Multi-Jurisdictional Contractor Advisory Committee (CAC)/Subject Matter Expert Meeting

February 11, 2021

Topic: Epidural Intervention for Chronic Pain Management

References and literature for epidural/selective nerve root blocks questions

This includes a reference list of societal guidance and key literature. Also provided are references that pertain to specific separately posted questions. If there are not references specific to a question, then refer to the reference list at the end for sources. Additional supporting literature for any question is welcomed.

Selection of patients for epidural injections

References for Question #2

Carette, S., et al., Epidural corticosteroid injections for sciatica due to herniated nucleus pulposus. New England Journal of Medicine, 1997. 336(23): p. 1634-1640.

Chou, R., et al., Epidural Corticosteroid Injections for Radiculopathy and Spinal Stenosis: A Systematic Review and Meta-analysis. Annals of internal medicine, 2015. 163(5): p. 373-81.

Bhatia, A., et al., Transforaminal Epidural Steroid Injections for Treating Lumbosacral Radicular Pain from Herniated Intervertebral Discs: A Systematic Review and Meta-Analysis. Anesth Analg, 2016. 122(3): p. 857-70.

Kaye, A.D., et al., Efficacy of Epidural Injections in Managing Chronic Spinal Pain: A Best Evidence Synthesis. Pain Physician, 2015. 18(6): p. E939-1004.

Manchikanti, L., Epidural injections for lumbar radiculopathy and spinal stenosis: a comparative systematic review and meta-analysis. Pain Physician, 2016. 19: p. E365-E410.

Sharma, A.K., et al., The Effectiveness and Risks of Fluoroscopically Guided Lumbar Interlaminar Epidural Steroid Injections: A Systematic Review with Comprehensive Analysis of the Published Data. Pain medicine (Malden, Mass), 2017. 18(2): p. 239-251.

Kennedy, D.J., et al., A minimum of 5-year follow-up after lumbar transforaminal epidural steroid injections in patients with lumbar radicular pain due to intervertebral disc herniation. The spine journal: official journal of the North American Spine Society, 2018. 18(1): p. 29-35.

Oliveira, C.B., et al., Epidural corticosteroid injections for lumbosacral radicular pain. The Cochrane database of systematic reviews, 2020.

References for Question #4:

Kaye, A.D., et al., Efficacy of Epidural Injections in Managing Chronic Spinal Pain: A Best Evidence Synthesis. Pain Physician, 2015. 18(6): p. E939-1004.

Sharma, A.K., et al., The Effectiveness and Risks of Fluoroscopically Guided Lumbar Interlaminar Epidural Steroid Injections: A Systematic Review with Comprehensive Analysis of the Published Data. Pain medicine (Malden, Mass), 2017. 18(2): p. 239-251.Friedly, J.L., et al., A randomized trial of epidural glucocorticoid injections for spinal stenosis. 2014. 371(1): p. 11-21.

Andersson, G.B., Epidural glucocorticoid injections in patients with lumbar spinal stenosis. The New England journal of medicine, 2014. 371(1): p. 75-6.

Manchikanti, L., et al., Randomized trial of epidural injections for spinal stenosis published in the New England Journal of Medicine: further confusion without clarification. Pain Physician, 2014. 17(4): p. E475-88.

Deer, T.R., et al., The MIST Guidelines: The Lumbar Spinal Stenosis Consensus Group Guidelines for Minimally Invasive Spine Treatment. Pain practice: the official journal of World Institute of Pain, 2019. 19(3): p. 250-274.

Davis, N., P. Hourigan, and A. Clarke, Transforaminal epidural steroid injection in lumbar spinal stenosis: an observational study with two-year follow-up. British journal of neurosurgery, 2017. 31(2): p. 205-208.

Ciocon, J.O., et al., Caudal epidural blocks for elderly patients with lumbar canal stenosis. Journal of the American Geriatrics Society, 1994. 42(6): p. 593-596.

Laxmaiah Manchikanti, M., K.A. Cash, and C.D.M. RT, A randomized, double-blind controlled trial of lumbar interlaminar epidural injections in central spinal stenosis: 2-year follow-up. Pain Physician, 2015. 18: p. 79-92.

Friedly, J.L., et al., Long-Term Effects of Repeated Injections of Local Anesthetic With or Without Corticosteroid for Lumbar Spinal Stenosis: A Randomized Trial. Archives of physical medicine and rehabilitation, 2017. 98(8): p. 1499-1507 e2.

Huang, R., et al., Nonsurgical medical treatment in the management of pain due to lumbar disc prolapse: A network meta-analysis. Seminars in arthritis and rheumatism, 2019. 49(2): p. 303-313.

Park, K.D., et al., Factors Associated with the Outcome of Ultrasound-Guided Trochanteric Bursa Injection in Greater Trochanteric Pain Syndrome: A Retrospective Cohort Study. Pain Physician, 2016. 19(4): p. E547-57.

Kim, E.D., et al., Clinical efficacy of transforaminal epidural injection for management of zoster-associated pain: a retrospective analysis. Skeletal radiology, 2018. 47(2): p. 253-260.

Jang, S.H. and M.C. Chang, At Least 5-Year Follow-up After Transforaminal Epidural Steroid Injection Due to Lumbar Radicular Pain Caused by Spinal Stenosis. Pain Pract, 2020. 20(7): p. 748-751.

Pennington, Z., et al., Comparing the short-term cost-effectiveness of epidural steroid injections and medical management alone for discogenic lumbar radiculopathy. Clinical neurology and neurosurgery, 2020. 191: p. 105675.

Arirachakaran, A., et al., Comparative outcomes of epidural steroids versus placebo after lumbar discectomy in lumbar disc herniation: a systematic review and meta-analysis of randomized controlled trials. European journal of orthopaedic surgery & traumatology: orthopedie traumatologie, 2018. 28(8): p. 1589-1599.

Wang, E., D. Wang, and h. reports, Treatment of cervicogenic headache with cervical epidural steroid injection. Current pain, 2014. 18(9): p. 442.

Stav, A., et al., Cervical epidural steroid injection for cervicobrachialgia. Acta anaesthesiologica scandinavica, 1993. 37(6): p. 562-566.

Manchikanti, L., et al., An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. Pain physician, 2013, 16(2 Suppl): p. S49-283

References for Question #5

Pengel, H.M., C.G. Maher, and K.M. Refshauge, Systematic review of conservative interventions for subacute low back pain. Clinical rehabilitation, 2002. 16(8): p. 811-20.

Qaseem, A., et al., Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. Annals of internal medicine, 2017. 166(7): p. 514-530.

References for Question #6

Manchikanti, L., et al., An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. Pain physician, 2013. 16(2 Suppl): p. S49-283.

References for Question #7

Pangarkar, S.S., et al., VA/DoD Clinical Practice Guideline: Diagnosis and Treatment of Low Back Pain. Journal of General Internal Medicine, 2019. 34(11): p. 2620-2629.

References for Question #8

Manchikanti, L., et al., Do cervical epidural injections provide long-term relief in neck and upper extremity pain? A systematic review. Pain physician, 2015. 18(1): p. 39-60.

Cohen, S.P., et al., Epidural steroid injections, conservative treatment, or combination treatment for cervical radicular pain: a multicenter, randomized, comparative-effectiveness study. Anesthesiology, 2014. 121(5): p. 1045-55.

Lee, J.W., et al., Fluoroscopic cervical paramidline interlaminar epidural steroid injections for cervical radiculopathy: effectiveness and outcome predictors. Skeletal radiology, 2014. 43(7): p. 933-938.

Kaye, A.D., et al., Efficacy of Epidural Injections in Managing Chronic Spinal Pain: A Best Evidence Synthesis. Pain Physician, 2015. 18(6): p. E939-1004.

Smith, C.C., et al., Risks and Benefits of Ceasing or Continuing Anticoagulant Medication for Image-Guided Procedures for Spine Pain: A Systematic Review. Pain medicine (Malden, Mass), 2018. 19(3): p. 438-448.

Bicket, M.C., et al., Epidural steroid injections: an updated review on recent trends in safety and complications. Pain management, 2015. 5(2): p. 129-46.

Benzon, H.T., M.A. Huntoon, and J.P. Rathmell, Improving the safety of epidural steroid injections. JAMA, 2015. 313(17): p. 1713-1714.

Manchikanti, L. and R.M. Benyamin, Key safety considerations when administering epidural steroid injections. Pain management, 2015. 5(4): p. 261-72.

References for Question #9

Benyamin, R.M., et al., A systematic evaluation of thoracic interlaminar epidural injections. Pain physician, 2012. 15(4): p. E497-514.

Performance of epidural injections and procedures

References for Question #11

Manchikanti, L. and R.M. Benyamin, Key safety considerations when administering epidural steroid injections. Pain management, 2015. 5(4): p. 261-72.

Benzon, H.T., M.A. Huntoon, and J.P. Rathmell, Improving the safety of epidural steroid injections. JAMA, 2015. 313(17): p. 1713-1714.

El-Yahchouchi, C.A., et al., Adverse Event Rates Associated with Transforaminal and Interlaminar Epidural Steroid Injections: A Multi-Institutional Study. Pain medicine (Malden, Mass), 2016. 17(2): p. 239-49.

Manchikanti, L.e.a., A prospective evaluation of complications of 10,000 fluoroscopically directed epidural injections. Pain physician, 2012. 15: p. 131-140.

Lee, J.H., et al., Comparison of clinical efficacy of transforaminal and caudal epidural steroid injection in lumbar and lumbosacral disc herniation: A systematic review and meta-analysis. Spine J, 2018. 18(12): p. 2343-2353.

Lee, J.H., et al., Comparison of Clinical Efficacy Between Transforaminal and Interlaminar Epidural Injections in Lumbosacral Disc Herniation: A Systematic Review and Meta-Analysis. Pain physician, 2018. 21(5): p. 433-448.

Wei, G., et al., Comparison of transforaminal verse interlaminar epidural steroid injection in low back pain with lumbosacral radicular pain: a meta-analysis of the literature. International orthopaedics, 2016. 40(12): p. 2533-2545.

Liu, J., et al., The Effectiveness of Transforaminal Versus Caudal Routes for Epidural Steroid Injections in Managing Lumbosacral Radicular Pain: A Systematic Review and Meta-Analysis. Medicine (Baltimore), 2016. 95(18): p. e3373.

Makkar, J.K., et al., Transforaminal Versus Lateral Parasagittal Versus Midline Interlaminar Lumbar Epidural Steroid Injection for Management of Unilateral Radicular Lumbar Pain: A Randomized Double-Blind Trial. Pain physician, 2019. 22(6): p. 561-573.

Pandey, R.A., Efficacy of Epidural Steroid Injection in Management of Lumbar Prolapsed Intervertebral Disc: A Comparison of Caudal, Transforaminal and Interlaminar Routes. Journal of clinical and diagnostic research: JCDR, 2016. 10(7): p. RC05-11.

References for Question #13

Przkora, R., et al., Functional Improvements Utilizing the Short Physical Performance Battery (SPPB) in the Elderly after Epidural Steroid Injections. Current pain and headache reports, 2019. 23(2): p. 14.

References for Question #17

Joswig, H., et al., Repeat epidural steroid injections for radicular pain due to lumbar or cervical disc herniation: what happens after ‘salvage treatment’? Bone Joint J, 2018. 100(10): p. 1364-1371.

Brändle, K., et al., Ten-day response to CT-guided spinal infiltration therapy in more than a thousand patients. Journal of Neurological Surgery Part A: Central European Neurosurgery, 2016. 77(03): p. 181-194.

Wang, J.C., et al., Epidural injections for the treatment of symptomatic lumbar herniated discs. Clinical Spine Surgery, 2002. 15(4): p. 269-272.

Ekedahl, H., et al., The 1-year results of lumbar transforaminal epidural steroid injection in patients with chronic unilateral radicular pain: the relation to MRI findings and clinical features. American journal of physical medicine, 2017. 96(9): p. 654-662.

Murthy NS, G.J., Shelerud RA, et al., The effectiveness of repeat lumbar transforaminal epidural steroid injections. Pain Med, 2014. 15: p. 1686-94.

Arden, N.K., et al., A multicentre randomized controlled trial of epidural corticosteroid injections for sciatica: the WEST study. Rheumatology (Oxford, England), 2005. 44(11): p. 1399-406.

References for Question #20

Manchikanti L, Abdi S, Atluri S, et al. An update of comprehensive evidence-based guidelines for interventional techniques of chronic spinal pain: Part II: Guidance and recommendations. Pain Physician 2013; 16:S49-S283.

Kaye AD, Manchikanti L, Abdi S, et al. Efficacy of epidural injections in managing chronic spinal pain: A best evidence synthesis. Pain Physician 2015; 18:E939-E1004.

Manchikanti L, Knezevic NN, Boswell MV, Kaye AD, Hirsch JA. Epidural injections for lumbar radiculopathy and spinal stenosis: A comparative systematic review and meta-analysis. Pain Physician 2016; 19:E365-E410.

Knezevic N, Manchikanti L, Urits I, et al. Lack of superiority of epidural injections with lidocaine with steroids compared to without steroids in spinal pain: A systematic review and meta-analysis. Pain Physician 2020; 23:S239-S270.

Manchikanti L, Kosanovic R, Vanaparthy R, Vangala BP, Soin A, Sachdeva H, Shah S, Knezevic NN, Hirsch JA. Steroid distancing in interventional pain management during COVID-19 and beyond: Safe, effective and practical approach. Pain Physician 2020; 23:S319-S352.

Shanthanna H, Busse J, Wang L, et al. Addition of corticosteroids to local anaesthetics for chronic non-cancer pain injections: A systematic review and meta-analysis of randomised controlled trials. Br J Anaesth 2020; 125:779-801.

Shah S, Diwan S, Soin A, et al. Evidence-based risk mitigation and stratification during covid-19 for return to interventional pain practice: American Society of Interventional Pain Physicians (ASIPP) Guidelines. Pain Physician 2020; 23:S161-S182.

Gharibo C, Sharma A, Soin A, et al. Triaging interventional pain procedures during COVID-19 or related elective surgery restrictions: Evidence-informed guidance from the American Society of Interventional Pain Physicians (ASIPP). Pain Physician 2020; 23:S183-S204.

Sim SE, Hong HJ, Roh K, Seo J, Moon HS. Relationship between epidural steroid dose and suppression of hypothalamus-pituitary-adrenal axis. Pain Physician 2020; 23:S283-S294

Friedly JL, Comstock BA, Heagerty PJ, et al. Systemic effects of epidural steroid injections for spinal stenosis. Pain 2018; 159:876-883.

Hooten WM, Nicholson WT, Gazelka HM, Reid JM, Moeschler SM, Lamer TJ. Serum triamcinolone levels following interlaminar epidural injection. Reg Anesth Pain Med 2016; 41:75-Abdul AJ, Ghai B, Bansal D, Sachdeva N, Bhansali A, Dhatt SS. Hypothalamic pituitary adrenocortical axis suppression following a single epidural injection of methylprednisolone acetate. Pain Physician 2017; 20:E991-E1001.

References for Question #24

Benzon, H.T., M.A. Huntoon, and J.P. Rathmell, Improving the safety of epidural steroid injections. JAMA, 2015. 313(17): p. 1713-1714.

References for Question #26

Manchikanti, L., et al., An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. Pain physician, 2013. 16(2 Suppl): p. S49-283.

Smith, C.C., et al., Risks and Benefits of Ceasing or Continuing Anticoagulant Medication for Image-Guided Procedures for Spine Pain: A Systematic Review. Pain medicine (Malden, Mass), 2018. 19(3): p. 438-448.

Bicket, M.C., et al., Epidural steroid injections: an updated review on recent trends in safety and complications. Pain management, 2015. 5(2): p. 129-46.

Terms

Therapeutic Phase: When the epidural injections are provided initially, this will be termed the “first year of treatment” or the “therapeutic phase” of treatment.

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

The early acute phase is defined as less than two weeks.

The late acute phase is defined as two to six weeks, secondary to the potential for delayed-recovery or risk phases for the development of chronic low back pain. Low back pain can occur on a recurring basis. If there has been complete recovery between episodes, it is considered acute recurrent. (Goertz et al. 2012)

Conservative Therapy: Consists of an appropriate combination of medication (for example, NSAIDs, analgesics, etc.) in addition to physical therapy, spinal manipulation therapy, cognitive behavioral therapy (CBT) or other interventions based on the individual’s specific presentation, physical findings and imaging results. (AHRQ 2013; Qassem 2017; Summers 2013)

Epidural Steroid Injections (ESI): Is a nonsurgical treatment for managing radiculopathy caused by disc herniation or degenerative changes in the vertebrae such as spondylosis. Medication is injected directly into the epidural space. The injection may also include a local anesthetic. The goal of ESI is to reduce inflammation, relieve pain, improve function, and reduce the need for surgical intervention. (Hayes, 2018)

Non-Radicular Back Pain: Pain which does not radiate along a dermatome (sensory distribution of a single root). Appropriate imaging does not reveal signs of spinal nerve root compression and there is no evidence of spinal nerve root compression seen on clinical exam. (Lenahan, 2018)

Radicular 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.

Radiculopathy: Radiculopathy is characterized by pain which radiates from the spine to extend outward to cause symptoms away from the source of the spinal nerve root irritation. May be accompanied by loss of sensation, strength loss, or reflex changes (difference between radicular pain and radiculopathy) (Lenahan, 2018)

Sub-Acute Low Back Pain: Low back pain with duration of greater than six weeks after injury but no longer than 12 weeks after onset of symptoms. (Goertz et al., 2012)

Transforaminal epidural steroid injection (TFESI) is a therapeutic injection of contrast (absent allergy to contrast) performed at a single or multiple spinal levels followed by the introduction of a corticosteroid and possibly a local anesthetic by inserting a needle into the neuroforamen under fluoroscopic or computed tomography (CT) guidance.

Selective Nerve Root Block (SNRB) is 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. SNRB's are erroneously referred to as a Transforaminal Epidural Steroid Injection (TFESI), although technically SNRB's involve the introduction of anesthetic only and are used for diagnostic purposes.

Interlaminar epidural steroid injection (ESI) is 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.

Caudal epidural steroid injection (ESI) is an the 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.

Radiculopathy is defined as the presence of pain, dysesthesia(s), or paresthesia(s) reported by the individual in a specified dermatomal distribution of an involved named spinal root(s), causing significant functional limitations resulting in diminished quality of life and impaired, age appropriate activities of daily living, and EITHER of the following:

Spinal stenosis refers to the narrowing of the spinal canal 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 as well as pain or abnormal sensations in the legs, thighs, feet or buttocks, or loss of bladder and bowel control.

References

Societal Guidelines

1. Chou, R., et al. Pain Management Injection Therapies for Low Back Pain. [Review] 2015 7/15/2015 1/5/2021];
2. Qaseem, A., et al., Noninvasive Treatments for Acute, Subacute, and Chronic Low Back Pain: A Clinical Practice Guideline From the American College of Physicians. Annals of internal medicine, 2017. 166(7): p. 514-530.
3. Manchikanti, L., et al., An update of comprehensive evidence-based guidelines for interventional techniques in chronic spinal pain. Part II: guidance and recommendations. Pain physician, 2013. 16(2 Suppl): p. S49-283.
4. Society, N.A.S., 2020 NASS Evidence-Based Clinical Guidelines for Multidisciplinary Spine Care: Diagnosis & Treatment of Low Back Pain 2020.

5. Society, N.A.S., NASS Diagnosis and Treatment of Degenerative Lumbar Spinal Stenosis – What is the role of epidural steroid injections (ESI) in the treatment of spinal stenosis? 2011 (revised).
6. Pangarkar, S.S., et al., VA/DoD Clinical Practice Guideline: Diagnosis and Treatment of Low Back Pain. Journal of General Internal Medicine, 2019. 34(11): p. 2620-2629.
7. ACR–ASNR–ASSR–SIR–SNIS, ACR–ASNR–ASSR–SIR–SNIS Practice Parameter for the Performance of Image-Guided Epidural Steroid Injection. 2019.
8. Chou, L., Systemic Pharmacologic Therapies for Low Back Pain: A Systematic Review for an American College of Physicians Clinical Practice Guideline. 2017.
9. Anesthesiologist, A.S.o., Practice Guidelines for Chronic Pain Management: An Updated Report by the American Society of Anesthesiologists Task Force on Chronic Pain Management and the American Society of Regional Anesthesia and Pain Medicine. Anesthesiology, 2010. 112(4): p. 810-833.
10. Carmel Armon, M., MHS; Charles E. Argoff, MD; Jeffrey Samuels, MD; and Misha-Miroslav Backonja, MD, Assessment: Use of epidural steroid injections to treat radicular lumbosacral pain Report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology. Neurology, 2007. 68: p. 723-729.
11. Watters, W.C., 3rd, et al., Guideline update for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 13: injection therapies, low-back pain, and lumbar fusion. J Neurosurg Spine, 2014. 21(1): p. 79-90.
12. Resnick DK, C.T., Dailey AT, Groff MW, Khoo L, Matz PG, Mummaneni P, Watters WC 3rd, Wang J, Walters BC, Hadley MN; American Association of Neurological Surgeons/Congress of Neurological Surgeons. , Guidelines for the performance of fusion procedures for degenerative disease of the lumbar spine. Part 13: injection therapies, low-back pain, and lumbar fusion. J Neurosurg Spine. 2005. 6: p. 707-15.
13. Mattie, R., B.J. Schneider, and C. Smith, Frequency of Epidural Steroid Injections. Spine Intervention Society. Pain Medicine, 2020. 21(5): p. 1078-1079.
14. Narouze, S., et al., Interventional Spine and Pain Procedures in Patients on Antiplatelet and Anticoagulant Medications: Guidelines from the American Society of Regional Anesthesia and Pain Medicine, the European Society of Regional Anaesthesia and Pain Therapy, the American Academy of Pain Medicine, the International Neuromodulation Society, the North American Neuromodulation Society, and the World Institute of Pain. Regional Anesthesia Pain Medicine, 2018. 43(3): p. 225-262.

Reference List

1. Chou, R., et al., Epidural Corticosteroid Injections for Radiculopathy and Spinal Stenosis: A Systematic Review and Meta-analysis. Annals of internal medicine, 2015. 163(5): p. 373-81.
2. Bhatia, A., et al., Transforaminal Epidural Steroid Injections for Treating Lumbosacral Radicular Pain from Herniated Intervertebral Discs: A Systematic Review and Meta-Analysis. Anesth Analg, 2016. 122(3): p. 857-70.
3. Kaye, A.D., et al., Efficacy of Epidural Injections in Managing Chronic Spinal Pain: A Best Evidence Synthesis. Pain Physician, 2015. 18(6): p. E939-1004.

4. Manchikanti, L., Epidural injections for lumbar radiculopathy and spinal stenosis: a comparative systematic review and meta-analysis. Pain Physician, 2016. 19: p. E365-E410.
5. Sharma, A.K., et al., The Effectiveness and Risks of Fluoroscopically Guided Lumbar Interlaminar Epidural Steroid Injections: A Systematic Review with Comprehensive Analysis of the Published Data. Pain medicine (Malden, Mass), 2017. 18(2): p. 239-251.
6. Kennedy, D.J., et al., A minimum of 5-year follow-up after lumbar transforaminal epidural steroid injections in patients with lumbar radicular pain due to intervertebral disc herniation. The spine journal: official journal of the North American Spine Society, 2018. 18(1): p. 29-35.
7. Akuthota, V., et al. Lumbar Transforaminal Epidural Steroid Injections Review & Recommendation Statement. in North American Spine Society. 2013.
8. Deer, T.R., et al., The MIST Guidelines: The Lumbar Spinal Stenosis Consensus Group Guidelines for Minimally Invasive Spine Treatment. Pain practice: the official journal of World Institute of Pain, 2019. 19(3): p. 250-274.
9. Huang, R., et al., Nonsurgical medical treatment in the management of pain due to lumbar disc prolapse: A network meta-analysis. Seminars in arthritis and rheumatism, 2019. 49(2): p. 303-313.
10. Park, K.D., et al., Factors Associated with the Outcome of Ultrasound-Guided Trochanteric Bursa Injection in Greater Trochanteric Pain Syndrome: A Retrospective Cohort Study. Pain Physician, 2016. 19(4): p. E547-57.
11. Jang, S.H. and M.C. Chang, At Least 5-Year Follow-up After Transforaminal Epidural Steroid Injection Due to Lumbar Radicular Pain Caused by Spinal Stenosis. Pain Pract, 2020. 20(7): p. 748-751.
12. Pennington, Z., et al., Comparing the short-term cost-effectiveness of epidural steroid injections and medical management alone for discogenic lumbar radiculopathy. Clinical neurology and neurosurgery, 2020. 191: p. 105675
13. Cohen, S.P., et al., Epidural steroid injections, conservative treatment, or combination treatment for cervical radicular pain: a multicenter, randomized, comparative-effectiveness study. Anesthesiology, 2014. 121(5): p. 1045-55.
14. Lee, J.W., et al., Fluoroscopic cervical paramidline interlaminar epidural steroid injections for cervical radiculopathy: effectiveness and outcome predictors. Skeletal radiology, 2014. 43(7): p. 933-938.
15. Oliveira, C.B., et al., Epidural corticosteroid injections for lumbosacral radicular pain. The Cochrane database of systematic reviews, 2020.
16. Manchikanti, L. and R.M. Benyamin, Key safety considerations when administering epidural steroid injections. Pain management, 2015. 5(4): p. 261-72.
17. Benzon, H.T., M.A. Huntoon, and J.P. Rathmell, Improving the safety of epidural steroid injections. JAMA, 2015. 313(17): p. 1713-1714. Friedly, J.L., et al., A randomized trial of epidural glucocorticoid injections for spinal stenosis. 2014. 371(1): p. 11-21.
18. Andersson, G.B., Epidural glucocorticoid injections in patients with lumbar spinal stenosis. The New England journal of medicine, 2014. 371(1): p. 75-6.
19. Manchikanti, L., et al., Randomized trial of epidural injections for spinal stenosis published in the New England Journal of Medicine: further confusion without clarification. Pain Physician, 2014. 17(4): p. E475-88.