Coronary artery aneurysm is an uncommon disease. We present a case of an unusual huge saccular coronary aneurysm of the left anterior descending coronary artery detected by 64-slice multi-detector computed tomography (MDCT) coronary angiography, which initially presented as a mediastinal mass on chest X-ray. The true size of the aneurysm would have been underestimated by coronary angiography because it contains substantial thrombus. In our case, the clinical role of MDCT coronary angiography is more superior than the traditional coronary angiography.

CASE REPORT

A 74-year-old man presented to our emergency room with dyspnea and cough for 2-3 days. He had a history of hepatitis B virus- and hepatitis C virus-related chronic liver disease, chronic obstructive pulmonary disease (COPD) without regular management, hypertension and cigarette smoking for 40 years. He had no history of diabetes or congestive heart failure.

Anteroposterior and lateral views of chest x-ray showed a well-defined mass-like lesion with ring-shaped calcification, superimposed with the left heart border and lingual segment (Fig. 1a, 1b).

A chest CT scan was performed to evaluate the mediastinal lesion. In precontrast CT survey, the lesion showed peripheral calcification and it was of close proximity to the left anterior descending coronary artery (LAD). Thus, computed tomography angiography (CTA) was then performed. Within a single breath-hold, CTA was performed on a 64-slice MDCT scanner (TSX-101A, Aquilion, 64, Toshiba medical systems corporation, Tokyo, Japan) with retrospective ECG gating. A total of 80 milliliters of non-iodinated contrast medium was injected through an antecubital vein at the rate of 4.5 ml/sec and flushed with 40 ml saline.
Scan parameters, including 0.5 mm section width, 400 msec gantry rotation time, a tube voltage of 120 kVp, and a tube current of 500 mA were set. The helical scan automatically began when the contrast density in the ascending aorta reached 160 HU. The patient's heart rate was between 87-120 beats/min during scanning. Beta-blocker was not used because he was suffering from COPD with acute exacerbation.

Reconstructed images of the three-dimensional volume-rendered images and maximum-intensity-projection images at various phases of the cardiac cycle were performed on a workstation (Vitrea 2). These images revealed a huge saccular LAD coronary aneurysm with rim calcification, measuring 4.6 x 4.6cm in size (Fig. 2). The aneurysm contained substantial thrombus and it was only filled with small foci of contrast medium (Fig. 3). The distal LAD was not opacified. Severe atherosclerotic change of the left main coronary artery (asterisk) and LAD are found. The right coronary artery (arrow head in b) is shown. A = aorta, P = pulmonary artery, LA = left atrium.

DISCUSSION

Coronary artery aneurysms are defined as abnormally dilated segments with a diameter 1.5 times greater than the normal adjacent artery seg-
Huge LAD aneurysm demonstrated by 64-slice MDCT

Aneurysms of the coronary arteries can be congenital or secondary to arteriosclerosis, inflammatory or infectious diseases (Kawasaki disease, Takayasu disease, systemic lupus erythematosis, or polyarteritis nodosa, endocarditis, syphilis), connective tissue diseases (Marfan’s syndrome or Ehlers-Danlos syndrome), metastatic tumors, and blunt trauma to the chest [3, 4, 5]. Coronary aneurysms also have been described after angioplasty [6]. Although giant coronary aneurysms are usually congenital in origin, the relatively advanced age of our patient and his multiple cardiovascular risk factors suggested arteriosclerosis as the most probable cause of his aneurysm.

According to chest X-ray findings, differential diagnoses of a coronary artery aneurysm include aneurysm of the cardiac chamber, post-traumatic pseudoaneurysms of the ascending aorta or the pulmonary trunk, tumor of the heart or pericardium, and, less likely, thymoma [7].

Most descriptions of large coronary artery aneurysms consist of isolated case reports using coronary angiography, low-detector spiral technology and magnetic resonance imaging (MRI). Coronary angiography remains the standard reference technique for diagnosing coronary aneurysms, but it is invasive. Moreover, coronary angiography may be false negative if the native vessel is occluded [8] and it may underestimate the true size of an aneurysm if the aneurysm contains substantial thrombus.

MRI has been shown to be useful in the diagnosis of giant coronary aneurysm [9], with the advantage over computed tomography (CT) of not using ionizing radiation. Nevertheless, the spatial resolution of MRI is inferior in relation to that of 64-slice MDCT, and MRI is not usually available for critical patients. MRI cannot show the typical linear peripheral calcifications of an aneurysm either, which is important for a correct diagnosis. Additionally, MDCT is faster, cheaper, and more available in many medical centers compared to MR imaging.

64-slice MDCT allows a rapid, noninvasive scan, with better spatial resolution and more accurate delineation of the size and shape of an aneurysm. Thin-section or thin-slab axial images provide the primary diagnostic information. 64-slice MDCT also enables high-quality 2D and 3D reformations such as three-dimensional volume-rendered images and maximum-intensity-projection images. These reconstructed images may be valuable in showing spatial relations among the aneurysm, great vessels, and the heart. These images are also useful in providing an estimate of the aneurysm’s volume. The extent of thrombus in relation to luminal flow can also be depicted with confidence.

Coronary artery aneurysm can be complicated by thrombosis or embolization, with subsequent ischemia and rupture. Congenital aneurysms have been reported to rupture into the pericardial space, causing cardiac tamponade [10], or into the right atrium [11].

The management varies from medical management to stent insertion and surgical ligation. In symptomatic patients, surgical excision and ligation is the procedure of choice [12]. The prognosis for coronary artery aneurysm is controversial. Some

Figure 3. Reconstructed images of maximum-intensity-projection images show a coronary aneurysm (arrow) with rim calcification, communicating with LAD. The aneurysm contained substantial thrombus and it was only filled with small foci of contrast medium.
believe that the presence of coronary artery aneurysm has an independent adverse effect on long-term mortality rate [13], while some mention that the prognosis is based on the coronary artherosclerosis [8]. It has been estimated that coronary artery aneurysm as an independent predictor of mortality has an overall 5-year survival of only 71% [13]. However, the prognosis for large coronary artery aneurysm is still unclear.

In our case, the true size of the aneurysm may be underestimated by coronary angiography because it contains substantial thrombus. 64-slice MDCT not only displayed the delineation of the size and shape of the aneurysm but also showed the extent of thrombus and the luminal flow, and gave a better spatial resolution. The patient did not receive angiography and surgical intervention due to his advanced age, poor medial condition and the absence of symptoms attributed to this large aneurysm. We are following this patient up conservatively and are planning to repeat CTA in six months.

In conclusion, large coronary artery aneurysm is an uncommon lesion that is sometimes associated with obstructive coronary artery disease or sudden death. Coronary artery aneurysms are typically diagnosed on coronary angiography. But, MDCT technology provides a noninvasive alternative to evaluate the abnormality of coronary artery. MDCT also appears to be an easy, rapid and reliable technique to confirm the diagnosis and plan treatment. In our case, the clinical role of MDCT coronary angiography is superior to the traditional coronary angiography.

REFERENCES

以 64 倍切層電腦斷層掃描儀之冠狀動脈血管攝影診斷巨大的冠狀動脈血管瘤：病例報告

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冠狀動脈血管瘤是少見的疾病。我們提出一例於冠狀動脈左前降支的巨大囊狀血管瘤。此病例是以 64 倍切層電腦斷層掃描儀之冠狀動脈血管攝影作診斷。此血管瘤初期在胸部 X 光片呈現出縱膈腔腫塊。這血管瘤含有大量的血栓，因此其實際大小在傳統的冠狀動脈血管攝影必然會被低估。因此在這案例中，多切層電腦斷層掃描儀之冠狀動脈血管攝影在臨床上之價值是高於傳統的冠狀動脈血管攝影。