Lumbar Spinal Subdural Hematoma as a Complication of Lumbar Discectomy (Case Report)

Lumber Diskektomi Komplikasyonu Olarak Gelişen Bir Spinal Subdural Hematom: Olgu Sunumu

EROL TAŞDEMİROĞLU, HALİT Ş. TOGAY

İstanbul Social Security Hospital, Neurosurgery Service, İstanbul, Türkiye

Received : 22.3.1999 ⇔ Accepted : 22.10.1999

Abstract: This report describes the case of 49-year-old female patient who developed a lumbar spinal subdural hematoma as a complication of lumbar discectomy. We give the details of the case and review the relevant literature.Our conclusion is that spinal subdural hematoma should be considered a possible postoperarive complication of lumbar discectomy if radicular pain and back pain recur soon after a patient has undergone a successful surgery of lumbar disc herniation.

Key Words: Lumbar disc surgery, postoperative complication, spinal subdural hematoma

Özet: Lomber disk hernisi operasyonunun komplikasyonu olarak gelişen bir spinal subdural hematom olgusu sunuldu. Literatür gözden geçirildi ve olgu tartışıldı. Başarılı bir lomber diskektomi operasyonunu takiben ortaya çıkan bel ağrısı ve radiküler tip bacak ağrısının spinal subdural hematoma bağlı olabileceği vurgulandı ve spinal subdural hematomun postoperatif dönemde tekrar oluşan bel ve bacak ağrısının ayırıcı tanısında göz önüne alınması gerektiği vurgulandı.

Anahtar Kelimeler: Lomber disk hernisi, postoperatif komplikasyon, spinal subdural hematoma

INTRODUCTION

Spinal subdural hematoma was first described by Potts in 1910 (11) and Harris in 1911 (5) in two consecutive case reports. In 1948, Schiller et al (15) published the first detailed report on a case of a spinal subdural hematoma.

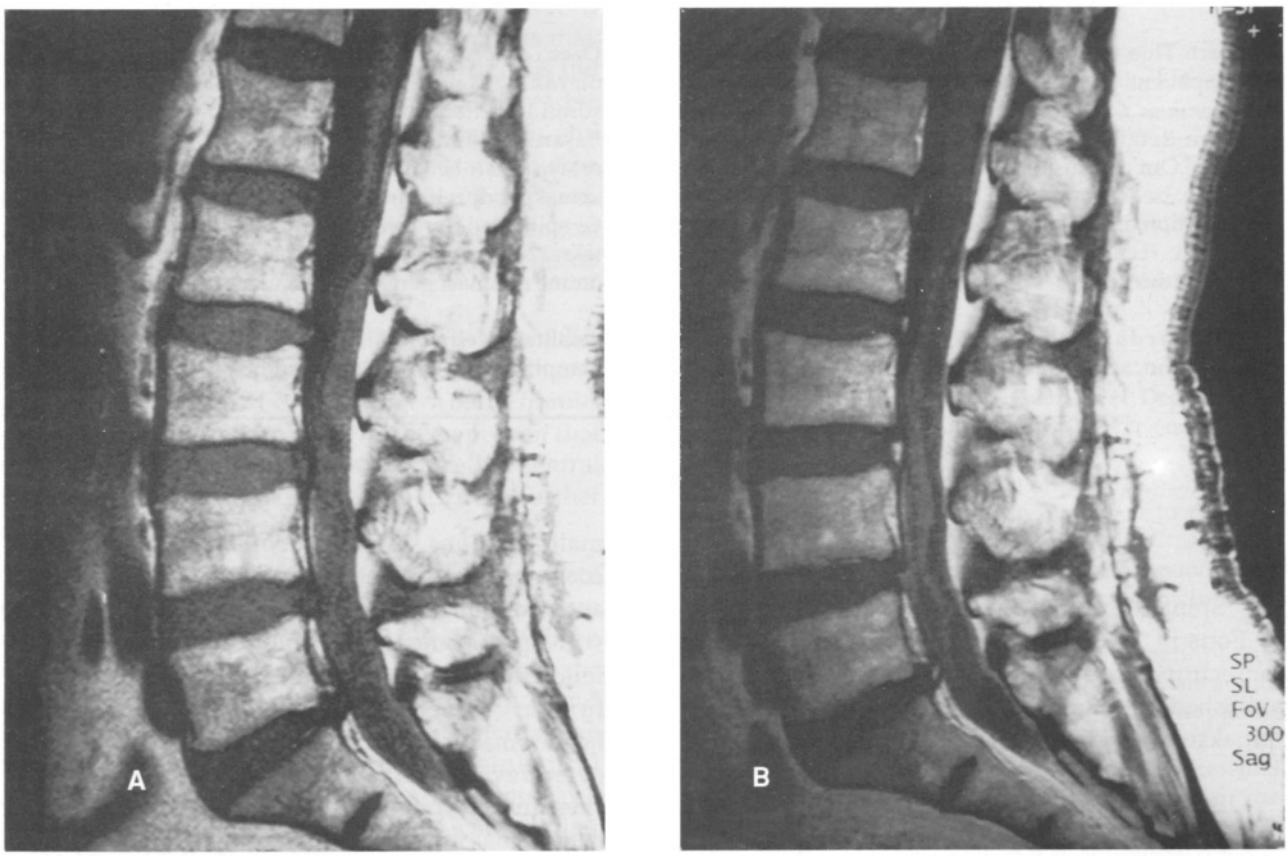
It has long been recognized that hematomas in the spinal canal can produce sudden spinal cord and/or cauda equina compression (10). Investigators have linked the development of these lesions to a variety of factors, including ruptured vascular malformations, existing neoplasm, hypertension, coagulopathy, trauma, pregnancy, old age, infection, anticoagulant therapy (especially when combined with spinal puncture or epidural anesthesia), and following ventriculo-peritoeal shunt placement and lumbar discectomy (1,8-12,14,15,17). Spinal hematomas can also occur spontaneously and may even develop after sudden movements such as sneezing or coughing (10). Most spinal subdural hematomas are detected in the acute phase (within 48 hours of the event), but some have been known to cause chronic myelopathy (2). Spinal subdural hematomas usually produce severe irreversible

neurological deficits, and these compressive lesions always require immediate surgical evacuation. However, some spinal hematomas have been known to resolve spontaneously (6) and treatment by serial lumbar spinal taps and drainage has also been effective (7).

Here we present a case of postoperative spinal subdural hematoma, that developed as an unusual complication of lumbar disc surgery. The hematoma was diagnosed by lumbar magnetic resonance (MR) imaging and iand the patient responded to oral steroid treatment.

CASE REPORT

A 49-year-old woman was admitted to the Neurosurgery Service at Eyüp Social Security Hospital in January of 1997. She had been suffering right leg and hip pain for 4 months. Her medical and surgical histories were unremarkable, and her physical exam and vital signs were normal. A neurological exam showed positive Straight Leg Raising on 30 degrees, decreased ankle jerk reflex and subnormal strength of dorsal flexion of the foot on the right side. These findings were consisted with right L5 radiculopathy. An axial computed tomography (CT) scan of the lumber spine showed L4-5 disc herniation . We performed right L4-5 discectomy via the classical approach. The patient's right leg pain improved immediately, and she was mobilized the day after surgery. However, on the second postoperative day her right leg pain returned. The patient's neurological exam was normal, but her right leg pain persisted and responded only minimally to nonsteroidal antiinflammatory medications. To rule out the possibility of having missed fragment of extruded disc during surgery, we performed, gadolinium-DTPA-enhanced MR imaging of the lumbar spine on the postoperative day 7. The scan revealed a posteriorly located spinal subdural hematoma extending from L1 to S2. We noted postoperative changes at L4-5 , but there was no residual disc fragment nor any evidence of nerve



Figures 1A and 1B. T1-weighted sagittal MR images of the lumbar spine on postoperative day 7 without (A) and with (B) gadolinium enhancement show a subdural collection in the posterior aspect of the dural sac and cauda equina. The lesion extends from L2 to S2.

root compression (Figures 1A,B &Figure 2). We prescribed oral steroid therapy of 4 mg dexamethasone four times daily for 20 days, and then tapered this to 4 mg every fifth day. The patient's symptoms subsided significantly in one week and her right leg pain eventually disappeared altogether. The 5 months a follow-up neurological exam and MR imaging of the lumbar spine were normal (Figure 3).

DISCUSSION

Symptomatic spinal subdural hematoma is a very unusual complication of lumbar disc surgery. This type of lesion has been detected after trauma, nad in the settings of coagulopathy and arteriovenous malformation (9). It has also been seen in surgical cases after removal of spinal arachnoid cysts. However one case by Reinsel et al. (12) has been described the development of spinal subdural hematoma after lumbar disc surgery. Most documented spinal subdural hematomas, the latter case included have been treated with immediate evacuation via laminectomy in order to preserve or restore neural function. However, spontaneous resolution (6) and treatment by serial spinal lumbar puncture and drainage have also been reported (7). Our patient's neurological status was normal other than severe leg pain. Oral steroids effectively treated her symptoms and helped resolve the subdural hematoma.

The mechanism behind hematoma formation in the spinal subdural space is not fully understood. A recent electron microscopy study by Haines and colleagues (4) offered an explanation for how subdural hematomas develop in the brain, and this theory could also apply to the spine. The authors discovered that the dura mater is composed of two layers, the external layer being strong and the inner "meningeal dura",also known as the dural border cell layer, being structurally weak and vulnerable

Figure 2. T2-weighted sagittal MR images of the lumbar spine on postoperative day 7 show a subdural collection at this hypointense to the spine cord white matter.

Figure 3. Sagittal T1-weighted sagittal MR imaging of the lumbar spine at the fifth postoperative month showed that the patient's subdural hematoma had completely disappeared.

to tears. In the spinal dura, this type of injury could occur during nerve root and dural sac retraction in disc surgery. Once the arachnoid membrane is torn any hemorrhage in the region could spread through the area. This would form an extensive discrete hematoma along the spinal canal in the "cleaved-open" space between the tough external dura and arachnoid membrane.

MR imaging is the method of choice for detecting spinal hematomas since it offers many advantages over myelography and axial CT scan (10,12,13). Lumbar MR scans make detection of subacute spinal subdural hematomas relatively easy, and compared to CT provide better definition of the boundaries of these lesions (10,12). Al hematoma in the subdural space will appear clumped and loculated producing an MR image similar to that of myelographic contrast at the site after subdural injection. The diagnosis is confirmed when changing the patient's position does not cause the subdural blood to relocate or diffuse freely. These hematomas are usually located at the anterior or posterior aspect of the spinal canal, but sometimes encircle the spinal cord in the subdural space.

The signal characteristics of spinal subdural hematomas are similar to those of acute and subacute hematomas of the brain (16). In the early subacute stage (3-7 days of subdural bleeding) the intracellular iron-hemoglobin in the hematoma changes to intracellular iron-methemoglobin. At this stage intracellular iron is hyperintense to brain parenchyma on T1-weighted MR images, and hypointense to brain parenchyma on T2-weighted MR images. On gradient-echo or T2-weighted images of acute spinal subdural collections, the presence of deoxyhemoglobin produces low signal intensity over the majority of the lesion. In addition to clues about the nature of the hematoma, MR scans also yield information on the extent of the lesion and the degree of cord and cauda equina compression that is involved.

In our patient , T2-weighted sagittal MR images revealed an intradural collection at L2 to S2 that was located posterior to the cauda equina and was hypointense to brain parenchyma (Fig 2). Gadolinium-enhanced T1-weighted sagittal MR images revealed that the collection was hyperintense to normal brain and showed contrast enhancement at the lesion margins (Figures 1A and 1B).

The diagnosed subacute spinal subdural hematoma was causing radicular pain, which resolved with steroid therapy. We believe that this hematoma was induced by trauma during surgery. The damage stimulated a secondary inflammatory response in the subdural space, involving granulation tissue formation and neovascularization. Since the progression of subdural hematoma is an inflammatory process, steroids offer benefits by inhibiting the reaction (3). Based on our findings it appears that steroid treatment may decrease both the inflammatory response and any associated pain that is chemically mediated.

We conclude that spinal subdural hematoma should be considered a possible postoperative complication of lumbar disc surgery. MR imaging is the diagnostic method of choice when this type of lesion is suspected. If the patient has no neurological abnormalities other than pain, oral steroid therapy can offer effective pain relief.

Correspondence: Erol Taşdemiroğlu
İncirli Caddesi, Deniz Apt. 74/7,
Bakırköy, İstanbul,
Türkiye.
Phone&fax: 90 (212) 542-88

REFERENCES

1. Benito-Leon J, Leon PG, Ferreiro A, Martinez J: Intracranial hypertension syndrome as an unusual form of presentation of spinal subarachnoid haemorrhage and subdural haematoma. Acta Neurochirur (Wien) 139: 261-262, 1997
2. Black PM, Zervas NT, Caplan LR, Ramirez LF: Subdural hygroma of the spinal meninges: a case report. Neurosurgery 2:52-54, 1978
3. Drapkin AJ: Chronic subdural hematoma: Pathophysiological basis of treatment. Br J Neurosurg 5: 467-473, 1991
4. Haines DE, Harkey HL, Al-Mefty O: The "subdural" space: a new look at an outdated concept. Neurosurgery 32:111-120, 1993.
5. Harris W: Two cases of spontaneous hematorrhachis or intrameningeal spinal hemorrhage, one cured by laminectomy. Proc R Soc Med 15:115-122, 1911
6. Kulkarni AV, Willinowsky RA, Gray T, Cusimano MD: Serial magnetic resonace imaging findings for a spontaneously resolving spinal subdural hematoma: case report. Neurosurgery 42:398-401, 1998
7. Lee JI, Hong SC, Shin HJ, Eoh W, Byun HS, Kim JH: Traumatic spinal subdural hematoma: rapid resolution

after repeated lumbar spinal puncture and drainage. J Trauma 40: 654-655, 1996
8. Lombardi V: Postoperative subdural hematoma with associated extradural arachnoid cyst of the spine. Case report . Acta Neurol (Napoli) 25: 123-125, 1970
9. Mattle H, Sieb JP, Rohnerr M, Mumenthaler M: Nontraumatic spinal epidural and subdural hematomas. Neurology 37: 1351-1356, 1987
10. Post MJD, Becerra JL, Madsen PW, Puckett W, Quencer RM, Bunge RP, Sklar EML: Acute spinal subdural hematoma : MR and CT findings with pathologic correlates. AJNR 15: 1895-1905, 1994
11. Potts CS: Intradural cyst of the spinal meninges removed by operation. Remarks on the location of the spinal centers for testicular sensibility. J Nerv Men Dis 37: 621-625, 1910
12. Reinsel TE, Goldberg E, Granato DB, Wilkinson S, Penn R: Spinal subdural hematoma: a rare cause of recurrent postoperative radiculopathy. J Spinal Disord 6: 62-67, 1993
13. Rothfus WE, Chedid MK, Deeb ZL, Alba AA, Muroon JC, Sherman RL: MR imaging in diagnosis of spontaneous spinal epidural hematomas. J Comput Assist Tomogr 11: 851-854, 1987
14. Russell NA, Benoit BG: Spinal subdural hematoma. A review. Surg Neurol 20: 133-137, 1983
15. Schiller F, Nelgan G, Budtz-Olsen O: Surgery in hemophilia: A case of spinal subdural hematoma producing paraplegia. Lancet 2: 842-845, 1948
16. Taşdemiroglu E: Subdural Hematoma, in Rakel RE (ed), Saunders Manual of Medical Practice. Philadelphia: WB Saunders, 1996: 1083-1086
17. Wurm G, Pogady P, Lungenschmid K, Fischer J: Subdural hemorrhage of the cauda equina. A rare complication of cerebrospinal fluid shunt. Case report. Neurosurg Rev 19:113-117, 1996