

Vertebral discitis caused by *Lactobacillus* infection

Ichiro Tsukamoto, Terumasa Ikeda and Masao Akagi

Department of Orthopaedic Surgery, Kinki University Faculty of Medicine,
Osakasayama, Osaka 589-8511, Japan

Abstract

We presented the case of a 79-year-old man who complained of severe back pain and lower leg muscular weakness. He was a compromised host with type 2 diabetes and had been administered many antibiotics, including vancomycin and antibiotic-resistant *Lactobacillus* preparation for cholangitis and aspiration pneumonia. MRI scans revealed prevertebral fluid collection and vertebral discitis between third and fourth lumbar vertebrae (L3/4) and L4/5. We performed X-ray guided needle aspiration

and lavage in the discs of L3/4 and L4/5. Only *Lactobacillus* sp. was isolated from the transparent fluids and the lavage fluids. C-reactive protein became negative within 17 days after the lavage. Muscle strength in the lower legs also recovered to manual muscle testing grade 5 in a month. This case showed that compromised hosts should be considered to be a risk for *Lactobacillus* infections in orthopedics.

Key words : *Lactobacillus* ; Vertebral discitis

Manuscript

1. Introduction

The most common causative organism of vertebral discitis is *Staphylococcus aureus*.¹ *Staphylococcus epidermidis* has also been recorded as a causative organism, along with *Group A Streptococcus*, *Group B Streptococcus*, *Haemophilus influenzae*, *Enterococcus*, *Pseudomonas aeruginosa*, and *Escherichia coli*.¹ Additionally, in compromised patients, fungus and avirulent organisms are also able to be causative organisms of vertebral discitis.² However, *Lactobacillus* has been recorded as a causative organism of vertebral discitis following an esophageal rupture only once previously. Usually in orthopedics, avirulent organisms that may be causative are *M. bovis* and *P. aeruginosa*. In all regions of orthopedics, *Lactobacillus* had been recorded as a causative organism only once in the above-mentioned case. *Lactobacillus* is very rare causative organism in orthopedics.

2. Case Report

A 79-year-old man with a known history of type 2 diabetes mellitus was admitted to our

hospital to treat acute obstructive suppurative cholangitis following an intrahepatic bile duct carcinoma. *Enterococcus faecium* was isolated from his bile and blood culture. Immediately, antibiotic treatments with vancomycin, doripenem and sulbactam-cefoperazone combination were performed with an antibiotic-resistant *Lactobacillus* preparation. Three weeks later, he underwent partial hepatectomy to resect the carcinoma. Also, throughout the perioperative period, antibiotic treatment with vancomycin, doripenem and sulbactam-cefoperazone combination had been continued, along with antibiotic-resistant *Lactobacillus* preparation for 8 weeks. The postoperative course was good and the stump of the resected tissue contained no carcinoma cells, so adjuvant chemotherapy was not performed. However, 10 weeks after the surgery, he developed aspiration pneumonia. Because he had been already administered antibiotics, pathogenic bacteria were not isolated. Immediately, antibiotic treatment with vancomycin and sulbactam-cefoperazone combination with antibiotic-resistant *Lactobacillus* preparation was performed and was continued for 8

weeks. Fortunately, the aspiration pneumonia was cured. However, a week after recovering from aspiration pneumonia, he acutely complained of severe back pain accompanied with leg paresis. His muscle strength was reduced to manual muscle testing (MMT) grade 2-3 in the proximal side of both legs and MMT 3-4 in the distal side of his legs. He did not complain of sensory disturbance or bladder and rectal disturbance. His blood investigations revealed increments of white blood cells (WBC, 7100/ μ l; neutrophils 78.1%) and C-reactive protein (CRP, 5.6 mg/dl). X-ray images showed erosion of vertebral endplates at L3/4 (Fig. 1). MRI scans revealed prevertebral fluid collection and vertebral discitis at L3/4 and L4/5 (Fig. 2). We diagnosed him with vertebral discitis, and immediately performed X-ray guided aspiration. We punctured the discs at L3/4 and L4/5 with 21G needles (Fig. 3), and aspirated about 2 ml of yellow transparent fluid from each disc. After aspiration, we washed the discs with 1 liter of

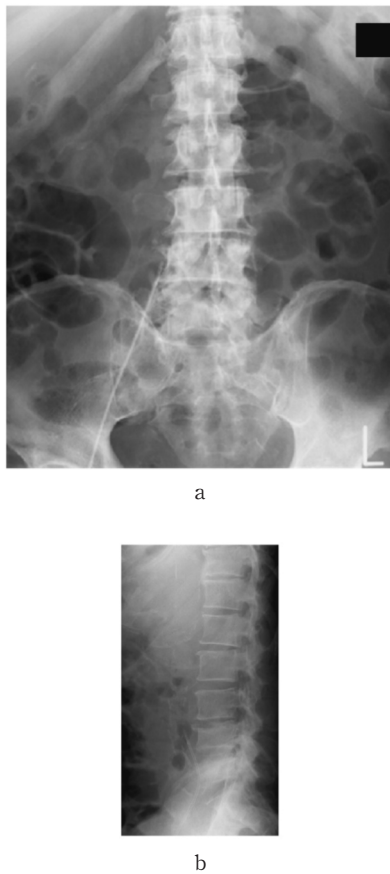


Fig. 1 Preoperative anteroposterior a) and lateral b) radiographs showing erosion of vertebral endplates at L3/4. The erosions were indicated with arrows.



a

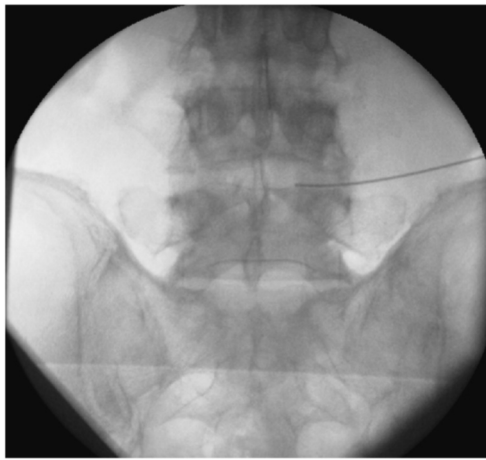


b

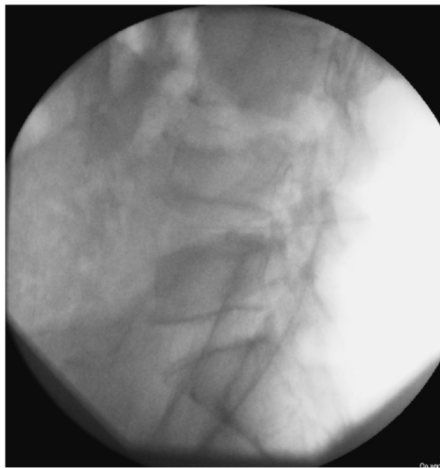


c

Fig. 2 Figure 2a-preoperative sagittal T2 weighted MR scan showing prevertebral collections at L5 and collections in disc at L3/4 and L4/5. Figure 2b-preoperative coaxial T2 weighted MR scan showing collection in disc and dural exclusion at L3/4. Figure 2c-preoperative coaxial T2 weighted MR scan showing collection in disc at L4/5. The collections were indicated with arrows.



a



b

Fig. 3 Intraoperative anteroposterior a) and lateral b) X-ray imaging showing 21G hollow needle was inserted into disc from posterior side.

physiological saline. We immediately submitted the aspirated fluid and lavage fluid to our laboratory for a culture test. Because the causative organism was unknown, we did not administer any antibiotics at this time. Although no antibiotics were administered after aspiration, his CRP fell to negative (CRP 0.2 mg/dl) 17 days after the lavage. His muscle strength also recovered to MMT grade 5 in a month. The culture test revealed that only *Lactobacillus* sp. was isolated from the aspirated fluid. One year after aspiration, discitis has not recurred.

3. Discussion

Lactobacillus is a Gram-positive facultative microaerophilic or anaerobic rod-shaped bacteria.² Its pathogenicity is weak and it is usually avirulent in healthy individuals. So *Lactobacillus* is often administered as a probiotic for anti-

biotics.^{3,4} However, in compromised hosts, sometimes it is pathogenic.⁵ A case of cervical epidural abscess and vertebral osteomyelitis was previously reported to have been caused by both *Lactobacillus* and *Candida*.⁶ However, the case followed an esophageal rupture. In that case, *Lactobacillus* was considered to have entered from the gastrointestinal tract through the perforation. However, in our case, the spine remained occlusive. It was not definite where the causative *Lactobacillus* sp. came from.

It is known that enteric bacteria are translocated into blood vessels.⁷ Additionally, most *Lactobacillus* species are intrinsically resistant to vancomycin.⁸ In our study, vancomycin and antibiotic-resistant *Lactobacillus* preparation had been administered together for 11 weeks. So, we had a hypothesis that the causative *Lactobacillus* sp. might be translocated from the intestine tract. In order to examine the hypothesis, we tried to investigate the isolated *Lactobacillus* sp. genetically. However, the isolated *Lactobacillus* sp. was annihilated during enrichment culture. We also could not perform an antimicrobial susceptibility test. Eventually, we could not determine the species, the details of drug resistance and genetically origin; it could not be revealed where the causative *Lactobacillus* sp. came from.

As a result of our experience, we suggest that *Lactobacillus* infections should be considered in compromised hosts, also in orthopedic infection.

Conflicts of interest

All authors declare no conflicts of interests. No benefits have been received or will be received in any form from a commercial party related indirectly or directly to our article.

References

- Butler JS, Shelly MJ, Timlin M, Powderly WG, et al. (2006) Nontuberculous pyogenic spinal infection in adults: a 12-year experience from a tertiary referral. *Spine* 31: 2695-2700
- Mackenzie AR, Laing RB, Smith CC, Kaar GF, et al. (1998) Spinal epidural abscess: the importance of early diagnosis and treatment. *J Neurol Neurosurg Psychiatry* 65: 209-212
- Barrons R, Tassone D. (2008) Use of *Lactobacillus* probiotics for bacterial genitourinary infections in women: a review. *Clin Ther* 30: 453-468
- Allen SJ, Wareham K, Wang D. (2013) *Lactobacilli*

- and bifidobacteria in the prevention of antibiotic-associated diarrhoea and *Clostridium difficile* diarrhoea in older inpatients (PLACIDE): a randomised, double-blind, placebo-controlled, multicentre trial. *Lancet* 382 : 1249–1257
5. Sussman JI, Baron EJ, Goldberg SM, Kaplan MH, et al. (1986) Clinical manifestations and therapy of *Lactobacillus* endocarditis : report of a case and review of the literature. *Rev Infect Dis* 8 : 771–776
 6. Metcalfe S, Morgan-Hough C. (2009) Cervical epidural abscess and vertebral osteomyelitis following non-traumatic oesophageal rupture : a case report and discussion. *Eur Spine J* 18 : 224–227
 7. Wiest R, Rath CH. (2003) Bacterial translocation in the gut. *Best Practice & Research Clinical Gastroenterology* 17 : 397–425
 8. Swenson JM, Facklam RR, Thornsberry C. (1990) Antimicrobial susceptibility of vancomycin-resistant *Leuconostoc*, *Pediococcus*, and *Lactobacillus* species. *Antimicrob Agents Chemother* 34 : 543–549