

EKG Findings Mimicking Pericarditis and STEMI in a patient with Ventricular Preexcitation: A Case Report

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Abstract

Wolff-Parkinson-White (WPW) syndrome is an electrical conduction abnormality of the heart in which atrial impulses are transmitted to the ventricle through an accessory pathway, leading to supraventricular tachycardia [1]. On EKG, WPW presents with shortened PR interval, widened QRS, and a characteristic delta wave. Here, we present the case of 44-year-old African American male with a history of preexcitation/WPW pattern and no known history of coronary artery disease who came to the hospital complaining of atypical chest pain. He had transient ST elevation in beats with delta waves, both in the ambulance and emergency room EKGs (**Figure 1 and 2**). Five minutes later, a repeat EKG showed ST elevation along with PR depression mimicking pericarditis (**Figure 4**). Cardiac enzymes remained normal. EKG stress test with myocardial perfusion imaging was negative for ischemia and echocardiogram was normal.

Learning Objectives

1. To appreciate that ventricular preexcitation can present with repolarization changes mimicking STEMI.
2. To appreciate that WPW can present with a pseudo-pericarditis pattern on EKG.
3. To aid in accurate diagnosis and management of patients with WPW presenting with these EKG findings.

Case Presentation

History of Present Illness

A 44-year-old African American male with no known history of coronary disease, hypertension, or previous MI presented to the ER with atypical lateral chest pain lasting less than 30 seconds. The patient had a syncopal event one year ago. A previous EKG showed WPW pattern.

He described the pain as a sharp pain in his left side, lasting a few seconds at a time. The pain had no relationship to position or deep breathing.

In the past, he occasionally felt palpitations but did not complain of palpitations at this time. He denied shortness of breath, orthopnea, fever, or chills. He denied smoking or drinking alcohol, but stated that he occasionally used Marijuana. Family history was negative for premature coronary disease.

Physical Exam

On physical exam, vital signs were normal. There was no clubbing, cyanosis, edema, or JVD elevation. Chest was clear to auscultation. S1 and S2 were normal. There was no pericardial rub. Rest of the physical exam was normal.

EKGs

The 3-lead rhythm strip obtained in the ambulance showed transient ST elevation in beats with a delta wave (**Figure 1**) . Soon thereafter, another rhythm strip obtained in the emergency department was similar (**Figure 2**) . Same findings are seen on 12-lead EKG as well (**Figure 3**) , with ST-elevation localized to inferior leads mimicking inferior ST Elevated Myocardial Infarction (STEMI) [2]. Interestingly, an EKG obtained five minutes later showed a different pattern: widespread minimal concave-upwards ST elevation with PR depression in lead II (**Figure 4**) .

A previous EKG from a year ago showed transient negative delta waves in the inferior leads (**Figure 5**) . The varying repolarization patterns mimicking both STEMI and pericarditis appear to be related to varying degrees of preexcitation. Also, the appearance of PR depression in lead II appears to be related to superimposed negative delta wave.

Labs and Radiological Data

Complete Blood Count (CBC), Basic Metabolic Panel (BMP), and Troponin were within normal limits. Urine toxicology was negative. Chest X-Ray was normal. Stress test with myocardial perfusion imaging was negative for ischemia and echocardiogram was normal.

Previous Hospitalization

The patient was seen by cardiology service in December 2019 when he presented with atypical chest pain and was found to have WPW pattern on EKG. Interestingly at that time there were concerning ST segment changes in inferior leads, and STEMI code was initiated. However, EKG changes resolved and patient was discharged with a follow-up with cardiology. No ischemic work-up was done.

Subsequently, the patient was seen in cardiology outpatient February 2020. At that time, he had had one episode of syncope and ongoing intermittent atypical chest pains. For further evaluation stress test was recommended.

Discussion

Depolarization abnormalities on EKG are usually associated with repolarization abnormalities; bundle branch blocks and intraventricular conduction delays almost always exhibit abnormal ST segments and T-waves [3]. Ventricular preexcitation represents another mechanism of abnormal ventricular activation [4]. Therefore, depending upon the volume and location of ventricular myocardium activated via the accessory pathway, peculiar repolarization patterns are possible.

Our case is interesting in that how closely the abnormal repolarization related to ventricular preexcitation mimics established EKG patterns for STEMI and pericarditis. We could find a few previous reports of STEMI like ST-elevation but no previous reports of delta-wave related pseudo-pericarditis EKG findings. PR segment depression is considered a very specific sign of pericarditis, but in our patient it is mimicked by the presence of a superimposed negative delta wave.

Early repolarization EKG pattern in WPW patients has been previously reported [5, 6].

Based on the patient's presentation and abnormal EKGs, the differential diagnosis included STEMI, pericarditis, coronary vasospasm, and benign repolarization changes associated with WPW pattern [1, 7]. Troponin remained negative and stress test showed no ischemia. Also, there were no clinical or echocardiographic findings for pericarditis. CRP was also negative.

Our case illustrates that patients with WPW pattern can present with repolarization changes on EKG mimicking pericarditis or STEMI. A negative delta wave in lead II can mimic PR-segment depression, which

is usually taken as a specific EKG finding of pericarditis. This has implications for correct diagnosis and management of patients [6]. We could find only five documented cases showing transient ST elevation in patients with WPW pattern [1, 2, 5-7]. To our knowledge, this is the first report of WPW pattern mimicking pericarditis on EKG showing both widespread ST elevation and PR segment depression in lead II.

Acknowledgments

None.

Conflicts of Interest

None.

Figures

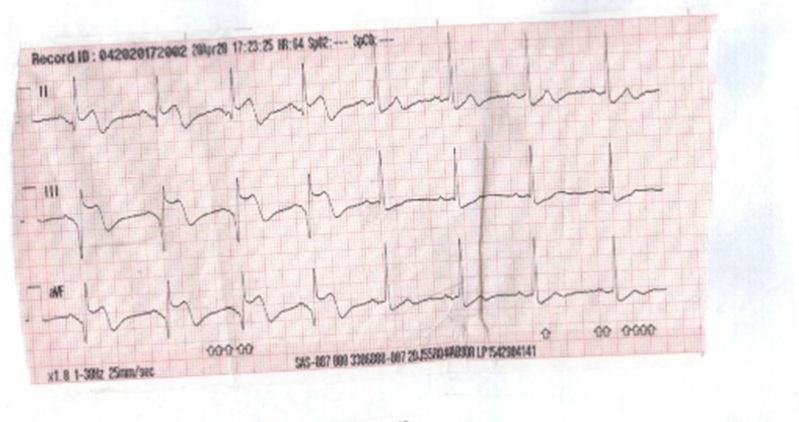


Figure 1: Ambulance EKG strip showing transient ST elevation in beats with Delta wave

