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Static De Winter ST-T type electrocardiographic pattern

Passang[1,*], Luis Alberto Rodríguez López[1], Edward Bediako Mensah[1], Norah Nina Apaza[2], Carlos Mirel Peñate Hoyos[3], Kuenzang Choden Dorji[4], Hezborn Magacha[5], Dechen Choden Samdrup[6]

1. Cardiovascular Hospital "Ernesto Guevara", Santa Clara City, Villa Clara Province, Cuba.
2. Hospital Celestino Hernández Robau, Santa Clara City, Villa Clara Province, Cuba.
3. Institute of Cardiology and Cardiovascular Surgery, Havana Province, Cuba
4. Jigme Dorji Wangchuck National Referral Hospital, Thimphu district, Bhutan.
5. East Tennessee State University, TN, USA.
6. Bronx Care Health System, NY, USA.

Corresponding Author: Passang, Cardiovascular Hospital "Ernesto Guevara", Santa Clara City, Villa Clara Province, Cuba.

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Summary

We present the case of a 59-year-old male patient, an engineer by profession, with a previous history of being a smoker and suffering from arterial hypertension and hypercholesterolemia, who was admitted to the cardiovascular preoperative service of the "Ernesto Guevara" Heart Center with a diagnosis of chronic ischemic heart disease in the form of left main coronary artery disease and multivessel disease for surgical treatment of myocardial revascularization, which was studied for presenting chest pain related to changes in its onset threshold both at rest and with physical exertion and that in the resting electrocardiogram, painless, shows peaked/hyperacute and symmetrical T waves with slight ascending ST depression in the anterior leads, without enzyme elevation and that in the ward had a stable clinical evolution until after surgery, when he died in the postoperative period due to a perioperative infarction. It is diagnosed as a stationary "De Winter ST-T" type electrocardiographic pattern that, like Wellens syndrome, is caused by severe disease of the proximal anterior descending coronary artery with a very poor prognosis that evolves into extensive anterior transmural acute myocardial infarction.

Abbreviations:

De Winter ST-T pattern, Acute Myocardial Infarction.

Introduction

Cardiovascular diseases are the first cause of death in the developed and developing world and, among them, coronary heart disease is one of the main causes of death and disability, with epidemiological predictions that indicate that its morbidity and mortality will exceed to that of cancer and infectious diseases in every country in the world1. The consequences of this disease in world health originate a serious health problem2. Percutaneous Coronary Intervention is a valuable tool for the revascularization of patients with ischemic heart disease3. The identification of certain typical electrocardiographic patterns makes it possible to select patients at high risk of progressing to Acute Myocardial Infarction (AMI) and death4,5. The interpretation of these tracings, with alterations suggestive of myocardial ischemia, is a necessary skill for physicians in emergency services. Despite this, a recent study showed that, of the patients evaluated and discharged for chest pain in emergency services, 2-13% had an AMI that was not diagnosed. "De Winter's ST-T" pattern was first described in 2008 by Winter R J, Verouden NJ, Wellens HJ who observed this pattern in 2% of cases, corresponding to occlusion/subocclusion of

the anterior descending coronary artery (ADA) at the ostial level and is an equivalent of evolving ST-segment elevation acute coronary syndrome (STEMI). Like Wellens Syndrome, it constitutes the presentation of a high-risk acute coronary syndrome and is associated with severe segment proximal to the anterior descending coronary artery, which is considered its first cousin.4,5,7. This clinical condition, if not identified and treated early, can progress to extensive anterior wall AMI and death.8-10 Appropriate conduct in this subgroup of patients makes it possible to change the natural history of their disease.

Information of the patient

Personal History and Physical Examination.

A 59-year-old male patient, with a personal pathological history of arterial hypertension and being a smoker of one pack a day as cardiovascular risk factors, occasional drinker and family pathological history of a father who died of acute myocardial infarction. He was admitted to our Heart Center for surgical treatment of myocardial revascularization due to severe left main coronary artery disease and multivessel disease. On physical examination upon admission to the ward, the patient did not complain of precordial pain or other cardiovascular symptoms suggestive of myocardial ischemia. Rhythmic heart sounds, with good tone, without S3 or heart murmurs or thermal gradient or edema in the lower limbs. Blood pressure of 110/70 mmHg. Heart rate of 68 beats per minute. Respiratory system with vesicular murmur audible in both lung fields, absence of rales and rest of normal physical examination.

Supplementary tests:

Laboratory tests: Normal Complete Blood Count (CBC) and coagulation. Normal blood glucose, Total Cholesterol-7.6 mmol/L, Triglycerides-4.3 mmol/L. Uric Acid-512 mmol/L.

Basal Electrocardiogram: Sinus Rhythm, striking hyperemic T-waves and with slight ST depression in precordial leads of V4 –V6 Fig.1. Evolutionary electrocardiograms in the ward without changes suggestive of intensification of myocardial ischemia.

Chest Rx: Cardiac silhouette within normality, absence of congestive pattern and without pleural effusion.

Preoperative Transthoracic Echocardiography (TTE) on admission: No evidence of motility alterations in the anterior segments of the left ventricle, with preserved global systolic function, structurally healthy valvular apparatus, without pericardial effusion or other alterations of interest.

Coronary angiography: Severe disease of the left main coronary artery and multivessel disease with surgical criteria for myocardial revascularization are evidenced in the report Fig.2.

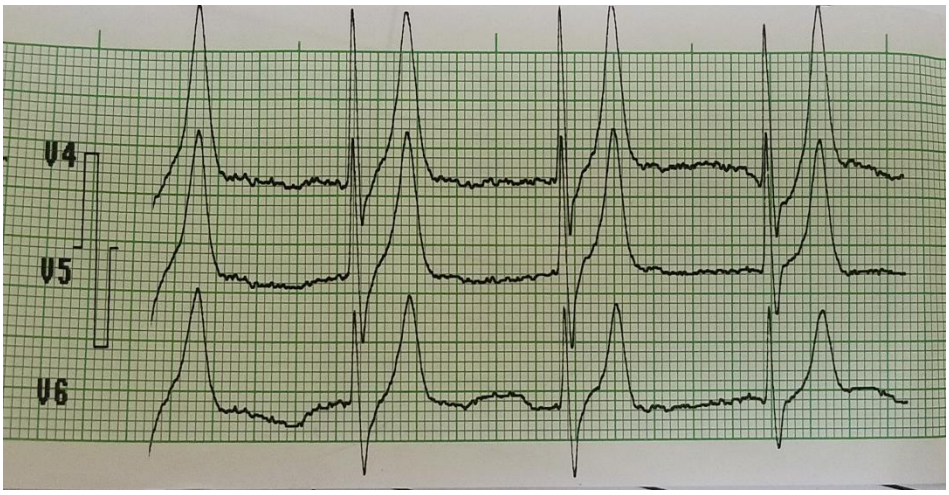

Figure 1. Electrocardiogram of the patient on admission without precordial pain with a stationary Winter ST-T pattern showing peaked/hyperacute and symmetrical T-waves with ascending ST-segment depression in the precordial leads.

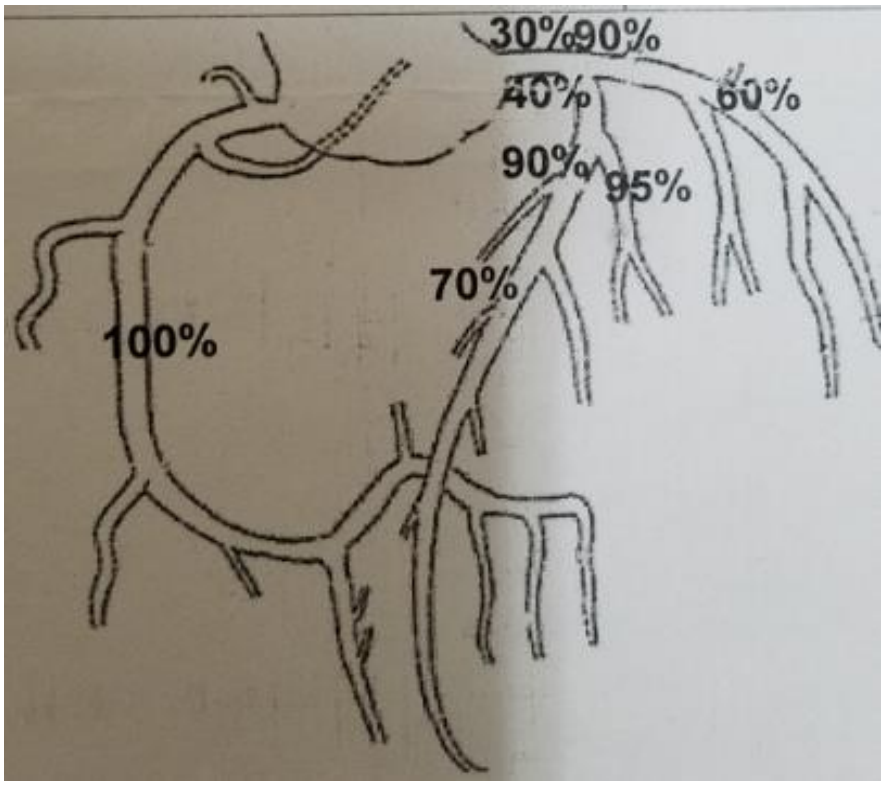

Fig.2. Coronary angiography showing severe multivessel and left main coronary artery disease.

Discussion

The ST-T pattern of De Winter and Wellens, also called Anterior Descending Coronary Artery Syndrome, was described in 2008 when a subgroup of patients with unstable angina was observed who showed specific precordial changes of the T-wave and subsequently developed a large ST elevation myocardial infarction in the anterior wall due to acute occlusion of the anterior descending coronary artery. Patients with the De Winter electrocardiographic (ECG) pattern are observed more frequently in young men and with a higher incidence of hypercholesterolemia compared to the classic pattern of STEMI1. In addition, from the evolution to AMI, the Winter pattern can evolve as a static pattern present in our patient who was taken to the operating room with clinical and electrical stability without changes suggestive of new ischemic events, the De Winter ST-T pattern can also be observed after thrombolytic treatment in a coronary syndrome with ST elevation11.

The mechanisms that explain this presentation are still unknown. As a hypothesis, the presence of collateral circulation, recurrent apical ADA, ionic disorders or a smaller area of necrosis. The current theory is a delay in repolarization in the subendocardial area with a change in the shape of the transmembrane action potential (slow rise and long duration). The sum of this small change with the transmembrane action potential of the subepicardium explains the depression of the J point and the high T wave of the electrocardiographic tracing12.

The ECG criteria are depression with a ascending ST segment (upsloping). In Winter's T wave there is no recognizable ST segment since the T-wave begins early at the base of the QRS, therefore it may visually appear to be ST depression, but it is actually Winter's T-wave. The peaked/hyperacute and symmetrical T-waves are confused with the QRS complex. Unlike the tall and peaked T-waves of Hyperkalaemia, they are high-voltage, broad-based T-waves. Wide QRS is another sign of hyperkalemia, but it may not be present in early stages10-13. These electrocardiographic alterations described in the De Winter ST-T pattern have high specificity for the diagnosis of severe atherosclerotic disease of the proximal anterior descending coronary artery, with a high risk for the development of anterior infarction and high mortality, therefore, for these patients it is The ideal would be to ignore the stress tests and urgently submit them to an angiography to determine the extent of the disease and, if possible, provide a therapeutic percutaneous coronary intervention.12-14. In the case of our patient, he did not have this therapeutic possibility due to history of very severe trunk and multivessel coronary artery disease and was referred to the cardiovascular surgery service with an unfavorable postoperative course because he was a patient with a very high surgical risk.

Finally, we would like to refer to the diagnosis of “De Winter's ST-T” pattern as a variant of high-risk unstable angina in a patient with typical chest pain that is suggestive of acute ischemia due to proximal ADA occlusion and warrants the importance of recognition of the syndrome to achieve a better performance from the hemodynamic point of view on the obstruction of the proximal LAD with the urgent

invasive study if the Hemodynamic Center is less than 3 hours away or thrombolysis in case the transfer is longer. The “De Winter pattern” is one of the patterns of confusion in evolving ST-segment elevation acute coronary syndrome that professionals caring for these patients should be aware of, because delayed diagnosis leads to extensive infarcts and death.15, 16.

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