*Case Report / Olgu Sunumu*

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# *An Osteoporotic Vertebral Fracture Case After Lumbar Sympathetic Ganglion Block*

## *Lomber Sempatik Ganglion Bloğu Sonrası Gelişen Osteoporotik Vertebra Kırığı Olgusu*

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## *Abstract*

We report the case of a patient with lymphedema who experienced an osteoporotic vertebral fracture following lumbar sympathetic ganglion block (LSGB). A 66-year-old woman with intractable lymphedema of the right leg went through surgery for cervix cancer. Because she was resistant to conventional treatments, we planned to commence LSGB treatment. Thus, she received two sessions of LSGB administered with a steroid and local anesthetic mixture. After the second session, the patient underwent severe lumbar pain. After thorough anamnesis and physical examination, we decided to use magnetic resonance imaging to rule out the possibility of metastasis. Contrast-enhanced magnetic resonance imaging, which was assessed by an expert spine radiologist, revealed an osteoporotic fracture of the L4 vertebra. The patient's severe pain considerably diminished in the third month after beginning antiosteoporotic and analgesic medications, orthosis, and exercises. We speculate that the use of steroids in LSGB may lead to osteoporotic vertebral fracture.
**Keywords:** Low back pain, lymphedema, osteoporotic fracture, sympathetic ganglion, steroids

## *Öz*

Lomber sempatik ganglion bloğu (LSGB) sonrası osteoporotik vertebra kırığı yaşayan lenfödemli bir hastayı sunuyoruz. Altmış altı yaşında, kadın, serviks kanseri nedeniyle ameliyat olduktan sonra sağ bacağında inatçı lenfödem gelişip konvansiyonel tedavilere dirençli olduğu için LSGB tedavisine başlamayı planladık. Bu nedenle hastaya steroid ve lokal anestezik karışımı ile iki seans LSGB tedavisi yapıldı. İkinci seanstan sonra hastada şiddetli bel ağrısı şikayeti gelişti. Kapsamlı bir anamnez ve fizik muayene yaptıktan sonra, metastaz olasılığını ekarte etmek için kontrastlı manyetik rezonans görüntüleme kullanmaya karar verdik. Uzman bir nöro-radyolog tarafından değerlendirilen kontrastlı manyetik rezonans görüntüleme ile L4 vertebrada osteoporotik fraktür tespit edildi. Anti-osteoporotik ve analjezik ilaçlar, ortez ve egzersizlere başlandıktan sonraki üçüncü ayda hastanın şiddetli ağrıları belirgin olarak azaldı. Bu olgudan yola çıkarak, LSGB'de steroid kullanımının osteoporotik vertebra kırığına yol açabileceğini düşünmekteyiz.
**Anahtar kelimeler:** Bel ağrısı, lenfödem, osteoporotik kırık, sempatik ganglion, steroidler

## Introduction

Lumbar sympathetic ganglion block (LSGB) has been commonly used in the diagnosis and management of sympathetically mediated, ischemic, and neuropathic pain in the lower limbs, including complex regional pain syndrome, circulatory insufficiency, and post-herpetic neuralgia (1,2). LSGB is also performed in clinical practice for various chronic conditions such as lymphedema (3). Local anesthetics and steroids are usually combined and injected around the sympathetic ganglia at the L2 or L3 level.

Osteoporosis (OP) is a serious complication associated with glucocorticoid therapy. Systemic glucocorticoids have adverse effects on the skeleton through different mechanisms. Glucocorticoids inhibit bone formation by suppressing osteoblast differentiation and accelerating bone loss by inducing osteoclast expression. They also indirectly impair bones through a reduction in intestinal calcium absorption, increase in urinary calcium loss and other extraskeletal effects (4).

Glucocorticoids are mostly used in interventional procedures such as epidural steroid injections (ESIs), facet joint injections, and sympathetic ganglion blocks. We conducted a review of the

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literature and, to the best of our knowledge, there have not been any reports on the association between LSGB and osteoporotic vertebral fracture. Here, we present a case of lymphedema in the right leg with osteoporotic vertebral fracture due to LSGB.

## Case Report

Verbal and written informed consent was obtained from the patient.

A 66-year-old woman is suffering from lymphedema of the right leg after she went through surgery for cervix cancer. She had OP and hypertension as comorbidities. She had been given all kinds of conventional treatment, such as complex decongestive therapy, pneumatic compression pump, etc., and yet she still had intractable lymphedema in her right leg. Thus, we decided to perform three sessions of LSGB on the right side, one week apart. The blockade was carried out by an experienced interventional pain specialist under sterile conditions with the C-arm fluoroscopy guidance. After the patient is placed in a prone position, the C-arm is rotated obliquely until the tip of the transverse process of L3 overlies the antero-lateral margin of the L3 vertebral body. The skin entry area was infiltrated with 2% prilocaine and a 12-cm, 22-gauge Quincke spinal needle was advanced to the anterolateral margin of the L3 vertebral body under intermittent fluoroscopic imaging. 1 mL of contrast medium (iohexol 300 mg/mL) was delivered to affirm the appropriate spread pattern and the absence of intravascular uptake prior to injection of a mixture of 6 mg betamethasone and 9 cc of 0.5% bupivacaine (Figure 1). The effectiveness of the injection was tested by measuring a temperature difference of at least 1 °C between the limbs. The patient attended the outpatient clinic with severe lumbar pain three days after the 2nd session. When a detailed anamnesis was taken from the patient, there was no history of trauma or fall. There was tenderness in her lumbar spinous processes during the examination and the numeric rating scale (NRS) score was 10 in the pain assessment. Owing to her prior diagnosis of OP, we immediately had a contrast-enhanced lumbar magnetic resonance imaging and measured bone mineral density (BMD) levels. An expert radiologist confirmed the existence of a minimal (grade 1) osteoporotic fracture in the L4 vertebra (Figure 2) and ruled out any metastasis regarding her cancer. There were no changes in her BMD values compared to prior BMD. We commenced denosumab 60 mg subcutaneous injection semi-annually, cholecalciferol 20,000 IU (0.5 mg vitamin D3) twice a week, tramadol 50 mg three times per day, lumbo-sacral orthosis, and a home-based exercise program. The NRS score of the patient declined by 4 points, from 10 to 6, after a week. Thus, the use of orthosis was discontinued, and the tramadol dose was reduced to twice a day. Her 3rd week and 3rd month NRS scores were 4 and 3, respectively.

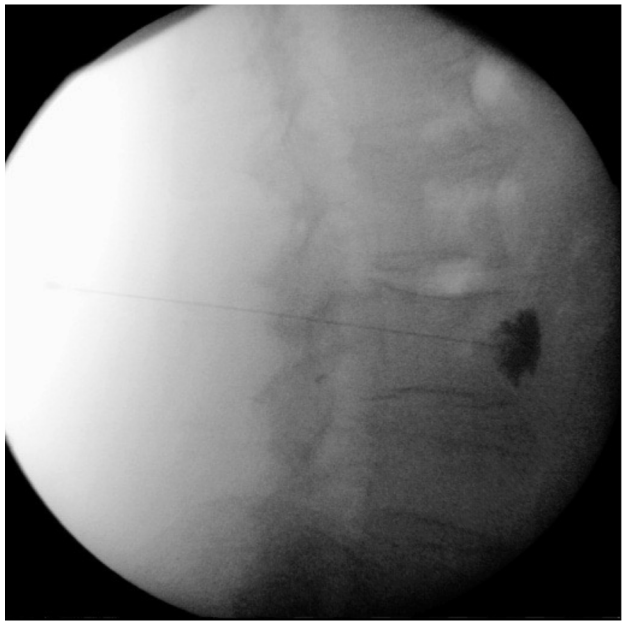

**Figure 1.** Lateral fluoroscopic image of the lumbar sympathetic ganglion block with contrast medium at the L3 vertebral body

## Discussion

In our patient with right leg lymphedema who was resistant to various conventional treatments, we detected the development of an osteoporotic vertebral fracture following a second LSGB session that was performed with local anesthetic and steroid mixture. We started antiosteoporotic agent, opioid analgesia, lumbo-sacral orthosis, and a home-based exercise program. After all these treatments, a 70% reduction in pain was achieved in the 3rd month control.

OP is a skeletal illness defined by a reduction in BMD, which causes bone fragility and increases the risk of fracture (5). Secondary OP is frequently the cause of glucocorticoid-induced

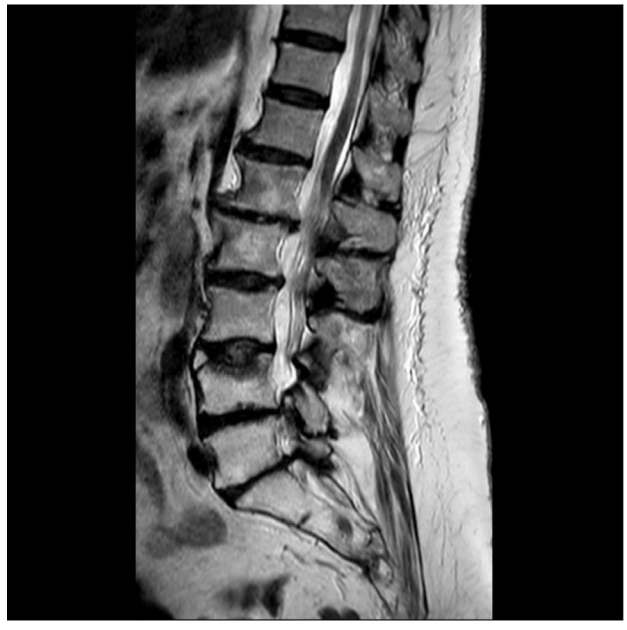

**Figure 2.** Osteoporotic compression fracture of the L4 vertebrae under T2 weighted sagittal MRI
*MRI: Magnetic resonance imaging*

OP (6). Oral and intravenous glucocorticoids have significant negative effects on bone and raise fracture risk promptly within the first three months of treatment (7). While systemic exposure via interventional procedures such as ESIs is much lower than from oral or intravenous administration, evidence of hyperglycemia and inhibition of the hypothalamic-pituitary-adrenal axis following ESIs proposes that some systemic absorption does take place (8). Even though there were some studies regarding ESIs and OP (9), to our knowledge, there was no study that looked into the systemic effects of glucocorticoid after LSGB. We assumed that since ESI and LSGB have similar GK doses and mechanisms, they may cause OP due to the systemic effects of GK. The association between ESIs and OP fracture risk has been investigated in a few retrospective studies (10-12). Among these investigations, only one study reported a higher incidence of OP fractures following ESIs (12). In accordance with this retrospective cohort study, the risk of vertebral fracture escalated by 29% after being exposed to ESI. In addition, the risk of fracture was shown to be dose-dependent, with each subsequent injection increasing the risk by a ratio of 1.21 (95% confidence interval =1.08-1.30) (12). Our patient's complaints developed in the second session of treatment. This may demonstrate that as the procedure is performed more frequently, the likelihood of complications also increases. These findings are consistent with the aforementioned study by Mandel et al. (12) The majority of research on the impact of ESIs on the skeletal system has been on changes in BMD. There is a link between ESI exposure and low BMD that has been found in several studies (13,14). However, we found no changes in BMD levels; this might be due to the short interval between evaluation periods. Given our patient's cancer and OP comorbidities, even only two sympathetic blocks with a total of 12 mg betamethasone may have facilitated this situation and induced the development of fracture.

Even if not administered systemically, the use of glucocorticoids, along with significant risk factors such as cancer and OP, may play an important role in the development of osteoporotic fracture. For this reason, when performing sympathetic blocks, using local anesthetic alone-not steroids-can be a better choice in patients with these risk factors. In conclusion, more research is required to assess the effectiveness and safety of adding steroids to sympathetic block applications.

### Ethics

**Informed Consent:** Verbal and written informed consent was obtained from the patient.

**Peer-review:** Externally and internally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: S.Ş., R.I., Ş.A., Concept: S.Ş., O.H.G., Design: R.I., S.Ş., Data Collection or Processing: R.I., Ş.A., Analysis or Interpretation: O.H.G., S.Ş., Literature Search: R.I., S.Ş., Writing: R.I., S.Ş.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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## References

1. Baig S, Moon JY, Shankar H. Review of Sympathetic Blocks: Anatomy, Sonoanatomy, Evidence, and Techniques. Reg Anesth Pain Med 2017;42:377-91.
2. Ozturk EC, Sencan S, Gunduz OH. Lumbar Sympathetic Block for Intractable Lower-Limb Postherpetic Neuralgia: Report of Two Cases. Pain Pract 2021;21:353-6.
3. Woo JH, Park HS, Kim SC, Kim YH. The effect of lumbar sympathetic ganglion block on gynecologic cancer-related lymphedema. Pain Physician 2013;16:345-52.
4. Whittier X, Saag KG. Glucocorticoid-induced Osteoporosis. Rheum Dis Clin North Am 2016;42:177-89.
5. Ferrari S, Bianchi ML, Eisman JA, Foldes AJ, Adami S, Wahl DA, et al. Osteoporosis in young adults: pathophysiology, diagnosis, and management. Osteoporos Int 2012;23:2735-48.
6. Mazziotti G, Angeli A, Bilezikian JP, Canalis E, Giustina A. Glucocorticoid-induced osteoporosis: an update. Trends Endocrinol Metab 2006;17:144-9.
7. Mitra R. Adverse effects of corticosteroids on bone metabolism: a review. PM R 2011;3:466-71.
8. Stout A, Friedly J, Standaert CJ. Systemic Absorption and Side Effects of Locally Injected Glucocorticoids. PM R 2019;11:409-19.
9. Krez A, Liu Y, Kanbour S, Clare S, Waldman S, Stein EM. The skeletal consequences of epidural steroid injections: a literature review. Osteoporos Int 2021;32:2155-62.
10. Nah SY, Lee JH, Lee JH. Effects of Epidural Steroid Injections on Bone Mineral Density and Bone Turnover Markers in Patients Taking Anti-Osteoporotic Medications. Pain Physician 2018;21:E435-47.
11. Yi Y, Hwang B, Son H, Cheong I. Low bone mineral density, but not epidural steroid injection, is associated with fracture in postmenopausal women with low back pain. Pain Physician 2012;15:441-9.
12. Mandel S, Schilling J, Peterson E, Rao DS, Sanders W. A retrospective analysis of vertebral body fractures following epidural steroid injections. J Bone Joint Surg Am 2013;95:961-4.
13. Al-Shoha A, Rao DS, Schilling J, Peterson E, Mandel S. Effect of epidural steroid injection on bone mineral density and markers of bone turnover in postmenopausal women. Spine (Phila Pa 1976) 2012;37:E1567-71.
14. Kim S, Hwang B. Relationship between bone mineral density and the frequent administration of epidural steroid injections in postmenopausal women with low back pain. Pain Res Manag 2014;19:30-4.