

Multi-access for the Diagnosis of Missed Upper Lumbar Disc Herniation

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Herein, a case of missed upper lumbar disc herniation, diagnosed by thorough neurological examination, digital infrared thermographic imaging(DITI), and repeated magnetic resonance(MR) image study, is reported. A 36-year-old female presented with intractable leg pain on left anterior thigh. Although she underwent lumbar MR image at other hospital, she was misdiagnosed as acute sprain. Neurological examination suggested the possibility of upper lumbar disc herniation, which was confirmed by DITI, MRI, and selective root block. After operation, her leg pain was significantly improved. It should be considered that upper lumbar disc herniation might be misdiagnosed as an acute sprain, as in our case. A high index of suspicion based on thorough neurological examination is most important in such cases. Then, multi-access such as DITI, MR image, and selective block, base on thorough neurological examination, are warranted.

KEY WORDS : Upper lumbar disc herniation · Neurologic examination · Digital infrared thermographic imaging(DITI).

Introduction

Upper lumbar disc herniation is rare in young adults, but its incidence increases with increasing age⁷⁾. Unlike lower lumbar disc herniation, it is difficult to diagnose the level of upper lumbar disc herniation based solely on clinical symptoms and signs^{1,6,10,11)}. Herein, a patient with lumbar disc herniation at L2-3, misdiagnosed with an acute sprain, is reported. After thorough neurological examination, we suspected the presence of upper lumbar disc herniation. Because digital infrared thermographic imaging(DITI) also suggested the presence of upper lumbar disc herniation, we performed magnetic resonance(MR) image again, which confirmed the diagnosis of upper lumbar disc herniation along with selective root block. After operation, her leg pain improved significantly.

The importance of multi-access, based on thorough neurological examination, for the diagnosis of missed upper lumbar disc herniation will be discussed.

Case Report

A 36-year-old female presented with intractable left buttock and leg pain of 8days duration. Because of the severe

pain, she had not been able to sleep and walk for 8days. She underwent lumbar MR image at other hospital, but this revealed only disc degeneration at L4-5 with no lesion that could cause such severe buttock and leg pain (Fig. 1). Under the diagnosis of an acute sprain, she underwent epidural block twice at the L4-5 level at other hospital. However, after the epidural block, her pain was not improved at all, so she was transferred to our hospital.

On admission, she could not walk because of severe leg pain. On neurological examination, she complained of left buttock pain and left leg pain in her antero-lateral thigh above the knee. She showed no Lasegue's sign or motor weakness. Knee jerk was decreased on the left side. She did not show any pathologic reflex. The Visual Analogue Scale(VAS) scores for back and leg pains were 8 and 10points, respectively. Therefore, the possibility of upper lumbar disc herniation was assumed. The initial MR image was reviewed by the radiologist (one of the authors, Kim HS), but he could not definitely diagnose any disc herniation because of poor image quality of the MRI. Therefore, it was decided to perform DITI.

DITI revealed the clue for the presence of upper lumbar disc herniation : Body temperature was decreased at the left anterior thigh. The difference of body temperature at the

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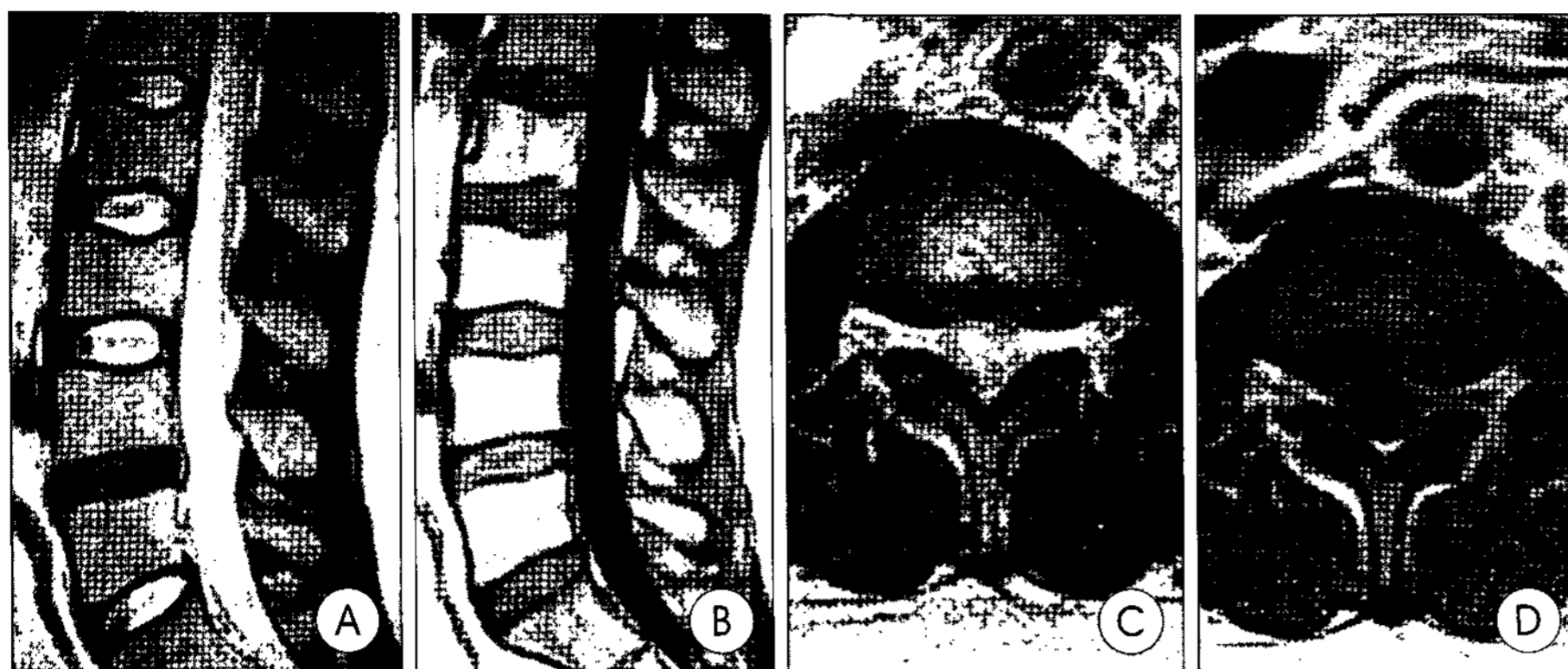


Fig. 1. Sagittal (A, B) and axial (C, D) magnetic resonance(MR) images. we could not definitely diagnose any disc herniation because of poor image quality of the MR image.

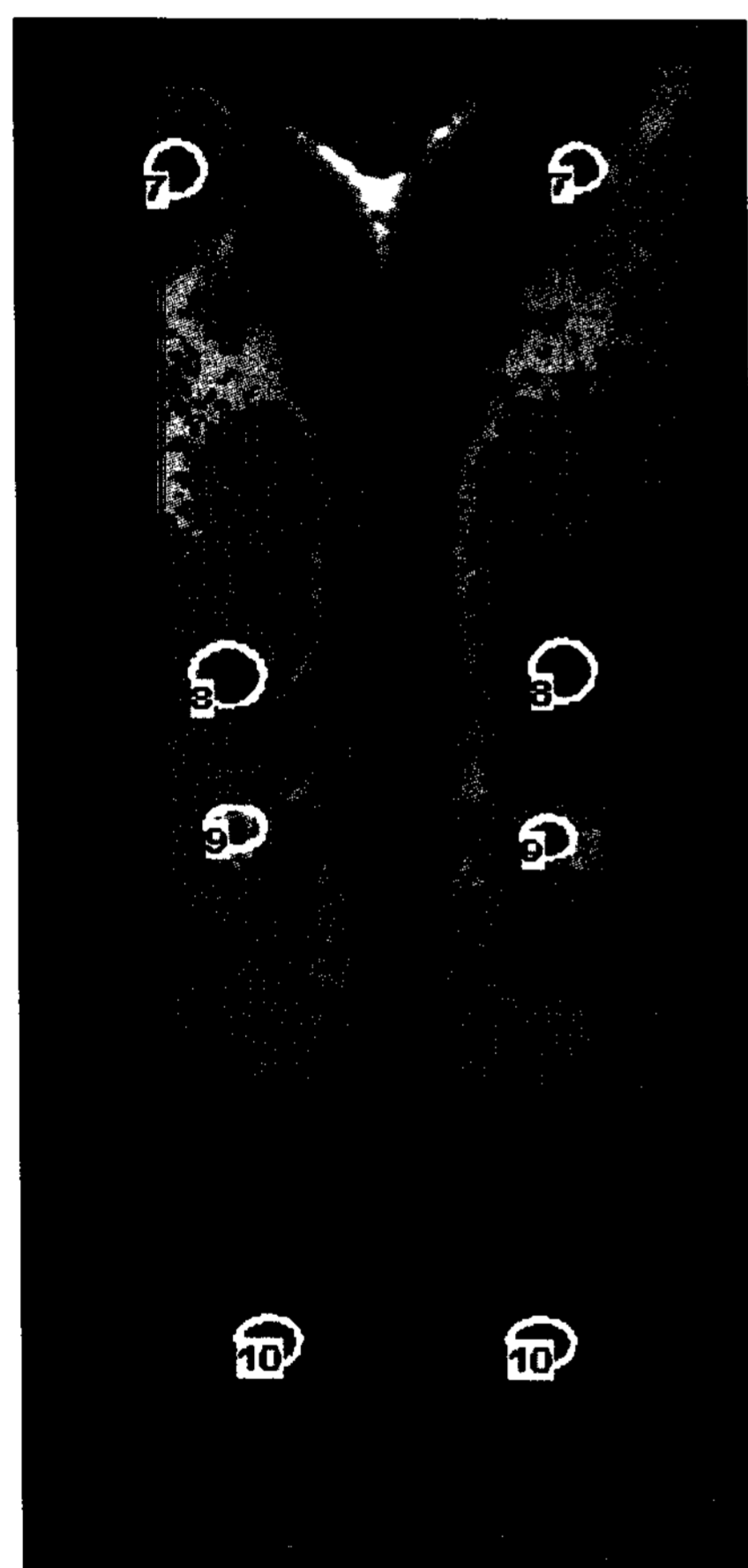


Fig. 2. Digital infrared thermographic image showing decreased temperature at the left anterior thigh. The difference of body temperature at the anterior thigh is 0.57°C (right side 25.45°C, left side 24.88°C).

acute onset of her leg pain, a lumbar disc herniation with upward migration at L2-3, was suspected. Before the operation, diagnostic transforaminal root block was performed on the left at the L2-3 level. After selective injection of 1cc of lidocaine, her pain improved dramatically. A posterior discectomy was performed via a partial hemi-laminectomy.

anterior thigh was 0.57°C (right side 25.45°C, left side 24.88°C) (Fig. 2). Therefore we performed MRI again. On MR image, a suspicious epidural mass lesion at the L2-3 level was found. The lesion was hypo-intense in T2-weighted images and iso-intense in T1-weighted images. The lesion compressed the dural sac on the left side (Fig. 3A, B, C). She then underwent MR image with gadolinium enhancement, which revealed a peripheral rim enhancing mass lesion at L2-3 (Fig. 3D).

Considering the

tions at the L1-2 and L2-3 levels, and may precipitate the development of abnormal spinal dynamics that lead to upper lumbar disc herniations¹¹⁾. Our previous study showed similar results; upper lumbar disc herniation (L2-3 or L3-4) is rare in young adults, with its incidence increases with increasing age⁷⁾. The typical clinical presentation of upper lumbar disc herniation is usually anterior thigh and/or groin pains. Patients with an upper lumbar disc herniation usually show normal straight-leg raising, whereas the femoral stretch test is positive in 84 to 94% of patients^{3,4,8)}.

Because of narrow upper lumbar canal, a single disc herniation at upper lumbar level can contact multiple roots²⁾. Most patients with upper lumbar disc herniation show ill-defined polyradiculopathies rather than clear mononeuropathies¹¹⁾. Therefore, preoperative symptoms and signs of upper lumbar disc herniation are highly variable¹⁾. This is why it is difficult to diagnose the level of the upper lumbar disc herniation based solely on clinical symptoms and signs^{1,6,10,11)}. Concerning radiographic studies of upper lumbar disc herniation, high false-negative rate was found for radiographic studies (CT, myelogram, MR image) when considered individually¹⁾. Therefore, when upper lumbar disc herniation is suspected after neurologic examination, multi-access is needed to confirm the diagnosis. Albert et al. recommended myelogram with post-myelogram CT and/or MR image in the work up of patients with upper lumbar disc herniation¹⁾.

In this case, the diagnosis of a L2-3 disc herniation was difficult. Because of poor image quality of initial MRI taken at other hospital, we could not definitely diagnose disc protrusion at the L2-3 level. However, because the patient still complained of intractable anterior thigh pain after epidural block, further radiological evaluation, such as MR image with gadolinium enhancement or myelogram should have been considered. However, electromyography(EMG) might have been less valuable in this case. First, as we mentioned, unlike patients with lumbar disc herniation at the L4-5 or L5-S1

After the laminectomy, the sequestered disc was easily found and removed with a blunt hook and pituitary forceps.

After the operation, the leg was improved significantly. The VAS scores of back and leg pains 2days after the operation were 3 and 1point, respectively.

Discussion

Age is one of the factors in the pathogenesis of disc hernia-

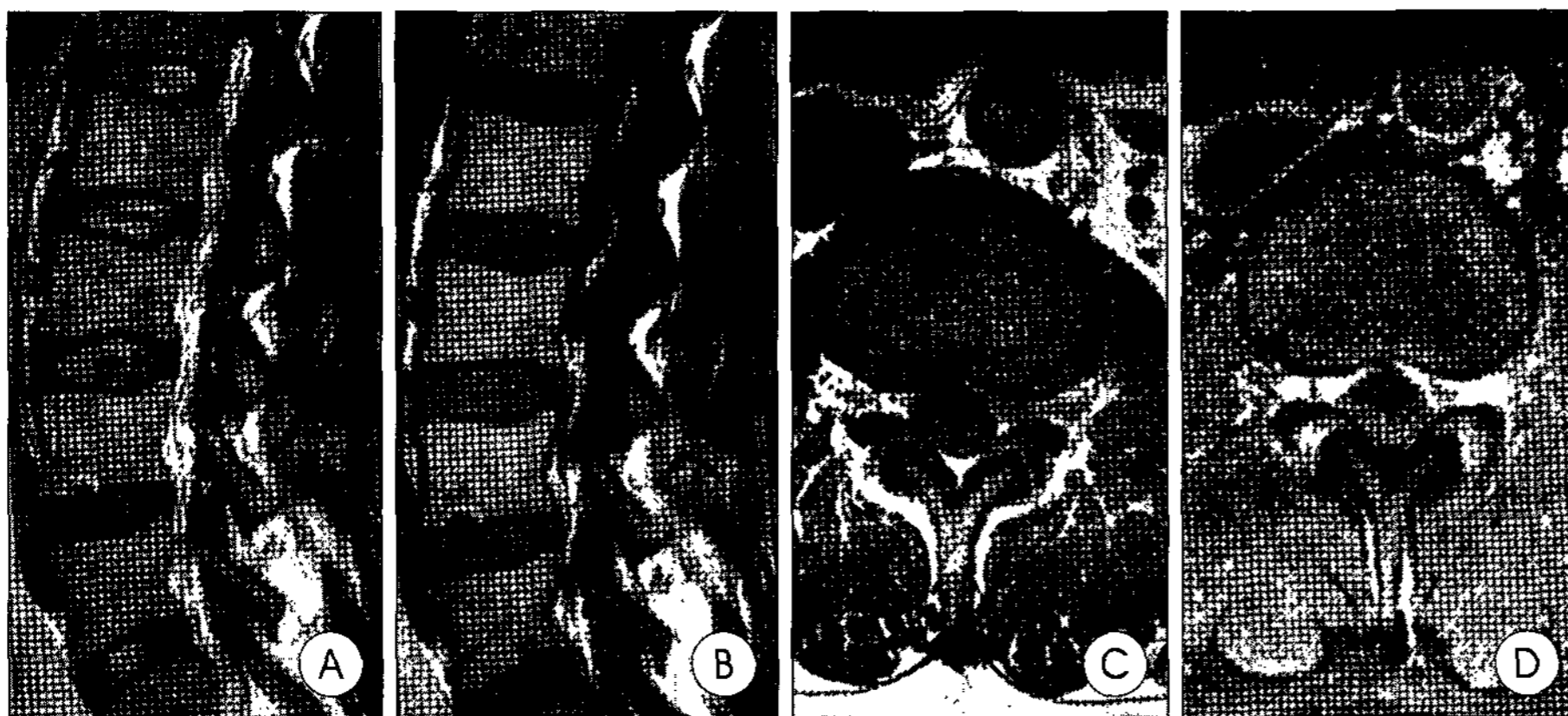


Fig. 3. Magnetic resonance image showing an epidural mass lesion compressing the dural sac at L2-3 (A-C). With gadolinium enhancement and fat suppression, a peripheral rim enhancing lesion is noted on the left side at the L2-3 level (D).

level, who show clear monoradiculopathy, most patients with an upper lumbar disc herniation usually show ill-defined polyradiculopathies⁸⁾. Significant cross-innervation between the spinal nerves in the upper lumbar region might explain this phenomenon¹⁾. Second, Denervation potential might not appear on EMG until 10 days after development of lumbar disc herniation. Therefore, EMG might have not diagnosed acute radiculopathy of this patient⁹⁾.

Rather, DITI might provide more clues for the presence of missed upper lumbar disc herniation than EMG like our case. When nerve root is compressed by disc herniation, because of stimulation of primary dorsal ramus of spinal nerve, body temperature at lumbar area is increased. Blood-flow in affected leg is decreased simultaneously due to stimulation of sympathetic nerve, which results in decreased body temperature along the affected dermatome⁵⁾. Takahashi et al. reported that thermal deficit should be considered an independent sign of lumbar radiculopathy and symptomatic severity of lumbar radiculopathy might be assessed by measuring the magnitude of thermal deficit in affected limb¹²⁾. Unlike EMG or myelography, DITI is not a painful and invasive procedure and can be easily performed in outpatient department. In this case, because the patient suffered from intractable pain of 8 days duration, regardless of epidural block, it was thought that there must be a lesion causing such severe pain. Therefore, the thorough neurological examination and radiological examinations were performed again. Several clues were then found for the presence of the upper lumbar disc herniation. First, she complained of severe left leg pain on the antero-lateral thigh above knee and there was no leg pain on lateral side below knee. Furthermore, although she complained of severe leg pain, she showed no Lasegue's sign at all. Second, on DITI, her body temperature was decreased on the left anterior thigh. Third, MRI with gadolinium enhancement confirmed the lesion was located at the L2-3 level. Last, with selective diagnostic root block, via

a transforaminal approach, pain was confirmed to have originated from the lesion at the L2-3 level.

It should be considered that upper lumbar disc herniation might be misdiagnosed as an acute sprain, as in our case. A high index of suspicion based on thorough neurological examination is most important in such cases. Then, multi-access such as DITI, MR image, and selective block, based on thorough neurological examination, are warranted.

Conclusion

It should be considered that upper lumbar disc herniation might be misdiagnosed as an acute sprain, as in our case. A high index of suspicion based on thorough neurological examination is most important in such cases. Then, multi-access such as DITI, MR image, and selective block, based on thorough neurological examination, are warranted.

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