T-Segment deviations in meningococemia are rare. Reported cardiovascular complications of meningococemia include sepsis, hypotension, disseminated intravascular coagulation, bacterial myocarditis, bacterial pericarditis, and cardiogenic shock. We report the case of a patient with meningococcal meningitis who developed marked asymmetric ST-segment elevations and recovered without a specific cardiac intervention. A brief discussion of the differential diagnoses of asymmetric ST-segment elevations in meningococemia is presented.

**CASE PRESENTATION**

**Initial Presentation**

A 21-year-old white male with no significant past medical history and no history of illicit drug use presented to the emergency department obtunded with a 1-day history of malaise, nausea, and emesis. There was no history of trauma. Physical examination revealed palpable, nonblanching purpura involving the trunk, face, and extremities. The patient’s serum chemistries were normal except for a bicarbonate level of 15.2 mEq/L (normal, 21–28 mEq/L), showing metabolic acidosis. His leukocyte count was 21.4 × 10³/µL; he was anemic with a hematocrit of 36.1%, and thrombocytopenic with a platelet count of 116 × 10³/µL. His liver function tests were within normal limits, and results of comprehensive serum and urine toxicology testing were negative. The patient’s cerebrospinal fluid revealed pleocytosis (1160 leukocytes/µL, 69% neutrophils), hypoglycorrhachia (glucose < 20 mg/dL), elevated protein (504 mg/dL), and gram-negative diplococci on Gram stain. *Neisseria meningitidis* was identified in cerebrospinal fluid and serum cultures. In addition, the patient had an elevated prothrombin time of 15.6 s (normal, 10–13 s), an elevated partial thromboplastin time of 39.2 s (normal, 22–35 s), and elevated fibrin split products (> 20 µg/mL). The patient was diagnosed with meningococcal meningitis complicated by mild disseminated intravascular coagulation and was admitted to the hospital where a 14-day course of intravenous ceftriaxone was initiated.

**Continued Clinical Course**

The evening following admission, ST-segment elevations in lead II were noted on routine intensive care unit monitoring. A subsequent 12-lead electrocardiogram (ECG) revealed 3- to 8-mm ST-segment elevations in leads I, II, III, aVF, V₅, and V₆ as well as a reciprocal ST-segment depression in lead aVR (Figure 1). The patient was intubated and sedated for airway protection, and his vital signs remained stable. Transthoracic echocardiography (TTE) obtained during the ECG demonstrated normal cardiac function without focal wall motion abnormalities or pericardial fluid accumulation. Intravenous nitroglycerin was administered at a dose of 50 µg/min overnight in an attempt to increase coronary blood flow (cardiac ischemia had not been ruled out), but it had no effect and was discontinued the next morning. Biomarkers of cardiac injury including creatinine kinase, creatinine kinase index, and troponin-T increased to 576 ng/mL, 11.6%, and 1.42 ng/mL, respectively; these markers declined to 316 ng/mL, 9.0%, and 0.51 ng/mL, respectively, the following morning.

All of the cardiac biomarkers returned to normal over the following week without intervention. Serial ECGs the following hospital day revealed evolution of ST-segment changes to T-wave inversions in leads II, III, aVF, V₅, V₆ (Figure 2). On hospital day 9, the apical leads normalized, and only the inferior T-wave inversions persisted (Figure 3). A repeat TTE obtained on hospital day 4 showed diffuse biventricular...
hypokinesis with a left ventricular ejection fraction of 40%. The patient was continued on antibiotic therapy with supportive care for the next 2 weeks without additional ECG changes. He was extubated on hospital day 5 and was discharged home on hospital day 17. A repeat TTE obtained before the patient was discharged revealed normal left and right ventricular function without wall motion abnormalities. The patient recovered without neurologic sequelae.

**DISCUSSION**

The differential diagnosis of asymmetric ST-segment elevations in a patient with meningococcemia includes coronary artery hypoperfusion due to systemic hypotension, acute coronary syndrome, neurologic injury, coronary artery vasospasm, and regional meningococcal myopericarditis. ST-Segment deviation in meningococcemia is rare but has been reported twice in the literature. In both cases, patients were...
hemodynamically unstable, and the ECG changes were ascribed to myocardial necrosis secondary to poor coronary artery perfusion.\(^2\)\(^3\) This mechanism seems implausible in our patient given his continuously normal blood pressure.

Our patient may have suffered an acute coronary syndrome; however, his rapid recovery without intervention, his normal repeat TTEs, and his relatively mild troponin elevation despite 2 days of ST elevations are inconsistent with this diagnosis. ST Elevations and T-wave changes can occur during central nervous system events, including closed head injuries, space occupying lesions, and subarachnoid hemorrhages; however, these events are not commonly associated with bacterial meningitis.\(^4\) Coronary artery vasospasm is also a possible diagnosis but is unlikely in our patient given that nitroglycerin administration had no effect on the ST-segment elevations.

Most likely, our patient developed a regional myocardial pericarditis that primarily affected the inferior and lateral myocardial walls, as evidenced by the asymmetric ECG changes consistent with pericarditis only in the inferior and lateral leads, reversible right and left ventricular dysfunction on repeat TTE, and transiently elevated cardiac markers. Furthermore, \textit{N. meningitidis} has a tropism for myocardial tissue, resulting in higher rates of myocarditis (78\% in 1 autopsy series), pericarditis, cardiogenic shock, atrioventricular nodal blockade, tamponade, and sudden cardiac death compared with other types of gram-negative sepsis.\(^5\)

**CONCLUSION**

This case documents ST elevations and myocardial necrosis in a hemodynamically stable patient with meningococcemia. The clinical approach of “watchful waiting” in this patient avoided the substantial risks associated with coronary angiography and endomyocardial biopsy, which includes bleeding, perforation, and infection. Awareness of this potential complication may help guide clinicians in diagnostic decision-making and prevent unnecessary invasive cardiac intervention.

**REFERENCES**


**Figure 3.** 12-Lead electrocardiogram demonstrating resolution of lateral T-wave inversions on hospital day 9.