



Postoperative Spondylodiscitis and Epidural Abscess Becoming Visible on Magnetic Resonance Imaging before Positive Laboratory Tests

Laboratuvar Testleri Pozitif Olmadan Magnetik Rezonans Görüntüleme ile Tanı Konulan Postoperatif Spondilodiskitis ve Epidural Abse

Aysin Pourbagher¹, Sermin Tok¹, Hülya Aslan¹

¹Baskent University Faculty of Medicine, Adana Teaching and Medical Research Center, Department of Radiology. ADANA

Cukurova Medical Journal 2015;40 (Ek Sayı 1):97-101.

ABSTRACT

Post operative disc space infection is relatively uncommon. The incidence of postoperative disc space infection is 0.21 %-3.6 % in association with all vertebral surgical procedures. Surgery causes a variety of neuroendocrine and metabolic responses which generally results in immunosuppression. Clinical results of immunosuppression include delayed wound healing and septic complications. In this article, we report magnetic resonance imaging findings of a case with spondylodiscitis and spinal epidural abscess in which the imaging findings were apparent before the infection and inflammation related laboratory findings become positive. She has a history of surgery due to lumbar herniated disc a month. She was complaining of back and left leg pain. We performed contrast-enhanced MR imaging. MR imaging showed post operative changes at level L5 and S1. There was contrast enhancement at the level of the surgical gap in the posterior paravertebral muscles. MR imaging may help to differentiate postoperative spondylodiscitis and epidural abscess from early postoperative changes even before the laboratory tests appearing positive. In our case, surgery induced immunosuppression may cause the infection and inflammation related laboratory findings being within normal limits at the beginning.

Key words: Spinal epidural abscess; Spondylodiscitis; Magnetic Resonance Imaging

ÖZET

Postoperatif disk mesafesi enfeksiyonu nisbeten nadir bir durumdur. Tüm vertebral cerrahi girişimler ile ilişkili postoperatif disk enfeksiyonu insidansı % 0.21-% 3.6 arasındadır. Cerrahi genellikle immünsüpresyon ile sonuçlanan çeşitli nöroendokrin ve metabolic yanıtlara neden olmaktadır. Bu makalede, laboratuvar bulguları pozitif olmadan, manyetik rezonans görüntüleme bulguları görünür hale gelen spondilodiskit ve spinal epidural absesi olgu sunulmuştur. Olgunun bir ay önce lumbal herniye disk nedeniyle operasyon öyküsü vardı. Sırt ve sol bacak ağrısından şikayet ediyordu. Kontrastlı MR L5 ve S1 düzeyinde operasyona sekonder değişiklikleri gösterdi. Cerrahi lojunda posterior paravertebral kaslarda kontrast tutulumu vardı. MR görüntüleme bulguları, laboratuvar testleri pozitif olmadan önce postoperative spondilodiskitis ve epidural abseyi eken dönem postoperative değişikliklerden ayırmamızı sağlayabilir. Olgumuzda, cerrahiye bağlı immünsüpresyon nedeniyle enfeksiyon ve inflamasyonun laboratuvar bulguları başlangıçta normal limitlerde olabilir.

Anahtar kelimeler: Spinal epidural abse; Spondilodiskit; Manyetik Rezonans Görüntüleme

INTRODUCTION

Postoperative disk space infection was first described in 1953¹. *Staphylococcus aureus* is the most common pathogen². Fungal infections and tuberculosis are the other causes of spondylodiscitis due to postoperative infection. Surgery is a risk factor spinal epidural abscess³. Spinal epidural abscess are primarily located in posterior aspect of spinal canal⁴. Early diagnosis is critical for treatment. We experienced spondylodiscitis and epidural abscess that are located in anterior, left lateral and posterior aspect of spinal canal after lumbar disc herniation operation. There were neither signs of chill nor fever and the laboratory results were normal. Magnetic Resonance (MR) imaging findings were consistent with epidural abscess and spondylodiscitis.

CASE

A 45-year-old female with a history of surgery due to lumbar herniated disc a month ago at another hospital was admitted to neurosurgery clinic 2 years ago. She was complaining of back and left leg pain. There were neither signs of chill nor fever. Her vital signs were normal. Her physical examination was significant for motor weakness in lower limb. There were no abnormalities in the complete blood count (CBC), erythrocyte sedimentation rate (ESR) and blood chemistry tests. ESR was 14 (normal range 0-20), and CRP level was 3.44 (normal range 0-6). She was initially diagnosed as an acute attack of rheumatoid arthritis. When she did not response to therapy, we performed contrast-enhanced MR imaging. MR imaging showed post operative changes at level

L5 and S1. L5 and S1 vertebral body showed high signal intensity on T2-weighted images, low signal intensity on T1-weighted images. On fat saturated T2-weighted images there was a loculated fluid collection in approximately 1.5 cm diameter at operation site. There was contrast enhancement at the level of the surgical gap in the posterior paravertebral muscles. Contrast enhanced MR images showed peripherally enhancement of fluid collection compatible with anterior epidural abscess locating in anterior, left lateral and posterior aspect of spinal canal.

L5 and S1 vertebral body and intervertebral disk showed rim like contrast enhancement after contrast administration (figures1-2-3-4). Patient went operation. The main micro-organisms were *staphylococcus aureus* in the culture. After operation, she received antibiotherapy and was still alive and healthy after surgery.



Figure 1. L5 and S1 vertebral body shows low signal intensity on T1-weighted image (white arrows)



Figure 2. L5 and S1 vertebral body shows high signal intensity on T2-weighted image (white arrows)



Figure 3. Contrast enhanced MR image shows peripherally enhancement of fluid collection compatible with posterior aspect of spinal canal (black arrow).



Figure 4. Contrast-enhanced MR images showed anterior epidural abscess locating in anterior (black arrow), left lateral and posterior aspect of spinal canal (white arrows).

DISCUSSION

Post operative disc space infection is relatively uncommon. The incidence of postoperative disc space infection is 0.21 %-3.6 % in association with all vertebral surgical procedures². Surgery is a risk factor providing a direct portal for organisms⁵. Fever, meningism, neurological deficit and pain on palpation of the back may be noted in clinical examination⁵. Laboratory investigations are helpful in the diagnosis. ESR is a sensitive laboratory indicator of pyogenic infections. C-reactive protein (CRP) is an acute phase protein synthesized. ESR and CRP are consistently elevated in post operative disc space infection. Leukocytosis may be present⁶. It is a rare condition for spondylodiscitis and spinal epidural abscess becoming visible on MR imaging before the laboratory tests becomes evident.

Surgery causes a variety of neuroendocrine and metabolic responses which generally results in immunosuppression. Total number of white blood cells in the peripheral blood increases after surgery; however the number and function of critical leucocyte subpopulations are suppressed⁷. In our case, surgery induced immunosuppression may cause the laboratory tests not becoming positive at the beginning.

MR imaging is a highly sensitive and specific imaging technique in diagnosing postoperative spondylodiscitis². In postoperative patients, the evaluation of MR images may be more difficult. There will be increased T2-weighted signal intensity and contrast uptake at the surgery site due to postoperative changes. If the vertebral body shows low signal intensity on T1-weighted images and contrast enhancement after contrast administration, infection is more likely in the diagnosis rather than normal postoperative changes⁸. Abscesses are fluid collections appearing hypointense on T1 and hyperintense on T2 weighted MR images. Rim enhancement pattern after contrast administration was highly suspicious for abscess¹.

Previously, slightly low signal intensity on T1-weighted and high signal intensity on both T2-weighted and STIR sequences were reported in postoperative infections of disc, vertebrae and paravertebral soft tissues⁹. After contrast administration, heterogenous pattern of enhancement was reported⁹. A study comparing degenerative end plate changes with infectious one by diffusion weighted MR imaging showed hypointensity at the Modic type 1 disorders controversially high signal intensity of infectious spondylodiscitis on diffusion weighted MR images¹⁰. Plain film is not sensitive to the early postoperative changes. Computed tomography may help to show fluid collections and epidural abscesses, but the imaging resolution is lower than MR images.

Intravenous antibiotics should be preferred in the empiric antibacterial treatment. In the presence

of abscess, the appropriate treatment is surgical resection and antibiotics. Early diagnosis is very important in decreasing morbidity and mortality.

Post operative disc space infection is relatively uncommon. In postoperative patients, the evaluation of MR images may be more difficult due to the increased T2 signal intensity and contrast enhancement in early post operative period. Although laboratory investigations are within normal limits, MR imaging may help to differentiate postoperative spondylodiscitis and epidural abscess from early postoperative changes³⁻⁵.

REFERENCES

1. Bavinski G, Schoeggl A, Trattinig S, Standhardt H, Dietrich W, Reddy M, et al. Microsurgical management of postoperative disc space infection. *Neurosurg Rev.* 2003;26:102–7.
2. Hamdan TA. Postoperative disc space infection after discectomy: A report on thirty-five patients. *Int Orthop.* 2012;36:445–50.
3. Popping DM, Zahn PK, Van Aken HK, Dasch B, Boche R, Pogatzki-Zahn EM. Effectiveness and safety of postoperative pain management: a survey of 18925 consecutive patients between 1998 and 2006 (2nd revision): a database analysis of prospectively raised data. *Br J of Anaesth.* 2008;101:832–40.
4. Mackenzie AR, Laing RB, Smith CC, Kaar GF, Smith FW. Spinal epidural abscess: the importance of early diagnosis and treatment. *J Neurol Neurosurg Psychiatry.* 1998;65:209-12.
5. Grewal S, Hocking G, Wildsmith JA. Epidural abscesses. *Br J of Anaesth.* 2006;96:292-302.
6. Adam D, Papacocea T, Hornea I, Croitoru R. Postoperative spondylodiscitis, A review of 24 consecutive patients. *Chirurgia.* 2014;109:90-4.
7. Hogan BV, Peter MB, Shenoy HG, Horgan K, Hughes TA. Surgery induced immunosuppression. *Surgeon.* 2011;9:38-43.
8. Cheung WY, Luk KD. Pyogenic spondylitis. *Int Orthop.* 2012;36:397–404.
9. Yang H, Wang R, Luo T, Ouyang Y, Lv F, Xia L, et al. MRI manifestations and differentiated diagnosis of

postoperative spinal complications. J Huazhong Univ Sci Technolog Med Sci. 2009;29:522-6.

imaging in differentiating degenerative and infectious end plate changes. Radiol Oncol. 2010;44:97-102.

10. Oztekin O, Calli C, Kitis O, Adibelli ZH, Eren CS, Apaydin M, et al. Reliability of diffusion weighted MR

Yazışma Adresi / Address for Correspondence:

Dr. Sermin Tok
Baskent University Faculty of Medicine
Adana Teaching and Medical Research Center
Department of Radiology
ADANA
E-mail: sermintok@hotmail.com

Geliş tarihi/Received on : 20.05.2015

Kabul tarihi/Accepted on: 22.06.2015