aetna®

Selective Nerve Root Blocks

Number: 0722

Policy

Please see amendment for Pennsylvania Medicaid at the end of this CPB.

I. Aetna considers diagnostic selective nerve root block (SNRB), also known as selective transforaminal epidural injection with imaging guidance (fluoroscopy or CT), medically necessary for identifying the etiology of pain in persons with symptoms suggestive of chronic radiculopathy, where the diagnosis remains uncertain after standard evaluation (neurological examination, radiological and neurodiagnostic studies):

- To establish the diagnosis of radiculopathy, when pain appears to be due to classic mono-radiculopathy but radiological or neurodiagnostic studies fail to provide a structural explanation; *or*
- To establish the diagnosis of radiculopathy in a person with classic mono-radicular pain, in whom radiological studies demonstrate an abnormality related to an adjacent nerve root only; *or*
- For those cases in which the clinical picture is suggestive but not typical for both nerve root and distal nerve or joint disease.

Aetna considers diagnostic SNRBs experimental and investigational for all other indications because its effectiveness other than the ones listed above has not been established.

Policy History

Last Review

08/09/2018
Effective: 04/04/200
Next Review: 08/08/2019

Review History

Definitions

Additional Information

II. Aetna considers therapeutic SNRB with imaging guidance (fluoroscopy or CT) medically necessary in the treatment of members with radiculopathy when non-invasive measures such as physical therapy and non-narcotic analgesics have failed or become intolerant, and the member has radicular pain that is consistent with radiologic findings.

Aetna considers therapeutic SNRBs experimental and investigational for all other indications because its effectiveness other than the ones listed above has not been established.

Note: Therapeutic SNRBs should be administered as part of a comprehensive pain management program. Administration of more than 3 SNRBs per 6 months is subject to medical necessity review.

III. Aetna considers ultrasound-guided transforaminal epidural injections experimental and investigational because their clinical effectiveness has not been established.

See also CPB 0016 - Back Pain - Invasive Procedures (../1_99/0016.html)

Background

Spinal nerve roots, arising from both sides of the spinal cord at each vertebral level, may be compressed or injured as a consequence of herniated discs, stenosis, facet cysts, whiplash, or hyper-extension injuries resulting in pain and inflammation. In the management of patients with low back pain (LBP) and radiculopathy, selective nerve root block (SNRB), also known as selective transforaminal epidural injection, is a procedure used for both diagnostic (to ascertain whether a specific spinal nerve root is the source of pain) and therapeutic (to reduce inflammation around the spinal nerve root, thus reducing or relieving the pain) purposes. Selective nerve root blocks are usually performed under fluoroscopic guidance; a needle is inserted into

the epidural space in the foramen at the suspected spinal level, and medications such as steroids and local anesthetics are then injected into the area bathing the nerve root. If a patient's pain improves following the injection, that nerve is likely the cause of the pain; otherwise the suspected nerve is probably not the source of the pain. Although usually performed under fluoroscopy, computed tomography (CT) and CT fluoroscopy have been increasingly used to guide needle placement. Use of intermittent CT fluoroscopy during lumbar SNRBs has been reported to result in minimal radiation dose levels and procedure times that are comparable to fluoroscopic guidance (Wagner et al, 2004). While there is no definitive research to dictate the frequency of SNRBs, it is generally considered reasonable to limit SNRBs to 3 times per year (Spine-health.com, 2005).

Although epidural injections of steroids may produce the same effect, SNRBs are more focused injections that have better diagnostic value than epidural injections, especially in surgical planning. When the two procedures are compared, injections of a large amount of steroid throughout the epidural space (i.e., epidural injections) are mostly of use when the pathology is located centrally in the spinal canal (e.g., central disk extrusion) or when 1 or 2 individual nerves can not be identified as the most likely source of the symptoms during physical examination or imaging studies. Conventional epidural injection of steroids can be described as a "general" approach, covering many spinal levels but administering only a small amount of steroid at each level. On the other hand, SNRB is more of a "target" approach, with the injection of a relatively large amount of steroid around a specific nerve root. The latter approach is useful when 1 or 2 nerve roots are considered to be the likely source of the patient's pain (Wagner, 2005).

Diagnostic SNRB:

Saal and colleagues (2002) reviewed the literature on diagnostic tests available to spine clinicians for the evaluation of chronic LBP. These investigators stated that in a comparison of nerve root blockade, sciatic nerve block, posterior ramus block, and subcutaneous injection in a cohort of patients with sciatica, the sensitivity of nerve root block was very high, with only a moderate level of specificity. Huston and Slipman (2002) stated that diagnostic SNRBs are useful in the diagnosis of radicular pain in atypical presentations. These investigators stated that patients should have shown a failure to improve with less invasive treatment. In these patients, a diagnostic SNRB may localize the pain to a specific spinal nerve. It must be emphasized that the diagnostic SNRB only determines if pain is emanating from a specific nerve root or spinal nerve. A diagnostic SNRB does not determine what has

caused the nerve root or spinal nerve pain, nor does it provide prognostic information. The etiology of the nerve root pain, mechanism of injury, underlying anatomy, duration of symptoms, co-morbidities, patient desire, physician skill and a host of other factors determine the appropriate treatment and prognosis (Huston and Slipman, 2002).

Anderberg and colleagues (2004) described the method of a cervical diagnostic SNRB technique and assessed its ability to correlate clinical symptoms with MRI findings in patients with cervical radicular pain and a single level degenerative disease. A total of 20 patients with cervical radiculopathy and correlating single level MRI pathology were studied. All patients underwent clinical investigation as well as arm and neck pain measurements with visual analog scales (VAS). The last 10 consecutive patients also underwent provocation with active neck motion when arm and neck pain were measured. They all underwent SNRB and 1 ml local-anesthesia (mepivacaine 10 mg/ml) was injected, with the aid of fluoroscopy, close to the nerve-root. The VAS estimation and clinical investigation including provocation were repeated 30 mins after the block. Criteria for a positive block response were a significant subjective pain reduction and at least 50 % VAS pain reduction in the arm. For the whole group, mean VAS arm pain reductions were 86 % and mean VAS neck pain reductions were 65 %. When the results from the provocation were added, all patients had a positive block. Eighteen patients were operated on by an anterior procedure and all 18 were free from radicular pain at follow-up. These researchers concluded that SNRB seems relevant for revealing a relationship between radiological pathology and clinical symptoms and signs. Furthermore, Anderberg et al (2005) also stated that SNRB might be a helpful tool together with clinical findings/history and MRI of the cervical spine when performing pre-operative investigations in patients with 2 or more level of degeneration presenting with radicular pain that can be attributed to the degenerative findings.

According to the Washington State Department of Labor and Industries' review criteria for cervical surgery for entrapment of a single nerve root (2004), a positive response to SNRB that correlates with imaging abnormality is needed if there are complaints of radicular pain with no motor, sensory, reflex, or electromyographic changes. A SNRB may be considered "positive" if (i) it initially produces pain in the distribution of the nerve root being blocked, and (ii) produces at least 75 % reduction in pain for a duration consistent with the type of local anesthetic used for the block.

In a review on SNRB for patients with LBP and radiculopathy, Gajraj (2004) stated that SNRB, when combined with a careful history, physical examination, and quality radiographical studies, is an important tool in the diagnostic evaluation of patients with predominantly radicular symptoms. Diagnostic SNRBs are used to identify nerve roots responsible for pain when clinical or radiological studies are equivocal and for planning surgical treatment. Indications for SNRB are as follows (Gajraj, 2004):

- ▪ Anomalous innervations (e.g., conjoint nerve roots or furcal nerves)
- ▪ Atypical extremity pain
- ▪ Equivocal imaging studies
- ▪ Equivocal neurological examinations
- ▪ Failed back syndrome with atypical extremity pain
- ▪ Temporary pain relief from a known cause of pain (e.g., disc herniation)
- ▪ Transitional vertebrae

Wagner (2005) stated that SNRB can help patients with symptoms related to a nerve root but who have no definite radiological diagnosis explaining the symptoms or who have so many abnormal MRI findings that confirming the origin of the symptoms is difficult. In patients with uncertain pain etiology, SNRB is an effective and accurate means of determining if a certain nerve root is the source of the symptoms.

In the evidence-based practice guidelines on chronic spinal pain developed by the American Society of Interventional Pain Physicians, Boswell et al (2005) stated that the evidence was moderate for transforaminal epidural injections (or SNRBs) in the pre-operative evaluation of patients with negative or inconclusive imaging studies and clinical findings of nerve root irritation. The guidelines also stated that epidural injections include the following routes: (i) caudal, (ii) inter-laminar, and (iii) transforaminal. In the diagnostic phase, a patient may receive two procedures at intervals of no sooner than 1 week or preferably, 2 weeks, except in cancer pain or when a continuous administration of local anesthetic is employed for reflex sympathetic dystrophy.

A systematic evidence review by Datta et al (2007) concluded that SNRBs may be helpful in the diagnosis of spinal pain with radicular features, but further research is required to clarify their role. The systematic evidence review identified 8 studies that provided data on sensitivity and/or specificity of diagnostic SNRBs. The sensitivity

ranged from 87 to 100 % in 4 studies that included some form of surgery as the reference standard. The authors reported that 1 study that used different blocks as the reference standard reported a much lower sensitivity of between 9 and 42 %. This study also reported a low specificity of 24 %. Four other studies that used surgery as part of the reference standard provided data on specificity; this ranged from 90 to 96 %. The authors stated that further research is needed to investigate the accuracy of SNRBs in comparison with other established imaging and electrodiagnostic tests. A critique of this systematic evidence review by the Centre for Reviews and Dissemination (2008) found that this review suffered from a number of limitations. The CRD stated that the literature search by Datta et al was adequate for published studies, but unpublished studies were not sought and it is unclear whether any language restrictions were applied; thus, the review may therefore be subject to language and publication bias. The CRD observed that a formal quality assessment was undertaken but the criteria used were for diagnostic accuracy studies; since only half of the included studies were diagnostic accuracy studies, these criteria were only appropriate for these studies. In addition, the results of the quality assessment were simply presented as summary scores with no details of the individual items fulfilled; this has been shown to be inappropriate for the QUADAS criteria. The CRD stated that the validity of the primary studies therefore remains unclear. The CRD noted that Datta et al had taken steps to avoid error and bias in the selection of studies, but it is unclear if such steps were also taken for other stages of the review process. Details of the included studies were tabulated clearly but did not always match up directly with the results reported in the text. The CRD noted that synthesis of the results was very difficult to follow as the results of each individual study were simply described with very little attempt to synthesize them across studies. The CRD stated that the lack of a synthesis of the results makes it difficult to comment on whether the authors' conclusions are supported by the data presented.

Therapeutic SNRB:

Zennaro et al (1998) assessed the effectiveness of direct intra-foraminal steroid injections into the peri-ganglionic space in the treatment of patients with acute or chronic radicular pain (n = 41). Neuroradiological imaging in all patients showed foraminal stenosis due to degenerative disorders or herniated disk. All injections were performed under CT guidance. A total of 70 % of patients had significant pain reduction, with the greatest success (90 % of patients) in those whose foraminal stenosis was due to degenerative disorders; 45 % of patients with foraminal

herniated disks had pain relief. These investigators concluded that intra-foraminal steroid injection is useful in the treatment of radicular pain, especially in cases of foraminal degenerative stenosis.

In a prospective, randomized, controlled, double-blind study, Riew et al (2000) examined the effectiveness of SNRB in obviating the need for an operation in patients with lumbar radicular pain who were otherwise considered to be operative candidates (n = 55). Patients were randomized to undergo SNRB with either bupivacaine alone or bupivacaine with betamethasone. The patients were allowed to choose to receive as many as four injections. The treatment was considered to have failed if the patient proceeded to have the operation, which he or she could opt to do at any point in the study. Twenty-nine of the 55 patients, all of whom had initially requested operative treatment, decided not to have the operation during the follow-up period (range of 13 to 28 months) after SNRB. Of the 27 patients who had received bupivacaine alone, 9 (33.3 %) elected not to have the operation. Of the 28 patients who had received bupivacaine and betamethasone, 20 (71.4 %) decided not to have the operation. The difference in the operative rates between the 2 groups was highly significant (p < 0.004). These researchers concluded that SNRB of corticosteroids are significantly more effective than those of bupivacaine alone in obviating the need for a decompression for up to 13 to 28 months following SNRBs in operative candidates. This finding suggested that patients who have lumbar radicular pain at 1 or 2 levels should be considered for treatment with SNRB of corticosteroids prior to being considered for operative intervention.

In a retrospective study, Narozny and associates (2001) investigated the clinical effectiveness of nerve root blocks (i.e., peri-radicular injection of bupivacaine and triamcinolone) for lumbar mono-radiculopathy in patients with a mild neurological deficit. These researchers analyzed 30 patients (aged 29 to 82 years) with a minor sensory/motor deficit and an unequivocal MRI finding (20 disc herniations, 10 foraminal stenoses) treated with a SNRB. Based on the clinical and imaging findings, surgery (decompression of the nerve root) was justifiable in all cases. Twenty-six patients (87 %) had rapid (1 to 4 days) and substantial regression of pain, 5 required a repeat injection. Furthermore, 60 % of the patients with disc herniation or foraminal stenosis had permanent resolution of pain, so that an operation was avoided over an average of 16 months (6 to 23 months) follow-up. The authors concluded that SNRBs are very effective in the non-operative treatment of minor mono-radiculopathy and should be recommended as the initial treatment of choice for this condition.

Pfirrmann et al (2001) studied SNRB for the treatment of patients with sciatica (n = 36). These researchers concluded that therapeutic SNRB is effective in sciatica, but early response does not predict the effect after 2 weeks.

In a retrospective study, Slipman et al (2004) examined the outcomes resulting from the use of fluoroscopically guided therapeutic SNRB in the non-surgical treatment of traumatically induced cervical spondylotic radicular pain (n = 15). The authors concluded that these findings do not support the use of therapeutic SNRB in the treatment of patients with traumatically induced spondylotic radicular pain. On the other hand, Strobel et al (2004) reported that patients with foraminal disk herniation, foraminal nerve root compromise, and no spinal canal stenosis appear to have the greatest pain relief after cervical SNRBs (n = 60).

In a review on SNRB for LBP and radiculopathy, Gajraj (2004) stated that SNRB appears to be effective in the treatment of radicular pain especially when it is caused by an acute inflammatory process without irreversible changes in neural structure, and with duration of symptoms less than 1 year.

DePalma and colleagues (2005) reviewed the evidence on the effectiveness of transforaminal epidural steroid injections (TFESI) or SNRBs to treat lumbosacral radiculopathy. These investigators concluded that there is moderate evidence in support of TFESI in treating painful lumbar radicular symptoms. The authors concluded that current studies support the use of TFESI/SNRB as a safe and minimally invasive adjunct treatment for lumbar radicular symptoms. In a critique of the systematic evidence review by DePalma et al, the Centre for Reviews and Dissemination (2008) stated that relevant data might have been missed as only published English language studies were included in the review. The CRD noted that the authors of this systematic review used published methods to assess the quality of the studies, but it is unclear how the studies were selected and how many reviewers performed the validity assessments; it is therefore difficult to assess the reliability, in terms of reviewer error or bias, of these review methods. The CRD observed that it appears that one study was initially included in the review, but then subsequently excluded from the analysis as it was not a true randomized controlled clinical trial. The CRD stated that, given the variability between the studies, in particular differences between the outcome measures and interventions, the authors' decision to use a narrative synthesis appears reasonable. The authors also note d a number of design problems with the included studies: the lack of a true placebo-control group and the lack of a sham control group. The studies were also

limited in size, with only 2 studies having over 50 participants. The CRD concluded that, "[g]iven the variability between the studies, the lack of appropriate controls, and the limited number of studies and participants, the authors' cautious conclusions appear reliable."

In a retrospective case series study with independent follow-up, Sabers et al (2005) assessed the success of fluoroscopically guided, contrast-enhanced lumbar zygapophyseal joint (Z-joint) aspiration and steroid injection combined with TFESI for the treatment of lumbar Z-joint cyst-induced radicular pain (n = 18). Main outcome measures were patient satisfaction, and whether or not surgery was performed. Fifty percent of patients treated with the procedure had significant long- term benefit and avoided surgical intervention at an average follow-up of 9.9 months . These investigators concluded that fluoroscopically guided, contrast- enhanced spinal procedures as part of an aggressive non-surgical treatment program are a safe and effective alternative to surgical intervention for lumbar Z-joint cyst-induced radicular pain.

In a retrospective study, Blankenbaker and co-workers (2005) examined if there is a difference in the effectiveness of triamcinolone acetonide injectable suspension versus betamethasone sodium phosphate and betamethasone acetate injectable suspension in the treatment of radiculopathy and LBP with lumbar SNRBs. Charts and self-reported pain score evaluations were reviewed in 114 patients who received 130 lumbar SNRBs with triamcinolone or betamethasone under fluoroscopic guidance. Forty-nine patients received a mixture of 1 ml of the triamcinolone, 40 mg/ml, and 1 ml of 0.5 % bupivacaine hydrochloride; while 81 patients received a mixture of 1 ml of the betamethasone, 6 mg/ml, and 1 ml of 0.5 % bupivacaine hydrochloride. From day 0 to 1 after the procedure, there was no statistically significant difference in improvement in LBP and lower extremity pain between groups. On day 3, 42 % of triamcinolone recipients and 58 % of betamethasone recipients reported improvement in LBP (p = 0.04), whereas 55 % of triamcinolone recipients and 57 % of betamethasone recipients had lower extremity pain improvement (p = 0.33). On day 7, 45 % of triamcinolone recipients and 58 % of betamethasone recipients had improvement in LBP (p = 0.38), whereas 52 % of triamcinolone recipients and 57 % of betamethasone recipients had improvement in lower extremity pain (p = 0.69). On day 14, 42 % of triamcinolone recipients and 53 % of betamethasone recipients had improvement in LBP (p = 0.26), whereas 49 % of triamcinolone recipients and 55 % of betamethasone recipients had improvement in lower extremity pain (p = 0.69). These investigators concluded that lumbar

SNRBs with betamethasone and triamcinolone reduced LBP and lower extremity pain, although there was no significant difference in effectiveness between the 2 agents.

Wagner (2005) stated that SNRBs are useful in the following groups of individuals: (i) patients after diskectomy who have recurrent radiculopathy but no recurrent disk herniation, symptoms are often caused when scar tissues tether the nerve. Many patients can be treated successfully by using SNRB, although some may require a repeat injection, and (ii) patients with disk herniations. Since the body naturally resolves 90 % of disk herniations when given enough time, pain relief is important to try to avoid surgery.

A technology assessment from the Institute for Clinical Systems Improvement (ICSI, 2004) found: "Fluoroscopically guided epidural steroid injections are generally safe when performed by an experienced physician in a controlled setting. Epidural steroid injections should not be done without fluoroscopic guidance. Commonly used corticosteroids include methylprednisolone and betamethasone." Regarding the evidence for transforaminal epidural injections, the ICSI Technology Assessment Committee concluded: "Based on limited data, the results appear promising."

Choi and Brull (2011) evaluated the effect of ultrasound (US) guidance compared with traditional nerve localization techniques for interventional management of acute pain and acute pain-related outcomes. These investigators performed a systematic search of Medline, Embase, and the Cochrane Central Register of Controlled Clinical Trials (from January 1990 to January 2011) to identify randomized controlled trials evaluating the effects of US guidance on acute pain and related outcomes compared with traditional nerve localization techniques. Studies were excluded if they did not report at least one of the following acute pain outcomes: pain severity, opioid consumption, sensory block duration, and time to first analgesic request. Related outcomes were classified as follows: patient related (opioid-related adverse effects, patient satisfaction, post-operative cognitive deficit); anesthesia related (unwanted motor block, perineural catheter failure, morbidity, development of chronic pain); surgery related (hospital readmission, ability to ambulate); and hospital-related (length of stay, cost). Promising novel applications of US guidance for ac ute pain management were also sought for discussion purposes. These researchers identified 23 randomized controlled trials, including 1,674 patients, that compa red US guidance with and without peripheral nerve stimulation with peripheral nerve stimulation alone or anatomical landmark techniques. Of the 16 studies that

evaluated pain severity, 8 reported improvement with US guidance; however, only 1 study reported a difference between US guidance and the comparator of greater than 1 interval on the numeric rating pain scale. Eight studies evaluated sensory block duration and 3 of these reported prolonged block duration with US guidance. Seven studies evaluated opioid consumption, of which 3 reported a reduction with US guidance. Three studies evaluated time to first analgesic request, of which 2 favored US guidance. These investigators uncovered no significant differences between US guidance and traditional nerve localization techniques for any other related outcome. Ultrasound guidance was not found to be inferior compared with traditional nerve localization techniques for any outcome. The authors concluded that at present, there is insufficient evidence in the contemporary literature to define the effect of US guidance on acute pain and related outcomes compared with traditional nerve localization techniques for interventional acute pain management.

An UpToDate review on "Musculoskeletal ultrasonography: Guided injection and aspiration of joints and related structures" (Bruyn, 2014) does not mention transforaminal epidural injection as one of the techniques of US-guided injections.

In summary, the clinical value of a SNRB appears to rely on careful patient selection. If it is carried out properly and the results are interpreted carefully, SNRB may be clinically useful, especially for those with insufficient diagnostic information. In some cases, therapeutic effect can be achieved selectively at the symptomatic root.

Yang et al (2016) stated that recently, most lumbar spine injections have been administered under ultrasound guidance; however, there is no standard method for ultrasound-guided lumbar transforaminal epidural injection (TFEI). In this study, these researchers evaluated the accuracy, effect on pain relief, and safety of ultrasound-guided lumbar TFEI. A total of 80 patients with LBP and radicular pain were enrolled. The subjects were randomly assigned to either the fluoroscopy group or the ultrasound group. The fluoroscopy-guided approaches were performed under standardized procedures using the C-arm, while the ultrasound-guided injections were performed with an ultrasound device with a linear probe, and were verified by fluoroscopy. The needle tip reached the lateral side of the lamina in the axis view and the middle of the adjacent facet joints in the para-sagittal view. Afterward, the needle was advanced slightly deeper until the loss-of-resistance test was positive. The success ratio of the ultrasound-guided interventions was 85 %. The operation time in the ultrasound group (518 ± 103 s) was shorter than the fluoroscopy group

(929 ± 228 s) (p < 0.05). In addition, the radiation dosage in the ultrasound group (2,640 ± 906 μGy m) was lower than in the fluoroscopy group (8,992 ± 2,132 μGy m). There was no significant difference in pain relief between the ultrasound and fluoroscopy groups. No serious complication was observed by any of the subjects in either group. The authors concluded that lumbar TFEI under ultrasound guidance was feasible, safe and required less radiation to achieve the same benefit as the fluoroscopy-guided interventions. The main drawback of this study was that it was a feasibility and safety study. The clinical effectiveness of TFEI needs to be ascertained in well-designed studies.

Transforaminal Epidural Steroid Injections:

Manchikanti and associates (2015) determined the long-term effectiveness of cervical interlaminar epidural and TFE injections in the treatment of cervical disc herniation, spinal stenosis, discogenic pain without facet joint pain, and post-surgery syndrome. The literature search was performed from 1966 to October 2014 utilizing data from PubMed, Cochrane Library, US National Guideline Clearinghouse, previous systematic reviews, and cross-references. The evidence was assessed based on best evidence synthesis with Level I to Level V. There were 7 manuscripts meeting inclusion criteria. Of these, 4 assessed the role of interlaminar epidural injections for managing disc herniation or radiculitis, and 3 assessed these injections for managing central spinal stenosis, discogenic pain without facet joint pain, and post-surgery syndrome. There were 4 high quality manuscripts. A qualitative synthesis of evidence showed there is Level II evidence for each etiology category. The evidence was based on 1 relevant, high quality trial supporting the effectiveness of cervical interlaminar epidural injections for each particular etiology. There were no randomized trials available assessing the effectiveness of cervical TFE injections. The authors concluded that the findings of this systematic review with qualitative best evidence synthesis shows Level II evidence for the effectiveness of cervical interlaminar epidural injections with local anesthetic with or without steroids, based on at least 1 high-quality relevant RCT in each category for disc herniation, discogenic pain without facet joint pain, central spinal stenosis, and post-surgery syndrome. The main drawback of this study was the paucity of available literature, specifically conditions other than disc herniation.

Kaye and co-workers (2015) evaluated and updated the clinical utility of the effectiveness of epidural injections in managing chronic spinal pain. These researchers performed a systematic review of randomized controlled trials (RCTs) of epidural injections in managing chronic spinal pain. In this systematic review,

randomized trials with a placebo control or an active-control design were included. The outcome measures were pain relief and functional status improvement. The quality of each individual 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). Best evidence synthesis was conducted based on the qualitative level of evidence (Level I to V). Data sources included relevant literature identified through searches of PubMed for a period starting in 1966 through August 2015; Cochrane reviews; and manual searches of the bibliographies of known primary and review articles. A total of 52 trials met inclusion criteria. Meta-analysis was not feasible. The evidence in managing lumbar disc herniatio n or radiculitis is Level II for long-term improvement either with caudal, interlaminar, or transforaminal epidural injections with no significant difference among the approaches. The evidence is Level II for long-term management of cervical disc herniation with interlaminar epidural injections. The evidence is Level II to III in managing thoracic disc herniation with an interlaminar approach. The evidence is Level II for caudal and lumbar interlaminar epidural injections with Level III evidence for lumbar TFE injections for lumbar spinal stenosis. The evidence is Level II for cervical spinal stenosis management with an interlaminar approach. The evidence is Level II for axial or discogenic pain without facet arthropathy or disc herniation treated with caudal or lumbar interlaminar injections in the lumbar region; whereas it is Level II in the cervical region treated with cervical interlaminar epidural injections. The evidence for post-lumbar surgery syndrome is Level II with caudal epidural injections and for post-cervical surgery syndrome it is Level II with cervical interlaminar epidural injections. The authors concluded that the findings of this systematic review, with an assessment of the quality of manuscripts and outcome parameters, showed the effectiveness of epidural injections in managing a multitude of chronic spinal conditions. Moreover, they stated that even though this was a large systematic review with inclusion of a large number of RCTs, the paucity of high-quality randomized trials literature continues to confound the evidence.

In a retrospective analysis, Costandi and colleagues (2015) evaluated the cervical TFESIs (CTFESIs) associated pain relief and possible decreased need for spine surgery, along with its potential predictive role in determining cervical surgical outcomes. Additionally, they estimated associated complications. A pain management database registry was used to identify patients who were referred by spine surgeons for diagnostic CTFESIs in preparation for possible surgery between January 2001 and December 2009. Outcomes were defined as the incidence of cervical surgery after diagnostic injection and the associated pain relief. A Poisson

distribution was used to obtain a 95 % confidence interval (CI) for the incidence of complications. A total of 64 patients met the inclusion and exclusion criteria. After diagnostic CTFESIs, 45 (70.3 %) of the observed 64 patients did not require cervical spine surgery whereas 19 (29.7 %) still did. The mean pain reduction was 4.4 units on the numeric rating scale, with no observed complications. The authors concluded that the findings of this retrospective analysis further demonstrated the safety, diagnostic value, and possible therapeutic role of CTFESIs. They stated that a larger, controlled, randomized study is needed to assess definitively the procedure's safety and effectiveness.

Bhatia and colleagues (2016) noted that steroids often are administered into the epidural space through the TFE) route to treat lumbo-sacral radicular pain secondary to herniated intervertebral discs. However, their safety and effectiveness compared with transforaminal epidural local anesthetics (LAs) or saline injections is unclear. These investigators reviewed RCTs that compared TFE injections of steroids (with or without LA) with LA or saline in adult outpatients with lumbosacral radicular pain secondary to herniated intervertebral disks. Databases searched included Medline, Embase, Cochrane central register of controlled trials, Cochrane database of systematic reviews, and Google Scholar up to February 2015. Data on scores of numerical rating scale for pain, validated scores for measuring physical disability and quality of life, and incidence of surgery measured at 1 month to 2 years after the interventions were meta-analyzed. Strength of evidence was classified with the Grading of Recommendations Assessment, Development and Evaluation (GRADE) system. A total of 8 RCTs including 771 patients (366 in steroid and 405 in comparator groups) were included. There was variability in the studies in the dose of TFE steroids, frequency, and number of procedures. Patients who received TFE steroids reported a significant, but clinically modest, reduction in mean pain scores (0 to 10 scale) compared with LA/saline (-0.97 points; 95 % CI: -1.42 to -0.51 points; $p < 0.0001$, $I^2 = 90$ %; GRADE weak recommendation; moderate-quality evidence) at 3 months after the interventions; TFE steroids did not decrease physical disability at 1 to 3 months after the intervention (GRADE strong recommendation ↓; high-quality evidence) or incidence of surgery at 12 months after the intervention (GRADE strong recommendation ↓; moderate-quality evidence) compared with LA/saline. The authors concluded that TFE steroids provided modest analgesic benefit at 3 months in patients with lumbosacral radicular pain secondary to herniated intervertebral disks, but they have no impact on physical disabili ty or incidence of surgery. There was a high degree of heterogeneity among the publications included in this meta-analysis. They stated that well-designed,

large, randomized studies are needed to evaluate appropriate dosages, adverse effects, number of procedures, and the effect of this intervention on psychological disability and quality of life.

CPT Codes / HCPCS Codes / ICD-10 Codes

Information in the [brackets] below has been added for clarification purposes.   Codes requiring a 7th character are represented by "+":

Code	Code Description
CPT codes covered if selection criteria are met:	
64479	Injection(s), anesthetic agent and/or steroid, transforaminal epidural, with imaging guidance (fluoroscopy or CT); cervical or thoracic, single level
+ 64480	cervical or thoracic, each additional level (List separately in addition to code for primary procedure)
64483	lumbar or sacral, single level
+ 64484	lumbar or sacral, each additional level (List separately in addition to code for primary procedure)
CPT codes not covered for indications listed in the CPB:	
0228T	Injections(s), anesthetic agent and/or steroid, transforaminal epidural, with ultrasound guidance, cervical or thoracic; single level
+0229T	each additional level (List separately in addition to code for primary procedure)
0230T	Injections(s), anesthetic agent and/or steroid, transforaminal epidural, with ultrasound guidance, lumbar or sacral; single level
+0231T	each additional level (List separately in addition to code for primary procedure)
Other CPT codes related to the CPB:	
77003	Fluoroscopic guidance and localization of needle or catheter tip for spine or paraspinous diagnostic or therapeutic injection procedures (epidural or subarachnoid)
77012	Computed tomography guidance for needle placement (e.g., biopsy, aspiration, injection, localization device), radiological supervision and interpretation
ICD-10 codes covered if selection criteria are met (not all-inclusive):	
G56.00 - G57.93	Mononeuropathy of upper and lower limb

Code	Code Description
G58.0 - G58.7 G58.9	Other mononeuropathies
M50.00 - M50.23 M50.90 - M50.93	Cervical disc disorders
M51.04 - M51.27 M51.9	Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders
M54.10 - M54.18	Radiculopathy
M54.30 - M54.42	Sciatica and lumbago with sciatica
M79.2	Neuralgia and neuritis, unspecified

The above policy is based on the following references:

1. Zennaro H, Dousset V, Viaud B, et al. Periganglionic foraminal steroid injections performed under CT control. AJNR Am J Neuroradiol. 1998;19 (2):349-352.
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