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Case report

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Myocarditis related to *Campylobacter jejuni* infection: A case report

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Abstract

Background: Myocarditis can develop as a complication of various infections and is most commonly linked to enterovirus infections. Myocarditis is rarely associated with bacterial infections; salmonellosis and shigellosis have been the most frequently reported bacterial cause. We report a case of myocarditis related to *Campylobacter jejuni* enteritis.

Case Presentation: A 30-year-old previously healthy man presented with a history of prolonged chest pain radiating to the jaw and the left arm. Five days prior to the onset of chest pain, he developed bloody diarrhea, fever and chills. Creatine kinase (CK) and CK-MB were elevated to 289 U/L and 28.7 μg/L. Troponin I was 30.2 μg/L. The electrocardiogram (ECG) showed T wave inversion in the lateral and inferior leads. The chest pain resolved within 24 hours of admission. The patient had a completely normal ECG stress test. The patient was initiated on ciprofloxacin 500 mg po bid when *Campylobacter jejuni* was isolated from the stool. Diarrhea resolved within 48 hours of initiation of ciprofloxacin. The diagnosis of *Campylobacter* enteritis and related myocarditis was made based on the clinical and laboratory results and the patient was discharged from the hospital in stable condition.

Conclusion: Myocarditis can be a rare but severe complication of infectious disease and should be considered as a diagnosis in patients presenting with chest pain and elevated cardiac enzymes in the absence of underlying coronary disease. It can lead to cardiomyopathy and congestive heart failure. There are only a few reported cases of myocarditis associated with *Campylobacter* infection.

Background

Myocarditis can result as a complication of various infectious diseases. The overall incidence of myocarditis is unknown but autopsy results have shown the frequency to be about 0.5 % to 5%.[1] Sensitive molecular techniques, such as polymerase chain reaction and in-situ hybridization, have determined infections due to enterovirus to be common causes of myocarditis in North America and Western Europe.[2,3] Myocarditis is rarely associated with bacterial infections; salmonellosis and shigellosis have been the most frequently reported cause of bacterial myocarditis.[4] There are a few case reports of myocarditis as a complication of *Campylobacter jejuni* infection from Europe only. [4–7]

We present a case of *Campylobacter jejuni*-related myocarditis with complete recovery. We believe this is the first reported occurrence in North America.

Case Presentation

A 30-year-old previously healthy man presented with a 5-hour history of constant, retrosternal chest pain radiating

to the jaw and the left arm. This was associated with shortness of breath and diaphoresis. Other than hypertension controlled with ramipril, he did not have other coronary artery disease risk factors. He exercised vigorously every day. Five days prior to the hospital admission, he developed bloody diarrhea, fever and chills. A few days before the onset of diarrhea, he had eaten mussels from a local restaurant.

On examination, he was in mild distress. Blood pressure was 145/101; heart rate, 90 beats per minute; respiratory rate, 18 per minute; temperature, 37.3 °C and the O_2 saturation measured 99% while breathing room air. Cardiac examination was normal without any extra sounds, murmurs, or pericardial rubs. Respiratory, abdominal and musculoskeletal examinations were normal.

Laboratory investigations revealed normal blood counts and serum electrolytes. Creatine kinase (CK) and CK-MB were elevated to 289 U/L (reference range, 0–225) and 28.7 μg/L (reference range, <10). Troponin I was 30.2 μg/L (reference range, 0 – 0.5). Electrocardiogram (ECG) showed T wave inversion in the lateral and inferior leads. The patient was treated with acetylsalicylate acid (ASA), topical nitroglycerine, oral metoprolol and was admitted to the coronary care unit for intensive cardiac monitoring.

Over the course of 24 hours, the chest pain resolved and the patient remained hemodynamically stable throughout the 5-day hospital stay. On the second day in hospital, CK normalized but troponin I remained elevated at 14.4 μg/L. Transthoracic echocardiography showed no pericarditis or area of hypokinesis. There was no sign of myocardial infarction or arrhythmia. The patient had a completely normal ECG stress test.

The bloody diarrhea persisted during the first 72 hours of hospitalization. The patient was initiated on ciprofloxacin 500 mg po bid when *Campylobacter jejuni* was isolated from the stool but the blood culture was sterile. *C. difficile* toxin, parasite and virus were not detected from the stool. No virus was isolated from the throat washing culture. Flexible sigmoidoscopy confirmed the presence of mild colitis.

The diagnosis of *Campylobacter* enteritis and related myocarditis was made based on the clinical and laboratory results. Shortly after initiating the antibiotic therapy, the diarrhea resolved and the patient recovered completely. After finishing a 5-day course of ciprofloxacin, the patient was discharged from the hospital in a stable condition.

Discussion

A diagnosis of myocarditis should be contemplated when a patient presents with unexplained congestive heart failure, or with chest pain and elevated cardiac enzyme levels in the absence of coronary disease or coronary spasm.[3] The pathophysiology of myocarditis in humans is not well understood, however, several theories have been developed. It may be due to post-infectious autoimmune mechanism, which can result in myocyte damage.[8] Murine and other animal models have demonstrated direct viral proliferation within the myocytes and destruction of the host cells.[9]

Clinical manifestations of myocarditis are variable and in part may depend on the underlying etiology. Patients may present with chest pain, arrhythmia, and/or congestive heart failure, one to two weeks following symptoms of gastroenteritis or a viral illness. Our patient presented with a 5-day history of bloody diarrhea due to stool culture confirmed *Campylobacter jejuni*. He developed severe, steady chest pain in the absence of underlying coronary artery disease. It is plausible that he developed myocarditis secondary to *Campylobacter jejuni* and not virus as the viral cultures of the stool and throat washing did not grow any organism. Evidence for myocyte injury is further provided by the changes in cardiac enzymes. CK and CK-MB were slightly elevated with a more dramatic rise in troponin-I to a peak of 30 μg/L. This parallels the profile of enzyme changes described in a similar reported case of *C. jejuni* myocarditis wherein troponin-I peaked at 58 μg/L.[4] Troponin I has been cited as the most sensitive cardiac enzyme marker in patients with clinically suspected myocarditis and has been found to correlate with immunohistologic assessments.[10,11]

In our patient, chest pain developed within 4 days following the onset of diarrhea. This is similar to the cases previously described, in which cardiac symptoms occurred 2 and 3 days respectively, after the first gastrointestinal complaints.[4,5] As suggested by Westling, this may indicate an immediate influence of *C. jejuni* on myocytes through either direct damage to cells by bacteria or circulating toxins. This is unlike the more typical enterovirus cases in which myocarditis can occur one to several weeks between recovery from the infection and development of myocarditis, suggesting a post-viral immune-mediated mechanism.[3]

Endomyocardial biopsy is recommended in a few circumstances as myocarditis cannot be reliably diagnosed clinically or with routine biochemical laboratory tests.[12] It is crucial to definitively establish the diagnosis of myocarditis, if the patient fails to improve for consideration of institution of immunosuppressive therapy and to ascertain prognosis.[13]

Conclusion

Myocarditis is rare but can be a severe complication of infectious disease and should be considered as a diagnosis in patients presenting with chest pain and elevated cardiac enzymes in the absence of coronary disease. Myocarditis can lead to cardiomyopathy and congestive heart failure. It has been most commonly associated with enterovirus. Occasionally it has been connected with bacterial enteritis and there are only a few reported cases of myocarditis due to *Campylobacter* infection.

Competing interests

None declared.

Authors' Contributions

All authors read and approved the final manuscript and contributed equally to the manuscript. CC: Literature search and review, case review and summary, drafting original article. CL: Patient management, article conception and critical, extensive revision of article for important intellectual content.

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