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Case Report
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A case of neuroleptic malignant syndrome following cardiac surgery

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ABSTRACT

Neuroleptic malignant syndrome (NMS) is rare but sometimes causes life-threatening conditions. We report the case of a 53-year-old male patient who developed NMS following cardiac surgery. He was diagnosed with schizophrenia and prescribed blonanserin, chlorpromazine, and biperiden. From postoperative day 3, hyperthermia, disturbed consciousness, and involuntary movement were observed. Subsequently, his serum creatine phosphokinase (CPK) levels increased. After NMS was suspected, chlorpromazine and biperiden were stopped. From postoperative day 7, intravenous administration of dantrolene was initiated. Following this treatment, his serum CPK levels gradually decreased, and the other symptoms improved. The treatment of NMS remains controversial. There is no evidence that dantrolene is effective for treating NMS; however, it may be one of the important options for treating NMS. We present the case and discuss the diagnosis and management of NMS following cardiac surgery.

Key words: *Neuroleptic malignant syndrome; cardiac surgery, dantrolene*

Introduction

Neuroleptic malignant syndrome (NMS) is rare but sometimes causes life-threatening conditions. Its main symptoms are hyperthermia, muscular rigidity, disturbance of consciousness, and hypoxemia in addition to extrapyramidal symptoms. Several researchers have reported NMS after cardiac surgery [1-3]; however, the number of reports is small. We present a case and discuss the diagnosis and management of NMS following cardiac surgery.

Case Report

A 53-year-old man was admitted to our hospital with congestive heart failure and a history of myocardial infarction. He was diagnosed with schizophrenia and prescribed 8 mg/day blonanserin, 25 mg/day chlorpromazine, and 1 mg/day biperiden. After the congestive heart failure had improved, detailed examination was performed. Cardiac catheterization revealed the following: the left anterior descending coronary artery (LAD) had 99% stenosis, the left circumflex artery (LCx) had 90% stenosis, and the proximal right coronary artery was 100% occluded. Echocardiogram showed left ventricular global hypokinesis with an ejection fraction of 39%, and moderate ischemic mitral valve regurgitation.

The patient underwent coronary artery bypass grafting and mitral valve annuloplasty with cardiopulmonary bypass (CPB). The left internal mammary ar-

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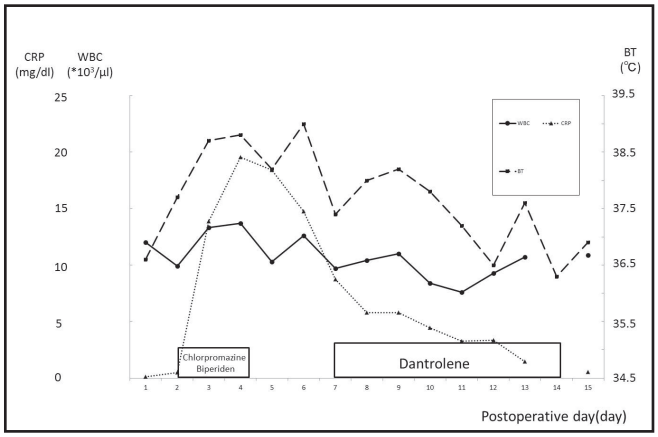

Figure 1. The postoperative change in body temperature, WBC counts, and CRP.

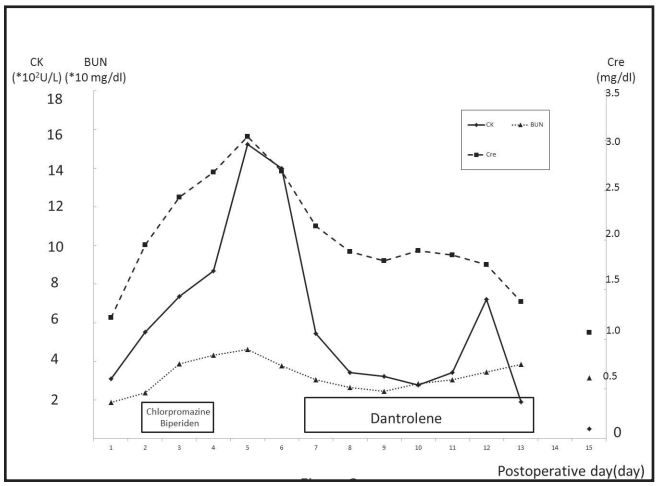

Figure 2. Postoperative changes in the levels of serum CPK, serum creatinine, and serum BUN.

tery was anastomosed to the LAD, and the right internal mammary artery was anastomosed to diagonal branche of the LAD. Saphenous vein grafts were anastomosed to the posterolateral branch of the LCx, the posterior descending artery, and the AV node of the right coronary artery. Mitral annuloplasty was performed using a semi-rigid mitral annuloplasty ring. The total CPB time was 183 min, and the total operation time was 427 min.

On the day of the operation, the patient was awake and had been confirmed to have no paralysis. The oxygenation was poor; therefore, he required highly concentrated oxygen. Chlorpromazine and biperiden were then administered via a feeding tube on postoperative day (POD) 2. However, from POD 3, hyperthermia, disturbed consciousness, and involuntary movement were observed. His body temperature increased to over 39°C, and his white blood cell (WBC) counts and C-reactive protein (CRP) were also increased. Ventilator-associated pneumonia was suspected, and 4 g/day cefepime was started. On POD 4, his serum creatine phosphokinase (CPK) levels increased again. At the same time, his renal function worsened, and his serum levels of creatinine and blood urea nitrogen (BUN) were elevated to 3.04 and 46.2 mg/dl, respectively. At this point, NMS was suspected, and chlorpromazine and biperiden were stopped immediately. On POD 5, his serum CPK levels peaked; however, hyperthermia disturbed consciousness, and involuntary movement continued. From POD 7 onwards, treatment was initiated with intravenous administration of 60 mg dantrolene on the first day and 40 mg/day dantrolene thereafter. Following this treatment, his serum CPK levels gradually decreased, his body temperature returned to the normal range, and his consciousness improved. The postoperative course is shown in Figure 1 and Figure 2. On POD 11, he was weaned off ventilation. The patient showed significant improvement with no sequelae of NMS.

Discussion

The incidence of NMS has been variably reported as 0.07%–2.2% in patients receiving neuroleptics [4]. Several symptoms have been suggested to aid in the diagnosis of NMS [5]. The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR) states that the main symptoms of NMS are hyperthermia and muscle rigidity. In addition, the minor symptoms of NMS are diaphoresis, tremor, dysphagia, altered consciousness, incontinence, mutism, elevated blood pressure, tachycardia, leukocytosis, and CPK elevation. However, there have been several reports of atypical NMS that reported NMS without hyperthermia or muscular rigidity [1,6,7].

For patients who have undergone cardiac surgery, the symptoms are more complicated. After cardiac surgery, patients often have high fever, elevated CPK levels, and tachycardia. When these symptoms appear, cardiac surgeons suspect infection, perioperative myocardial infarction, and hypovolemia. In the case of cerebral complications, disturbances of consciousness, tremor, or paralysis often occur. Therefore, it is more difficult to diagnose NMS after cardiac surgery than in other situations.

The precise mechanisms responsible for NMS remain controversial. Thus, the treatment for NMS also remains controversial. Pelonero and colleagues recommended that supportive care should be initiated, and if

the patient's condition does not improve, or worsens, additional pharmacological interventions should be considered [5]. Lieberman and colleagues [8] reported a case of successful treatment of NMS with bromocriptine after open-heart surgery. In addition, Mieno and colleagues [3] reported NMS following cardiac surgery that was treated with dantrolene. Bromocriptine is administered orally, whereas dantrolene can be administered by intravenous bolus. In addition, dantrolene does not have severe side effects, although it occasionally causes drug-induced hepatitis. In the present case, the patient had been rapidly deteriorating from POD 3 onwards. Therefore, we decided to administer dantrolene and expected an early effect.

However, there is another opinion about dantrolene. Reulbach and colleagues reviewed 271 NMS case reports and compared the treatments [9]. They divided the subjects according to therapy into four groups: dantrolene monotherapy, dantrolene with additive medication, other medication, and supportive therapy only. They reported that treatment of NMS with dantrolene monotherapy appeared to be associated with a higher mortality rate. Therefore, there is no evidence that dantrolene is effective in treating NMS; however, it may be one of the important options for treating NMS.

Conclusion

The incidence of NMS following cardiac surgery is rare but sometimes causes life-threatening conditions. NMS following cardiac surgery exhibits manifold symptoms; therefore, immediate treatments are crucial when NMS is suspected.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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