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Case Report

Acute anterior myocardial infarction seen on conventional iodine-contrast CT

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ABSTRACT

Diagnosis of acute myocardial infarction (AMI) is based on clinical symptoms of chest pain and dyspnea in combination with electrocardiographic changes and a raise in myocardial-specific biomarkers. Imaging is by echocardiography and magnetic resonance. The preferred technique for identification of previous myocardial infarction (MI) is magnetic resonance imaging with late gadolinium technique, but in the acute patient echocardiography is applied. In selected cases, important information can be obtained from other imaging modalities. We describe a case of a patient first suspected of an abdominal catastrophe in whom acute MI was diagnosed from a computerized tomography (CT) scan with iodine contrast. Our case together with a few other cases reported in the literature demonstrate that contrast enhancement of the myocardium can be important to follow in the acute patient because the CT scans sometimes give a unique opportunity to recognize findings consistent with MI even though the CT scan was performed for another reason.

Introduction

Computerized tomography (CT) is increasingly applied in the emergency setting for patients presenting with acute critical illness, and is in the acute cardiac patient, presenting with dyspnea and chest pain, applied to rule out pulmonary embolism and acute aortic dissection. These, however, are only 2 of the 3 feared acute chest pain syndromes, the remaining being acute myocardial infarction (AMI). AMI is diagnosed from a combination of electrocardiogram (ECG), a rise in myocardial biomarkers (troponin or creatine kinase myocardial band, or both), and visual signs of myocardial infarction (MI) by echocardiography or magnetic resonance [1]. In rare cases, information of possible AMI is obtained from iodine CT scan. Here, we describe a patient first suspected of acute abdomen in whom AMI was diagnosed from a CT scan with

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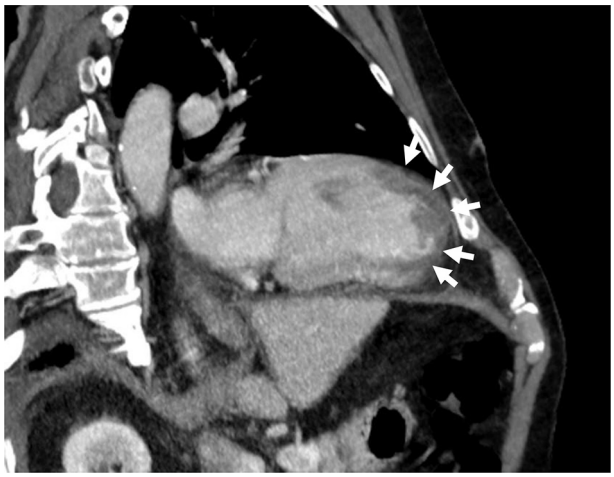

Fig. 1 – CT scan of the heart following iodine-contrast injection, 2 chamber view. Please note widespread subendocardial filling defect of the apex and anterior wall of the left ventricle (dark area in myocardium lightened by iodine contrast; white arrows).

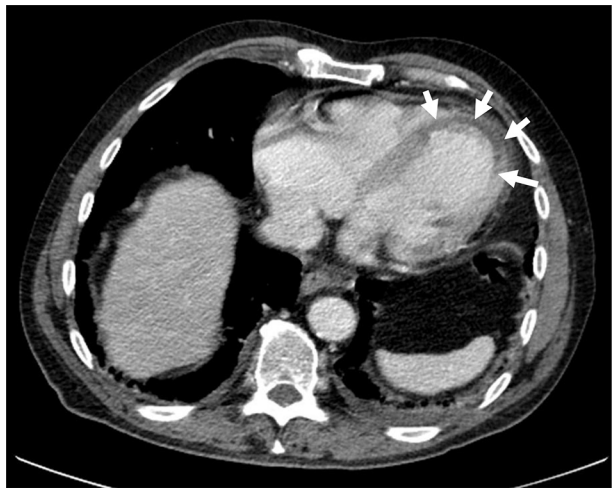

Fig. 2 – CT scan of the heart following iodine-contrast injection, transversal view. Note near-transmural filling defect of the anterior wall of the left ventricle (dark area in myocardium lightened by iodine contrast; white arrows).

iodine contrast. Our case report underlines this overlooked possibility of CT and discusses specificity and sensitivity of diagnosing AMI with iodine CT.

Case presentation

A 49-year-old almost blind and deaf-mute man was admitted to hospital because of what was interpreted by his caregivers through tactile communication as severe abdominal pain. With slightly raised leukocytes and C-reactive protein, the abdominal surgeon suspected intra-abdominal infection. Partly because of problems with obtaining an adequate anamnesis and no obvious focus for the infection, a non–ECG-gated CT-scan of the abdomen and thorax with iodine contrast was performed. Abscess and other signs of localized infection were ruled out, but with infusion of iodine contrast a widespread subendocardial filling defect was noted in the anterior segments of the left ventricle. The iodine filling defect stretching from the midventricular segment of the interventricular septum to anterior segments including lateral segments (Figs. 1 and 2), ie, corresponding to the territory of the left coronary artery.

The ECG confirmed an AMI presenting with ST segment-elevation in leads V_1-V_6 and Q-wave in II, III, and aVF compatible with acute anterior AMI and previous inferior AMI, the latter not visualized by the CT scan (Fig. 3). Transthoracic echocardiography demonstrated akinesia of the apex without dilatation or myocardial thinning in line with AMI. The left ventricular ejection fraction was 35%. Troponin I and creatine kinase myocardial band were 57,000 ng/L (normally <40 ng/L) and 21 μg/L (normally <7 μg/L), respectively. Via the tactile interpreter, the patient was offered acute coronary angiography and thrombolysis, but declined both. He was admitted to the department of cardiology and was treated with blood thinning and subsequently heart failure medication.

Discussion

For stable ischemic heart disease, CT is increasingly used for coronary lumenography with ultralow dose dual source spiral technique [2], and fractional flow reserve studies offer the potential for physiological knowledge on myocardial perfusion; but in light of CTs unrivalled speed and versatility, it is fast becoming a common imaging technique in the critically ill; and CT, as shown in our case, can sometimes be applied to diagnose AMI. Myocardial lipomatous metaplasia and calcifications are sometimes seen suggested to represent chronic MI [3–5], but more often left ventricular thrombi and areas of myocardial wall thinning and aneurysm formation are seen indirectly indicating older infarctions. However, case reports of MI being diagnosed by conventional iodine-contrast CT exist, but are rare [6,7]. In one study of 18 patients presenting with chest discomfort and primary scan indications of pulmonary malignancy, pulmonary embolism, or aortic dissection, MI was incidentally found in 15 patients [8]. Based on these numbers, sensitivities and specificities for diagnosis of MI >80% were suggested, but these sensitivities and specificities have never been substantiated in larger cohorts. Also, to the best of our knowledge, has never been studied in cohorts of patients presenting with more diffuse symptoms, as was the case in our patient. Left ventricular dilatation and lowered ejection fraction may be seen secondary to sepsis, and troponin may be increased in light of sepsis [1,9]; thus, MI can be overlooked in this population, and it is therefore of

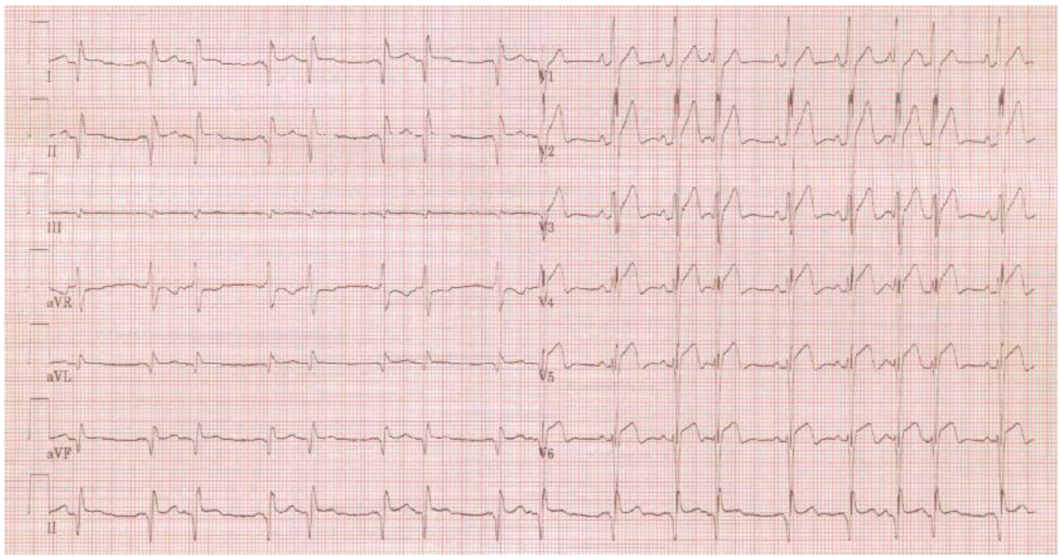

Fig. 3 – 12-lead ECG demonstrating ST-segment elevation in V_1-V_6 and Q-waves in I-III and aVF in patient presenting to the emergency department in whom filling defect of the anteroseptal myocardium was seen on iodine-contrast CT whole body CT scan.

interest that CT may also obtain vital information in such patients.

Conclusion

The preferred imaging technique for identification of AMI is echocardiography in combination with magnetic resonance imaging with late gadolinium technique [1], but in conventional iodine-contrast CT applied in the critically ill, it pays to follow contrast enhancement of the myocardium because it provides a unique opportunity to recognize MI in acute patients.

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