

Background

The retrodural space of Okada is a potential space that is located dorsal to the ligamentum flavum that was initially described by Dr. Kikuzo Okada in 1981⁽²⁾. This space may serve as a connection between bilateral facet joints that may serve as a conduit for inflammatory and infectious processes. Although this space is a potential space, it may be encountered during interventional spine procedures especially inpatients with defects of the par interarticularis.

Materials and Methods

This case report contains no identifiable patient information and is, therefore, exempt from IRB review as per current policy at Northwestern Memorial Hospital.

References

⁽¹⁾ Kim SH, Cho TH, Kim HJ, Kwon HJ, Kwak HH, Shin KJ, Lee YS, Yang HM. Retrodural space of Okada in the posterior ligamentous complex region: clinical and anatomical findings relevant to lumbar interlaminar epidural injection. Reg Anesth Pain Med. 2023 Jan;48(1):22-28. doi: 10.1136/rapm-2022-103765. Epub 2022 Oct 14. PMID: 36241348.

⁽²⁾ Murthy NS, Maus TP, Aprill C. The retrodural space of Okada. AJR Am J Roentgenol. 2011 Jun;196(6):W784-9. doi: 10.2214/AJR.10.5751. PMID: 21606270.

⁽³⁾ Tiegs-Heiden CA, Madhavan AA, Diehn FE, Lehman VT, Murthy NS. Injection into the Space of Okada During Transforaminal Epidural Steroid Injections. Pain Med. 2022 May 30;23(6):1066-1074. doi: 10.1093/pm/pnac008. PMID: 35021225.

Case Presentation

A 76 year old female presented with a history of chronic low back pain and right lower extremity pain consistent with lumbar radiculitis. The patient had MRI findings significant for severe canal stenosis from grade 1 spondylolisthesis and severe bilateral neuroforaminal stenosis at L4-5. She also had EMG findings consistent with L5-S1 radiculopathy. She underwent diagnostic bilateral L4 selective nerve to determine origin of her pain. Upon entry into the foramen on the right side, contrast spread was noted within the bilateral facet joints and across midline, consistent with uptake into the retrodural space of Okada, with some L4 nerve root spread. Similar spread was noted with contrast administration when the procedure was repeated on the left, however we were unable to achieve optimal L4 nerve root outline. 2 cc of 2% lidocaine was administered within the foramen. Although some L4 nerve root spread was noted bilaterally, the patient's pain was unchanged.

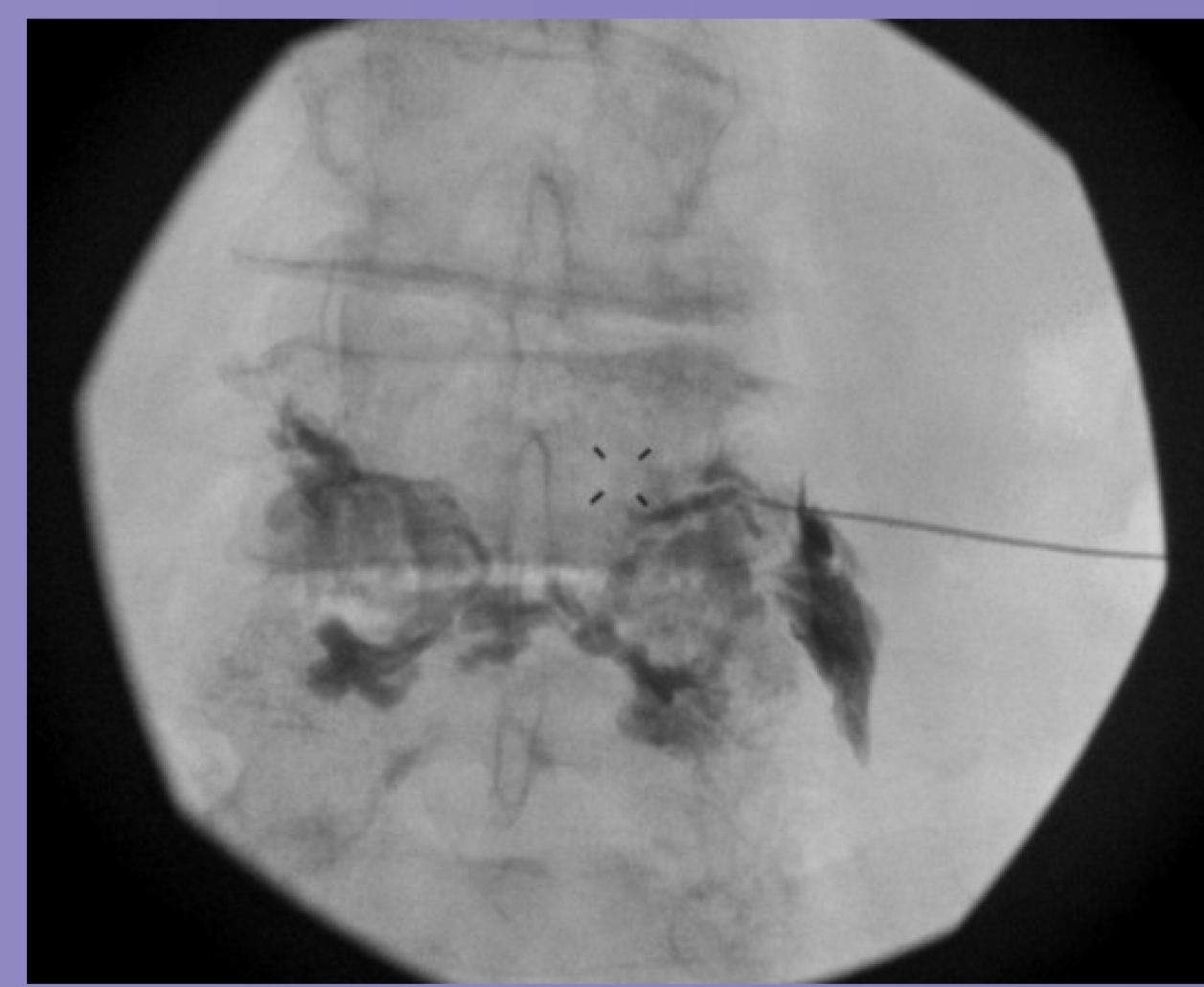
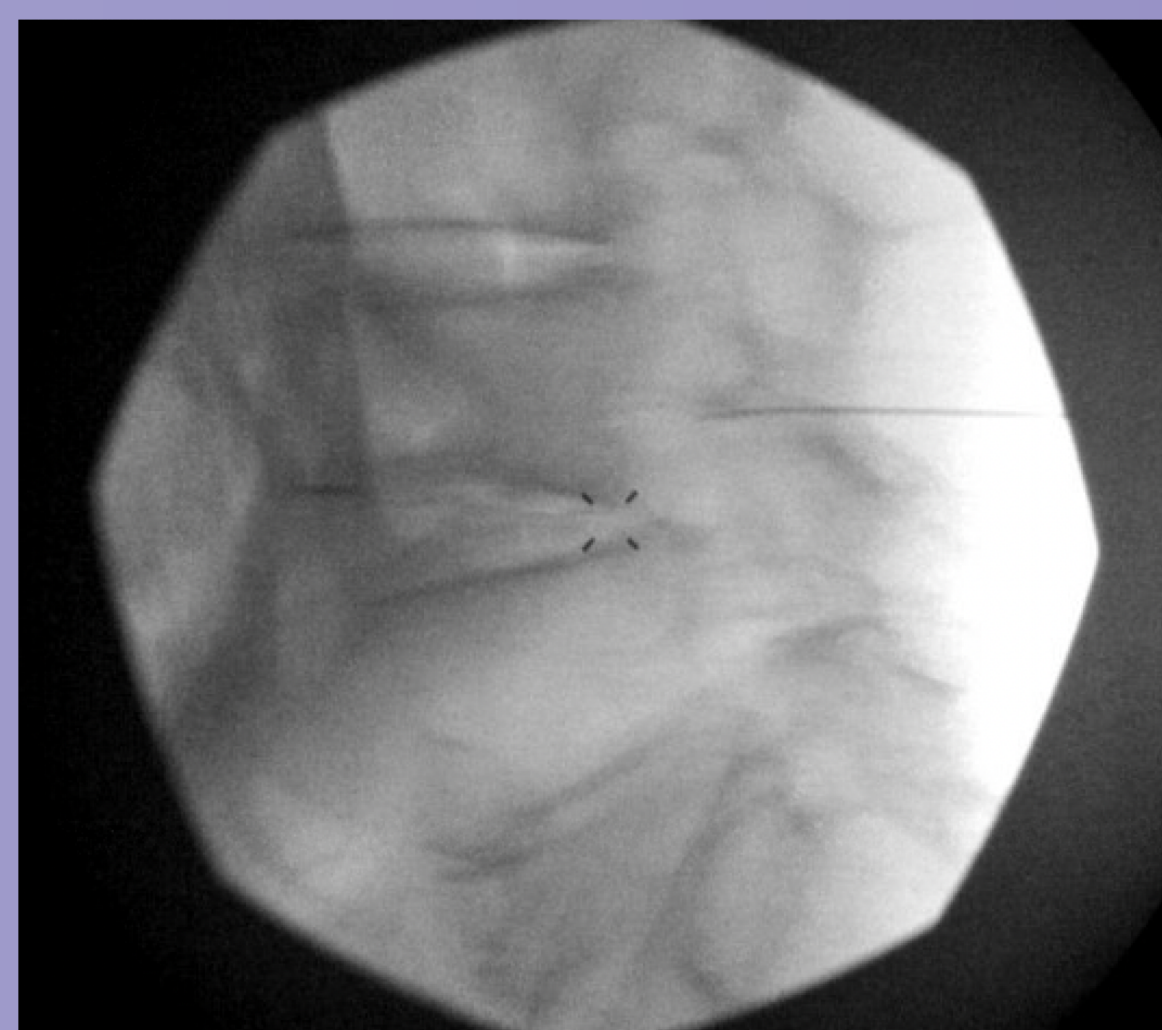


Figure 1 (Left): Image shows 22 G needle appropriately positioned in right L4 neural foramen prior to contrast administration

Figure 2 and 3 (Middle and Right): Images shows contrast spread into L4-5 facet joint, along the right L4 nerve root and across midline to the contralateral facet joint, consistent with spread into the retrodural space of Okada

Discussion

This case highlights the presence of the retrodural space of Okada as a potential space that may be inadvertently injected during interventional pain procedures. Particularly in patient's receiving interlaminar epidural steroids injections using loss of resistance technique, this space may present as false loss, ultimately leading to treatment failure as medication is delivered outside the epidural space ⁽¹⁾. It is important for pain physicians to be aware of the risks factors and radiographic findings of contrast spread, as outlined below, to avoid accidental injection into this space.

Risk Factors: ⁽¹⁾

- Facet Joint Pathology (Osteoarthritis, effusions, cysts)
- Interestingly, Severe Central Canal Stenosis, Spondylolisthesis, and interspinous bursitis have a higher prevalence, however in one study were found to not be statistically significant

Characteristic Spread of Contrast into retrodural space of Okada: ⁽³⁾

- Spread across midline to the contralateral facet joint
- Flows inferior compared to expected epidural contrast spread
- Lack of hypodense fat globules typically seen in epidural space

Limited research has been studied on risk factors associated with the retrodural space of Okada. Additional research would be beneficial in helping to identify these high risk patients.