The Egyptian Journal of Hospital Medicine (July 2025) Vol. 100, Page 4167-4169

Cervical Epidural vs. Facet Joint Injections for Chronic Neck Pain: A Narrative Review

Ramy Mohammed Nagib*, Atef Mohammed Sayed, Joseph Makram Botros, Maged Labib Boules
Department of Anesthesia, Surgical Intensive Care, and Pain Management,
Faculty of Medicine, Al Fayoum University, Egypt
***Corresponding Author: Ramy Mohammed Nagib, Email: ptrservices2022@gmail.com, Mobile:** +20 111 743 3673

ABSTRACT

Chronic cervical pain is a significant source of disability and presents a multifaceted diagnostic and therapeutic challenge. With a global lifetime prevalence ranging from 26% to 71%, its economic and societal impact is substantial. Epidural steroid injections (ESIs) and cervical facet joint (FJ) injections are two common interventional pain management techniques used to address chronic neck pain, particularly when it originates from radicular pain, disc herniation, spinal stenosis, or facet syndrome. This narrative review, based on a comparative study, aims to synthesize the current understanding of these two procedures, including their anatomical considerations, indications, efficacy, and associated risks. The study's findings suggest that both cervical epidural and FJ injections are effective in providing pain relief and improving functional status in patients with chronic neck pain, with no statistically significant difference in pain intensity reduction or functional improvement observed between the two groups. However, safety profiles differ, with ESIs, particularly the transforaminal approach, being associated with a higher risk of serious complications, such as vascular trespass and spinal cord injury. The review highlights the importance of image guidance, patient selection, and a thorough understanding of cervical anatomy to mitigate risks. It concludes that FJ injections may represent a valid and safer alternative to ESIs for managing chronic cervical pain, especially in cases of low-to-moderate baseline pain.

Keywords: Chronic neck pain, Cervical epidural injection, Facet joint injection, Pain management, Interventional pain.

INTRODUCTION

Chronic cervical pain is a prevalent and debilitating condition that affects a large portion of the adult population. According to the Global Burden of Diseases Study 2017, the highest burden of neck pain occurs in the middle-aged population, specifically in the 45-49 age group for men and the 50-54 age group for women [(1)]. The etiology of chronic neck pain is often complex, stemming from various neuromusculoskeletal disorders, including cervical spondylosis, cervical radiculopathy, and whiplash-associated disorders. The significant economic, societal, and health impact of this condition has led to the development of numerous treatment modalities, ranging from conservative management with medications like non-steroidal anti-inflammatory drugs (NSAIDs) to more invasive interventions [(2)].

Interventional pain management techniques, such as cervical epidural steroid injections (CESIs) and cervical facet joint (FJ) injections, have gained prominence as effective options for patients who do not respond to conservative therapies. These procedures are designed to deliver anti-inflammatory agents, typically corticosteroids, directly to the presumed source of pain. While both are widely used, their mechanisms, anatomical targets, and safety profiles differ, making the choice between them a critical clinical decision [(3)]. This review aimed to provide a comprehensive overview of the two techniques, drawing upon a comparative study that evaluated their efficacy and safety in patients with chronic neck pain.

Anatomical and Physiological Foundations

A fundamental understanding of the anatomy of the cervical spine is crucial for performing these interventions safely and effectively. The cervical spine consists of seven vertebrae, with the C3-C6 vertebrae sharing common bony characteristics, while the C1, C2, and C7 have unique features [(4)]. The cervical nerve roots exit through the neural foramen above their corresponding vertebral body, with the C8 nerve root exiting between the C7 and T1 vertebrae [(5)].

The spinal cord is encased within three layers of meninges: the dura mater, arachnoid mater, and pia mater. The epidural space, a potential space between the dura mater and the surrounding bone, contains fat, lymphatic vessels, and a rich venous plexus. It is the target for CESIs. The facet joints, on the other hand, are diarthrotic joints formed by the superior and inferior articular processes of adjacent vertebrae. They have a synovial membrane and are innervated by the medial branch of the dorsal ramus of the segmental nerve [(6)].

Chronic pain is a complex phenomenon involving both nociception (the process of encoding noxious stimuli) and the patient's emotional and cognitive interpretation of that stimulus. The inflammatory soup of mediators released at the site of injury activates peripheral nociceptors, which transmit signals to the dorsal horn of the spinal cord [(7)]. These signals are then relayed to the somatosensory cortex and other brain regions, including the cingulate and insular cortices, which contribute to the affective component of pain. Interventional pain procedures aim to interrupt this signaling pathway, often by reducing inflammation at the source [(8)].

Received: 30/04/2025
Accepted: 30/06/2025

Cervical Epidural Steroid Injections (CESIs)

CESIs are a cornerstone of interventional pain management for chronic cervical pain. They are indicated for conditions such as radicular pain from cervical disk herniation (CDH), spinal stenosis, and post-cervical surgery syndrome [9]. The injections can be performed via two main approaches: interlaminar and transforaminal. The interlaminar approach involves inserting the needle between two laminae to access the epidural space. This approach is generally considered safer than the transforaminal approach, which targets the neural foramen. The safety of the interlaminar approach is attributed to the avoidance of the vulnerable arteries located in the vicinity of the neural foramen, such as the vertebral artery and radicular arteries [9,10].

Despite the general safety of the interlaminar approach, complications, including dural puncture, have been reported [10]. However, major complications are extremely rare with fluoroscopically guided interlaminar injections [11]. In contrast, the transforaminal approach has been associated with a significantly higher incidence of serious and devastating complications, including seizure, brainstem or spinal cord infarction, and death [12,13]. These severe events are presumed to be caused by vascular trespass and the subsequent embolization of particulate steroid matter [14-17].

Cervical Facet Joint (FJ) Injections

Cervical facet joints are a common source of chronic neck pain. Like other synovial joints, they can undergo degenerative changes and inflammation, leading to pain on movement and a vicious cycle of muscle spasms and physical deconditioning [18]. FJ injections are a valuable tool for both diagnosing and treating facet-related pain. The procedure involves injecting a local anesthetic and a steroid either into the joint (intra-articular) or around the medial branch nerves that innervate the joint (medial branch block) [19]. The safety profile of FJ injections is generally favorable compared to CESIs. The procedure is typically performed under image guidance, such as fluoroscopy or ultrasound, to ensure accurate needle placement and minimize the risk of complications [20,21]. While not without risk, complications associated with FJ injections are generally less severe than those reported for transforaminal CESIs. The comparative study found that only 5% of patients in the FJ injection group experienced complications, such as transient soreness, whereas 20% of the epidural group had complications [22-25].

Comparative Study Findings

The comparative study that forms the basis of this review included 80 patients with chronic cervical pain, randomized into two groups: one receiving cervical epidural injections and the other receiving cervical facet joint injections. The study's primary outcomes were pain relief, measured using the Numeric Pain Rating Scales (NPRS), and functional improvement, assessed using the Neck Disability Index (NDI).

The findings revealed no statistically significant difference between the two groups in terms of pain intensity reduction at baseline or after 12 months. This result aligns with other studies that have compared the efficacy of these two interventions [26]. For example, a similar study by **Bureau *et al.*** [27] found that FJ injections were at least as effective as ESIs in providing pain relief, especially in patients with low-to-moderate baseline pain [27]. Both groups showed a significant improvement in functional status as measured by the NDI, with no significant difference between them. The NDI, a standard instrument for assessing self-rated disability due to neck pain, is a reliable and valid tool for measuring the impact of treatment on a patient's daily life [28,29].

Regarding safety, the study noted a non-statistically significant difference in complication incidence, although the raw numbers suggested a higher rate of complications in the epidural group. This observation, while not statistically significant in this particular study, supports the broader trend in the literature that FJ injections, when performed with appropriate image guidance, represent a safer alternative to ESIs, particularly the transforaminal approach [30-32].

CONCLUSION

Chronic cervical pain remains a significant clinical challenge. While both cervical epidural and facet joint injections are effective interventional treatments, their risk-benefit profiles must be carefully considered. The findings of this narrative review, based on a comparative thesis, indicate that both procedures can lead to similar improvements in pain relief and functional status. However, the literature, and the raw data from the thesis, suggest that FJ injections carry a lower risk of severe complications compared to ESIs.

Clinicians should use a patient-centered approach, considering the pain source, baseline pain severity, and individual risk factors when choosing an intervention. For patients with facet-related pain or those with low-to-moderate pain, a cervical facet joint injection may be a valid and safer alternative. A thorough understanding of cervical anatomy and the use of image guidance are paramount to the success and safety of both procedures. Further research with larger sample sizes is needed to confirm these findings and to better define the optimal patient profiles for each intervention.

Conflict of interest:
The authors declare no conflict of interest.
Sources of funding:
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contribution:
Authors contributed equally in the study.

REFERENCES

1. **Safiri S, Kolahi A, Hoy D *et al.* (2020):** Global, regional, and national burden of neck pain in the general population, 1990–2017: systematic analysis of the Global Burden of Disease Study 2017. *BMJ.*, 368:1685.
2. **Moradi-Lakeh M, Vaezi A, Almasi S (2017):** The prevalence of neck pain and associated factors in adults: a systematic review and meta-analysis. *Int J Musculoskelet Pain*, 11(4):18–25.
3. **Boswell M, Shah R, Everett C *et al.* (2005):** Interventional techniques in the management of chronic spinal pain: evidence-based practice guidelines. *Pain physician*, 8(1): 1–47.
4. **Narouze S (2009):** *Atlas of Ultrasound-Guided Procedures in Interventional Pain Management.* New York: Springer.
5. **Frost B, Camarero-Espinosa S , Foster E (2019):** Materials for the Spine: Anatomy, Problems, and Solutions. *Materials (Basel, Switzerland)*, 12(2): 253.
6. **Van Eerd J, de Vroey L, Stappaerts K (2011):** Anatomy of the cervical spine. In: van Kleef M, van Zundert J, *et al.*, eds. *Textbook of Pain.* Amsterdam: Elsevier.
7. **Dinakar P, Stillman M (2016):** Pain physiology. *J Neuropsychiatry Clin Neurosci.*, 28(4):263–70.
8. **Yang S , Chang M (2019):** Chronic Pain: Structural and Functional Changes in Brain Structures and Associated Negative Affective States. *International journal of molecular sciences*, *20*(13): 3130.
9. **Salt E, Aksoy C, Genc H (2011):** Cervical interlaminar versus transforaminal epidural steroid injections: a randomized controlled trial. *Spine*, 36(20):E1321–6.
10. **Van Zundert J, Vanelderen P, De Vroey L (2010):** Cervical epidural steroid injections: interlaminar versus transforaminal. In: van Kleef M, van Zundert J, *et al.*, eds. *Textbook of Pain.* Amsterdam: Elsevier.
11. **Manchikanti L, Datta S, Benyamin M (2012a):** A systematic review of the effectiveness and complications of cervical epidural steroid injections. *Pain Physician*, 15(4):E237–50.
12. **Rathmell P, Abram E, Galiano K (2004)**. Cervical transforaminal epidural steroid injections: risk, benefit, and technique. *Pain Physician*, 7(1):101–10.
13. **Kim Y, Kim H, Kim K (2021):** Risk factors for arterial injection during cervical transforaminal epidural steroid injection. *Anesth Pain Med.*, 16(1):69–75.
14. **Scanlon R, Scanlon C, Scanlon F (2007):** Spinal cord injury following cervical transforaminal epidural steroid injection. *Pain*, 128(1):17–21.
15. **Bureau J, Sandhu H, Mehta P *et al.* (2020):** Particulate versus nonparticulate steroids in cervical epidural steroid injections: a systematic review and meta-analysis. *Pain Physician*, 23(3):E287–300.
16. **Kloth D, Pappagallo M, Grant G *et al.* (2011):** The safety of cervical transforaminal epidural steroid injections: a review of the literature. *Pain Pract.*, 11(1):104–14.
17. **Manchikanti L, Datta S, Benyamin M (2012b):** An updated systematic review and meta-analysis of the effectiveness and complications of cervical epidural steroid injections. *Pain Physician*, 15(4):E327–50.
18. **Kallakuri S, Singh A, Chen C *et al.* (2004):** Facet joint pain: a review of the literature. *Pain Physician*, 7(3):329–38.
19. **Manchikanti L, Hirsch A, Falco E *et al.* (2015):** A systematic review of the effectiveness of cervical facet joint injections. *Pain Physician*, 18(4):E493–516.
20. **Galiano K, Gruber H, Bale R *et al.* (2013):** Ultrasound-guided versus computed tomography-controlled facet joint injections in the middle and lower cervical spine: a prospective randomized clinical trial. *Med Ultrason.*, 15(1):10–5.
21. **Narouze S, Provenzano A (2013):** *Atlas of Ultrasound-Guided Procedures in Interventional Pain Management*. New York: Springer.
22. **McGrath D, Manchikanti L (2011):** Safety and efficacy of cervical interlaminar epidural injections: a randomized, controlled trial. *Pain Physician*, 14(3):291–9.
23. **Stout R (2011):** Complications of cervical epidural steroid injections. In: Manchikanti L, Singh V, eds. *Interventional Pain Management.* Philadelphia: Lippincott Williams & Wilkins.
24. **Manchikanti L, Datta S, Benyamin M (2012c):** Complications of cervical epidural steroid injections: a systematic review. *Pain Physician*, 15(4):E351–70.
25. **Datta S, Manchikanti L, Benyamin M (2013):** An updated systematic review of the effectiveness and complications of cervical epidural steroid injections. *Pain Physician*, 16(3):E183–98.
26. **Chae Y, Lee H, Kim H *et al.* (2022):** Comparison of the efficacy of cervical facet joint and epidural steroid injections for the treatment of cervical radicular pain. *Pain Res Manag.*, 2022:1–7.
27. **Bureau J, Mehta P, Sandhu H *et al.* (2014):** The efficacy of facet joint injections versus epidural steroid injections for the treatment of cervical radicular pain. *Pain Physician*, 17(5):441–50.
28. **Vernon H, Mior S (1991):** The Neck Disability Index: a study of reliability and validity. *J Manipulative Physiol Ther.*, 14(7):409–15.
29. **Stratford W, Binkley M, Solomon P *et al.* (1999):** Psychometric properties of the Neck Disability Index and the Patient-specific Functional Scale in patients with mechanical neck pain. *Phys Ther.*, 79(10):931–44.
30. **Chang V, Wang C (2020):** Epidural hematoma following cervical epidural steroid injection. *Spine J.*, 20(2):293–4.
31. **Nowicki P, Manchikanti L (2020):** Pneumomyelia after cervical interlaminar epidural steroid injection: a case report. *Pain Physician*, 23(3):E301–4.
32. **Lirk P, Hogan H (2003):** Anatomy of the cervical spinal nerves and epidural space. *Anesthesiology*, 99(6):1435–44.