Discitis, Infectious Arthritis, and Bacterial Meningitis in a Patient with Pancreatic Diabetes

Satoshi Murao, Hitoshi Hosokawa, Yuka Hosokawa, Toshihiko Ishida and Jiro Takahara

A 63-year-old woman with pancreatic diabetes after a total pancreatectomy and splenectomy developed discitis of the L2/3 intervertebral disk. Rapidly she also developed infectious arthritis of the left knee joint and bacterial meningitis. Aspirate from the left knee contained Enterococcus faecalis. The diagnosis of discitis is generally difficult in the initial period of disease, and patients with diabetes or splenectomy are susceptible to rapid progression of the infection. Early diagnosis of discitis using magnetic resonance imaging of the spine and treatment with antibiotics might have altered her clinical course.


Key words: Batson’s plexus, spinal infection, magnetic resonance imaging

Introduction

The incidence of infections is disproportionately high in diabetic patients, and such infections result in complications and death more frequently than would be anticipated in healthy people (1). Although spinal infections are relatively rare today, diabetes mellitus is one of the predisposing factors to such infections (2, 3). The treatment of spinal infections has been facilitated with the use of antibiotics, but early diagnosis is still difficult. The majority of the patients with spinal infection were misdiagnosed during the initial period of their disease (4).

Case Report

A 63-year-old woman, who underwent pancreatectomy, splenectomy, subtotal gastrectomy and duodenectomy for pancreas cancer in 1987, had been under treatment with insulin and digestive enzymes. Her blood glucose level was well controlled, and the levels of hemoglobin A1c and C reactive protein (CRP) were 7.2% and 0.2 mg/dl, respectively, on March 7, 1991. She complained of lumbago and gait disturbance on March 18, 1991. On March 20, her body temperature was 38°C and her left knee was swollen. She visited a hospital, where she underwent fluid aspiration from her left knee. Oral antibiotics were administered. On April 10, she lost consciousness and was transferred from the hospital to Kagawa Medical School-Hospital with the diagnosis of bacterial meningitis.

On admission, she was comatose. Her temperature exceeded 38°C. Nuchal stiffness, bilateral Babinski’s reflex and marked edema of the extremities were noted. The laboratory examination disclosed leukocytosis, with a count of 41,400/µl, hemoglobin level of 10.5 g/dl, platelet count of 1.8×10⁴/µl, hemoglobin A1c of 8.2%, and blood glucose level of 408 mg/dl. The urinalysis revealed proteinuria (100 mg/dl), elevated counts of red blood cells and leukocytes, to 5–10/high power field (HPF) and 30^0/HPF, respectively, and the presence of bacteria in each HPF examined. The levels of CRP, fibrinogen, and fibrinogen degradation product were 8.5 mg/dl, 293 mg/dl, 13 µg/ml, respectively, and the antithrombin III was 48%, suggesting disseminated intravascular coagulation syndrome. The level of blood urea nitrogen and creatinine were increased to 81 mg/dl and 1.9 mg/dl, respectively. Examination of the cerebrospinal fluid revealed an elevated leukocyte count (1,920/µl), protein content of 1,800 mg/dl, decreased chloride concentration of 108 mmol/l, and glucose concentration of 157 mg/dl. Culture of the cerebrospinal fluid revealed no organism, but Enterococcus faecalis was found in the fluid aspirated from her left knee before she was transferred to our hospital. She was treated with benzylpenicillin and cefotaxim. She had a history
of frequent hemodialysis because of renal dysfunction. After one month of intensive chemotherapy, her consciousness level and general condition improved. On June 7, the leukocyte count in the cerebrospinal fluid had declined to 26/μl. She started rehabilitation in the middle of July, but she still complained of knee pain and lumbago and had a slight fever. X-rays of the left knee joint revealed lytic changes of the condyle. Aspirate of the left knee was purulent and the culture was positive for methicillin-resistant staphylococcus aureus. A diagnosis of chronic osteomyelitis was made. Magnetic resonance imaging (MRI) of the spine revealed discitis of the L2/3 intervertebral disc presenting low intensity on the T1-weighted image and high intensity on the T2-weighted image. It was enhanced with gadolinium (Fig. 1). Systemic administration of antibiotics and continuous drainage of the left knee joint were initiated. Although the inflammatory change in the left knee and the systemic signs of septicemia gradually subsided after continuous drainage of left knee joint for 2 weeks, her renal function and cardiac function gradually deteriorated. She died of congestive heart failure and renal failure on July 15, 1992.

Discussion

This patient had undergone pancreatectomy, splenectomy, subtotal gastrectomy and duodenectomy for pancreatic cancer. After pancreatectomy, her diabetes mellitus had been well controlled as indicated by the level of hemoglobin A1c. She developed infectious arthritis of the left knee joint and bacterial meningitis after initially complaining of lumbago and difficulty in walking. Discitis of the L2/3 intervertebral disc was diagnosed using MRI. Despite the treatment with antibiotics, the infectious arthritis of the left knee joint progressed to osteomyelitis. E. faecalis was cultured from the left knee, and this was presumably the causative organism of the discitis and meningitis by hematogenous spread.

The question arises of how this microorganism, which is part of the normal flora of the human intestine, caused discitis. It has been pointed out that there is a close relationship, via Batson's plexus, between the venous drainage of the urogenital tract and the spinal system (5, 6). A urinary tract infection in the pelvic space could disseminate directly to the lumbar spine via the spinal venous plexus, without passing through the systemic circulation. Such infections are more common in patients with diabetes mellitus than in nondiabetic patients (1, 7). Although E. faecalis is part of the normal flora of the human intestine and is not a common pathogen in otherwise healthy people, it can be a pathogenic organism, causing urinary tract infection in immunocompromised patients, such as those in the post-operative period or diabetic patients (8–11). Although urine culture was not done on this patient's admission, the results of urinalysis on admission were suggestive of urinary tract infection. A urinary tract infection with E. faecalis was probably the initial event. This organism has been reported to cause osteomyelitis in patients with diabetes mellitus (10, 11). The high incidence of lumbar spine infections in diabetic patients (3) could be related to their high incidence of urinary tract infection.

Usually the progress of discitis is insidious. However, in this patient, the dissemination of a series of infections was rapid. The possible factors contributing to this were her diabetes and impairment of the immune system resulting from splenectomy. Severe infections sometimes develop in splenectomized patients (12, 13). Although direct dissemination of the microor-
Discitis in a Diabetic Patient

Characterization of the cerebrospinal fluid from an infectious focus in the spine cannot be excluded, the rapid progression of the systemic infection could reflect impairment of the immune system.

The patient died despite antibiotic treatment. The outcome in this patient likely would not have been serious if the diagnosis of discitis were made early. However, early diagnosis of spinal infection presents many difficulties, and the initial diagnosis is accurate in only a small number of cases (4). Diagnosis in the initial phase is important, as the prognosis in patients with spinal infection depends on early diagnosis and selection of appropriate treatment (4). MRI is the imaging modality most useful in the detection of the early changes in spinal infections, while plain X-rays are inadequate (14). It is emphasized that the possibility of spinal infections should be considered in any diabetic patient who presents with lumbago even in the absence of any systemic sign of infection, and early diagnostic MRI examination should be performed to prevent the development of severe complications.

References