Subtle Ts— recognition of Wellen's syndrome in the emergency department

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Introduction

- Wellen's syndrome describes a distinct pattern of subtle electrocardiographic abnormalities associated with significant proximal left anterior descending (LAD) coronary artery occlusion[1-3]
- The ischemia manifests as biphasic or deeply inverted T waves in leads V2 and V3 with limited ST segment deviation[2,3]
- EKG changes are typically only present during pain-free intervals. Patients may have a normal EKG while symptomatic[4]
- Cardiac markers are often negative or only mildly elevated[2,3,5,6]
- Patients with Wellen's syndrome require urgent cardiac catheterization as they are at risk for progression to a devastating anterolateral wall myocardial infarction (MI)[1-3]
- Additional diagnostic testing (such as exercise stress test) is not appropriate and will precipitate deterioration[1-6]
- Without rapid definitive treatment, 75% of patients will go on to develop an extensive ST segment elevation MI[1]

Case Description

History

- 34-year-old male presented to the ED with 2 days of mild constant chest pain described as non-radiating left-sided tightness associated with mild dyspnea, worse when laying flat and unchanged with deep inspiration
- The patient's symptoms prevented him from sleeping the previous night
- He was seen at an urgent care facility that morning and was referred to the ED for further evaluation
- Initial EKG in triage was unchanged from urgent care with no ST abnormalities. Patient was instructed to remain in waiting room to await room placement and lab results
- Approximately 2-3 hours later the patient was brought back to a room upon return of critical troponin level at 4.6 ng/mL
- The patient's symptoms had completely resolved upon repeat evaluation
- Denied nausea, vomiting, palpitations, diaphoresis, hemoptysis, syncope, and back pain

PMHx:

- GERD, no cardiac disease

Surgical Hx: None
Medications: None
Family Hx: No family hx of cardiac disease

Social history:

- Intermittent use of intranasal cocaine, last use 2 days ago
- ½ PPD current smoker
- Denied use of alcohol, marijuana, or other illicit substances

Physical Exam

- Vitals: 146/82 / 76 bpm /14 breaths/min / 98.3F / 98% RA
- Well-appearing Caucasian male resting comfortably on stretcher in no acute distress, no diaphoresis
- No JVD
- Lungs clear to auscultation. No wheezes, rales, or rhonchi.
- Regular rate and rhythm, no murmurs or rubs. Clear S1, S2 without splitting. Chest wall non-tender.
- Peripheral pulses equal and 2+ bilaterally. No lower extremity edema.
- Abdomen soft, non-tender non-distended. No palpable masses.

Initial Diagnostic Testing

- Figure 1 shows repeat EKG during pain-free interval. There are biphasic T waves in V2-V5 with 1 mm ST elevation in V3 and 2 mm ST elevation in V2. No reciprocal changes
- Troponin 4.6 ng/mL (<0.04 ng/mL)
- Mild hypokalemia at 3.2
- AST elevated at 52
- CBC, BNP, LFTs, lipase, PT/INR otherwise within normal limits
- Portable chest x-ray unremarkable

Treatment:

- Patient was given aspirin 325 mg and beta blockers in the ED. Calcium channel blockers were considered as an alternative given the history of recent cocaine use, however the risk of unopposed alpha stimulation was felt to be low

Differential Diagnosis:

- Wellen's Syndrome
- Cocaine-induced vasospasm
- GERD
- Electrolyte disturbance
- Pulmonary embolism
- Aortic dissection
- NSTEMI
- Unstable angina
- Pericarditis
- Myocarditis

Management

- Consulting cardiologist was concerned the EKG changes were due to cocaine-induced vasospasm as opposed to an obstructing lesion
- Emergent catheterization revealed **100% occlusion of proximal LAD**
- Distal LAD with collateral from large posterior descending artery
- Thrombectomy with placement of drug eluting stent to proximal LAD with TIMI-3 reperfusion
- Serial troponins peaked at 11.84 five hours post PCI. No significant change in post PCI EKG
- Asymptomatic self-limiting 13-beat run of ventricular tachycardia overnight post reperfusion
- **Moderately decreased EF 35%-40%** with apical akinesis and mild mitral regurgitation on echocardiogram
- EKG done POD#1 showed marked symmetric T wave inversions in V2-V5 (Figure 2)
- Patient remained hemodynamically stable without chest pain or SOB during hospitalization
- Patient was started on aspirin, ticagrelor, atorvastatin, and metoprolol
- Discharged POD#2 with outpatient cardiology follow up. Details regarding the patient's care following hospital discharge are not known

Discussion

- Deeply inverted T waves can be seen following thombolysis, supporting the idea that Wellen T waves may actually represent reperfusion of the LAD following a brief MI[7]

Conclusion

- Wellen's syndrome can easily be missed in the emergency department setting, as subtle and transient T wave changes are sometimes the only marker of significant coronary thrombosis
- Because the lesion is highly unstable and likely to re-occlude, it is important for clinicians to recognize this rare entity quickly and advocate for urgent catheterization

Figure 1. EKG with biphasic T waves in V2-V5

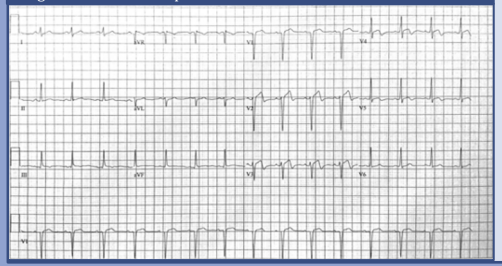
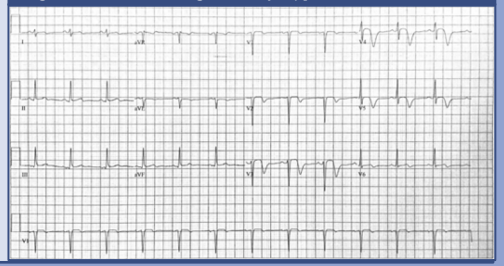


Figure 2. EKG at discharge, two days s/p stent to LAD



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