The Journal of Emergency Medicine, Vol. 57, No. 1, pp. 97–99, 2019

0736-4679/$ - see front matter

https://doi.org/10.1016/j.jemermed.2019.03.006

Visual Diagnosis in Emergency Medicine

DE WINTER SYNDROME: AN UNDERRECOGNIZED ELECTROCARDIOGRAPHY FINDING IN MYOCARDIAL INFARCTION

Kai-Chun Hu, MD, Yi-Chung Yu, MD, Chin-Wang Hsu, MD, Karen Chia Wen Chu, MD, and Wen-Cheng Huang, MD

Department of Emergency, School of Medicine, College of Medicine, and the Department of Emergency and Critical Medicine, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan

Corresponding Address: Wen-Cheng Huang, MD, Taipei Medical University, Emergency Department, Wan Fang Hospital, Number 111, Section 3, Xinglong Road, Taipei 11696, Taiwan

INTRODUCTION

The de Winter electrocardiography (ECG) pattern was first reported as an anterior ST-segment elevation myocardial infarction (STEMI) equivalent that presents without obvious ST-segment elevation in 2008 (1). The culprit vessel was proven to be the proximal left anterior descending artery. The de Winter pattern is a rare finding, but it is critical for emergency physicians to recognize it for urgent reperfusion therapy.

CASE REPORT

A 42-year-old man without any systemic disease presented to the emergency department (ED) suffering from sudden onset chest pain while driving. He reported a 15-min episode of resting chest pain with diaphoresis, but no radiating pain.

In the ED, his vital signs were within normal ranges and the physical examination revealed no crackles or rales. ECG was performed immediately upon arrival (Figure 1) and showed a sinus arrhythmia of 73 beats/min, with ST segment elevation in precordial leads (V3–V6) and the inferior leads (II, III, and aVF), along with an upsloping pattern. Peaked T waves were also noted in precordial leads V2–V6. In aVR, a 1-mm elevation of the ST segment was noted as well. The above patterns are consistent with the de Winter pattern, which is an anterior STEMI equivalent that presents without obvious ST segment elevation. As a result, we activated the cardiac catheterization protocol immediately. In addition, laboratory reports showed a troponin I level of 0.06 ng/mL (normal <0.5 ng/mL) an hour later.

Complete stenosis of the proximal left anterior descending artery was revealed at percutaneous coronary intervention (PCI) (Figure 2). The right coronary artery and left circumflex artery were patent. Percutaneous transluminal coronary angioplasty was performed and a stent was inserted (Figure 3). After PCI, the patient was admitted for further care. Echocardiography revealed hypokinesis of the anterior septal region. The patient was discharged under relatively stable condition after an uneventful inpatient course.

DISCUSSION

The de Winter ECG pattern was first reported in 2008 as an anterior STEMI equivalent that presents without obvious ST segment elevation (1). The diagnostic criteria include 1) tall, prominent, symmetric T waves in the precordial leads; 2) upsloping ST segment

Received: 7 January 2019; Final submission received: 22 February 2019;
Accepted: 4 March 2019

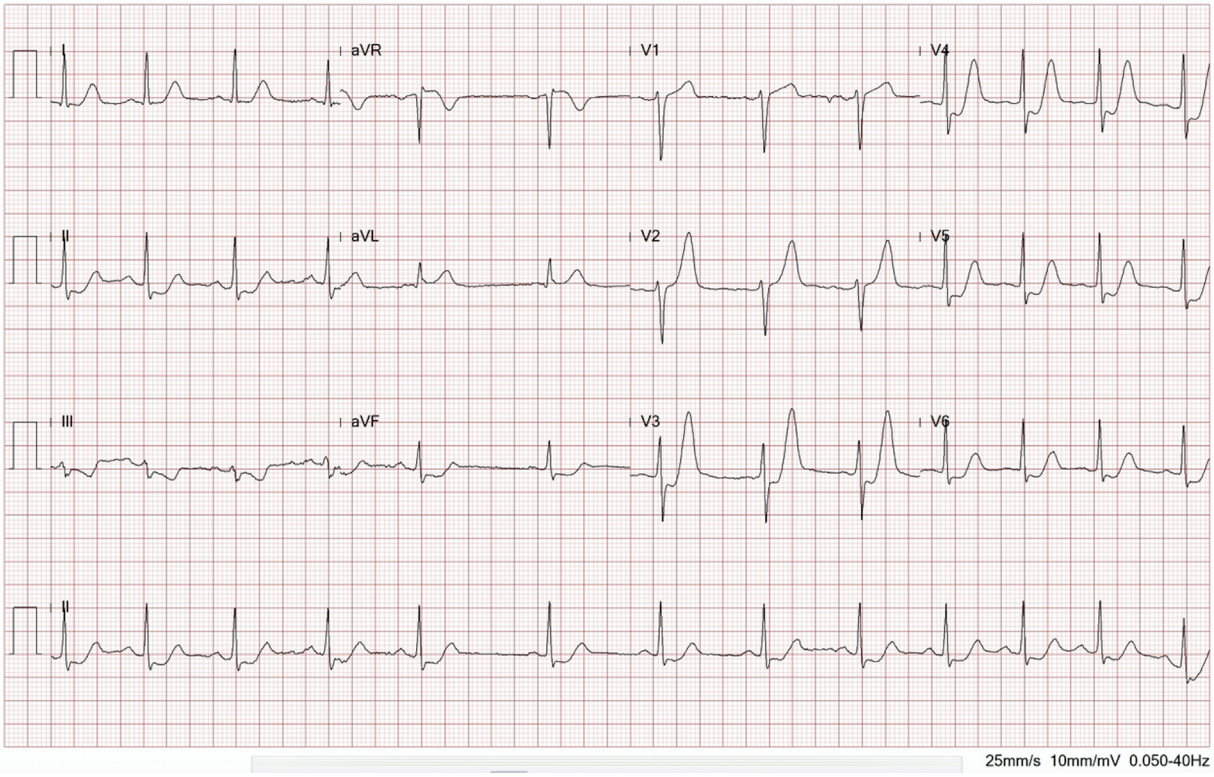

Figure 1. Electrocardiography. de Winter T wave with ST segment depression in the precordial leads.

depression >1 mm at the J-point in the precordial leads; 3) no ST elevation in the precordial leads; 4) ST segment elevation (0.5–1 mm) in aVR; and 5) classical STEMI morphology may precede or follow the de Winter pattern (2). Verouden et al. confirmed this finding in a case series in 2009 (3). Most patients with the de Winter pattern tend to be young adults, predominantly males with a history of hyperlipidemia. They also found 2% of patients that need PCI to the left anterior descending artery (3). The de Winter T-wave ECG pattern is not mentioned as part of the acute coronary syndromes in any guidelines, such as the American Heart Association or European Society of Cardiology; there are no clear recommendations for management. However, the increasing evidence suggests PCI should be performed for these patients (4). If immediate PCI is not available, fibrinolytic therapy without contraindication is worthy of consideration (5).

Figure 2. Total occlusion of the left anterior descending artery (arrow).

Figure 3. Total occlusion of the left anterior descending artery status post–balloon dilatation and a stent indwelling.

REFERENCES

1. de Winter RJ, Verouden NJ, Wellens HJ, Wilde AA. Interventional Cardiology Group of the Academic Medical Center. A new ECG sign of proximal LAD occlusion. N Engl J Med 2008;359:2071–3.
2. Morris NP, Body R. The de winter ECG pattern: morphology and accuracy for diagnosing acute coronary occlusion: systematic review. Eur J Emerg Med 2017;24:236–42.
3. Verouden NJ, Koch KT, Peters RJ, Henriques JP, Baan J, van der Schaaf RJ, et al. Persistent precordial "hyperacute" T-waves signify proximal left anterior descending artery occlusion. Heart 2009;95:1701–6.
4. Rokos IC, French WJ, Mattu A, Nichol G, Frarkouh ME, Reiffel J, et al. Appropriate cardiac cath lab activation: optimizing electrocardiogram interpretation and clinical decision-making for acute ST-elevation myocardial infarction. Am Heart J 2010;160:995–1003.
5. Denktas AE, Anderson HV, McCarthy J, Smalling RW. Total ischemic time: the correct focus of attention for optimal ST-segment elevation myocardial infarction care. JACC Cardiovasc Interv 2011;4:599–604.