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"An Unexpected Surgical Surprise: Epidural Steroid-Induced Dural Swelling Complicating Lumbar Laminectomy

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Learning point of the article:
Recent caudal epidural steroid injection can induce transient dural oedema and friability, altering its handling characteristics during surgery.Awareness of this possible dural reaction helps spine surgeons anticipate increased risk of intraoperative dural tear. Adequate time interval should be maintained between caudal epidural injection and planned lumbar decompression.

ABSTRACT
Background: Caudal epidural steroid injections (CESI) are commonly used in the conservative management of lumbar canal stenosis and radiculopathy. Although generally safe, their short-term effects on dural integrity before surgery have not been well documented.
Case Description: A patient namedK. Venkatavva 55 year-old female with lumbar canal stenosis underwent decompressive laminectomy 1 week after receiving a CESI of [mg methylprednisolone acetate, 80mg]. Intraoperatively, the dura was tense, pale, and friable, tearing easily with gentle handling. A small dural tear occurred during decompression and was repaired primarily. The postoperative course was uneventful.
Conclusion: Recent caudal epidural injections may induce transient dural oedema and reduced tensile strength, predisposing to intraoperative dural injury. Surgeons should consider avoiding epidural injections shortly before planned lumbar surgery.
Keywords: caudal epidural injection; dural swelling; dural fragility; lumbar laminectomy; dural tear; spine surgery.

Introduction
Epidural steroid injections (ESIs) are widely used for lumbar radiculopathy and canal stenosis, providing temporary symptomatic relief and often delaying surgery. Complications such as dural puncture, infection, and arachnoiditis have been described, but intraoperative effects on dural texture and handling characteristics have not been well characterized.
Shakya et al. (2022) recently reported that patients who received lumbar ESIs within 3 months prior to minimally invasive discectomy had a significantly higher risk of intraoperative dural tear. Likewise, abnormal epidural tissue reactions after interlaminar epidural particulate steroid injections have been documented histologically. However, no prior report has described direct intraoperative observation of dural swelling and friability following a recent caudal epidural injection.

I. CASE PRESENTATION

A 55 years old female presented with chronic low back pain radiating to both the lower limbs for 12months, associated with neurogenic claudication. Neurological examination showed – EHL of Left Lower Limb = 4/5, EHL of Right Lower Limb= 3/5, Left Ankle Dorsiflexion= 4/5, Right Ankle Dorsiflexion= 3/5. MRI of the lumbar spine revealed severe central canal stenosis at L4–L5 with hypertrophied ligamentum flavum and facet arthropathy.

As part of conservative management, the patient received a caudal epidural steroid injection consisting of 80 mg methylprednisolone acetate in 10 mL normal saline and 2 mL 2% lignocaine, administered under fluoroscopic guidance. The patient experienced transient pain relief for 2 days but persistent symptoms thereafter.

One week later, the patient underwent L4–L5 laminectomy and decompression under general

anaesthesia. After removal of the ligamentum flavum, the dura appeared tense, pale, and thickened, lacking its usual sheen. The surface was friable and oedematous, tearing easily upon minimal retraction. A 2 mm linear dural tear occurred, which was repaired primarily using 6-0 Prolene under microscope. No cerebrospinal fluid leakage was detected upon Valsalva maneuver. The postoperative course was uneventful.

II. DISCUSSION

This case suggests that dural oedema and fragility may occur following recent caudal epidural injection. Potential mechanisms include chemical irritation, osmotic and pressure effects, and inflammatory spread. Histologic studies in animal models have shown epidural fibrosis and inflammatory cell infiltration following particulate steroid injections. Although these studies did not specifically evaluate acute dural swelling, they demonstrate that epidural tissues are susceptible to inflammatory alteration.

Shakya et al. (2022) found a 2.5-fold increase in dural tear risk in patients who received preoperative ESIs within 3 months before minimally invasive discectomy, suggesting temporal vulnerability. Nagpal et al. (2023) reported abnormal epidural tissue reactions including granulomatous inflammation and fibrosis. Conversely, large-scale registry studies (Donnally et al., 2020) have reported no consistent association between preoperative ESIs and postoperative complications, possibly reflecting longer injection-to-surgery intervals.

III. CONCLUSION

Recent caudal epidural injections may cause transient inflammatory or osmotic changes in the dura, rendering it oedematous and fragile. This can increase susceptibility to intraoperative dural tears during lumbar decompression. Awareness of this phenomenon and adequate timing between injection and surgery may help reduce complications.

Competing interests:

The authors declare that they have no competing interests.

They have no financial or personal relationships with any organizations that could inappropriately influence (bias) the work reported in this paper. The study was conducted independently without external funding or sponsorship.

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REFERENCES

[1]. Shakya A, Sharma A, Singh V, et al. Preoperative lumbar epidural steroid injection increases the risk of a dural tear during minimally invasive lumbar discectomy. Int J Spine Surg. 2022;16(3):505-511.

[2]. Nagpal S, et al. Epidural tissue reaction after interlaminar particulate steroid injection: a case series and systematic review. Spine J. 2023; [Epub ahead of print]. PMID: 40530804.

[3]. Derby R, Lee SH, Date ES, et al. Size and aggregation of corticosteroids used for epidural injections. Pain Med. 2008;9(2):227-234.

[4]. Hogan QH, Abram SE. Histologic analysis of epidural corticosteroid injections in dogs. anaesthesiology. 1997;87(1):156-163.

[5]. Donnally CJ III, et al. Preoperative epidural steroid injection does not increase the risk of infection or dural tear in lumbar fusion: analysis of 37,000 cases. Eur Spine J. 2020;29(8):1889-1896.

[6]. Labaran LA, Puvanesarajah V, Rao SS, Chen D, Shen FH, Jain A, Hassanzadeh H.Global Spine J. 2019 Dec;9(8):807-812. doi: 10.1177/2192568219833656. Epub 2019 Mar 21.PMID: 31819845Free PMC article.

[7]. Singla A, Yang S, Werner BC, Cancienne JM, Nourbakhsh A, Shimer AL, Hassanzadeh H, Shen FH.J Neurosurg Spine. 2017 May;26(5):645-649. doi: 10.3171/2016.9.SPINE16484. Epub 2017 Mar 14.PMID: 28291411

[8]. Yang S, Werner BC, Cancienne JM, Hassanzadeh H, Shimer AL, Shen FH, Singla A.Spine J. 2016 Feb;16(2):191-6.

doi: 10.1016/j.spinee.2015.07.439. Epub 2015 Jul 30.PMID: 26235469

[9]. Coskun E, Wellington IJ, Desai S, Singh H, Mallozzi SS, Moss IL.Clin Spine Surg. 2024 Apr 1;37(3):E158-E161. doi: 10.1097/BSD.0000000000001569. Epub 2024 Jan 5.

[10]. Labaran LA, Puvanesarajah V, Rao SS, Chen D, Shen FH, Jain A, Hassanzadeh H.Global Spine J. 2019 Dec;9(8):807-812. doi: 10.1177/2192568219833656. Epub 2019 Mar 21.PMID: 31819845Free PMC article.