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Medicine

A Case of Cardiac Arrest Due to Multiorgan Failure, Including Myocardial Injury Caused by *Flavonifractor plautii*

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Abstract **Case Report**

A 55-year-old man with obesity and hypertension had been experiencing symptoms such as loss of appetite, constipation, and vomiting for several days. A colleague found him with his face down on his desk and not breathing. He was transported to our hospital, but he could not obtain return of circulation. Various test results revealed sepsis associated with ileus, leading to multi-organ failure accompanied by myocardial injury. Blood culture results were positive for *Flavonifractor plautii*. There have been no previous reports of cases in which *Flavonifractor plautii* caused myocardial damage or of patients transported to a hospital in cardiac arrest.

Keywords: *Flavonifractor plautii*; cardiac arrest; myocardial damage.

Text

Flavonifractor (F) plautii is an anaerobic microorganism belonging to the order Clostridiales and is a component of the human gut microbiota. It is a Gram-positive bacillus. Although it is widely present in the gut, *F. plautii* is rarely isolated from human clinical specimens [1]. The clinical symptoms associated with infection by this bacterium remain poorly understood [1]. We report a case of a patient who was transported to our hospital following cardiac arrest due to multi-organ failure, including myocardial dysfunction, and in whom *F. plautii* was detected in a blood culture.

A 55-year-old man, who had been diagnosed with obesity, hypertension, and dyslipidemia during a routine health checkup but had neglected to seek treatment, had been experiencing symptoms such as loss of appetite, constipation, and vomiting for several days but had not sought medical care. On the morning of his visit to our hospital, he reported feeling even worse but went to work anyway. He exhibited abnormalities such as being unable to recall the names of his subordinates and forgetting what he had just said. Around 1:00 PM, he was still able to converse, but by the afternoon, he had fallen asleep snoring. At approximately 2:40 PM, a colleague discovered the patient with his face down on his desk and not breathing, prompting a call to 119. When he was placed in the supine position, a large amount of black vomit was expelled from his mouth. An on-site electrocardiogram (ECG) upon the arrival of the emergency medical team showed asystole. He exhibited trismus, and was transported to the hospital receiving only chest compressions and rescue breathing. Upon arrival, the patient was in cardiac arrest with dilated pupils; the initial ECG showed asystole. Due to trismus, advanced cardiac life support, including cricothyroidotomy, was performed; however, cardiac arrest could not be reversed. Venous blood gas analysis results showed pH 6.90, $PC0_2$ 88 mmHg, $HC0_3^-$ 17 mmol/L, base excess -17 mmol/L, and lactate 12.7 mmol/L, indicating mixed acidosis. Autopsy imaging revealed cardiac enlargement, bilateral diffuse pulmonary edema, pericardial effusion, pleural and abdominal effusions, and massive fluid accumulation in the stomach, esophagus, small intestine, and large intestine, indicating ileus (**Figure 1**). Blood tests revealed elevated inflammatory markers, hypoglycemia, rhabdomyolysis, abnormally high troponin levels, abnormally high brain natriuretic peptide levels, renal failure, liver dysfunction, coagulation disorders, and electrolyte imbalances (**Table 1**). Based on these findings, the cause of death was determined to be multiple organ failure, including myocardial damage due to sepsis. Blood culture results were positive for *F. plautii.*

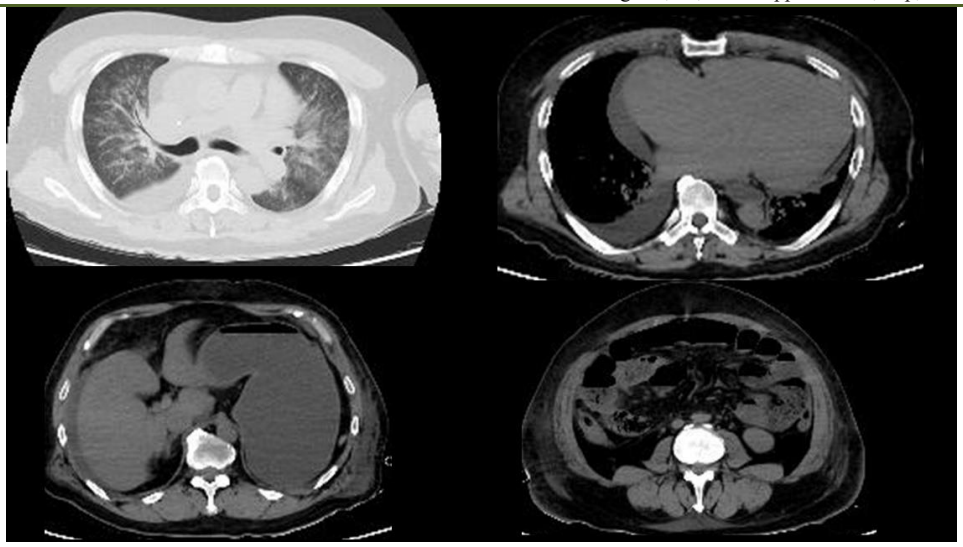

Figure 1: Autopsy imaging

The imaging revealed cardiac enlargement, bilateral diffuse pulmonary edema, pericardial effusion, pleural and abdominal effusions, and massive fluid accumulation in the stomach, esophagus, small intestine, and large intestine, indicating ileus.

Table 1: Results of blood examination on arrival

Variables	Level	Unit
White blood cell count	14,800	/μL
Hemoglobin (Hb)	15.6	g/dL
Platelets	134,000	/μL
Total protein	4.4	g/dL
Albumin	2.3	g/dL
Total bilirubin	2.8	mg/dL
Aspartate aminotransferase	316	U/L
Alanine aminotransferase	148	U/L
Gamma-glutamyl transpeptidase	51	U/L
Alkaline phosphatase	69	U/L
Lactate dehydrogenase	933	U/L
Glucose	13	mg/dL
Blood urea nitrogen	46.2	mg/dL
Creatinine	3.27	mg/dL
Creatine kinase	12,745	U/L
Amylase	154	U/L
Troponin	14,681 (< 34.2)	U/L
Brain natriuretic peptide	>2,902 (< 18.4)	pg/mL
Ammonia	315 (<79)	μg/dL
Sodium	148	mmol/L
Potassium	9.5	mmol/L
C-reactive protein	14.6	mg/dL
Prothrombin time	39.7 (12.5)	second
Activated partial thromboplastin time	41.6 (29.5)	second
Fibrinogen	351	mg/dL
Fibrinogen degradation product	29.1	μg/mL

* The values in parentheses are the normal range.

This was a case of a patient who was transported to the hospital following cardiac arrest due to multiorgan failure, including myocardial injury, and in whom *F. plautii* was detected in a blood culture. To our knowledge, there have been no previous reports of cases in which *F. plautii* caused myocardial injury or of patients transported to the hospital following cardiac arrest; this is the first such report.

Kvernberg *et al.,* have compiled a report on 11 cases of sepsis caused by *F. plautii*. According to this report, the patients were primarily middle-aged and elderly, ranging in age from 33 to 83 years; 7 of 11 (63%) were male; the main initial symptom was abdominal pain in 7 of 11 (63%); and, including secondary symptoms, 10 of 11 (90%) exhibited gastrointestinal symptoms [1]. In addition, 10 out of 11 (90%) had underlying medical conditions [1]. Five out of 11 (45%) underwent emergency abdominal surgery, and the final outcome showed that 10 out of 11 (90%) survived [1]. The present case also involves a middle-aged or elderly male with underlying medical conditions, and in that abdominal symptoms were the initial presentation, it shares similarities with the report by Kvernberg *et al.,* [1]. The reported fatality involved a 73-year-old woman who was an alcohol user and had comorbidities including hypertension, atrial fibrillation, chronic obstructive pulmonary disease, and heart failure [2]. She was transported by ambulance after going into shock following the onset of diarrhea. Laboratory results revealed multiple organ failure, and although she received antibiotic treatment, she ultimately died. Although the underlying conditions in this case were not as severe as those in the fatal case, I speculate that the patient did not seek prompt medical attention after the onset of symptoms, which may have led to cardiac arrest due to a complication of myocarditis and multiorgan failure.

In this case, blood cultures were collected from a patient who presented at the hospital in cardiac arrest [3]. Since culture testing is not routinely performed in patients with cardiac arrest, it is possible that some cases of sepsis leading to cardiac arrest involve sepsis caused by *F. plautii* and multiple organ failure; therefore, accumulating more such cases will be necessary to clarify the epidemiology.

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Conflict of interest: The author states that he has no Conflict of Interest.

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