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Cardiovascular Imaging In-a-Month

●Left Main Trunk Coronary Stenosis in an Angina Patient With Low Coronary Risk Factors Assessed by Multi-Detector Row Computed Tomography

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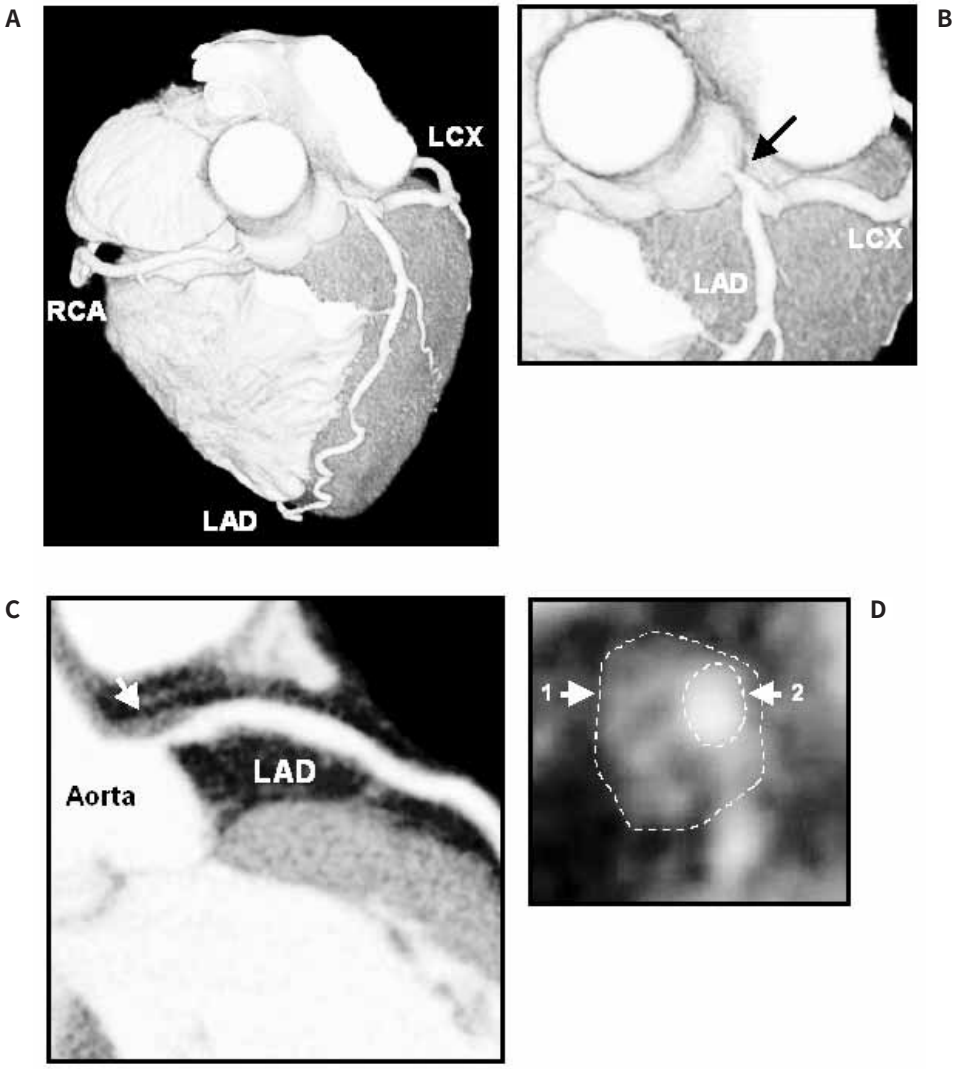

Fig. 1

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CASE

A 51-year-old woman with smoking as the only coronary risk factor was referred to our hospital after complaining of increasing chest pain on mild exertion and even at rest. Electrocardiography at rest showed ST depression of 0.1 to 0.2 mV in leads II, III, aV_F, and V_4 to V_6. Symptoms were relieved by nitrate administration. Next, 64 multi-detector row computed tomography (MDCT) (Aquilion 64, TOSHIBA) was performed for diagnosis (**Fig. 1**).

Point of Diagnosis

MDCT has rapidly become available in many hospitals, and permits non-invasive visualization of the coronary lumen, coronary atherosclerotic plaque, and coronary stenosis,[1] as well as the quantification of coronary artery calcification.[2]

In this case, we detected severe stenosis of the left main trunk coronary artery and coronary atherosclerotic plaque. The mean density of the plaque by MDCT was analyzed on a workstation (ZIO M900 Quadra). Plaque can be categorized into 3 levels based on its mean density.[3] The mean CT numbers for soft, intermediate, and calcified plaque are 14 ± 26, 91 ± 21, 419 ± 194 HU, respectively. In this case, MDCT coronary angiography showed that the mean density of the plaque was 35.9 HU, which was classified as acute coronary syndrome-prone soft plaque. Therefore, the plaque was considered likely to cause sudden occlusion of the left main trunk coronary artery, leading to sudden death. This could occur when the plaque ruptures or as a complication at catheter cannulation in the left coronary artery. MDCT findings regarding the presence of soft plaque from the ostium before invasive coronary angiography can contribute to a careful catheter procedure to avoid fatal cardiac complications. Therefore, we performed invasive coronary angiography and very carefully introduced a 5 Fr Judkins-type catheter (JL-3.5, Terumo) into the left coronary artery. Invasive coronary angiography also showed severe stenosis of the left main trunk coronary artery (**Fig. 2**). Therefore, the patient urgently underwent two-vessel coronary artery bypass grafting without complications. The symptoms improved after the operation, and patency of the bypass graft was confirmed angiographically.

Recent studies have demonstrated approximately 95 % sensitivity and specificity of MDCT angiography for the identification of significant coronary stenosis in comparison with invasive coronary angiography.[4] Thus, findings by MDCT could be useful for considering a safer strategy before performing invasive coronary angiography.

The present case of diagnosis of severe left main trunk stenosis in a patient with low coronary risk factors by MDCT coronary angiography shows the potential for the non-invasive identification of disease of the coronary arteries, especially ostial lesions. Further development of MDCT with regard to spatial resolution could enable coronary artery bypass grafting without the need for invasive coronary angiography in the future.

Diagnosis: Left main trunk coronary artery stenosis

Key Words: Angina pectoris; Angiography; Risk factors; Plaque; Computed tomography

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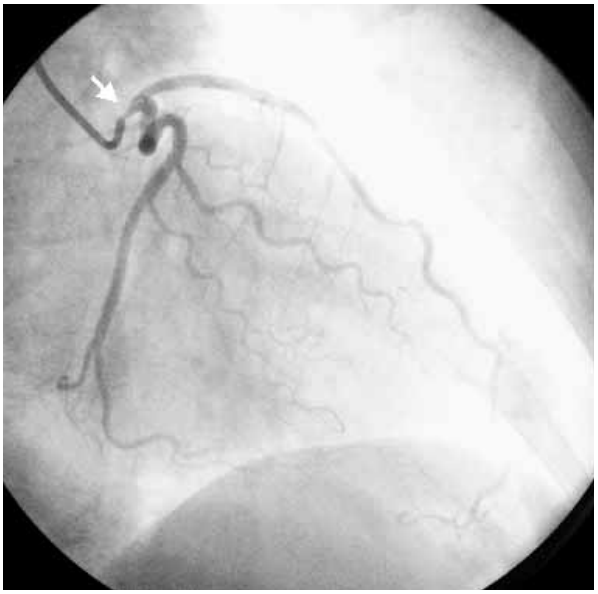

Fig. 2

Fig. 1 64-multi-detector row computed tomography coronary angiograms
A and *B*: Volume rendering images showed severe left main trunk coronary stenosis.
C: Multi-planar reconstruction image demonstrated plaque.
D: Cross-sectional image identified plaque (*arrow 1*) and luminal narrowing of the left main trunk coronary artery (*arrow 2*). The mean computed tomography number of the plaque was 35.9 HU, which was classified as soft plaque.
RCA = right coronary artery; LAD = left anterior descending artery; LCX = left circumflex artery.

Fig. 2 Invasive coronary angiogram showing 90% luminal narrowing (*arrow*) of the left main trunk coronary artery