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Posterior Myocardial Infarction : A Must To Be Considered.

Nafitra Windri[1]
[1]Universitas Andalas
Email: nafitrawindri@gmail.com

ABSTRAK

Gambaran klinis infark miokard posterior tidak selalu jelas. Laporan kasus ini menunjukkan seorang pria Asia berusia 52 tahun dengan angina pektroris tipikal yang didiagnosis menderita infark miokard posterior setelah pasien melakukan tes EKG 15 sadapan secara tidak rutin. Elektrokardiogram pada pemeriksaan menunjukkan depresi segmen ST yang nyata pada sadapan V1 hingga V5. Laporan kasus ini akan menyoroti elektrokardiografi untuk diagnosis dini infark miokard posterior dengan menggunakan sadapan posterior V7 hingga V9 sehingga memudahkan dan mempercepat pengenalan dengan konsekuensi pengobatan dan peningkatan prognosis.

Kata Kunci: EKG, PMI, Diagnosis Dini.

ABSTRACT

The clinical presentation of posterior myocardial infarction is not always clear. This case report shows A 52-years old Asian man with typical angina pectroris that diagnosed with posterior myocardial infarction after unroutinely test 15-lead ECG had done on the patient. The electrocardiogram at presentation showed marked ST-segment depression in leads V1 to V5. This case report will highlight the electrocardiographic for early diagnosis of posterior myocardial infarction by using the posterior leads V7 to V9 leading to easier and faster recognition with consequences for treatment and improved prognosis.

Keywords: *ECG, PMI, Early Diagnosis.*

A. INTRODUCTION

True posterior myocardial infarction (PMI), the easily missed of the electrocardiogram (ECG), is often misjudged and this may be the reason for undertreatment. It is suggested to be one of the most commonly missed types of acute myocardial infarction (MI) electrocardiographic patterns. The clinical presentation of PMI is not different from other myocardial infarctions, but the absence of 'traditional' electrocardiographic infarct signs such as ST-segment elevation can lead to errors or delay in the diagnosis. Correct interpretation and use of the ECG using the additional leads V7 to V9 can establish the electrocardiographic diagnosis of PMI. The term PMI is used to indicate the occurrence of necrosis in the dorsal infra-atrial region of the left ventricle, which is located under the left atrioventricular sulcus. A majority of patients with PMI have stenosis or occlusion of the left circumfex coronary artery (LCx). The LCx is the dominant vessel in 15% of patients, supplying the left posterior descending artery from the distal continuation of the LCx. It provides blood supply to the posterior part of the left ventricle. Acute MI, which involves the posterior wall of the left

ventricle, accounts for 15–20% of the total cases of acute MI. In routine practice, a 12-lead ECG is used to diagnose ST-elevation myocardial infarction (STEMI), especially for the anterior and inferior walls of the left ventricle. Meanwhile, additional ECG leads (V7–V9) reflect the activity of the posterior wall of the left ventricle. These additional leads have increased the rate of PMI diagnoses from "very rare" to 3.3% among all patients with acute MI [6]. On standard 12-lead ECG, the typical indication for MI (ST-segment elevation) of the posterior wall appears as ST-segment depression on the precordial side because the posterior endocardial wall is opposite to the anterior endocardial wall. Specifically, if there is an ST-segment deviation (horizontal > downslope/upslope) that is accompanied by a prominent R wave (R/S > 1 in lead V2) and prominent T waves (or a combination of a deviated horizontal ST-segment and prominent T waves) in leads V1–V3, then it will appear as an ST-segment elevation or Q wave caused by acute PMI when the ECG is reversed.

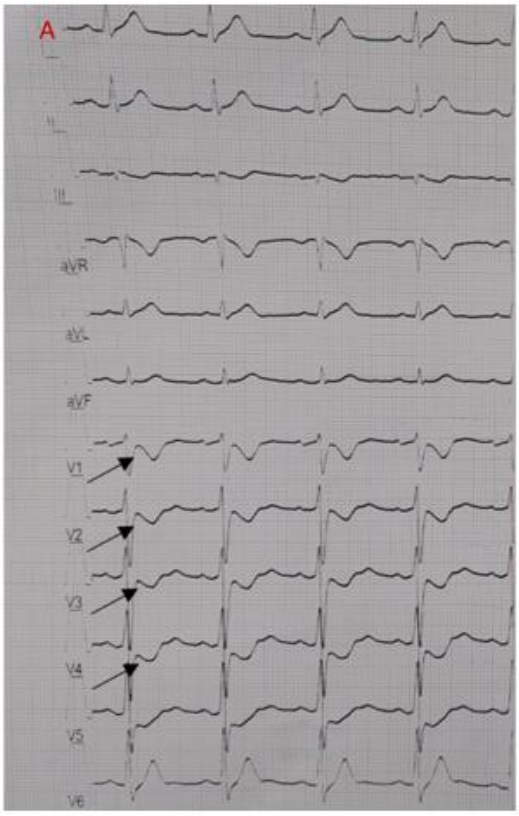
PMI is responsible for subtle changes on the ECG. For the diagnosis of PMI it is important to recognise the clinical signs at presentation, combined with subtle manifestations on the ECG in order to start reperfusion therapy early. This case report explained some of the subtle findings on 12-lead ECG that are suggestive of PMI. Objective of our case report to demonstrate the usefulness of additional leads in identifying ST-segment elevation in the setting of PMI. Using posterior leads in patients presenting with symptoms suspicious for MI will reveal more patients with PMI who will benefit from early reperfusion treatment

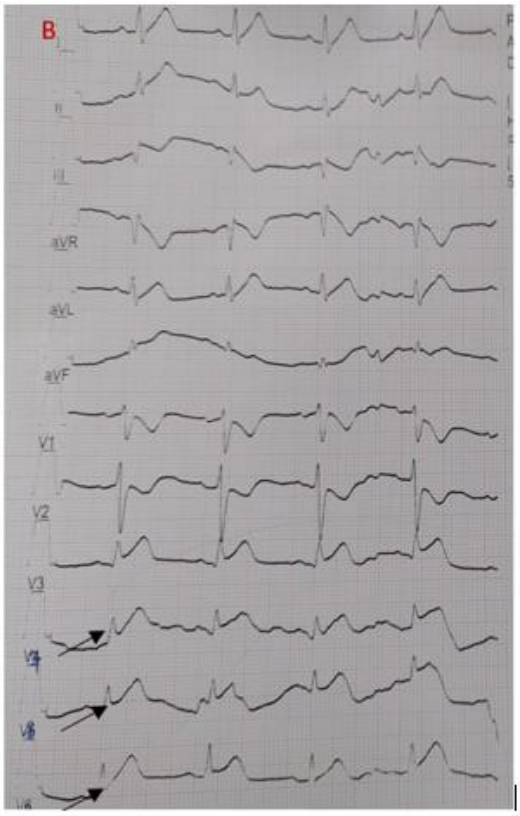
B. RESEARCH METHOD

This research is a descriptive study that contains a case report of a 52-years old Asian man who diagnosed with posterior myocardial infraction. The data of this research taken from medical record of the patient.

Case Presentation

A 52-years old Asian man with a pack per day smoking history was admitted at Sijunjung regional public hospital emergency room with typical chest pain for the past 1 hour. Patient had no history of hypertension, diabetes melitus and previous heart disease. His vital signs were normal. The ECG conducted at our hospital showed downsloping ST depression in V1-V5 and ST elevation in V7-V9 (Fig.1). A posterior STEMI was confirmed. The patient was given loading doses of dual antiplatelettherapy and planned to referred to cathlab center for primary percutaneous coronaryintervention (PCI). Patient arrived at referral hospital in 7,5 hours after first onset of chest pain. Serial ECG examination at referral hospital showed ST elevation in posterior leads. Additionally, Chest X-ray revealed no abnormalities and the troponin T value increased to 16.639 ng/L. Coronary Angiogrphy showed total occlusion of the distal LCx and 70-80% stenosis in mid LAD. Percutaneous transluminal angioplasty 1 stent on proximal-distal LCx. After the procedure, The Trombolysis in Myocardial Infarction Score (TIMI 3) flow was observed in the LCx.





C. RESULTS AND DISCUSSION

All patients who present with chest pain should have a 12-lead ECG. The ECG should be scrutinised for any features that might suggest myocardial ischaemia, infarction or pulmonary embolism. Prompt recognition of these life-threatening conditions will aid in the institution of timeous and appropriate revascularisation therapy.

In normal physiology, the vectors at the end of depolarisation and the beginning of repolarisation neutralise each other. On the ECG, this manifests as a J point (start of ST-segment), which is not deviated from the isoelectric line. This balance of charge is maintained by Na+/K+ ATPase channels, which are dependent on glucose. In coronary artery occlusion, the lack of glucose supply causes malfunctioning of these ion-gated channels, resulting in an imbalance of electrical charge across the myocardial cell membrane. This imbalance in electrical charge manifests as ST-segment deviation. Transmural ischaemia leads to ST-segment elevation in leads overlying the ischaemia, whereas sub-endocardial ischaemia can manifest as ST-segment depression or T-wave inversion.

Myocardial infraction can occure in a part of all the myocard wall. Acute posterior MI is frequently associated with lateral or inferior MI (15–21%). However, isolated posterior MI is rare, accounting for 3.3% of all MI. Patients with electrocardiographic isolated PMI often do not receive the appropriate reperfusion treatment if the clinical diagnosis of MI is not suspected, probably due to lack of the classical ST-segment elevation. Unlike the anterior, lateral, and inferior left ventricle walls, none of the typical 12-lead ECG leads cover the posterior wall, and

initially posterior MI is detected by reciprocal changes in the standard anterior leads (V1–V3). According to the European Society of Cardiology, isolated posterior MI ECG changes are defined as isolated ST segment depression greater than or equal to 0.5 mm in leads V1–V3 and ST segment elevation greater than or equal to 0.5 mm in posterior chest wall leads V7–V9. Due to milder ECG abnormalities, the detection of an isolated posterior MI is more likely to be missed. In the present patient, 12-lead ECG demonstrated ST depression in the V1–V4 segments and ST segment elevation in the V7–V9 segments.

Acute posterior STEMI can be accompanied with inferior STEMI if the culprit lesion is proximal to the posterior descending artery of the right coronary artery. However, isolated posterior STEMI can occur if the culprit occlusion is in a posterior lateral wall branch of the right coronary artery or in the circumflex artery (as in this case). In a posterior STEMI, the evolution of changes over days includes the development of a dominant R wave in V1 (a reciprocal Q wave) or Q waves in V7 to V9 with a T wave that is usually upright in V1.

Mortality reduction is highest when reperfusion of the infarcted vessel is achieved within six hours of pain onset, with the best results during the first ‘golden’ hour. In search of faster and more reliable methods in identifying PMI, the extra posterior leads V7 to V9 significantly increase the detection of posterior injury patterns compared with the standard 12-lead ECG. Lead V7 should be placed at the level of lead V6 at the posterior axillary line, lead V8 on the left side of the back at the tip of the scapula and lead V9 is placed halfway between lead V9 and the left paraspinal muscles. ST-segment elevation of >1 mm in the posterior leads is suggestive of PMI. Using all 15 leads significantly improves the further detection of circumflex coronaryrelated injury pattern over the standard 12-lead ECG.

D. CONCLUSION

This report has highlighted the importance of performing 15-lead ECG In patients presenting with ischaemic symptoms, horizontal ST depression in the anteroseptal leads (V1-3) to raise the suspicion of posterior MI.

REFERENCES

Perloff J. The recognition of strictly posterior myocardial infarction by conventional scalar electrocardiography. Circulation 1964;30: 706-18.

Perlof JK. The recognition of strictly posterior myocardial infarction by conventional scalar electrocardiography. Circulation. 1964;30(5):706–18. https://doi.org/10.1161/01.CIR.30.5.706..

Levis J. ECG diagnosis: isolated posterior wall myocardial infarction. Perm J. 2015;19(4):e143–4. https://doi.org/10.7812/TPP/14-244.

Thejanandan Reddy CS, Rajasekhar D, Vanajakshamma V. Electrocardiographic localization of infarct related coronary artery in acute ST elevation myocardial infarction. J Clin Sci Res. 2013;2:151–60

Rich MW, Imburgia M, King TR, Fischer KC, Kovach KL. Electrocardiographic diagnosis of remote posterior wall myocardial infarction using unipolar posterior lead V9. Chest. 1989;96(3):489–93. https://doi.org/10. 1378/chest.96.3.489

Oraii S, Maleki M, Abbas Tavakolian A, et al. Prevalence and outcome of ST-segment elevation in posterior electrocardiographic leads during acute myocardial infarction. J Electrocardiol. 1999;32(3):275–8. https://doi. org/10.1016/S0022-0736(99)90110-3

Brady WJ, Erling B, Pollack M, Chan TC. Electrocardiographic manifestations: acute posterior wall myocardial infarction. J Emerg Med. 2001;20(4):391–401. https://doi.org/10.1016/s0736-4679(01)00318-3.

E.O.F. van Gorselen, F.W.A. Verheugt, B.T.J. Meursing, A.J.M. Oude Ophuis. Posterior myocardial infarction: the dark side of the moon Case report and review of electrocardiographic diagnosis. Netherlands Heart Journal.2007;15(1).

Ibanez B, James S, Agewall S, Antunes MJ, Bucciarelli-Ducci C, Bueno H, et al. 2017 ESC guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The task force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC). Eur Heart J 2018; 39(2): 119–177.

Klabunde RE. Cardiac electrophysiology: normal and ischemic ionic currents and the ECG. Adv Physiol Ed 2017; 41(1): 29–37.

Boden E, Kleiger R, Gibson R, Schwartz D, et al. Electrocardiographic evolution of posterior acute myocardial infarction: Importance of early precordial ST-segment depression. Am J Cardiol 1987;59:782-7.

Hähnle L, et al. Posterior infarction: a STEMI easily missed. CVJ Africa 2020;31(6)