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# Staphylococcal Discitis L3-L4: Early Diagnosis and Treatment with Favorable Result — A Case Report

Chui-Lee Wong, Tzung-Chien Wang\*

A 60 year-old male patient who presented with lumbago, fever, local tenderness over lumbar spine and associated with paravertebral muscle spasm, was prescribed antibiotic therapy 12 days after the onset of initial symptom under the impression of septic lumbar discitis, which was then verified by MRI and microbiology within one week after admission. Early diagnosis and adequate antibiotic therapy gained a favorable result, although the patient needed anterior interbody fusion for symptomatic retrolisthesis of L3 on L4 at the sixth week after admission.

**Key words:** discitis, septic, lumbar

## INTRODUCTION

Adult septic discitis is difficult to diagnose [1-5], causing considerable delay in initiating appropriate treatment, which may contribute to the poor outcome frequently noted in adults [2]. Here reported an early diagnosed and antibiotic treated case with a favorable result.

## CASE REPORT

A 60 year-old male patient, who underwent subtotal gastrectomy and B-II anastomosis because of duodenal ulcer bleeding 3 years ago, felt sudden onset of mild low back pain after a trivial twisting of his waist. Three days later, the patient received cupuncture legs in other hospital because of aggravation of lumbago. Local injection at low back was given on the next day. Another 3 days later, the patient had fever up to 38.5°C. When the patient was sent to ES, local tenderness over lumbar spine

and spasm of bilateral paravertebral muscles were noted. The patient needed assistance in walking because of lumbago and radiating pain to both thighs. There was no apparent weakness of lower limbs by MMT. The patient did not have sphincter disturbance. He was admitted under the impression of spinal infection.

Initial white blood count was  $7.61 \times 10^3/\mu\text{L}$  with neutrophilia 94%. ESR was 57 and 100 mm at the first and the second hours, respectively. In the following week, the maximal WBC was  $19.92 \times 10^3/\mu\text{L}$ , and ESR 115. Blood and urine cultures grew *Staphylococcus aureus*. The colony count of urine culture was 65000/ml. CSF culture did not yield organism. Plain X-ray of L-S spine showed spur formation at L2, 3 and 4 vertebrae, and minimal retrolisthesis of L3 on L4 (Fig. 1-a). Myelography revealed anterior epidural mass lesion at the level of L2 to L4 (Fig. 2). CT myelography showed obliteration of around the vertebral bodies and erosion of the ver-

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tebral end plates in addition to anterior extrathecal sac lesion (Fig. 3). MRI demonstrated reduced height of the L3-L4 IVD with peripheral extension of the disc material and a marked epidural lesion along dorsal aspect of L2 to L4 levels. Multiple enhancing shadows over bilateral psoas muscles at the same levels were noted on Gd-T1W image (Fig. 4). Serial studies confirmed the diagnosis of L3-L4 discitis with epidural abscess formation and paravertebral inflammation.

The patient was placed on complete bed rest and analgesics. Fever did not appear the next day after admission. Intravenous injection of Oxacilline Sodium 1 gm. every 6 hours and Gentamycin Sulfate 40 mg. every 8 hours were prescribed three days after admission. One week later, Oxacilline Sodium was continued and increased to 1 gm. every 4 hours, and Gentamycin Sulfate was discontinued basing on the result of blood culture and biosensitivity test. The patient got improvement of lumbago. Unfortunately, marginal ulcer with bleeding happened in the following week, and then resection of the bled marginal ulcer and B-II anastomosis were done (two weeks after admission).

Ten days after GI surgery, the patient began to sit with a corset applied on. Then he walked with minimal support from care giver as tolerated. Three days later, he complained of intermittent shooting pain radiating from buttocks to both thighs while walking. The symptom became progressive in the following days. There was neither knocking tenderness over the lumbar spine nor weakness of lower limbs by MMT. Plain X-ray of L-S spine showed markedly decreased in height of L3-L4 IVD, mild destruction of the inferior part of L3 body and superior part of L4 body, and progressive retrolisthesis of L3 on L4 (Fig. 1-b). MRI follow up revealed absence of the intranuclear cleft and linear appearance of the L3-L4 IVD, and increased enhancement of the epidural lesion and the psoas muscles as compared with previous MRI (Fig. 5). It suggested organization of the inflammatory tissues as corre-

lated with the clinical improvement. ESR was 64. WBC was  $5.76 \times 10^3/\mu\text{L}$ .

In the sixth week after admission, anterior interbody fusion of L3-L4 via retroperitoneal approach was done under the impression of symptomatic retrolisthesis. Friable intervertebral disc L3-L4, end plates of adjacent vertebrae and longitudinal ligaments at the same level were noted at operation. The patient was then strictly placed on complete bed rest after operation. Culture of the L3-L4 disc material and the tip of drain tube did not yield organism. After a course of 8 weeks, Oxacilline Sodium was discontinued. ESR was 48 at that time. The patient was discharged after hospitalization for 11 weeks. Active exercise of all limbs on lying position as home program was instructed, and complete bed rest was emphasized.

Three months after operation, the patient could walk independently. Neither lumbago nor sciatica was complained. ESR was 11 and 31 mm at the first and the second hours, respectively. Plain X-ray of L-S spine followed up 3 months and 7 months after operation, respectively, revealed that the bone graft was taken (Fig. 1-c, d).

## DISCUSSION

Septic discitis implies a primary suppurative process involving the metaphyseal region of two adjoining vertebrae and the corresponding disc resulting from hematogenous, invasion or contamination by pathogenic organisms [2,3].

Urinary tract infection and instrumentation are the two most common primary sources of vertebral spine infection. Soft tissue infection, respiratory tract infection, intravenous drug abuse, spinal surgery and infected iv sites are other probable sources of infection. However, 37% of a total of 207 patients reviewed by Sapico had no obvious source of infection [6]. *Staphylococcus aureus* and *E. Coli* were the most common causative organisms [3,7], but a variety of offending organisms have been

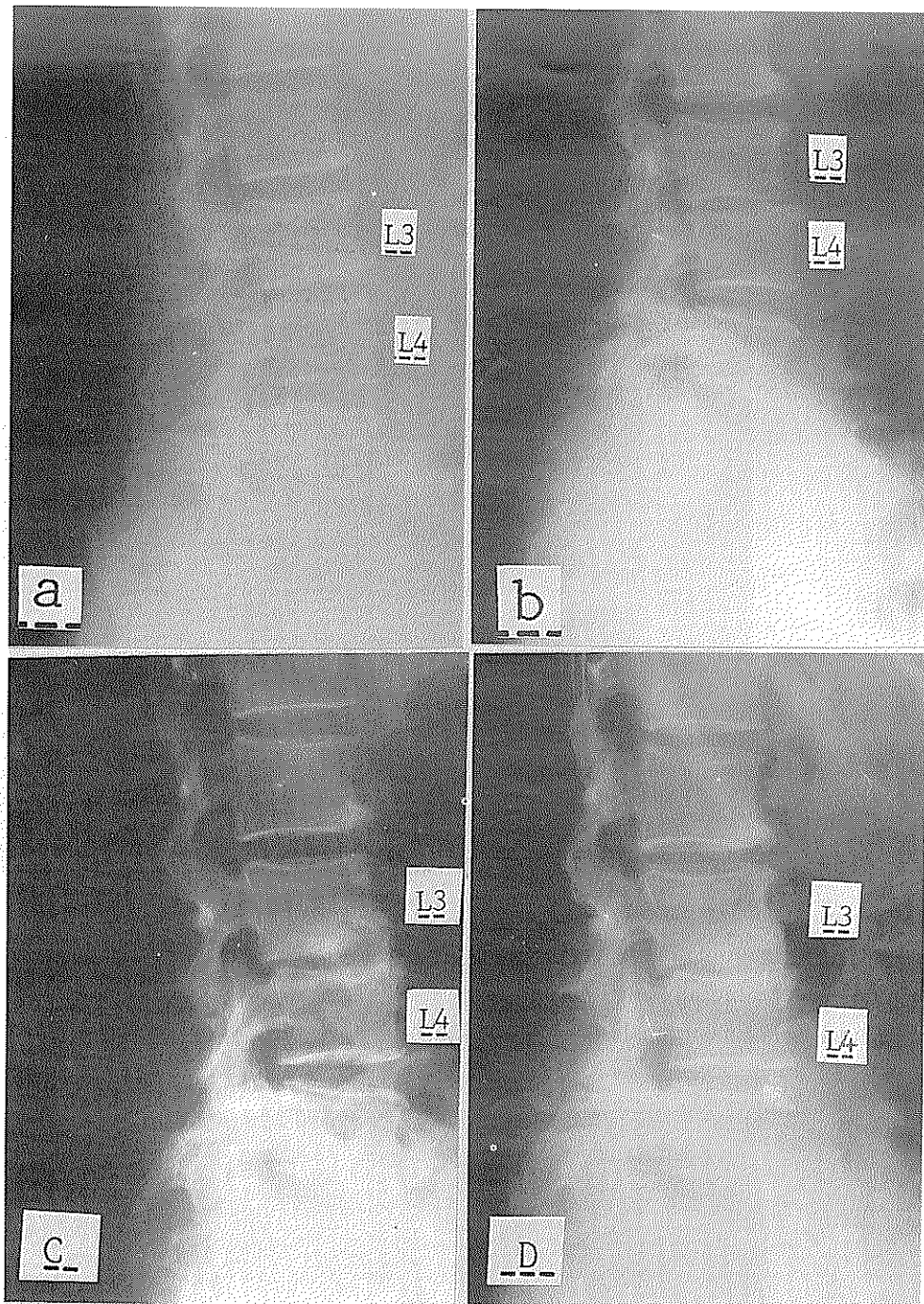


Fig. 1. Plain X-ray films of L-S spine. (a): spur formation at L2, 3 and 4 vertebrae, and minimal retrolisthesis of L3 on L4. (b): marked narrowing of L3-L4 IVD, blurring of the cortex of the adjacent end plates, and progressive retrolisthesis of L3 on L4. (c) and (d): bone graft being taken (followed up 3 months and 7 months after operation, respectively.)

implicated [6].

Ratcliffe has explained the pathogenesis and radiological features of adult spinal infection. In the adult vertebrae the metaphyseal arteries are endarteries and when impacted by a septic throm-

bus, contributing a wedge-shaped area of bone to be destroyed. The thrombus extends proximally into narrow metaphyseal anastomosis and spreads around the anastomosis, obstructing the origin of other metaphyseal arteries as well as the origins of the pri-

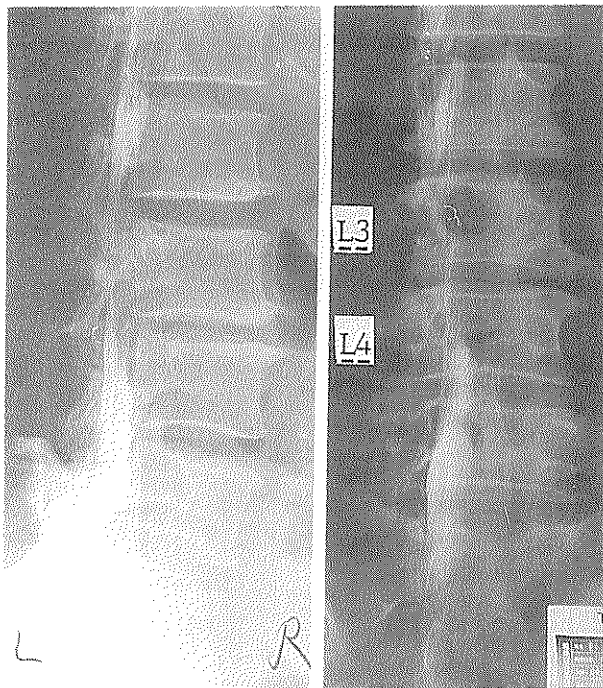


Fig. 2. Myelography (lateral and oblique views) showing anterior epidural mass lesion at the levels of L2 to L4.

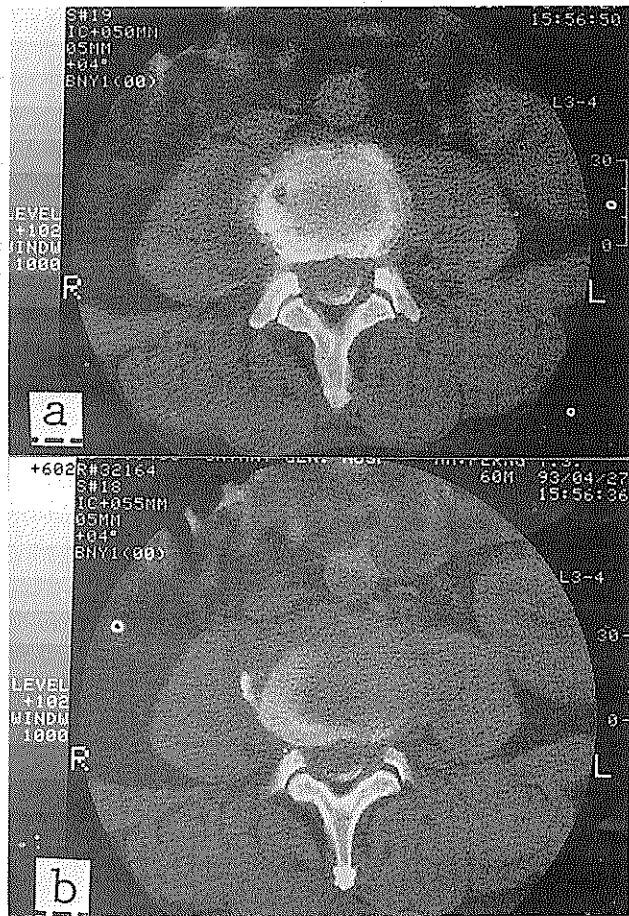


Fig. 3. CT myelography revealing erosion of the vertebral end plates (a), in addition to anterior extrathecal sac lesion and obliteration of the fat plane around the vertebral body (a, b).

mary and secondary periosteal and peripheral intraosseous arteries, resulting in widespread superficial destruction. The spreading septic thrombosis may cross the disc space in the adventitial arteries to involve the metaphyseal anastomosis of the ad-

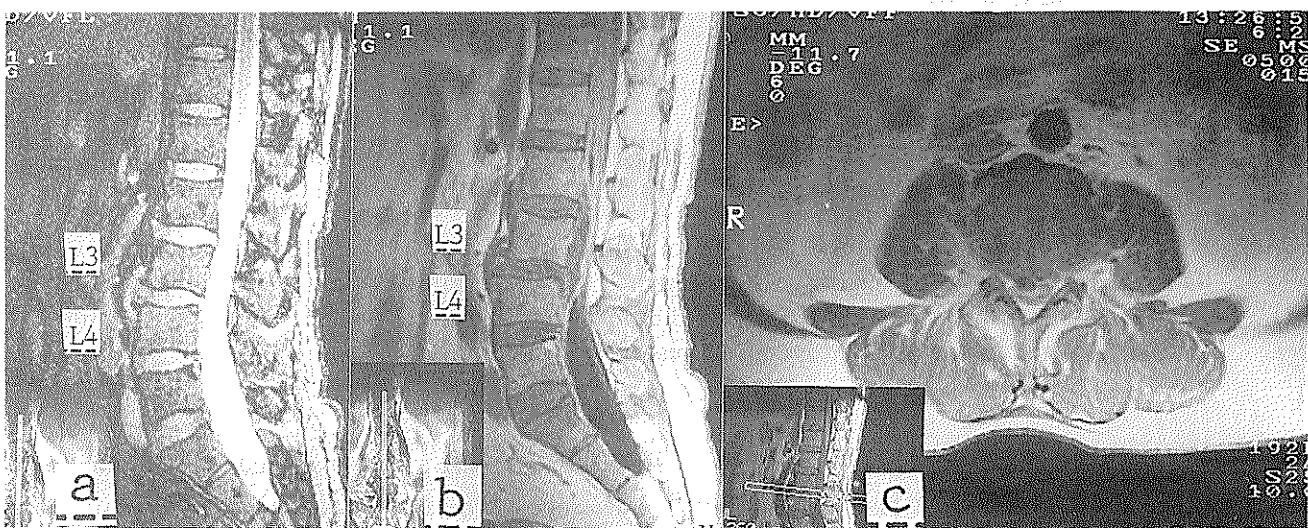


Fig. 4. MRI of L-S spine at admission. (a): sagittal T2\*WI showing decreased in height of L3-L4 IVD with peripheral extension of the disc material. (b): epidural lesion from L2 to L4 on Gd-T1WI. (c): axial Gd-T1WI showing poorly-defined enhanced shadows over bilateral psoas muscles.



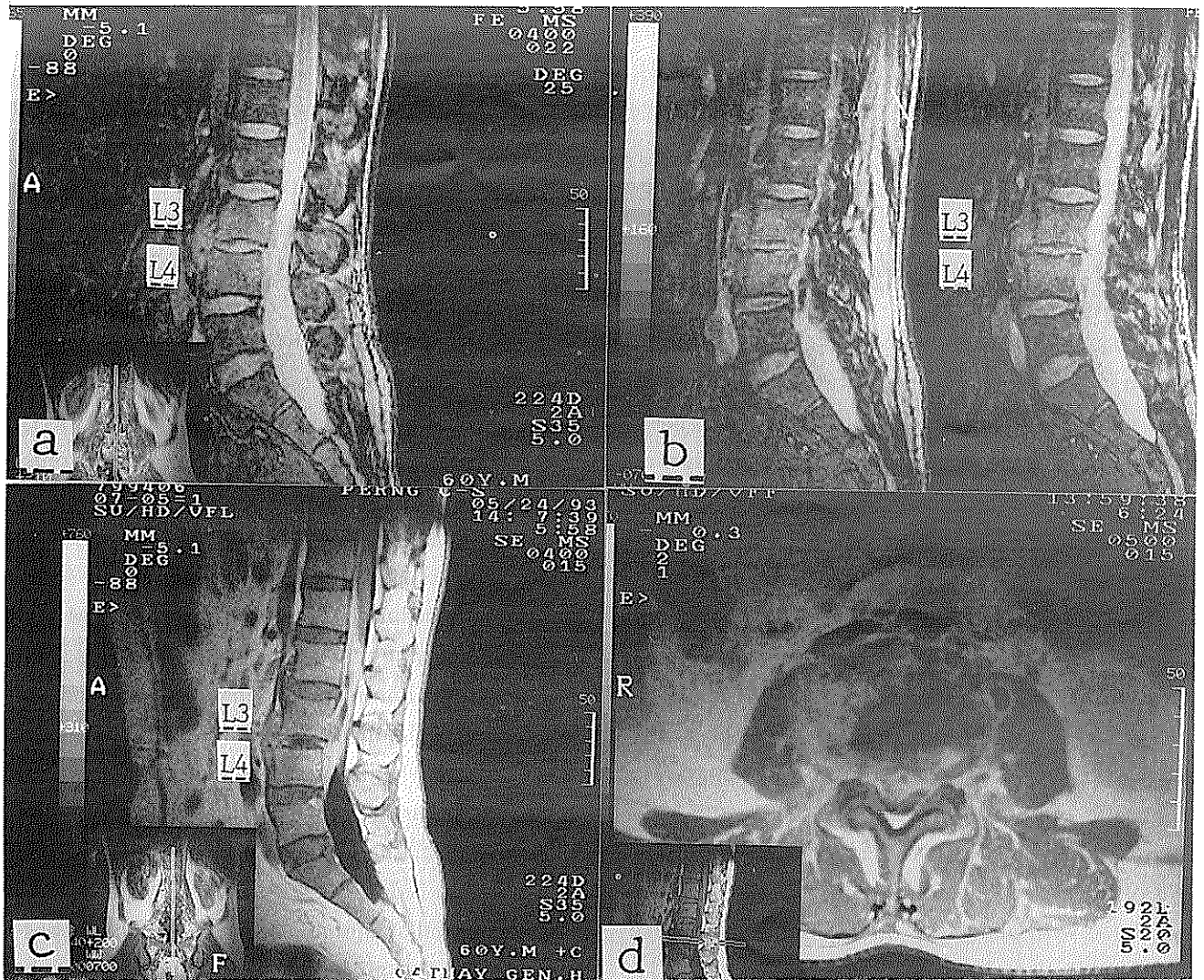


Fig. 5. MRI of L-S spine one month after admission. (a, b): Sagittal T2\*WI showing absence of intranuclear cleft and linear appearance of the L3-L4 IVD and increased signal intensity of L3 and L4 bodies. (c, d): increased enhancement of the epidural lesion and psoas muscles on sagittal and axial Gd-T1WI as compared with fig. 4-b, c.

adjacent vertebral body. The blood flow in the segmental artery and main intraosseous branches is faster, washing away the septic embolus. The equatorial region of the vertebral body is thus spared [8].

McCain reviewed the clinical and laboratory findings in 15 patients with septic discitis, and noted an average interval of 14 weeks between symptom presentation and diagnosis. Low grade fever and chills developed in less than half of the reviewed cases. Point tenderness over the affected area with associated paravertebral tenderness was the most

useful clinical signs. ESR was the most useful diagnostic laboratory test which was elevated at presentation in all patients. The complete blood cell count was usually normal. The serum alkaline phosphatase was occasionally elevated [3].

Roentgenograms are of no value in early localization of the involved interspace [1]. The earliest radiological sign is narrowing of the affected intervertebral space, which may be noted during the first three months. It is followed by progressive sclerosis of the subchondral bone. The third radiological features is progressive irregularity (erosion) of

the adjacent vertebral plates. Circumferential bone bridging may appear at attempted healing [2]. Nielsen described the roentgenologic course of 111 patients of postoperative discitis, and noted that the mean time from operation to the first radiologic lesion was 2 months (range 10 days to 9 months), and to the first radiological sign of healing 5.5 months (rangs 1 month to 2 years) [9]. Bone scans were valuable in making the diagnosis of septic discitis in cases when plain radiographs and CT scans were negative. The scintigraphic criteria for discitis was increased uptake in the vertebral bodies or on either side of the affected disc space together with increased blood pool activity [10]. The CT findings in the discitis patients were: (1) anterior paravertebral soft tissue swelling with obliteration of the fat plane around the vertebral body, (2) fragmentation or erosion of the vertebral end plates, and (3) paravertebral fluid collection (abscess). When all three (1, 2, 3) occur, the CT finding are diagnostic of discitis. In those patients with only (3) or both (1) and (2), the CT scan can be suggestive of discitis in the proper clinical setting when correlated with plain film findings; however, these findings are also observed in other conditions [11]. In MRI, there is a sharp decrease in the bony signal in T1W images and a considerably more intense signal in T2W images [12,13]. Abnormal configuration, either a streaky linear appearance or absence of the intranuclear cleft, was reported by Modic in his study [13].

Needle aspiration and biopsy or open operation may be indicated as the ultimate diagnostic procedure in cases with inconclusive clinical, radiographic and imaging investigations. These procedures may also provide the material for bacterial culture to guide the selection of the appropriate antibiotics for continued treatment [5,6,7,14-17].

Bacterial isolations isolates were considered significant when cultured from the spine itself, from an abscess adjacent to bone, from the blood or from any combination of these sites in conjunction with

a characteristic clinical picture [6].

Treatment methods are controversial. Most authors suggest bed rest and antibiotics treatment [2,3,7,14-22], but the choice of antibiotics should reflect the results of culture and sensitivity studies. It seems prudent to administer antibiotics for 6 to 8 weeks [16,21,22]. Besides, back pain, local tenderness, and ESR can be used to determine the length of parenteral therapy [3,20,22]. Surgical treatment is reserved for paravertebral abscess, epidural abscess, spinal cord compression, extensive vertebral destruction, spinal instability or recurrence of infection [2,3,5-7,16].

In the case presented, fever and severe lumbago with associated paravertebral muscle spasm aroused the suspicion of spinal infection. Myelography, CT myelography and MRI demonstrated the features of L3-L4 discitis, epidural abscess and paravertebral inflammatory process. Blood culture yielding *Staphylococcus aureus* indirectly confirmed the septic nature. The patient was placed on complete bed rest. Intravenous antibiotic therapy was administered 3 days after admission (12 days after onset of initial symptom). One week later, lumbago subsided. Although there was coexisting epidural abscess, clearance of infectious tissue and decompression surgery were not performed as the patient did show good response to the antibiotic therapy. Lumbago improved markedly, and there is no apparent cauda equina syndrome. After antibiotic therapy for a course of one month, ESR value dropped to nearly one-half of the previous maximal value.

As symptomatic retrolisthesis developed subsequently, anterior interbody fusion with bone graft was done for stabilizing the spine. In spite of early diagnosis and initiation of appropriate antibiotic therapy, instability of the spine was still can not be avoided. So adequate bed rest or immobilization of the spine with brace until the appearance of radiographic sign of healing (either bony bridging or fusion) may be necessary.

Septic discitis per se was considered to be well

controlled at the time of interbody fusion (the sixth week after admission), since the culture of the disc material and the tip of drain tube did not yield any organism. Besides, clinical symptoms and signs, and laboratory tests showed improvement.

Although the patient had no obvious primary infection site, acupuncture at legs or local injection at low back was reasonably considered as a probable route of infection.

A high index of suspicion, awareness of characteristic clinical findings (elevated ESR, severe lumbago and point tenderness with associated paravertebral muscle spasm) [3], and the use of recently available MRI study should lead to early diagnosis and appropriate treatment.

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### 第三、四腰椎膿毒性椎間盤炎—病例報告

黃翠莉 王宗前\*

一位60歲男性患者因下背疼痛三天而在第四、五天分別接受兩下肢針灸及下背局部軟組織藥物注射。再過三天，患者發燒，下背疼痛加劇，且疼痛放射至兩下肢。腰椎有壓痛感，脊柱旁肌呈痙攣。脊髓造影、斷層掃描及磁振影像掃描顯第三、四腰椎膿毒性椎間盤炎、前側硬膜上膿腫及脊柱旁組織發炎。血液培養出金黃色葡萄球菌。經由及早診斷與八週的靜脈注射抗生素治療，症狀改善。

在住院第六週，因第三、四脊椎滑脫症而施予腰

椎體融合術。手術後，經過三個月的臥床休息，患者可行走，也無下背或下肢疼痛的現象。

在臨床上，對於合併發燒、紅血球沉降速率升高、嚴重的局部腰椎壓痛感及脊柱旁肌痙攣的下背疼痛患者，應高度警覺毒性椎間盤炎的可能性，同時利用磁振影像掃描，可及早診斷並給予適當的治療，以期達到好的治療效果。

本病例雖然無原發性病竈，但下肢針灸或下背局部軟組織藥物注射可能為其細菌感染的途徑。