Case Report

Invasive group B streptococcal infection in a patient with post splenectomy for hypersplenism secondary to liver cirrhosis and portal hypertension

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BACKGROUND: Splenectomy in patients with liver cirrhosis (LC) is expected to become more common owing to its efficacy on portal hemodynamics. In this report we describe an alarming case of group B streptococcus (GBS) infection after splenectomy in a patient with LC.

METHODS: A 72-year-old woman with a history of LC was admitted to our emergency department because of respiratory failure. The patient had received left lateral segmentectomy of the liver and splenectomy three months before admission. Pulmonary examination revealed significant wheezing during inspiration and expiration, but no crackles and stridor. Chest radiography and CT showed no infiltrates. A presumptive diagnosis of bronchial asthma caused by upper respiratory infection was made. Four days after admission, GBS infection was confirmed by blood culture and penicillin G was administered. Antibiotics were given intravenously for a total of 12 days.

RESULTS: The patient was discharged on the 12th day after admission.

CONCLUSIONS: Although efficacy of splenectomy in patients with LC has been reported, immune status should be evaluated for a longer period. Patients who have undergone splenectomy are highly susceptible to bacteria; moreover, LC itself is an independent risk factor for mortality in patients with sepsis. Since prophylaxis against GBS has not been established, immediate action should be taken. Emergency physicians should be aware of invasive GBS infection in the context of the critical risk factors related to splenectomy and LC, particularly the expected increase of splenectomy performed in LC patients.

KEY WORDS: Group B streptococcal infection; Splenectomy; Liver cirrhosis

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INTRODUCTION

The efficacy of splenectomy on portal hemodynamics has been found in patients with liver cirrhosis (LC).^[1] Hence the number of LC patients undergoing splenectomy will increase in the near future.

Patients in a hyposplenic state or undergoing splenectomy are highly susceptible to bacteria such as group B streptococcus (GBS) and may develop an overwhelming post-splenectomy infection (OPSI).^[2] Once OPSI develops, the mortality rate of patients

will be as high as 38%–69% despite aggressive critical care.^[3] Immunologically, as LC itself is an independent risk factor for mortality in sepsis,^[4] patients who have to undergo splenectomy with LC are considered at critical risk. Moreover, prophylaxis against GBS including vaccination and prophylactic antibiotics has not been established.^[5]

This report is to describe an alarming case of invasive GBS infection in a patient after splenectomy for hypersplenism secondary to LC and portal hypertension

and highlight the need for immediate action against the possible increase of infection in this type of patients.

CASE REPORT

A 72-year-old woman with a history of splenectomy for hypersplenism secondary to liver cirrhosis and portal hypertension was admitted to our emergency department after respiratory failure. Three months before her admission, a left lateral segmentectomy of the liver for recurrent hepatocellular carcinoma and splenectomy for hypersplenism secondary to LC and portal hypertension were performed at another hospital. Four hours before presentation, the patient experienced a sudden onset of dyspnea while she was asleep. On admission, her body temperature was 38.5 °C, blood pressure 190/100 mmHg, pulse rate 120/minute, respiratory rate 30/minute, and oxygen saturation rate 98% (10 L of oxygen by face mask). Pulmonary examination revealed significant wheezing during inspiration and expiration, but no crackles and stridors. Chest radiography and computed tomography (CT) showed no infiltrates. A presumptive diagnosis of bronchial asthma caused by upper respiratory infection was made, and the patient was treated with inhaled short-acting β_2 -agonist, intravenous methylprednisolone, ampicillin sulbactam (ABPC/STB), and non-invasive mechanical ventilation. Two hours later, she experienced symptom improvement, although she developed hypotension (80/46 mmHg) and sinus tachycardia. Fluid resuscitation, norepinephrine, and vancomycin (VCM) were initiated (Figure 1). Her condition stabilized and norepinephrine was gradually tapered off. Four days after admission, GBS infection was confirmed by blood culture. No obvious focus

of infection was detectable. ABPC/STB and VCM were discontinued and penicillin G was administered. Antibiotics were intravenously administered for a total of 12 days. The patient was discharged on the 12th day after admission. Vaccinations against OPSI were scheduled at the outpatient clinic of another hospital.

DISCUSSION

In our case, although the patient with LC developed invasive GBS infection after splenectomy, a favorable outcome was obtained with appropriate management.

There is a significant increase of GBS infection in adults in contrast to a reduction of the infection in neonates and pregnant women, concomitant to an increase in elderly patients.^[6] Underlying conditions such as diabetes mellitus, followed by malignancy, renal failure, and LC have been identified as risk factors for GBS infection.^[6] Moreover, a study^[7] showed that LC is the highest risk factor for developing invasive GBS infections.

Among organisms that induce fatal sepsis post splenectomy, *Streptococcus pneumoniae* is the most common, followed by *Haemophilus influenzae* type b and *Neisseria meningitidis*.^[8] OPSI is characterized by high mortality despite patients being aggressively treated according to the "Surviving Sepsis Campaign" guidelines.^[9] A prevention strategy with vaccination is fundamental for patients who have undergone splenectomy or have hyposplenism. According to the current guidelines, vaccination for *S. pneumoniae*,^[10] *H. influenzae* type b,^[11] and *N. meningitidis*^[12] is recommended in patients with asplenia or splenic hypofunction aged over 5 years.^[5] Although the current

Figure 1. Hospital course. NA: noradrenaline; NPPV: non-invasive positive pressure ventilation.

case also received vaccinations, a significant question pertaining to *S. pneumoniae*, *H. influenzae* type b, *N. meningitides*, and GBS is whether prevention by vaccination can be achieved in clinical practice.

In the absence of commercially available GBS vaccines, physicians should be aware of the increase of potential GBS infection risk related to splenectomy in LC patients. Moreover, prophylactic antibiotics against GBS have not been discussed in the guidelines.^[5]

Although the efficacy of splenectomy in LC patients was proven, the side effect of splenectomy on the immune status has not yet been thoroughly evaluated.^[1] The side effects of splenectomy in LC patients, who are mainly focused on, include bleeding requiring resurgery, postoperative bleeding, and liver functions.^[13] However, immune status during a longer observational period should be evaluated and indications for splenectomy should be carefully assessed while judging the risk of severe infection.

Our patient developed GBS bacteremia without a clear source, and the primary bacteremia comprised 40% of invasive GBS cases.^[14] Most GBS infections in adults have no distinctive features that would lead the physicians to strongly suspect GBS infection. In the current case, we could only confirm the GBS infection once the GBS was isolated in cultures. Therefore, physicians must perform a detailed examination of host risk factors.

In conclusion, although efficacy of splenectomy in LC patients was proven, the side effect of splenectomy on the immune status during a longer observational period should be evaluated.

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