Severe Acute Cholangitis with Complications of Bacterial Meningitis Associated with Hearing Loss

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Abstract

We herein report a case of severe acute cholangitis complicated by bacterial meningitis. A 56-year-old Japanese man was admitted to our hospital due to a consciousness disorder that had developed while he was being treated for acute cholangitis. The levels of both hepatobiliary enzymes and inflammatory markers were high, and computed tomography revealed common bile duct stones and cholangiectasis. A diagnosis of acute cholangitis was made, and meningitis was subsequently confirmed on a cerebrospinal fluid analysis. The patient recovered successfully after receiving emergency endoscopic drainage and antibiotic therapy. This case demonstrates that a disturbance of consciousness complicated by acute cholangitis may result from septic encephalopathy as well as meningitis via bloodstream infections.

Key words: acute cholangitis, bacterial meningitis, hearing loss

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Introduction

Acute cholangitis and meningitis are infections with high mortality rates, and it is therefore crucial to appropriately diagnose and precisely treat the patient. Acute cholangitis may be complicated by dysfunction in various organs, the outcomes of which may be fatal. Consciousness disorders are one of the most serious life-threatening complications. Although the “Tokyo Guidelines 2013 (TG13): Updated Tokyo Guidelines for acute cholangitis and acute cholecystitis” classify acute cholangitis with organ dysfunction as severe, to our knowledge, there are no reports of acute cholangitis complicated by meningitis. We herein report a case of acute cholangitis complicated by bacterial meningitis associated with hearing loss due to a bloodstream infection.

Case Report

A 56-year-old Japanese man developed a fever and back pain that persisted for several days. He subsequently complained of hearing loss and a headache and was thus admitted to another hospital, where he was diagnosed as having acute cholangitis. However, he presented with a consciousness disorder after receiving intravenous antibiotics without obtaining culture results and was transferred to our hospital for emergency biliary drainage. He had a history of drug treatment for hypertension.

A physical examination performed on admission showed the patient to be febrile, with a temperature of 38.0°C, blood pressure of 144/92 mmHg and regular pulse rate of 92 beats per minute. His neck was severely rigid, and he demonstrated positive meningeal signs, including Kernig’s and Brudzinski’s signs. Although there was no muscle guarding or rebound tenderness, slight spontaneous pain was noted in the right hypochondrial region.

The laboratory data obtained on admission are shown in Table 1. Slight elevation of the serum transaminase activity with high levels of biliary enzymes and hyperbilirubinemia presenting with predominant conjugated bilirubin were remarkable on the liver function test. A peripheral blood analysis showed leukocytosis (25,900/μL) with neutrophilia...
Acute cholangitis is a clinical condition involving acute inflammation of the bile duct. This disorder may easily progress to serious and fatal infections, such as sepsis, when aggravated by extensive inflammation (1). The fatality rate has been reported to be 2.5-5.3% in recent years owing to the development of biliary tract drainage techniques, such as EST (2, 3); however, the fatality rate with conservative treatment is high at 83% (4). Bacterial meningitis, which is a neurological emergency, has an extremely poor prognosis without treatment, with an estimated mortality rate of 15-30% (5). It is therefore important to diagnose both meningitis and cholangitis at the early stage and treat each condition appropriately.

Physicians often encounter patients with acute cholangitis exhibiting consciousness disorders due to septic encephalopathy, reported in 7.2-9% of cholangitis patients (6, 7). Our patient was initially diagnosed as having severe acute cholangitis with a consciousness disorder. However, meningitis was suspected based on his head symptoms, including a headache, hearing loss, and meningeal irritation, and the diagnosis was confirmed according to a CSF analysis. In addition, the sequence of infection from acute cholangitis to sepsis to meningitis was suspected in this case based on the patient’s clinical course, which initially involved symptoms of meningitis, such as a headache and hearing loss. Furthermore, no bacteria were detected in the blood cultures, bile culture or spinal fluid culture. However, because antibiotics were administered for acute cholangitis in previous cases, with partial therapeutic effects, we also treated our patient with antibiotics. In cases of bacterial meningitis, the rate of bacterial identification prior to the administration of antibiotics has been reported to be 50-80% (8). However, this rate decreases to approximately 20% after treatment with antibiotics (9, 10).

Bacterial meningitis sometimes occurs after multiple organ infection, and it has been reported that 40% of patients with bacterial meningitis due to pneumococcus have otitis media, sinusitis and pneumonia (11, 12). However, to our knowledge, the onset of meningitis due to acute cholangitis

Table 1. Laboratory Data of the Patient on Admission.

| WBC   | 25.900/L | TP   | 6.7 g/dL |
|-------|----------|------|----------|
| Band  | 27.0%    | Alb  | 3.4 g/dL |
| Seg   | 63.0%    | T-Bil| 2.60 mg/dL |
| Eosino| 0.0%     | D-Bil| 1.72 mg/dL |
| Baso  | 0.0%     | AST  | 30 IU/L |
| Mono  | 5.0%     | ALT  | 73 IU/L |
| Lympho| 4.0%     | LDH  | 220 IU/L |
| RBC   | 4.81 × 10^{12}/L | ALP | 1,157 IU/L |
| Hb    | 14.7 g/dL | γ-GTP| 1,042 IU/L |
| Ht    | 41.2%    | AMY  | 24 IU/L |
| Phl   | 21.8 × 10^{11}/L | BUN | 15.7 mg/dL |
|       |          | Cre  | 0.79 mg/dL |
|       |          | Na   | 137 mmol/L |
|       |          | K    | 3.6 mmol/L |
|       |          | Cl   | 100 mmol/L |
|       |          | CRP  | 29.81 mg/dL |
|       |          | Procalcitonin | 6.37 mg/mL |
|       |          | PT   | 11.7 s |
|       |          | APTT | 25.1 s |
|       |          | Fibrinogen | 857 mg/dL |
|       |          | D-dimer | 2.2 μg/mL |
|       |          | FDP  | 8.0 μg/mL |

Table 2. Cerebrospinal Fluid Data of the Patient on Admission.

| Color          | Cloudy |
|----------------|--------|
| WBCs           | 636/mm³ |
| Polymorphonuclear | 86% |
| Glucose        | 1 mg/dL |
| Protein        | 928 mg/dL |

Discussion

After hospitalization, we regarded the cause of the patient's consciousness disorder as being meningitis rather than cholangitis based on the results of the physical examination. The patient was therefore diagnosed with bacterial meningitis and we started treatment with intravenous meropenem hydrate (MEPM; 4 g/day). An endoscopic nasobiliary drainage (ENBD) tube (7.5F Flexima ENBD Catheter, Boston Scientific, USA) was inserted to treat the acute cholangitis; the drainage consisted of dark brown bile owing to infection. Although excretion of this bile continued for a few days, the hepatobiliary enzyme levels improved immediately. Nevertheless, no improvements were noted in the inflammation, and antibiotic treatment for meningitis with tazobactam/piperacillin sodium (TAZ/PIPC; 13.5 g/day) was started in addition to MEPM after three days of hospitalization, which subsequently improved the inflammation. After 10 days of hospitalization, we performed endoscopic retrograde cholangiopancreatography (ERCP) (Fig. 2) and removed three common bile duct stones after endoscopic sphincterotomy (EST) (Fig. 3). Although the patient’s hearing loss remained, his condition recovered as a result of the accurate diagnosis and precise treatment.

Course after hospitalization

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Figure 1. Abdominal CT displaying dilated intrahepatic bile ducts, a high-density area in the common bile duct (arrowhead) and gallbladder stones.

Figure 2. Endoscopic retrograde cholangiopancreatography displaying three stones in the dilated common bile duct.

Figure 3. A photograph of the common bile duct after the removal of the three stones via endoscopic sphincterotomy.

has not been previously reported. Hence, this case is thought to be extremely rare.

Sequelae of bacterial meningitis have been reported to include hearing loss, deafness, convulsions, hydrocephalus, spastic paralysis, cranial nerve palsies and visual disturbances (13). Hearing loss, which involves sensorineural deafness that is often irreversible, is the most common adverse effect, observed in 14% of patients (14). Although the administration of steroids for bacterial meningitis in adults has been shown to reduce mortality and the incidence of sequelae (15), our patient was not treated with steroids due to the severe acute cholangitis.

We herein encountered a patient with acute cholangitis complicated by bacterial meningitis that required emergency treatment. The patient’s life was saved due to the accurate diagnosis and precise treatment. To our knowledge, there are no previous reports of acute cholangitis complicated by bacterial meningitis resulting from a bloodstream infection. This case demonstrates that consciousness disorders complicated by acute cholangitis may be caused by septic encephalopathy as well as meningitis via bloodstream infections.

The authors state that they have no Conflict of Interest (COI).

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