Detection of *Salmonella enteritidis* in a immunocompetent patient with myocarditis

Miyokardit tanılı immünokompetan hastada *Salmonella enteritidis* saptanması

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**ABSTRACT**

*Salmonella* is a gram-negative, motile, non-spore-forming, facultative anaerobic bacterium belonging to the *Enterobacteriaceae* family. There are several subtypes that can cause disease in humans and animals. Infection can be caused by food, such as eggs, poultry, contaminated waters, and can also be monitored after contact with animals. In humans, it may present with different clinics ranging from asymptomatic carriage to enteric fever. Factors such as the age of the host, immunosuppressive status and additional comorbidities may be effective in the course of the disease. Extraintestinal complications can be observed during the course of enteric fever clinic. Among these complications, clinical conditions such as endocarditis, visceral abscess, osteomyelitis can be considered. In this case, we presented the myocarditis clinic in a patient who presented with vomiting, chest pain and diarrhea, and *Salmonella* was found in the stool.

**Key Words:** Myocarditis, Salmonella, diarrhea

**ÖZET**


**Anahtar Kelimeler:** Miyokardit, Salmonella, diyare

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INTRODUCTION

Myocarditis is a clinical condition in which inflammation is seen in the cardiac muscular tissue and infectious and non-infectious agents are involved in the etiology. Among the non-infectious causes, factors such as cardiac toxins, chemotherapeutic drugs, systemic diseases and radiotherapy are counted (1). Among the infectious factors, viral, bacterial, fungal and protozoal agents can be counted (1).

Among the bacterial agents, Salmonella is a very rare factor especially in western societies where sanitation techniques are developed (2). Usually foodborne contamination. Poultry and eggs are among the foods often blamed. While non-typhoidal salmonella infection is usually self-limited in immunocompetent individuals, complications such as osteomyelitis and endocarditis can be observed in immunosuppressed individuals (3). In this case report, we aimed to present the clinic of salmonella-associated myocarditis, which started with diarrhea, nausea, vomiting, chest pain in an immunocompetent 49-year-old male patient with no known disease.

CASE

A 49-year-old male patient with no known disease was admitted to the emergency department with nausea, vomiting, fever and diarrhea lasting ten times a day for four days. At the emergency service evaluation, the patient was oriented and cooperated. His general condition was evaluated as poor. The respiratory rate was recorded as 32/minute. No pathology was observed in the cardiovascular system examination of the patient whose bilateral respiratory sounds were decreased. Abdominal examination revealed no defense and rebound. Bowel sounds increased in all four quadrants. His skin was evaluated as dehydrated. In laboratory tests, wbc: 11400 mm3, Hemoglobin: 19.3 g/dl, Hct: 56.8, platelet: 189 000 /ul, bun: 67 mg/dl kre: 5.61 mg /dl ast: 87 u/l alt: 21 u/l na: 123 mEq/l ph: 7.27 hco3: 9.2 pco2: 21 lactate: 5.3, procalcitonin: 100, crp: 440 mg/l, ck mb: 9 ng /ml, troponin: 927. The creatinine value of the patient, which was measured three years ago, was found to be 1.13 mg/dl. Considering the available laboratory and clinical data, the patient was evaluated as prerenal acute renal failure and hypovolemic hyponatremia. Hydration was started intravenously. Peripheral blood culture and stool culture were sent from the patient who had acute phase increase and had diarrhea. Enteric panel in stool was sent from the patient who was learned to have consumed raw eggs before the onset of the complaints. Covid 19 PCR test taken. The patient with increased cardiac enzyme was evaluated with ECG. Coronary angiography was performed with the pre-diagnosis of myocardial infarction upon detection of ST elevation in the inferior leads. Coronary arteries were evaluated as normal. Service follow-up of the patient was continued after angiography. The sent Covid PCR sample was negative. Covid 19 mRNA vaccine was not administered. Salmonella spp was detected in the enteric panel, which was examined with BioFire Film array (Biomerieux) in the stool sample of the patient. No reproduction was reported in blood culture. Current ECG changes and bradycardia observed in clinical follow-ups were evaluated as Salmonella-associated myocarditis. Ciprofloxacin antibiotic therapy was started. IV hydration continued. Decrease in the number of defecations was observed with hydration and antibiotic therapy. Acute phase reactants decreased. On the tenth day of treatment, this was observed as BUN: 14 mg/dl creatinine: 0.84 mg/dl. The control ECG also showed that the ST elevations decreased. The patient, whose complaints were resolved, was discharged with oral antibiotic therapy. It was learned from the antibiogram that the growing Salmonella bacteria were sensitive to the empirically initiated quinolone. It was also susceptible to ampicillin and trimethoprim/sulfamethoxazole.

“Informed Consent Form” has been taken from the patient.
Table 1. Changes in laboratory parameters after hydration and antibiotic therapy

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<tr>
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<tbody>
<tr>
<td>BUN/kreatin</td>
<td>67/5,61</td>
<td>58/2,93</td>
<td>16/0,8</td>
<td>9/0,7</td>
<td>10/0,74</td>
<td>14/0,75</td>
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<tr>
<td>CRP</td>
<td>400</td>
<td>340</td>
<td>111</td>
<td>21</td>
<td>6,62</td>
<td>3,59</td>
</tr>
<tr>
<td>Prokalsitonin</td>
<td>100</td>
<td>75,8</td>
<td>21</td>
<td>1,82</td>
<td>0,46</td>
<td>0,24</td>
</tr>
<tr>
<td>Ck-mb</td>
<td>9</td>
<td>7,6</td>
<td>5,4</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Trop-t</td>
<td>927</td>
<td>414</td>
<td>210</td>
<td>77</td>
<td>43</td>
<td>24</td>
</tr>
</tbody>
</table>

Figure 1. Creatinin follow-up with i.v hydration

Figure 2. CRP follow-up with antibiotic treatment
DISCUSSION and CONCLUSION

Myocarditis is a clinical condition in which inflammation is seen in the myocardial tissue with infectious and non-infectious factors in its etiology. Absence of pathognomonic clinical presentation, mimicking other myocardial-related diseases, and non-specific biopsy findings are among the compelling factors in diagnosis (4). Endomyocardial biopsy is shown as the gold standard for diagnosis. Dallas criteria are used in tissue diagnosis. The presence of sampling errors in the biopsy, the presence of complications that may occur in the biopsy, and the low sensitivity and specificity of histological findings make the application of tissue diagnosis difficult. In clinical practice, the diagnosis is often made clinically. The lack of diagnostic criteria with high sensitivity and specificity makes it difficult to estimate the true prevalence of myocarditis (5).

There are toxic, immune-mediated, radiotherapy-related and infectious causes in the etiology of myocarditis. Among the infectious agents, viral agents are often considered as causative agents. Coxsackievirus A and Coxsackievirus B, Parvovirus, influenza, HHV6, EBV, VZV, CMV can be counted among the leading viral factors. In addition to viral factors, bacterial, fungal, parasitic agents are also considered to be among the infectious pathogens that can be causative agents (6).

Among bacterial pathogens, Chlamydia, Legionella, Mycoplasma, Staphylococcus, Mycobacterium tuberculosis are frequently counted (6). Salmonella-associated myocarditis is considered very rare among infectious pathogens (7). There are case-level reports in western society where sanitation techniques are advanced. Transmission is usually observed after consumption of poultry and raw eggs. In the case we presented, raw egg consumption was present before the complaints (8). The patient had a habit of consuming raw eggs, which had been for many years. The consumption history of eggs, both packaged and sold in the open in rural areas, was known. According to European survey data, in 2019, the quinolone resistance of the Salmonella enteritidis bacterium isolated from humans was found to be 0.3% in Germany, 0% in Malta, and 49% in Italy, which may also be an indicator for antibiotic use rates in poultry and fattening animals. Quinolone resistance has been found to be 1% in studies conducted in different provinces in our country for infections due to Salmonella bacteria, and it still seems to be a good option for empirical treatment (9,10).

The main complaints in the reported cases are fever, diarrhea, nausea, vomiting and chest pain. In cases with accompanying myocarditis, increase in troponin and ck mb accompanies. The most common ECG finding in the clinic of myocarditis has been reported as ST segment elevation. Salmonella enteritidis is the most commonly isolated non-typhoidal pathogen (8). In the case we presented, the elevation of the ST segment on the ECG, the growth of Salmonella enterica D1 in the stool, the increase in cardiac markers and normal coronary angiography made us think of the diagnosis of salmonella-associated myocarditis. Apart from invasive methods, cardiac MRI can be used as a non-invasive method in the diagnosis of myocarditis (11). However, it is not always a method that can be achieved in clinical practice.

BioFire Film array (Biomerieux) is a method that can detect bacterial, viral and parasitic agents. Campylobacter spp, C. difficile, V. cholerae, Salmonella spp, Shigella spp, Astrovirus, Norovirus, Rotavirus are some of them. While the sensitivity of biofilm array was 100% in detecting the Salmonella agent in feces, the specificity was evaluated as 99.6% (11).

Myocarditis is a challenging diagnosis for the clinician due to factors such as nonspecific clinical findings and laboratory results, and controversial descriptive criteria. It is very difficult to estimate the true incidence as tissue diagnosis is not possible in every case (12).
Salmonella is an uncommon pathogen, especially in western societies where sanitation techniques are advanced. Myocarditis is among the rarely reported extraintestinal manifestations. It is possible to show the pathogen in stool and blood cultures. While it can be brought to mind in clinical diagnosis and satisfactory results can be obtained with appropriate antibiotic therapy, it can be mortal in patients with delayed diagnosis.

KAYNAKLAR


