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Wandering acute myocardial infarction.

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WANDERING ACUTE MYOCARDIAL INFARCTION

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Incorrect electrode placement or cable connection during electrocardiographic (ECG) recording can significantly alter the ECG morphology. We report a case of ST-segment elevation myocardial infarction causing a diagnostic dilemma due to cable interchange.

A 62-year old male with medical history of hypertension, dyslipidemia, and tobacco abuse presented to the Emergency Department with a one hour history of crushing central chest discomfort. He had no history of myocardial infarction or angina, and no family history of premature coronary artery disease. A twelve-lead ECG showed ST- segment elevation in the inferior leads (Figure 1A) with reciprocal ST-segment depression in lead aVL, consistent with an acute inferior myocardial infarction. The patient was emergently taken to the cardiac catheterization laboratory. An ECG with right sided precordial leads on arrival to the catheterization laboratory did not show evidence of acute right ventricular infarction. However, the ST-segment elevation in the inferior leads had resolved. Coronary angiogram showed total occlusion of left anterior descending coronary artery beyond the first diagonal branch, a co-dominant left circumflex coronary artery with moderate lesions in the obtuse marginal branches (Figure 1B), a co-dominant right coronary artery with significant proximal and mid segment stenosis and a totally occluded small posterolateral branch with collateral filling (Figure 1C). Two drug eluting stents were placed in mid left anterior descending coronary artery and 3 drug eluting stents were placed in proximal to mid right coronary artery with resultant Thrombolysis in Myocardial Infarction (TIMI) 3 flow. The patient had resolution of chest pain and he was transferred to the cardiac care unit in stable condition. ECG following the procedure showed ST-segment elevation in the anterior leads with no ST- segment elevation in the inferior leads (Figure 1D). Echocardiogram showed the left ventricular ejection fraction to be 35-40% with

severe hypokinesis of the distal anterior, the apical and inferoapical segments of the left ventricle, consistent with anterior myocardial infarction.

The initial diagnosis of inferior myocardial infarction was based on history and ECG findings. Coronary angiography showed significant two vessel coronary artery disease. Although the right coronary artery would be the culprit lesion based on initial ECG localization, the appearance of the left anterior descending coronary artery with an acute thrombotic occlusion prompted revascularization of both the arteries. The presence of ST-segment elevation in V5 on the initial ECG (Figure 1A) and absence of ST-segment elevation in the inferior leads on right sided ECG were clues to misplaced ECG cables.

Up to 4% of 12-lead ECGs are recorded with incorrect electrode cable connections[1]. This may involve incorrect placement of an electrode, incorrect cable connection, or both[2]. There are 3,628,800 possible interchanges of the ten ECG cables. Interchange of only the limb electrodes or the precordial electrodes without disturbing the neutral electrode causes the waveforms to be rearranged or unaffected, and it does not affect the amplitudes or the duration of intervals. However, interchange of the limb electrodes with precordial electrodes or with the neutral electrode disrupts Einthoven's triangle and Wilson's central terminal thus changing the morphology of the waveforms in the precordial and limb leads[3]. These are more difficult to ascertain and can pose a diagnostic challenge even to experienced electrocardiographers[4,5].

We report a case of misplaced ECG cables which changed the localization of a ST-segment elevation myocardial infarction from the anterior to inferior wall. Lead misplacement can be easily missed unless paying careful attention and could adversely impact patient management.

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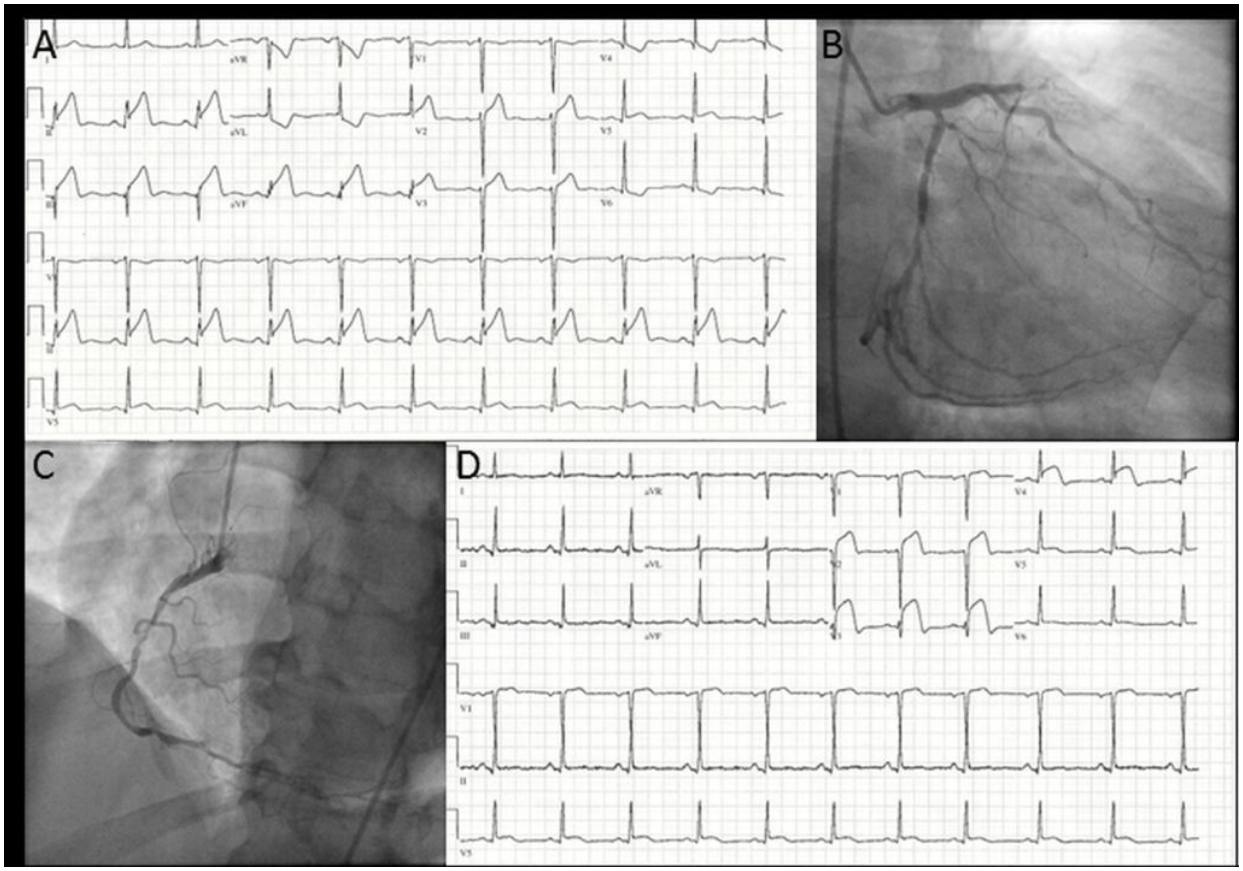
Figure legend:

Figure 1: Misplaced ECG cables resulting in change in localization of myocardial infarction. Initial 12-lead ECG showing acute inferior myocardial infarction (A). Coronary angiogram of the left coronary system (B) and right coronary system (C). Post-procedure ECG suggestive of anterior myocardial infarction (D).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