

Seizure-Induced Unstable L1 Burst Fracture without Trauma: a Case Report

Travma Olmaksızın Nöbetin Sebep Olduğu Stabil Olmayan L1 Patlama Kırığı: Olgu Sunumu

Merih İş

Assist. Prof., M.D.
Department of Neurosurgery
Duzce University Medical Faculty
merihis@yahoo.com

Cumhur Kılıncı

Assoc. Prof., M.D., Ph.D.
Department of Neurosurgery
Trakya University Medical Faculty
ckilincer@hotmail.com

Altay Sencer

M.D.
Department of Neurosurgery
Istanbul University Medical Faculty

Aykut Karasu

M.D.
Department of Neurosurgery
Istanbul University Medical Faculty

Murat İmer

Prof. Dr., M.D.
Department of Neurosurgery
Istanbul University Medical Faculty

Abstract

A 62-year-old female presented with severe low back pain following a generalized tonic-clonic epileptic seizure. There was no history of trauma. Neurologic examination was normal. Radiologic examinations revealed burst fracture at the L1 level with %50 spinal canal narrowing. She underwent L1 corpectomy, cage, and plate fixation via anterolateral approach. The postoperative period was uneventful. Most vertebral fractures induced by seizure are asymptomatic and stable. The current case is a rare example of seizure-induced burst fracture of thoracolumbar junction with significant canal compromise. The mechanisms of seizure induced burst fractures were reviewed and treatment options were discussed.

Key words: **Epilepsy; Fractures, compression; Seizures.**

Özet

Bu yazıda jeneralize tonik klonik epileptik nöbeti takiben başlayan ciddi bel ağrısı ile başvuran 62 yaşındaki bayan hasta sunulmuştur. Hastanın travma hikayesi yoktu. Nörolojik muayenesi normaldi. Radyolojik incelemede spinal kanalı %50 daraltan lomber 1'de patlama fraktürü izlendi. Hastaya torokotomi ile lomber 1 korpektomi, kafes ve plak ile fiksasyon uygulandı. Postoperatif dönem sorunsuz geçti. Nöbete bağlı oluşan vertebra kırıklarının çoğu semptomsuz ve stabildir. Sunulan olgu nöbete bağlı olarak torakolomber bileşkede oluşan ve belirgin şekilde kanal basısı yapan patlama kırığının nadir örneğidir. Nöbete bağlı patlama fraktürü oluşum mekanizmaları gözden geçirilmiş ve tedavi seçenekleri tartışılmıştır.

Anahtar kelimeler: **Epilepsi; Kompresyon kırığı; Nöbet.**

Submitted : February 05, 2008
Revised : July 16, 2008
Accepted : December 15, 2008

Corresponding Author:

Dr. Merih İş
Department of Neurosurgery
Faculty of Medicine University of Duzce
Düzce, Turkey

Telephone : +90 - 380 5414107
E-mail : merihis@yahoo.com

Introduction

The incidence of injury in the consequent of a seizure is high and varies from 0.03 to 3% (1, 2). The most common injuries are head laceration or contusions, burns, and fractures (1, 3). Examples of bony injuries following seizures include facial bones, ribs, compression glenohumeral and manubriosternal joint, scapula, vertebrae, femoral neck, and pelvis fractures (4-6).

Seizure-induced vertebral fractures without trauma have been recognized, but rarely have been reported in the neurosurgical literature (7-10). They may be related to the violent contraction of the trunk musculature that occurs during generalized seizure (11). We describe the management of a patient with unstable lumbar burst fracture following an epileptic seizure.

Case Report

A 62-year-old female was admitted to outpatient clinic with severe low back pain. She had a history of rheumatoid arthritis for five years and had a generalized tonic-clonic epileptic seizure three weeks ago. When she woke up following seizure, she had felt severe low back pain. There was no trauma in the history. Neurologic examination was normal. She had severe low back pain (visual analog score= 7 points) and the pain was resistant to the medical therapy. Plain radiographs, computerized tomography (CT), and magnetic resonance images (MRI) of the lumbar spine revealed L1 burst fracture with 50% anterior height loss, 11 degrees segmental kyphosis angle, and nearly 50% narrowing of the spinal canal (Picture 1, 2, 3). Bone mineral density and T score measured 0.74 g/cm² and -2.8 in the lumbar spine, respectively. Erythrocyte sedimentation rate and leukocyte count was 24 mm/hour and 6800/mm³, respectively. The investigations regarding seizure etiology (including cranial CT and electroencephalography) revealed no abnormality.

The patient underwent decompression and stabilization via L1 corpectomy, cage and plate between T12 and L2 with a left-sided thoracotomy (Picture 4). The postoperative period was uneventful. The patient was mobilized with thorocolumbosacral orthosis (TLSO) on postoperative day 3. Her visual analog score was 2 points without any medication. In the postoperative sixth month follow up, the patient was doing well.



Picture 1. X-ray showing more than 50% reduced vertebral height.



Picture 2. Axial computed tomographic image using bone window settings of lumbar 1 showing reduced spinal canal diameter.



Picture 3. T2- weighted magnetic resonance (MR) imaging of lumbar spine showing L1 fracture.

Discussion

Seizure-associated vertebral fractures occur mostly in adult males and during sleep in 40% of patients (6). Symptomatic spinal fracture from a seizure is rare and it has been predicted about 1% of epileptic patients (6). The epilepsy-related vertebral body fractures are usually mild, frequently asymptomatic, and show a predilection for the thoracic spinal column (12-14). Vasconcelos (6) reported back pain and vertebral fractures were observed in 15 of 1487 epileptic patients. However, the author found that 11 (15%) of 70 epileptic patient were asymptomatic. Also, Pederson et al (13) reported asymptomatic vertebrae fractures in 15% of the 87 epileptic outpatients.



Figure 4. Postoperative X-ray showing L1 corpectomy, cage, and fixation with plate-screw system.

Some authors reported that strong hyperflexion contraction of extremity muscles during the seizure can cause vertebral fracture, mainly in the midthoracic area (15, 16). Cervical and thorocolumbar junction fractures following epileptic seizure were rarely reported (6, 17). This distinctive distribution may occur due to concentration of compressive forces of muscles along the anterior and middle columns of the midthoracic kyphosis (8, 17). We thought that muscular forces generated by axial skeletal contraction during seizure activity could be the reason of the L1 burst fracture in our patient. Osteoporosis (caused by postmenopausal status and long-standing use of anti-rheumatoid drugs) should contribute to this significant fracture.

Seizure-induced vertebral fracture presents a medical dilemma regarding spinal precautions in epileptic patients. So far, there is no evidence exists to suggest that spinal precautions are necessary for all seizure patients. Patients

who present in a post-ictal state should be carefully monitored for any neurological or skeletal compromise. Complaints of back pain, paraspinal tenderness, or limb weakness require a detailed neurologic examination.

Vertebral fracture must be suspected in patients who have the risk factors for osteoporosis (especially in postmenopausal women) in the presence of persistent pain after seizures.

The treatment of osteoporotic fractures is debatable. Medical therapy including bed rest, brace, and analgesia can be tried for compression vertebral fracture without neurologic deficit. However, percutaneous interventions such as vertebroplasty / kyphoplasty or open surgery may be necessary according to neurological and radiological findings. In our case, despite large dose of analgesic usage, the pain of the patient was severe. Also significant height loss of the vertebral corpus and canal compromise directed us to perform an anterolateral decompression and stabilization.

In conclusion, forceful muscle contraction during the seizure can result in vertebral fracture. However, patients with seizures-induced traumas may have normal neurological examination and can easily be overseen due to absence of trauma and post-ictal impairment of consciousness. The only presenting symptom could be persistent back pain. Postmenopausal status or other risk factors for osteoporosis should be alerting sign. In patients with back pain after an epileptic seizure, radiological evaluation should also be performed.

References

1. Kirby S, Sadler RM. Injury and death as a result of seizures. *Epilepsia* 1995; 36: 25-28.
2. Nakken KO, Lossius R. Seizure-related injuries in multihandicapped patients with therapy-resistant epilepsy. *Epilepsia* 1993; 34: 836-840.
3. Spitz MC. Severe burns as a consequence of seizures in patients with epilepsy. *Epilepsia* 1992; 33:103-107.
4. Kelly JP. Fractures complicating electro-convulsive therapy and chronic epilepsy. *J Bone Joint Surg Br* 1954; 36:70-79
5. Kumar SK, Freeman BJ. Quadriplegia following grand mal seizures. *Injury* 1999; 30:626-629.
6. Vasconcelos D. Compression fractures of the vertebrae during major epileptic seizures. *Epilepsia* 1973; 14: 323-328.
7. Granhed HP, Karladani A. Bilateral acetabular fracture as a result of epileptic seizure: a report of two cases. *Injury* 1997; 28: 65-68.
8. Parrish GA, Skiendzielewski JJ. Bilateral posterior fracture-dislocations of the shoulder after convulsive status epilepticus. *Ann Emerg Med* 1985;14: 264-266.
9. Ribbans WJ. Bilateral anterior dislocation of the shoulder following a grand-mal convulsion. *Br J Clin Pract* 1989; 43:181-182.
10. Vanderhooft E, Swiontkowski M. Bilateral femoral neck fractures following a grand mal seizure. *Ann Emerg Med* 1994; 24:1188-1191.
11. Gnanalingham K, Macanovic M, Joshi S, Afshar F, Yeh J. Non-traumatic compression fractures of the thoracic spine following a seizure-treatment by percutaneous kyphoplasty. *Minim Invasive Neurosurg* 2004; 47: 256-257.
12. Finelli PF, Cardi JK. Seizure as a cause of fracture. *Neurology* 1989; 39: 858-860.
13. Pedersen KK, Christiansen C, Ahlgren P, Lund M. Incidence of fractures of the vertebral spine in epileptic patients. *Acta Neurol Scand* 1976; 54:200-203.
14. Vernay D, Dubost JJ, Dordain G, Sauvezie B. Seizures and compression fracture. *Neurology* 1990; 40: 725-726.
15. McCullen GM, Brown CC. Seizure-induced thoracic burst fractures. A case report. *Spine* 1994;19: 77-79.
16. Youssef JA, McCullen GM, Brown CC. Seizure-induced lumbar burst fracture. *Spine* 1995; 20:1301-1303.
17. Grabe RP. Fracture-dislocation of the lumbosacral spine during a grand mal epileptic seizure. A case report. *S Afr Med J* 1988; 74:129-131.