for the effectiveness of TFESI, based on outcomes of multiple randomized control trials and high-quality observational studies. Most studies in this review showed treatment benefits lasting three to six months, with some studies suggesting benefits at one or even two years post-injection. However, they attribute the one to two-year benefit likely related to the natural history of lumbar radicular pain rather than a direct effect of the corticosteroids. One of the challenges with this body of literature is that the follow-up interval is highly variable among the studies, and co-interventions are prominent, so it is difficult to determine the true durability of the intervention. The literature reviewed showed a trend towards a reduction in surgery in patients who reported success with ESIs.[55]

While the overall clinical experience of the SMEs leaned towards a reduction in surgery with the use of ESIs, they agreed this was not consistently reproduced in the literature with a score of 2/5 (range 2-5). Overall, the panel felt that there was some evidence to support that ESIs reduced the need for opiates with a score of 3/5 (range 1-4), however studies to specifically address this are lacking.

Lumbar Spinal Stenosis

The evidence surrounding the use of ESIs for lumbosacral spinal stenosis is conflicting. A 2014 double-blind, multisite, randomized controlled trial funded by the AHRQ reported on 400 patients with lumbar central spinal stenosis with moderate to severe pain (>4/10 at baseline) and a disability score of 7 or higher on the RMDQ to receive ESI with glucocorticoids plus lidocaine or lidocaine alone. The patients received one or two injections and evaluation at six weeks from the first injection. At six weeks, there was no significant difference between the groups RMDQ scores (adjusted difference in the average treatment effect between the glucocorticoid–lidocaine group and the lidocaine-alone group, −1.0 points; 95% confidence interval [CI], −2.1 to 0.1; P = 0.07) or leg pain scores (adjusted difference in the average treatment effect, −0.2 points; 95% CI, −0.8 to 0.4; P = 0.48). They concluded ESI with LA and glucocorticoids offered minimal or no short-term benefit compared to ESI with LA alone.[56] This was met by support for surgical management or trial of conservative measures for lumbar spinal stenosis and criticism from members of the interventional pain management community.[57] A 2015 systematic review and meta-analysis,

including eight trials on ESIs for spinal stenosis, concludes there were no clear effects of ESIs for spinal stenosis with the strength of evidence rated low to moderate.[49] The 2019 MIST Guidelines for lumbar spinal stenosis from the minimally invasive spine treatment consensus group evaluated nine studies (2 RCTs; 7 observational studies, 4 prospective studies and 3 retrospective studies) of minimally invasive spine treatments and reported there is Level I evidence for percutaneous image-guided lumbar decompression as superior to lumbar ESI. The consensus group developed treatment algorithms to guide management.[58]

On the contrary, there are several papers that support the use of ESI for spinal stenosis. A two-year observational study on the use of TFESI for lumbar spinal stenosis followed 68 consecutive patients at six weeks, one and two years, to avoid decompressive surgery. Of these patients, 32% opted for surgery, 24% had repeat injections, and 44% were satisfied with non-surgical management at two years. The authors conclude TFESI is a reasonable treatment for lumbar spinal stenosis, provides long-term relief in a high proportion of patients, and can reduce the need for surgical management.[59] There are prospective studies supporting this use.[60] A 2015, double-blinded RCT compared the effectiveness of lumbar ILESI with LA only to lumbar ILESI with corticosteroids and LA with central spinal stenosis. Assessments to measure success were defined as ≥ 50% pain relief at 3, 6, 12, 18, and 24 months. They reported 72% (95% CI: 61-83%) of patients receiving lidocaine and corticosteroids and 73% (95% CI: 62-85%) receiving lidocaine alone had significant pain relief at 24 months; concluding ESI with LA, with or without steroids were equally effective and beneficial.[61] However, overlapping confidence intervals suggest the treatments are equivalent at those timeframes, so it does not provide evidence for long-term improvement. In the 2015 systematic review of 52 RCTs with placebo control or active-control design looking at the efficacy of epidural injections in managing chronic spinal pain, they concluded Level II evidence for caudal and lumbar interlaminar epidural injections with Level III evidence for lumbar transforaminal epidural injections for lumbar spinal stenosis. The evidence is Level II for cervical spinal stenosis management with an interlaminar approach.[51]

Even further conflicting papers support a short-term, but not long-term, benefit. A 2017 multicenter, double-blind, randomized controlled trial compared epidural injections of corticosteroid plus lidocaine versus lidocaine for lumbar central spinal stenosis alone at sixteen clinical sites. Participants had the option of blinded crossover after six weeks to receive the alternate treatment. Disability was measured using the RMDQ. The authors report at twelve months, both treatment groups maintained initial observed improvements, with no significant differences between groups on the RMDQ (adjusted mean difference, -0.4; 95% confidence interval [CI], -1.6 to 0.9; P=.55), leg pain (adjusted mean difference, 0.1; 95% CI, -0.5 to 0.7; P=.75), opioid use (corticosteroid plus lidocaine: 41.4% vs lidocaine alone: 36.3%; P=.41), or spine surgery (corticosteroid plus lidocaine: 16.8% vs lidocaine alone: 11.8%; P=.22). They did not observe a difference among participants who crossed over at six weeks. They conclude for lumbar spinal stenosis symptoms, epidural injections of corticosteroid plus lidocaine offered no benefits from 6 weeks to 12 months beyond that of injections of lidocaine alone in terms of self-reported pain and function or reduction in the use of opioids and spine surgery. However, in patients with improved pain and function six weeks after the initial injection, these outcomes were maintained at 12 months. They did not receive additional benefits after three weeks based on the injectant type. Additionally, if there was no improvement during the first six weeks, repeated injections of either type provided no added long-term benefit.[62] A 2017 systematic review and a meta-analysis using GRADE methodology reported on four observational studies; one RCT concluded the evidence suggests a lack of effectiveness of lumbar ILESI in treating primary axial pain related to spinal stenosis, but does suggest significant short-term improvements in radicular pain with stenosis.[17]

A 2019 meta-analysis reviewed non-surgical medical treatment in the management of pain due to lumbar disc prolapse. Fifty-eight studies in global effects and 74 studies in pain intensity analysis were included, with 65.5% rated as high risk for bias. They found caudal ESI and TFESI had higher short-term scores at follow-up while biologicals and manipulation had a higher score at long-term follow-up for pain intensity; however, no treatment was found to be superior when comparing multiple outcomes and periods. The TFESI was reported to be an effective short-term treatment. They reported a lack of high-quality studies as a limitation.[63,64]

There is little evidence showing a benefit for long-term outcomes. A 2020 retrospective cohort of 54/90 patients who underwent TFESI for controlling lumbar spinal stenosis induced radicular pain were interviewed at least five years

after their initial procedure. Half of the patients were receiving repetitive TFESIs every two to six months or were taking oral pain medication; 25% had undergone surgical intervention. The authors report poor long-term pain relief with surgery as well and conclude ESIs offer a safe option for controlling radicular pain associated with spinal stenosis.[65]

A 2020 prospective comparative analysis of cost and quality of life (QOL) compared lumbar ESIs to conservative management alone at three and six months. One hundred forty-one patients were included, and the authors concluded at three months, ESIs provided similar improvements in QOL outcomes relative to medical management and at similar costs. At six months, neither ESIs nor conservative management provided significant QOL outcomes.[66]

In the 2020 systematic review by Smith et al for lumbar spinal stenosis, using a ≥50% pain relief criteria, the studies (range) reported success rates of 49% (43–55%) at one month, 48% (35–61%) at three months, 43% (33–53%) at six months, and 59% (45–73%) at one year. The author offers low-quality evidence according to GRADE methodology and notes the lack of corroboration from appropriately controlled studies.[55]

The MIST Guidelines on lumbar spinal stenosis consensus group concludes there is ample evidence to support the use of ESIs in the management of symptomatic lumbar spinal stenosis. Depending on the duration and extent of relief, these options can be repeated or continued to more surgical treatment solutions (Grade B, Level II-2, Consensus strong).[58]

Overall, the SMEs felt there was evidence to support a benefit of ESIs for spinal stenosis voting 4/5 for lumbar central spinal stenosis (range 2-5), foraminal stenosis (range 1-5) and subarticular stenosis (range 1-5).

Herpes Zoster

Herpes zoster may lead to severe zoster-associated pain (ZAP) and post neuralgia pain (PNP) to the degree of interfering with activities of daily living. Several studies have explored the role of ESIs in the management of ZAP. A 2017 retrospective review of 137 patients with ZAP who underwent TFESI for management of ZAP was included. They compared those who had the TFESI within the first 30 days to those who had the procedure between 30-90 days. They concluded that early application of TFESIs in the acute phase was a useful option to control ZAP-related pain. Those who received the injection earlier had a significantly shorter time to pain relief with a lower incidence of postherpetic neuralgia (PHN).[6] This was limited by the retrospective nature of the study, lack of control group, or comparison to other treatment options such as antivirals, topical analgesic, or pharmacological treatment. There are several trials evaluating continuous epidural infusion for the management of ZAP, but no studies that compare infusion to injections.

The SMEs had low confidence voting 2/5 (range 1-3) that there is evidence to support the use of ESIs for postherpetic neuralgia and 3/5 (range 1-5) for acute herpes zoster associated pain.

Cervicogenic Headaches and Cervicobrachialgia

The caudal ESI is considered by many interventional pain management specialists to be a reasonable option for patients who have failed conservative treatments for cervicogenic headache. A 2014 review on caudal ESI for cervicogenic headache found no RCTs, and two prospective studies, with thirty-six patients in the studies combined that support a role of caudal ESI for this indication; however, there is a paucity of literature to support this indication.[18]

Cervicobrachialgia is used to describe pain in the neck radiating to the arm due to nerve root compression typically caused by disc herniation or spinal stenosis. A non-controlled randomized trial in 1993 on caudal ESI for cervicobrachialgia randomized twenty-five patients to caudal ESI and seventeen to steroid/lidocaine injection into the posterior neck muscles with one to three injections at two-week intervals and followed them for one year. One week

after the last injection, they found that pain relief was rated as very good and good in 76% of the patients in the caudal ESI group, compared to 35.5% of the patients in the posterior neck muscle injection group.[67]

The SMEs voted 3/5 (range 1-5) that there is evidence to support the use of ESIs for cervicogenic headaches and 4/5 (range 1-5) for cervicobrachialgia. The SMEs indicated that cervicobrachialgia is caused by disc herniation and spinal stenosis, where ESIs are beneficial.

Non-Specific Back Pain

There is a lack of literature on the use of ESIs for non-specific low back pain. Most of the literature for non-specific pain supports exercise therapy and multi-modality conservative treatments. A 2017 systematic review reported on 71 publications addressing lumbar ILESIs regardless of etiology. They found low-quality evidence using GRADE methodology and concluded lack of effectiveness of lumbar ILESIs for treatment of primary axial pain regardless of etiology. They report that most studies on radicular pain due to lumbar disc herniation and stenosis report statistically significant short-term improvement.[17]

The SMEs voted not confident 1/5 (range 1-2) that there is evidence to support the use of ESIs for non-specific back pain, widespread diffuse back pain, and non-organic back pain.

Post-Surgical Back Pain

A 2018 systematic review and meta-analysis of randomized controlled trials comparing outcomes of epidural steroids (ES) versus placebo after lumbar discectomy in lumbar disc herniation reported on 12 studies with 1,006 patients (502 in ESI group and 504 in placebo group) and found an unstandardized mean difference of VAS of back pain at 1 week and 1 month, leg pain at 1 week and 1 month, morphine consumption and hospital stay was - 0.53 (95% CI - 1.42, 0.36) score, - 0.89 (95% CI - 1.36, - 0.42) score, - 0.63 (95% CI - 0.75, - 0.50) score, - 0.47 (95% CI - 0.78, - 0.15) score, - 8.47 (95% CI - 16.16, - 0.78) mg and - 0.89 (95% CI - 1.49, - 0.30) days lower when compared to placebo after lumbar discectomy in patients with lumbar disc herniation. Ten studies compared complications and found no significant difference between the two groups (0.92; 95% CI 0.47, 1.83), and reported no significant difference in complications for ES application after lumbar discectomy in lumbar disc herniation.[68]

A 2018 case-controlled series of sixty patients by Akbas et al compared the three different approaches (TFESI, caudal ESI, ILESI) for post lumbar surgery syndrome and concluded that VAS, OSW and patient satisfaction scores were comparable across the three groups at all time intervals ($P > 0.05$), relative to baseline, there were significant decreases in pain relief scores (VAS and OSW) and functional assessment expressed by patients' satisfaction across all time intervals and in all three groups ($P < 0.01$).[69] A 2020 systematic review by Smith et al states a paucity of literature for TFESI for failed back surgery syndrome.[55]

The SMEs voted 3/5 (range 1-5) that there is evidence to support the use of ESIs for post -laminectomy pain syndrome.

Cervical Radicular Pain

Intervertebral disc-related pain can be caused by disc degeneration or herniation in the cervical spine region. Cervical disc herniation is a common source of cervical radicular pain. The natural history of this condition is spontaneous resolution overtime. The NASS Guidelines from 2011 reported 43% of patients' symptoms resolve in the first few months of experiencing mild or intermittent symptoms, and 27% continue to have chronic pain.[70] Safety issues associated with cervical epidural injections include the risk of spinal cord injury, vascular injury, spinal infarct, and ischemia. Cervical TFESI has been associated with a higher risk of neurovascular complications and possible infarction of the spinal cord, brain stem, cerebrum, or the cerebellum. The interlaminar technique is associated with increased risk of direct trauma to the spinal cord.[16]

A 2015 systematic review reports on the long-term efficacy of cervical ILESI and TFESI to treat neck pain. Seven manuscripts between 1966 - 2014 using Interventional Pain Management Techniques-Quality Appraisal of Reliability and Risk of Bias Assessment (IPM-QRB) methodology were included. There were four papers rated high quality, all authored by the same author who was also the lead author on this systematic review. They reported Level II evidence for the efficacy of cervical interlaminar epidural injections with LA, with or without steroids, based on at least one high-quality relevant randomized control trial in each category for disc herniation, discogenic pain without facet joint pain, central spinal stenosis, and post-surgery syndrome.[71] In the 2015 systematic review, also published by this group, on the efficacy of epidural injections for chronic spinal pain, they rate the evidence Level II for long-term management of cervical disc herniation with ILESI, Level II for cervical spinal stenosis management with an interlaminar approach, Level II for post cervical surgery syndrome treated with cervical ILESI, and Level II to III in managing thoracic disc herniation with an interlaminar approach.[51] These systematic reviews rated a higher level of evidence than an earlier review on the same subject with overlapping authors but using a different methodology for the assessment of the literature, and the literature was older,[72] but similar to the 2021 consensus reports from ASIPP Guidelines for methodology.[73]

A 2014 multi-centered RCT of 169 patients with cervical radicular pain compared ESIs, conservative treatment, or combination treatment for cervical radicular pain over six months. Conservative treatment was pharmacotherapy with gabapentin and/or nortriptyline, and PT, as indicated, and combination therapy was ESI and pharmacotherapy with gabapentin and/or nortriptyline plus PT. At one-month, arm pain scores were 3.5 (95% CI, 2.8 to 4.2) in the combination group, 4.2 (CI, 2.8 to 4.2) in ESI patients, and 4.3 (CI, 2.8 to 4.2) in individuals treated conservatively (P = 0.26). Combination group patients experienced a mean reduction of −3.1 (95% CI, −3.8 to −2.3) in average arm pain at one month versus −1.8 (CI, −2.5 to −1.2) in the conservative group and −2.0 (CI, −2.7 to −1.3) in ESI patients (P = 0.035). For neck pain, a mean reduction of −2.2 (95% CI, −3.0 to −1.5) was noted in combination patients versus −1.2 (CI, −1.9 to −0.5) in conservative group patients and −1.1 (CI, −1.8 to −0.4) in those who received ESI (P = 0.064). Three-months post treatment, 56.9% of patients treated with combination therapy experienced a positive outcome versus 26.8% in the conservative group and 36.7% in ESI patients (P = 0.006). The authors reported a lack of significant difference between the groups, with the combination therapy providing better improvement. These results support an interdisciplinary approach to neck pain may improve outcomes; confirmatory studies are needed.[74]

A 2014 prospective observational study of 143 patients who received cervical paramidline interlaminar ESIs reported initial improvements at two weeks in 115 of 143 patients (80.8%). Patients with paresthesia only and no pain showed significantly fewer improvements after ESIs (11/19, 57.9%) than patients with pain (104/124, 83.9%) (p = 0.013). The authors conclude that fluoroscopic paramidline ILESIs can effectively manage cervical radiculopathy, irrespective of the cause or zone of nerve root compression, and patients with paresthesia only, experienced fewer improvements.[75]

A 2018 randomized trial compared cervical interlaminar epidural injections in post-surgery syndrome with LA with steroids to LA alone using a ≥ 50% improvement on numerical rating scale and functional status improvement using the Neck Disability Index (NCI). The authors report similar improvements in both groups, with 69% of patients receiving LA and 71% of patients receiving LA and steroids showing significant improvement at the end of two years. They report an average number of procedures of five to six with an approximate 12 weeks of significant improvement per procedure. Limitations of the study were multiple co-interventions, and variability in the frequency and number of interventions, and lack of true control group.[76]

A 2020 systematic review and meta-analysis on the effectiveness of fluoroscopic guided cervical transforaminal ESI for the treatment of radicular pain included six randomized and eleven nonrandomized comparative studies with pain improvement at least 50% from baseline. Using GRADE methodology, they reported approximately 50% of patients experienced ≥ 50% pain reduction at short and intermediate-term follow-up. However, they acknowledged the literature was very low quality according to GRADE criteria and the lack of existing studies with adequate control groups.[77]

A 2020 systematic review and meta-analysis on the effectiveness of epidural injections with LA with or without steroids for management of chronic neck pain concluded that similar pain relief and function were achieved between the two groups. This was limited by the lack of randomized controlled trials, lack of heterogenicity in the included studies with only one group publishing on this topic, and lack of control groups within the RCTs.[78]

A 2020 retrospective report on the proportion of patients requiring surgery after caudal ESIs reported 11.2% of patients underwent surgery within six months of caudal ESI, 14.5% by one year, and 22.3% by five years. Patients with stenosis and herniation were more likely to undergo surgery than those with radiculopathy. They report repeat injections reduced risk for subsequent surgery with a mean of 1.7 to 5.5 injections in follow-up over two years. The study is limited by its retrospective nature, varying numbers of repeat injections and duration of time between injections, and lack of specific indications for injections or subsequent surgery or surgical candidacy. It is difficult to conclude that the steroid injections reduce the risk for subsequent surgery as the natural disease course points towards improvement alone.[79]

Multiple papers review the safety concerns surrounding cervical ESIs. The risk of spinal cord injury increases as the epidural space narrows moving cranially, so many authors and recommendations conclude that cervical injections should be restricted to C6-C7 or C7-T1. Additional safety measures include a review of pre-procedural imaging and avoiding particulate steroids in cervical injections.[1,14] A report addressing key safety issues states, "overall cervical and thoracic transforaminal epidurals constitute 2.4% of all epidural injections and less than 5% of all transforaminal epidural injections; however, they contribute to over 99% of the complications related to intra-arterial injection of particulate steroids" and recommends against the use of cervical TFESI injections.[29]

The subject matter expert panel was asked their confidence for evidence to support cervical ESIs and they voted 4/5 (range 1-5).

Thoracic Epidural Injections

A 2012 systematic review of thoracic ILESI used the United States Preventive Task Force (USPTF) rating of evidence methodology and reviewed two studies, one RCT and one observational study. The review concluded the evidence for thoracic epidural injection treating chronic thoracic pain is considered fair and limited for post-thoracotomy pain.[80] The USPTF grading has been revised since 2012, but at that time fair was considered sufficient evidence to determine the effect on health outcome, but the strength of evidence was limited, and limited/poor was insufficient evidence to assess.

A 2014 RCT without a placebo group with 110 patients was randomized to two groups; one group received LA (n=55) and the other group received LA with steroids (n=55). They reported most patients had five to six procedures over two years and reported improvement in 71% in LA alone and 80% in LA plus steroids. Limitations included lack of placebo group and variability in timing and number of procedures.[81]

The SME panel voted 4/5 (range 2-5) that the evidence supports the benefits of ESI outweigh risk for thoracic radicular pain. The panel discussed that thoracic radicular pain is far less common and has not been well studied.

Frequency, Laterality and Multiple Level Injections

Existing evidence and societal guidance support conservative management for acute back pain. There is little data regarding the frequency of ESIs for patients who are candidates for intervention. A 2018 prospective cohort study of 102 patients who had ESI for radicular symptoms related to disc herniation (n=57) or cervical disc herniation (n=45) and had a second injection administered for persistent pain were followed for one year. Seventeen patients had a second injection for lumbar herniation (29.8%) and seven for cervical herniation (15.6%) at a mean of 65.3 days (SD 46.5) and 47 days (SD 37.2), respectively. All but one patient who had surgery responded satisfactorily with a mean VAS for leg pain of 8.8 mm (SD 10.3) and a mean VAS for arm pain of 6.3 mm (SD 9) one year after the second injection, respectively. They concluded repeat injections were acceptable treatment in symptomatic patients

without satisfactory relief after the first injection.[82] Limitations of this study conducted in Europe were different standards for ESI and repeat injection, risk of recall bias, and varying times to the second injection. In a study by the same authors, 1,002 consecutive patients were prospectively assessed on short-term response to ESIs for various indications. They determined ten-day outcomes of the second injection were as good as the outcomes of the primary injection for a lumbar herniation: (72.2% better, 24.7% the same, and 3.1% worse following 295 primary injections compared with 70.1% better, 24.8% the same and 5.1% worse after 117 second injections; p = 0.593). For cervical herniation, the improvement was reported in 63.1%, the same in 28.6%, and worse in 8.3% after 84 primary injections compared with 52.2% better, 34.8% the same, and 13% worse after 23 second injections; p = 0.602. This study was also a European population and did not use validated outcome scores.[83] Other studies have also reported improvements with second injections, but high variability in timing and number of injections and inclusion of other spinal procedures challenge interpretation. A 2016 prospective observational study included 184 patients who underwent TFESI for axial neck or radicular arm pain due to herniated disc or spinal stenosis. A group of partial responders (n=108) was scheduled to undergo repeat injection at two-three weeks. The other group (n=76) of partial responders received repeat injections for aggravation of pain. They concluded the scheduled repeat injection group showed a significantly longer time to reinjection and improved clinical benefits.[64] This was limited by a lack of a control group, lack of standardization in the total number of injections, and unclear randomization.

A 2014 retrospective observational study investigated if repeat lumbar TFESIs resulted in pain relief which has waned since index injection, and if a cumulative benefit could be achieved by repeat injections within three months of the index injection. A total of 4,161 patients received single-level TFESIs for radicular pain with or without radiculopathy. Injections were repeated at intervals of at least two weeks for a duration of up to one year from index injection. Of the total patients in the database, 933 of the 4,161 patients, received a total of 2,087 TFESIs. Of these 933 patients, 22.4% received repeat injections during the study period. The data indicates that 18% of patients had two injections and 3.6% of patients had three or more injections. The cohort showed a significant decrease in improvement with subsequent injections (p=0.0311). They found most patients did not require repeat injections for treatment of lumbar radicular pain but did find those with an incomplete initial response who received early repeat injections within three months can achieve a cumulative benefit. This study is limited by retrospective design and high variability in the duration between injections and steroid preparations.[84]

On the contrary, several authors reported no difference in long-term outcomes in patients receiving a second injection nor a reduction in the need for surgery.[85,86] The 2005 WEST study was a multicenter, double-blinded randomized placebo-controlled trial with 228 patients with sciatica. The patients were randomized to either three lumbar ESIs with steroid or placebo (saline) at intervals of three weeks. At three weeks, they discovered that the ESI group had a transient benefit over the placebo group (75% improvement in ODQ, 12.5 vs. 3.7%; number needed to treat, 11.4). No benefit was demonstrated from 6 to 52 weeks. They concluded that ESIs did not improve physical function, hasten return to work or reduce the need for surgery and did not find a benefit of repeated ESIs over single injection. They advocate a multidisciplinary approach for management.[87] Limitations were the use of 75% cut off for improvement while most studies use 50%, and assessment of disability but not pain assessment.

A 2013 systematic analysis identified nine studies with ≥ 50% pain relief after TFESIs for radicular pain after a single injection and reported 94% required a single injection and 4% required a second injection to achieve this level of pain relief. The use of three or four injections was rare.[7]

Using quality assurance databases from radiology and two medicine and rehabilitation (PM&R) practices, 16,638 consecutive procedures in all spine segments (14,956 TFESI; 1,682 ILESI) were evaluated for major and minor adverse safety outcomes. The most frequent complication was a vasovagal reaction in 1.2% and dural puncture in 0.06%. They reported no major adverse reactions, no long-term sequelae from any intermediate or delayed minor adverse events. They concluded both TFESI and ILESI are safely performed with low immediate and delayed adverse event rates when informed by evidence-based procedural guidelines. Of note, multiple patients in this population had bilateral procedures or two-level injections without additional safety concerns.[31]

A 2016 study was conducted for 184 patients who underwent TFESI for axial neck and radicular arm pain with a single ESI. Group A (n=108) was comprised of partial responders defined as a numerical rating scale ≥3 and received scheduled repeat injections at two to three weeks after the first injection. Group B (n=76) was comprised of partial responders who did not receive a repeat injection but received intermittent injections for aggravation of pain. Total number of injections within one year and NRS scores <3 were recorded, and they concluded Group A showed a significantly longer time to re-injection and a longer time between injections. The average number of injections was 2.48 in Group A, with four patients receiving more than three injections and 2.98 in Group B with 16 patients receiving >3 injections.[88] This study is limited by retrospective design and selection bias as patients who did not follow up for a year or choose surgery were excluded.

Subject matter experts were asked about their confidence that the evidence demonstrates ESIs provided relief for a minimum of six weeks after injection with score of 4/5 (range 1-5).

- The panel was split regarding repeating ESIs if the initial treatment did not result in substantial pain relief with the majority feeling that repeating in a different level would be appropriate 3/5 (range 1-5), but not at the same level that did not achieve improvement with ESI.
- When asked if there is literature on a safe or harmful number of ESIs per year, 7/11 SMEs voted no. There was not a consensus among the panel in terms of the number of ESIs that would be considered safe or harmful in a twelve-month time period with a range of three-four in twelve months suggested.
- In response to the question concerning the literature providing input on the safety of multiple levels of ESIs performed in the same session, 6 out of 11 voted no. When asked the number of levels they felt would be safe, the range was one to three per session.
- Half (5/10) did not feel the literature provides input on a safe duration of time between the administration of separate ESIs in the same spinal region and the recommended duration ranged from two weeks to three months. One SME stated, "the need for individual assessment and response to prior injections as well as goals of treatment management versus resolution are factors that can influence this decision."
- Subject matter experts were asked about their level of confidence in the evidence to support repeat epidural injections for long-term management of chronic back pain >6 months and there was not a consensus. Comments included lack of supporting evidence for ESIs for chronic pain management. This must be balanced against patients who do have good results with injections and wish to avoid surgery when clinical benefit is evident.

Injectants

Epidural steroid injections usually contain LA and glucocorticoids. The optimal combination and dosing have not been determined. The role of epidural nonsteroidal injections remains controversial. A 2013 systematic review and meta-analysis looked at the control arm of forty-three studies which included saline, LA, and injections into muscle or ligament (sham). In the indirect comparison, they concluded epidural non-steroidal injections achieved positive outcomes (risk ratio, 2.17; 95% CI, 1.87-2.53) and provided greater pain reduction scores (mean difference, -0.15, 95% CI, -0.55 to 0.25). Indirect comparison does not qualify as the same level of evidence as a randomized comparison, and the study was limited by only one included study being ranked as high quality using GRADE methodology and inadequate numbers to detect in effect by size, but suggests that the nonsteroidal injections were not entirely placebo.[89] A 2015 systematic review of RCTs using Cochrane review criteria and the American Society of Interventional Pain Physicians (ASIPP) criteria for assessing interventional techniques looked at thirty-one trials seeking evidence on LAs, saline, steroids, and other solutions. They conclude equal efficacy for LA with steroids and LA alone in multiple spinal conditions. For disc herniation, they report superiority of LA with steroids over LA alone.[90] A 2021 systematic review of randomized control trials by Manchikanti et al compared sodium chloride solution alone, steroids alone, or sodium chloride solution with steroids in managing spine pain secondary to disc herniation or spinal stenosis. The authors reported utilizing a single-arm analysis that both epidural saline and epidural steroids with saline were effective in reducing 20% of pain, however, only reducing disability score by 10 to 20%.[91] Several 2020 systematic reviews and meta-analysis looking at the difference in efficacy between lidocaine alone versus lidocaine

and steroids in the management of lumbar disc herniation or spinal stenosis concluded there were similar effects associated with lidocaine alone or in combination with steroids.[92,93]

This study contradicts multiple other studies that showed steroids were superior to saline or other placebos. The Friedly et al multicenter, double-blinded randomized controlled trial compared epidural injections of corticosteroids plus lidocaine versus lidocaine alone in 400 patients with confirmed spinal stenosis. In this study, patients had the option of blinded crossover after six weeks to receive the alternate treatment. However, fewer participants randomized to corticosteroids plus lidocaine (30%, n=60) versus lidocaine alone (45%, n=90) crossed over in six weeks (p=0.03) and 93% indicating a lack of effectiveness as a reason to cross-over. Using an intention-to-treat (ITT) analyses, a small, but consistent difference favoring steroids plus LA over LA alone was observed. At twelve months there was no significant difference between the groups. This study did not show repeat injections of either type offering additional benefit if injections in the first six weeks did not improve pain.[62] A systematic review by Bicket et al evaluating control injections in RCTs reports that ESIs may provide a benefit compared to non-ESIs while acknowledging this was based on few, low-quality studies directly comparing controlled treatment and short-term outcomes. However, this review with 3,641 patients from 43 studies represents the largest analysis comparing ESI with a steroid to a nonsteroidal alternative including, LA alone, etanercept, saline, intramuscular or ligamentous injections, and dry needling. The authors concluded the benefit from ESIs was limited but suggested it may not constitute a placebo effect.[89]

While systematic reviews and meta-analysis have suggested a role in non-steroidal injections, these studies are limited because they rely on previously conducted randomized control trials where the research question was not specific to determining the effectiveness of these non-steroid injections. The data set utilized is subject to significant heterogenicity (I^2 >50-99%), variability of the patient population, and small sample sizes. Studies dedicated to the investigation of the non-steroid injections are necessary as well as studies with longer-term follow-up periods to understand if there is a role for nonsteroidal injections in lieu of ESIs. There is not enough evidence to be confident that non steroid injections are equally effective to steroid injections based on the current body of literature.

A 2016 study reported improvement in pain with particulate compared to non-particulate steroids.[94] Spinal cord ischemia and posterior circulation infarction have been reported after cervical ESIs. Concern arose that this risk was greater for particulate compared to non-particulate steroids prompting further investigations and recommendations. In 2011, the FDA required a label change for triamcinolone stating it should not be used for ESI.[95] A 2017 systematic review and meta-analysis comparing particulate steroids to non-particulate counterparts conclude that particulate steroids are not better in relieving pain compared to their non-particulate counterparts but may offer an improved safety profile. They conclude with the recommendation to consider switching to non-particulate steroids.[96] Another 2017 systematic review by Mehta et al agreed concluding, no benefit to particulate steroids and recommending non-particulate steroids with performing cervical TFESI, with Grade of Recommendation: B. For lumbar TFESI, they state particulate vs. non-particulate as equivocal with Grade of Recommendation: B for pain reduction and C for function with an overall recommendation for non-particulate steroids for lumbar TFESI.[97]

Steroid dosing, dilution, and additives are not standardized and are another area of controversy. There is evidence that different dilutions such as sodium chloride and LA can alter the steroids particle size and distribution. There is concern about the toxicity of additives (such as benzyl alcohol and polyethylene glycol). Based on the potential risk associated with systemic corticosteroid absorption, the WIP Benelux Workgroup recommends using the lowest effective dosing, which amounts to 40 mg for methylprednisolone acetate (MPA), 10-20 mg for triamcinolone acetate, and 10 mg (10mg/mL) for dexamethasone phosphate. They recommend limiting the cervical interlaminar and lumbar transforaminal volume to 4mL and inject slowly.[16]

Etanercept is a soluble p75 tumor necrosis factor fusion protein administered subcutaneously for inflammatory arthritis and other rheumatological conditions. While it has been explored in several studies with preliminary positive results, it is not FDA approved for injection into the epidural space, and therefore is not considered medically reasonable and necessary. Additional agents such as platelet-rich plasma, amniotic fluid, gabapentin, and others have been investigated, but there is not sufficient evidence to support use and they are considered investigational..

Multiple Procedures

Since injectants may have a bilateral effect or spread to adjacent levels, diagnostic interlaminar or caudal ESIs are seldom used. Diagnostic TFESIs are sometimes used to determine the level of radicular nerve root pain, to differentiate radicular from non-radicular pain, to evaluate a discrepancy between image studies and clinical findings, to identify the source of pain in the prevalence of multi-level nerve root compression, and to help identify the level of pathology at a previous operative site. Selective spinal nerve blocks (SSNBs) may also be used to identify the source of pain. The cumulative steroid dose and long-term safety has not been studied in the setting of multiple injections administered in the same session.

The SMEs were split in terms of multiple procedures during a single session, with half of the experts (6/11) voting that evidence supported the administration of ESIs at the same time as other interventional procedures. However, there was no additional supporting literature provided, and others brought up the concern of lack of diagnostic specificity when multiple procedures are performed in the same session.

Society Guidance

North American Spine Society (NASS)

The 2020 NASS Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care: Diagnosis and Treatment of Low Back Pain concludes that there is insufficient evidence to make a recommendation for or against the use of caudal or interlaminar epidural steroid injections in patients with low back pain with Grade of Recommendation: I (good evidence for or against recommending intervention).[15]

The 2020 NASS Epidural Steroid Injections and Selective Spinal Nerve Blocks[11] offers evidence-based coverage recommendations when possible and in the absence of strict evidence-based criteria recommendations are based on multidisciplinary experience and expertise of the authors. Evidence in this document are not graded.

- ESIs can be performed to provide relief of radicular or referred pain when 2/4 of the following are present: 1) Pain is severe enough to cause a degree of functional and/or vocational impairment or disability; 2) Pain duration of at least 4 weeks, and/or inability to tolerate or failure to respond to 4 weeks of noninvasive care; 3) Objective findings of radiculopathy or sclerotomal referred pain pattern are present and documented on examination; and 4) Advanced imaging (CT or magnetic resonance imaging [MRI]) demonstrates a correlative region of nerve involvement.
    - Criteria for exemption of four week delay is moderate to severe pain with functional loss at work and/or home; pain unresponsive to outpatient medical management; inability to tolerate non-surgical non injection care due to coexisting medical condition or severe pain; or prior successful injection therapy for same condition that achieved greater than 50% relief.
- ESIs are contraindicated for axial or nonspecific pain without radiating pain, most cancer or strong clinical suspicion of cancer, infection, and compression lesions of the spinal cord, conus medullaris or cauda equina. Relative contraindications to the performance of ESIs may include coexisting medical conditions such as uncontrolled bleeding disorders, poorly controlled diabetes (if corticosteroids are going to be used), immune system impairment, history of severe allergic reaction to components, etc. In these situations, the risk/benefits of the procedure should be considered in the medical decision-making process.
- Procedural based recommendations include the use of image guidance, ILESIs should not be performed above C7, injection of contrast media under real time fluoroscopy or digital subtraction imaging, use of a non-particulate steroid with the exception of thoracic and cervical spine, extension tubing for provider safety, and appropriate provider training.
- Suggested frequency of ESIs were based on author's expert opinion and included: No more than 4 ESIs and/or SSNBs should be performed in a 6-month period of time, no more than 6 ESIs and/or SSNBs should be

performed in a 12-month period of time regardless of the number of levels, no more than 2 TFESIs should be performed at a single setting (e.g., single level bilaterally or two levels), and for caudal ESIs or ILESIs, only one level per session may be performed and NOT in conjunction with a TFESI injection.
- Local anesthesia is sufficient for most cases. Occasional minimal to moderate conscious sedation is appropriate and if monitored anesthesia care is utilized the need for such sedation should be clearly documented in the medical record.
- The NASS reports that studies found that most patients who respond to ESIs do so with 3 or less injections for a specific episode of back and radicular pain. They provide non-evidence-based criteria for instances when they consider it medically appropriate to perform more than 3 injections. These circumstances include: Performance of SSNBs for surgical planning after failed ESIs; the presence of new injuries after resolution of a prior condition or after interval surgery since prior ESIs; prior injections were done without fluoroscopy or were inaccurately placed; exacerbation of symptoms that responded well to prior ESIs; and patients who responded well to prior ESIs that are not surgical candidates due to comorbid medical conditions.

U.S. Department of Veterans Affairs (VA)/U.S. Department of Defense (DoD)

The 2017 VA/DoD Clinical Practice Guideline for Diagnosis and Treatment of Low Back Pain utilized GRADE methodology.[19] The original guidelines were developed in 2007. In 2017, the literature was reviewed, and recommendations were added (New-added).

- For the long-term reduction of radicular low back pain, non-radicular low back pain, or spinal stenosis, we recommend against offering spinal ESIs. (Strong against | Reviewed, New-added)
- For the very short-term effect (less than or equal to two weeks) of reduction of radicular low back pain, we suggest offering epidural steroid injection. (Weak for | Reviewed, New-added)
- For the treatment of low back pain, we suggest against offering intra-articular facet joint steroid injections. (Weak against | Reviewed, New-added)

American Society of Interventional Pain Physicians (ASIPP)

The ASIPP released updated 2021 Epidural Interventions in the Management of Chronic Spinal Pain: American Society of Interventional Pain Physicians (ASIPP) Comprehensive Evidence-Based Guidelines.[73] This extensive evidence synthesis utilized a modified approach to the grading of evidence[98] and a recommendations grade table published in the British Medical Journal in 2001. This grading system utilizes the type of study and the number of studies. In contrast, the GRADE system, defined in definitions above and commonly used in guideline development, focuses on the quality of the studies with up or downgrading based on methodology. The quality of each article was assessed by Interventional Pain Management Techniques-Quality Appraisal of Reliability and Risk of Bias Assessment (IPM-QRB). Recommendations were made based on the National Guideline Clearing Extent Adherence to Trustworthy Standards instrument. While many of the recommendations were moderate to strong and based on Level I-II evidence, paucity of literature with many of these areas is based on one study.

Evidence:

- Disc Herniation: Based on relevant, high-quality fluoroscopically guided epidural injections, with or without steroids, and results of previous systematic reviews, the evidence is Level I for caudal ESIs, lumbar ILESIs, and lumbar TFESIs and cervical ILESIs with a strong recommendation for long term effectiveness.
- For thoracic disc herniation, based on one relevant, high quality RCT of thoracic epidural with fluoroscopic guidance, with or without steroids, the evidence is Level II with moderate to strong recommendation for long term effectiveness.
- For spinal stenosis, the evidence is based on one high-quality RCT in each category. The evidence is Level II-III for fluoroscopically guided caudal epidural injections with moderate to strong recommendation and Level II

for fluoroscopically guided lumbar and cervical interlaminar epidural injections with moderate to strong recommendation for long-term effectiveness.
- The evidence for lumber TFESIs is Level III-IV with moderate recommendation with fluoroscopically guided lumbar TFESIs for long term improvement.
- For axial discogenic pain, the evidence without facet joint pain or sacroiliac joint pain in the lumbar, and cervical spine with fluoroscopically guided caudal, lumbar and cervical ILESIs, based on one relevant high-quality RCT in each category is Level II with moderate to strong recommendation for long-term improvement, with or without steroids.
- The evidence for lumbar and cervical post-surgical syndrome based on one relevant high-quality RCT with fluoroscopic guidance for caudal and cervical ILESIs, with or without steroids, is Level II with moderate to strong recommendation for long-term improvement.

The American College of Radiology (ACR), the American Society of Neuroradiology (ASNR), the American Society of Spine Radiology (ASSR), the Society of Interventional Radiology (SIR), and the Society of NeuroInterventional Surgery (SNIS)

ACR–ASNR–ASSR–SIR–SNIS Practice Parameter for the Performance of Image-Guided Epidural Steroid Injection (2019) is a collaborative guideline.[99]

- When an ESI is performed, success is defined as the achievement of significant pain relief, reduced disability, and/or improved quality of life. These should be measured by at least one of the relevant and validated measurement tools, such as the ten-point numerical pain rating scale score or a visual analogue scale score (Roland-Morris Back Pain score, Oswestry Disability Index, The Short Form (36) Health Survey, or similar outcome tool to measure pain, disability, and/or quality of life). It is generally accepted that a minimum of 20% change in pain scores is clinically meaningful, based upon previous trials and FDA requirements.

  They list the following absolute contraindications:

  1. Coagulopathy not correctible
  2. Concurrent systemic infection
  3. Infectious spondylitis
  4. Acute spinal cord compression
  5. Myelopathy or cauda equina syndrome
  6. Inability to obtain informed consent
  7. Infection at the skin puncture site

- They list the following relative contraindications:

  1. Uncorrected anticoagulation therapy – ILESIs and TFESIs are considered intermediate-risk procedures with a moderate risk of bleeding.
  2. Hypersensitivity to administered agents – allergy to contrast may be treated with premedication with antihistamine agents or an alternative approach (such as using CT guidance with air as the contrast medium may be considered).
  3. Pregnancy – Although such interventions may be performed without image guidance in pregnant patients, there is a 30% rate of incorrect placement. Other options include MRI-guided injections and ultrasound-guided injections as image-guided procedures have a significantly greater margin of safety and should be utilized when feasible.
  4. Hepatitis – When performing neuraxial blockade in hepatitis C patients, thrombocytopenia must be

excluded in order to avoid hematoma formation and its associated neurologic complications.
5. Uncontrolled diabetes mellitus - Insulin-dependent diabetics are at risk of elevated blood sugars after steroid injections.
6. Congestive heart failure – The steroid may lead to fluid retention.
7. Immunosuppressed state - Preprocedural antibiotics may be considered.
8. Patient improving on medical and physical therapy.
9. Severe spinal canal stenosis.
10. No response to previous well-performed ESI.
11. Complication to steroid therapy (Cushing's, etc.).

Agency for Healthcare Research and Quality (AHRQ)

The AHRQ 2015 Technology Assessment for Pain Management Injection Therapies for Low Back Pain[2]

The 2015 AHRQ technology assessment played a pivotal role in epidural injection for pain. While this report has not been updated since 2015 due to loss of funding for this project, this report remains significant as it was funded by AHRQ, so there was low-risk of outcome reporting bias, and leads to questions regarding the effectiveness and utility of epidural injections for pain. The report includes a systematic review of RCTs of patients with lumbosacral radiculopathy, spinal stenosis, non-radicular back pain, or chronic post-surgical back pain. Quality of evidence was assessed for risk of bias using the Cochrane Back Review Group criteria. Meta-analysis was performed and stratified by time. A total of 79 RCTs of epidurals were included. The results were: "For epidural corticosteroid injections versus placebo interventions for radiculopathy, the only statistically significant effects were on mean improvement in pain at immediate-term follow-up (weighted mean difference [WMD] -7.55 on a 0 to 100 scale, 95% CI -11.4 to -3.74) (strength of evidence [SOE]: moderate), the mean improvement in function at immediate-term follow-up when an outlier trial was excluded (standardized mean difference [SMD] -0.33, 95% CI -0.56 to -0.09) (SOE: low), and risk of surgery at short-term follow-up (relative risk [RR] 0.62, 95% CI 0.41 to 0.92) (SOE: low). The magnitude of effects on pain and function was small, did not meet predefined thresholds for minimum clinically important differences, and there were no differences in outcomes at longer-term follow-up. Evidence on effects of different injection techniques, patient characteristics, or comparator interventions estimates was limited and did not show clear effects. Trials of epidural corticosteroid injections for radiculopathy versus non-placebo interventions did not clearly demonstrate effectiveness (SOE: insufficient to low). Evidence was limited for epidural corticosteroid injections versus placebo interventions for spinal stenosis (SOE: low to moderate) or non-radicular back pain (SOE: low), but showed no differences in pain, function, or likelihood of surgery. Serious harm from injections were rare in randomized trials and observational studies, but harm reporting was suboptimal (SOE: low)." The authors concluded that corticosteroid injections for radiculopathy were associated with immediate but short-term benefits and did not reduce the long-term risk of surgery. They also conclude that ESI is not effective for spinal stenosis or non-radicular back pain.

The American College of Physicians (ACP)

The ACP created the Clinical Practice Guidelines for Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain (2017) using the ACP grading system methodology and based on published systematic reviews and a systematic review of RCTs through April 2015 to develop the following recommendations [22]:

- Recommendation 1: Given that most patients with acute or subacute low back pain improve over time regardless of treatment, clinicians and patients should select nonpharmacologic treatment with superficial heat (moderate-quality evidence), massage, acupuncture, or spinal manipulation (low-quality evidence). If pharmacologic treatment is desired, clinicians and patients should select nonsteroidal anti-inflammatory drugs or skeletal muscle relaxants (moderate-quality evidence). (Grade: strong recommendation).
- Recommendation 2: For patients with chronic low back pain, clinicians and patients should initially select nonpharmacologic treatment with exercise, multidisciplinary rehabilitation, acupuncture, mindfulness-based

stress reduction (moderate-quality evidence), tai chi, yoga, motor control exercise, progressive relaxation, electromyography biofeedback, low-level laser therapy, operant therapy, cognitive behavioral therapy, or spinal manipulation (low-quality evidence). (Grade: strong recommendation).

This report was updated in 2017 with some changes in recommendations for initial pharmacological management, but other conclusions were relatively unchanged.[100]

American Society of Anesthesiologists (ASA)

The ASA Task Force developed Practice Guidelines for Chronic Pain Management, which were last updated in 2010. At that time, they stated, "ESI, with or without local anesthetics, may be part of a multimodal treatment regimen to provide pain relief in selected patients with radicular pain or radiculopathy. Shared decision-making regarding ESIs should include a specific discussion of potential complications, particularly regarding the transforaminal approach. Transforaminal epidural injections should be performed with appropriate image guidance to confirm correct needle position and spread of contrast before injecting a therapeutic substance; image guidance may be considered for interlaminar epidural injections."[10]

American Academy of Neurology (AAN)

The AAN published a technology assessment and reported in March 2007 and reaffirmed in July 2010 on epidural steroid injections to treat radicular lumbosacral pain.[10,20] Their recommendations and conclusions include:

- Epidural steroid injections may result in some improvement in radicular lumbosacral pain when determined between two and six weeks following the injection, compared to control treatment (Level C, Class I–III evidence). The average magnitude of the effect is small, and the generalizability of the observation is limited by the small number of studies, limited to highly selected patient populations, the few techniques and doses studied, and variable comparison treatments.
- In general, ESIs for radicular lumbosacral pain have shown no impact on average impairment of function, on the need for surgery, or long-term pain relief beyond three months. Their routine use for these indications is not recommended (Level B, Class I–III evidence).
- Data on the use of ESIs to treat cervical radicular pain are inadequate to make any recommendation (Level U).

American Association of Neurological Surgeons (AANS) and the Congress of Neurological Surgeons (CNS)

The AANS and the CNS guideline update for performance of fusion procedures for degenerative disease of the lumbar spine reviewed injection therapies for low back pain in Part 13 of their guideline update and reported no new evidence that changes recommendations from their original publication in a 2014 update.[101] The guidelines were based on a review of literature through 2011 and focuses on three systematic reviews and an updated review of RCTs. They conclude, "the medical literature continues to fail to support using lumbar epidural injections for long-term relief of chronic back pain without radiculopathy. There is limited support for the use of lumbar epidural injections for short-term relief in selected patients with chronic back pain."

- Lumbar ESIs: Grade C. Lumbar ESIs are an option for the short-term relief of chronic low-back pain without radiculopathy in patients with degenerative disease of the lumbar spine (Level III evidence).
- Caudal ESIs are an option for decreasing low-back pain of greater than six weeks duration, without radiculopathy, in patients with degenerative disease of the lumbar spine (Level III).

Spine Intervention Society (SIS)

The SIS Patient Safety Committee published 2020 guidance on the frequency of epidural steroid injections[8]:

- After an ESI, a period of up to 14 days may be needed to assess the clinical response. Systemic effects on the hypothalamic-pituitary-adrenal (HPA) axis may last three weeks or longer. These factors must be considered when determining if or when another ESI is indicated.
- There is no evidence to support the routine performance of a "series" of repeat injections without regard to the clinical response to an initial injection.
- Two separate studies suggest that repeat injections may improve outcomes in patients with a partial response to a first (index) ESI. Repeat ESI at greater than two weeks and less than one year from the index injection has also been shown to result in a statistically and clinically significant decrease in pain, and patients with acute to subacute symptoms recover all prior benefit with a statistically significant cumulative benefit.

The American Society of Regional Anesthesia and Pain Medicine, the European Society of Regional Anesthesia and Pain Therapy, the American Academy of Pain Medicine, the International Neuromodulation Society, the North American Neuromodulation Society, and the World Institute of Pain provided updated guidelines for Interventional Spine and Pain Procedures in Patients on Antiplatelet and Anticoagulant Medications (Second Edition).[102]

This updated guideline addresses 'Pain Procedures Classification According to the Potential Risk of Serious Bleeding' and indicates:

- Intermediate risk defined as patients with a high risk of bleeding (e.g., old age, history of bleeding tendency, concurrent uses of other anticoagulants/antiplatelets, liver cirrhosis or advanced liver disease, and advanced renal disease) undergoing low- or intermediate-risk procedures should be treated as intermediate or high risk, respectively includes:
    - Interlaminar ESIs (cervical, lumbar, sacral and thoracic) and
    - Transforaminal ESIs (cervical, lumbar, sacral and thoracic).
- Recommends review of radiological imaging prior to performance of the procedure to assess for central and foraminal stenosis, disk herniations that compromise canal diameter, ligamentum flavum hypertrophy, epidural fibrosis, and previous surgical scarring, which can alter the level of procedural difficulty.
- Provides summary and guidance for multiple drugs including aspirin, NSAIDs, coumadin, heparin, low molecular weight heparin, fibrinolytic agents, etc.

The National Institute for Health and Care Excellence (NICE) provided guidelines for 'Low back pain and sciatica'.[25] **Assessment and management recommendations include:**

- Support use of epidural injections for acute and severe sciatica.
- Recommends imaging if it may change future management, including consideration for epidural or spinal surgery.

Analysis of Evidence (Rationale for Determination)

Epidural steroid injections are a common pain management procedure for use in acute and chronic back pain. There are many areas of controversy regarding ESIs. This controversy was reflected among the subject matter expert panel, where the experts expressed broadly differing interpretations of the literature and opinions regarding the appropriate use of ESIs. There is a body of literature of randomized controlled trials comparing ESIs to various placebos, including LA, saline, and sham procedures. However, few new trials have been conducted in recent years to further address the questions and issues surrounding ESIs. Instead, there is a multitude of systematic reviews and meta-analyses of the previously conducted RCTs. These reviews have produced divergent conclusions despite using a

similar body of literature. Meta-analysis is limited as there is a great deal of heterogenicity among the randomized control trials. Meta-analysis is to synthesize the effects of many different studies into one single effect, which can be a powerful tool to expand the number of subjects and help to determine the real or true effect. However, when heterogenicity is high, it may not be appropriate to pool the data as we cannot be certain there is a real or true effect behind the data. Single arm analysis is not sufficient to resolve this limitation.

There is a lack of a well-defined control in the studies conducted on the effectiveness of ESI. The SMEs did not agree on the definition of placebo with an extensive discussion surrounding the concept that LAs, or even saline, are equally effective to steroids and cannot be counted as a placebo. To further complicate, there are multiple randomized controlled trials that showed inferiority of LA alone compared to LA with ESIs. The lack of standardization among the studies, including the route of administration, the type of steroid used, what it is combined with (such as LA or saline), the amount of steroid, type of needle used, the use of imaging, the indication for the procedure, the frequency of injections and the comorbidities among the patient population create additional challenges in interpreting the literature. There are a large number of variables that have not been adequately accounted for in the existing data. There is a paucity of evidence addressing long-term effectiveness or quality of life outcomes. New studies specifically addressing these issues are limited, and most new reports are systematic reviews and not specifically designed to answer these questions. For these reasons, we must critically assess the existing body of literature and focus on nationally accepted standards for the grading of evidence to ensure consistency and transparency in the analysis of evidence. We also looked towards societal guidance and expert input to aid in decision-making regarding this LCD.

The natural disease course of lumbar radicular pain from disc herniation is acute pain that typically resolves spontaneously. While pain may be debilitating during this time, outcomes are overall favorable. Conservative management may improve pain and function and is considered the standard of care in the acute phase. When pain persists past the acute phase, overall outcomes are still favorable for improvement. The existing evidence was consistent for a short-term benefit of ESIs to reduce pain and improve function for patients experiencing this type of pain and potentially reducing the need for surgery for a condition that may improve spontaneously with time. The continued use of ESIs past six months is not well supported by the existing evidence. Most trials did not go past 12 months, and those trials that did investigate the past six months did not find consistent evidence of benefit for ESIs in chronic management. While the evidence does not support the continued use of ESIs, societal guidance and expert input identifies a subset of patients who are not good candidates for surgery, or even unsuccessful with surgery, where ESIs may provide improvement in their function and quality of life.

In spinal stenosis, the natural disease may result in improvement over time. Still, in settings of long-term and chronic pain, spontaneous improvement is less likely due to the physical impingement of the nerve involved in the stenosis. There is low-quality evidence to support the role of ESIs in the short-term management of spinal stenosis and a trend towards improvement that may allow time for spontaneous improvement. There is no high-quality evidence showing a benefit for long-term outcomes. Societal guidance varies with recommendations both in support and against use for spinal stenosis. Despite conflicting evidence, we agree with the SMEs that patients in the setting of shared decision making and risk and benefit discussion can elect a trial of ESIs as recovery can occur in greater than half of the patients without surgery.

Evidence to support the use of ESIs in post-surgical back syndrome is limited. However, alternative treatment options in this patient group are also limited. For patients experiencing chronic back pain, especially those with previous back surgery, multimodal therapy is an important aspect of comprehensive treatment. Despite weak evidence, we support shared decision-making and risk and benefit discussion of ESIs as part of the treatment plan. In multimodal therapy, ESIs may play a role to optimize pain and function in this population but should not be a sole treatment option.

There was insufficient evidence to support the use of ESIs for non-specific low back pain, complex regional pain syndrome, widespread diffuse pain, spondylolisthesis, pain from neuropathy from other causes, or cervicogenic headaches. The subject matter experts were divided with some supporting use for these indications; however, with

the lack of supporting literature and controversy amongst the experts, we maintain that the use of ESIs in these conditions is not medically reasonable and necessary.

Studies support that a single injection can relieve pain in appropriately selected patients. This is consistent with the natural history of the disease course, which will result in spontaneous improvement over time. Repeat injections were necessary for a minority of patients, about 20%, in the existing literature with less than 5% receiving more than three injections. National data confirms that the use of more than four injections is used less than 5% of the time in the Medicare population. Simultaneously, the literature is variable in terms of timing between injections with reported ranges of two to twelve weeks. Observational data suggests a potential benefit of a shorter interval between injections of two to three weeks after initial injection, concluding that overall pain and number of injections are reduced with this approach. However, this must be balanced against the cumulative steroid exposure and not allowing enough time for treatment to be fully effective. A series of injections is not supported by the literature and there is agreement for the same among the SMEs.

While there are outliers and differing opinions as demonstrated amongst the SMEs, the existing evidence aligns with a maximum of four injections in a year for most patients. Additionally, the natural history of the diseases treated with ESIs would rarely involve more than one region. In review of national data, less than 0.05% of ESI sessions involved more than one region in the same session.

Regarding levels, no studies compared single injections to multi-level injections to understand if the second level truly improved pain and function. Existing data did not show increased safety risk of a second level, and almost no studies reported more than two levels in the same session. Because the drug is not localized with more tendency to spread, second levels would not be indicated for the caudal or interlaminar routes.

Epidural steroid injections have played a role in pain management for a long time. While there is controversy on their role in back and neck pain management, it is established that patients have benefited at least in the short term to improve pain and function. Existing evidence does not support that ESIs result in long term improvement but rather provide pain relief to allow time for the natural disease course to result in improvement. This may reduce the need for opiates and surgery in patients suffering from extreme pain and dysfunction who would not be able to wait for the improvement through conservative modalities. While the risk of adverse outcomes associated with ESIs is rare, they can be serious; therefore, appropriate use is critical. Little evidence exists to support the use of epidural steroids over the long term as the existing data largely demonstrates a benefit in the short term (less than six months) for management of back and neck pain. Also, continued use of steroids over the long term may exacerbate underlying medical conditions, with an increased risk for osteoporosis and fracture. Each intervention also carries the risk of complications, and radiation exposure potentially causes more harm than good. Based on our subject matter expert input, there is an understanding that there are unique circumstances where a patient is not a good surgical candidate or strongly opposes surgery. This may provide an option for pain and function relief and improved quality of life. For this reason, the use of ESIs beyond one year must be combined with multimodal therapy, which has been shown to optimize outcomes by treating pain through a variety of modalities. For any patient continuing to need ESIs beyond a year, evaluation of alternative treatment options and the risk and benefit of continued use are an important aspect of care. The involvement of the patient's entire medical team, including primary care physicians who manage other underlying diseases and understand the procedure’s impact on other health outcomes, should play a role in the risk and benefit discussion.

There is a lack of standardization in the use of ESIs, including the approach to the injection, type of injection, amount of injectant, duration of time and criteria for repeat injection would be considered, indications for injections, and measurements of outcomes. Subject matter experts and societal guidance are conflicting. The literature does not provide clear answers to these questions, and the high variability in the individual studies makes consolidation of these reports in the form of meta-analysis difficult to interpret because the studies are so different that it is comparing “apples to oranges.” Additional research is necessary to reconcile the controversial areas and fully understand the role of ESIs in pain management. The coverage determined within this LCD is based on the available literature and maintains access to this service, despite the limitations and unknowns, and to ensure access to non-

surgical options for beneficiaries.

General Information

Associated Information

Please refer to the related Local Coverage Article: Billing and Coding: Epidural Steroid Injections for Pain Management (A56651) for documentation requirements, utilization parameters and all coding information as applicable.

Sources of Information

N/A

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Revision History Information

REVISION HISTORY DATE	REVISION HISTORY NUMBER	REVISION HISTORY EXPLANATION	REASONS FOR CHANGE
12/12/2021	R13	LCD posted for notice on 10/28/2021 to become effective 12/12/2021. Proposed LCD posted for comment on 06/10/2021.	• Creation of Uniform LCDs With Other MAC Jurisdiction
10/01/2019	R12	Revision Number: 7 Publication: September 2019 Connection LCR B 2019-022 Explanation of Revision: Based on review of the LCD, formatting errors were identified and corrected. The Bibliography section of the LCD was updated to be consistent with AMA formatting. Also, frequency limitations information was removed from the "Utilization Guidelines" section of the Billing and Coding article and placed into the "Limitations" section of the LCD. The effective date of this revision is for dates of service on or after 10/01/19. 10/01/2019: At this time 21st Century Cures Act will apply to new and revised LCDs that restrict coverage which requires comment and notice. This revision is not a restriction to the coverage determination and therefore not all the fields included on the LCD are applicable as noted in this LCD.	• Other (Formatting corrections)
06/18/2019	R11	Revision Number: 6	• Other (Revisions

REVISION HISTORY DATE	REVISION HISTORY NUMBER	REVISION HISTORY EXPLANATION	REASONS FOR CHANGE
		Publication: June 2019 Connection LCR B2019-014 Explanation of Revision: Based on CR 10901, the LCD was revised to remove all billing and coding and all language not related to reasonable and necessary provisions ("Bill Type Codes", "Revenue Codes", "CPT/HCPCS Codes", "ICD-10 Codes that Support Medical Necessity", "Documentation Requirements" and "Utilization Guidelines" sections of the LCD) and place them into a newly created billing and coding article. The effective date of this LCD revision is for claims processed on or after January 8, 2019, for dates of service on or after October 3, 2018. In addition, based on a review of the LCD, the "ICD-10 Codes that are covered" section of the newly created Billing and Coding article was updated. The following ICD10-CM diagnosis codes were added to the "Group 1 Codes:" section of the LCD, as they were omitted in error: C76.1, C76.2, C76.3, C76.40, C76.41, C76.42, C76.50, C76.51, C76.52, C76.8, C77.0, C77.1, C77.2, C77.3, C77.4, C77.5, C77.8, C77.9, C78.00, C78.01, C78.02, C78.1, C78.2, C78.30, C78.39, C78.4, C78.5, C78.6, C78.7, C78.80, C78.89, C79.00, C79.01, C79.02, C79.10, C79.11, C79.19, C79.2, C79.31, C79.32, C79.40, C79.49, C79.51, C79.52, C79.60, C79.61, C79.62, C79.70, C79.71, C79.72, C79.81, C79.82, C79.89, C79.9, C80.0, C80.1, D37.02, D37.030, D37.031, D37.032, D37.039, D37.04, D37.05, D37.09, D37.1, D37.2, D37.3, D37.4, D37.5, D37.6, D37.8, D37.9, D38.0, D38.1, D38.2, D38.3, D38.4, D38.5, D38.6, D39.0, D39.10, D39.11, D39.12, D39.2, D39.8, D39.9, D40.0, D40.10, D40.11, D40.12, D40.8, D40.9, D41.00, D41.01, D41.02, D41.10, D41.11, D41.12, D41.20, D41.21, D41.22, D41.3, D41.4, D41.8, D41.9, D42.0, D42.1, D42.9, D43.0, D43.1, D43.2, D43.3, D43.4, D43.8, D43.9, D44.0, D44.10, D44.11, D44.12, D44.2, D44.3, D44.4, D44.5, D44.6, D44.7, D44.9, D45, D46.0, D46.1, D46.20, and D46.21. The effective date of this billing and coding article update is for claims processed on or after June 18, 2019, for dates of service on or after October 1, 2015. 06/18/2019: At this time 21st Century Cures Act will apply to new and revised LCDs that restrict coverage which requires comment and notice. This revision is not a restriction to the coverage determination and therefore not all the fields included on the LCD are applicable as noted in this LCD.	based on CR 10901.)
10/01/2018	R10	Revision Number: 5 Explanation of Revision: Based on CR 10847 (Annual 2019 ICD-10-	• Revisions Due To ICD-10-CM Code Changes

REVISION HISTORY DATE	REVISION HISTORY NUMBER	REVISION HISTORY EXPLANATION	REASONS FOR CHANGE
		CM Update), the LCD was revised to indicate that diagnosis codes were added and deleted within existing diagnosis code ranges. The effective date of this revision is based on date of service.	
10/01/2017	R9	**Revision Number: 4** Publication: September 2017 Connection LCR B2017-011 **Explanation of Revision:** Based on CR 10153 (Annual 2018 ICD-10-CM Update) the LCD was revised. Changed ICD-10-CM diagnosis code range D47.0-D47.1 to D47.01-D47.1. Deleted ICD-10-CM diagnosis code D47.0. The effective date of this revision is based on date of service. 10/01/2017: At this time 21st Century Cures Act will apply to new and revised LCDs that restrict coverage which requires comment and notice. This revision is not a restriction to the coverage determination and therefore not all the fields included on the LCD are applicable as noted in this policy.	• Revisions Due To ICD-10-CM Code Changes
06/13/2017	R8	Revision Number:3 Publication: June 2017 Connection LCR B2017-006 Explanation of Revision: Based on an external correspondence regarding denials of CPT codes 62320 and 62322 when billed in a hospital setting, the LCD was revised to remove conflicting language regarding coverage of interlaminar injections. In addition, CPT codes 62320 and 62322 were added to the "CPT/HCPCS Codes" section of the LCD. The effective date of this revision is for claims processed on or after 06/13/2017, for dates of service on or after 01/01/17.	• Reconsideration Request
01/01/2017	R7	Revision Number: 2 Publication: December 2016 Connection LCR B2017-001 Explanation of Revision: Annual 2017 HCPCS Update. Revised LCD to add CPT codes 62321 and 62323 and delete procedure codes 62310 and 62311. Additionally, the LCD was revised within section titled, 'Indications and Limitations of Coverage and/or Medical	• Revisions Due To CPT/HCPCS Code Changes

REVISION HISTORY DATE	REVISION HISTORY NUMBER	REVISION HISTORY EXPLANATION	REASONS FOR CHANGE
		Necessity' to add CPT codes 62320 and 62322 as not considered medically reasonable and necessary. The effective date of this revision is based on date of service.	
10/01/2016	R6	Revision Number: 1 Publication: October 2016 Connection LCR B2016-018 Explanation of Revision: Based on CR 9677 (Annual 2017 ICD-10-CM Update) the LCD was revised to add new ICD-10 diagnosis code range C49.A0 – C49.A9. Revised the following diagnosis ranges: diagnosis range G56.00 – G56.92 to read G56.00 – G56.93; G57.40 – G57.42 to read G57.40 – G57.43; G57.70 – G57.82 to read G57.70 – G57.83. The effective date of this revision is based on date of service.	• Revisions Due To ICD-10-CM Code Changes
10/01/2015	R5	Added a note to paragraph section "ICD-10-CM Codes that Meet Medical Necessity" section to clarify coverage.	• Other
10/01/2015	R4	policy was updated by the ICD-10 2013-2014 Annual Update.	• Revisions Due To ICD-10-CM Code Changes
10/01/2015	R3	05/29/2014 – The language and/or ICD-10-CM diagnoses were updated to be consistent with current LCD language and ICD-9-CM coding.	• Revisions Due To ICD-10-CM Code Changes
10/01/2015	R2	05/29/2014 – The language and/or ICD-10-CM diagnoses were updated to be consistent with current LCD language and ICD-9-CM coding.	• Revisions Due To ICD-10-CM Code Changes
10/01/2015	R1	TYPOGRAPHICAL CORRECTION	• Typographical Error

Associated Documents

Attachments

N/A

Related Local Coverage Documents

Articles

A56651 - Billing and Coding: Epidural Steroid Injections for Pain Management

A58928 - Response to Comments: Epidural Steroid Injections for Pain Management

LCDs

DL33906 - Epidural Procedures for Pain Management

Related National Coverage Documents

N/A

Public Versions

UPDATED ON	EFFECTIVE DATES	STATUS
10/22/2021	12/12/2021 - N/A	Future Effective (This Version)
10/02/2019	10/01/2019 - 12/11/2021	Currently in Effect
Some older versions have been archived. Please visit the MCD Archive Site to retrieve them.		

Keywords

N/A