Calcified Unruptured Aneurysm of the Left Sinus of Valsalva

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ABSTRACT

Aneurysm of sinus of Valsalva is a rare anomaly which can be congenital or acquired. The right coronary sinus is the commonest site of aneurysm formation, with only a few cases reported to arise from the left coronary sinus. Although most patients with unruptured aneurysm of sinus of Valsalva are asymptomatic, fatal complications of unruptured aneurysms of sinus of Valsalva have been reported. These include compression of the coronary artery, ventricular outflow tract obstruction and aneurysm dissecting into the interventricular septum. Thus it is important to recognize the image appearance of aneurysm of sinus of Valsalva to make an accurate diagnosis. In this article, we present an unusual case of unruptured calcified aneurysm arising from the left coronary sinus of Valsalva.

CASE REPORT

A 59 year-old man visited our health management center for health examination. He denied any systematic diseases and denied any discomforts in recent days. The routine physical examination and laboratory data revealed no abnormalities. The electrocardiogram (ECG) showed normal sinus rhythm. The chest radiography delineated a normal cardiothoracic ratio and no focal lung lesions. However, curve-like calcified contour of the aortic root was noted on the posteroanterior (PA) view and lateral view of the chest radiography (Fig. 1). Subsequent ECG-gated contrast material-enhanced multisection computed tomography (CT) showed a calcified unruptured aneurysm of left sinus of Valsalva. The size of this aneurysm was about 3.5 cm (Fig. 2) with mild compression of the left atrium. Although the patient denied any symptoms, we still referred him to our cardiovascular clinic for close follow-up.

DISCUSSION

Sinus of Valsalva is defined as the portion of the aortic root between the aortic valve annulus and the sinotubular ridge [1]. There are three outpouching sinus structures and each sinus is associated with a corresponding right, left, or noncoronary aortic valve cusp.

Aneurysm formation of sinus of Valsalva is rare with unknown true incidence. Although it can be either congenital or acquired, the majority of cases are thought to be congenital [2]. Congenital aneurysms of sinus of Valsalva may result from localized weakness of the elastic lamina or an underlying deficiency of normal elastic tissue (such as that found in Marfan and Ehlers-Danlos syndromes). Acquired aneurysms of sinus of Valsalva commonly are caused by infectious, degenerative conditions and trauma [1, 3]. Congenital aneurysms of sinus of Valsalva usually demonstrate isolated dilatation of a single sinus of Valsalva,
and involvement of multiple coronary sinuses is often associated with an acquired etiology [1, 2, 4, 5].

Approximately 72% of aneurysms of sinus of Valsalva originate from the right sinus and about 22% from the noncoronary sinus. Those originating from the left coronary sinus are extremely rare (only about 6%). Aneurysms of sinus of Valsalva are three to four times as common in men as in women, and five times as common in Eastern and Asian countries as in Western countries [3].

The clinical presentation of aneurysms of sinus of Valsalva varies between asymptomatic and symptomatic. The symptomatic presentation may be related to compression of adjacent structures or related to the intracardiac shunting caused by rupture of the aneurysm into the adjacent space of the heart [1]. Rupture of aneurysm of sinus of Valsalva into the adjacent structures occurs most commonly in right ventricle (55.6%) or right atrium (30.3%). The subsequent aortocardiac shunt often leads to insidious heart failure. Rupture into the extracardiac space is rare, but it can lead to critical complications, such as cardiac tamponade [3]. Although unruptured aneurysms of sinus of Valsalva are usually asymptomatic, depending on the aneurysm size and the consequent mass effect on the adjacent cardiac structures, they may result in serious anatomic or physiologic derangements, such as aortic regurgitation, pulmonary outflow obstruction, tricuspid regurgitation, atrioventricular conduction disturbance and occlusion of the coronary orifice by a thrombus in the aneurysm [6].

The electrocardiography (ECG) findings of aneurysm of sinus of Valsalva are non-specific, as they depend on how severe the aneurysms affect the different levels of cardiac conduction tract. Normal sinus rhythm to complete atrioventricular block have all been reported, as well as sinoatrial conduction disruption and various levels of His bundle block [2].

The imaging criteria for diagnosing aneurysm of sinus of Valsalva includes dilation or enlargement of the sinus of aortic root between the aortic valve annulus and the sinotubular ridge, with normal dimension of the adjacent aortic root and ascending aorta [1, 3].

Angiography is considered the gold standard for proving the presence of an aneurysm of sinus of Valsalva. It can also assess coronary arterial flow, and determine if ventricular inflow or outflow obstruction has occurred by measuring the pressure gradient. However, angiography is more invasive with complications including bleeding, infection and allergic reaction. The use of CT to evaluate chest discomfort patients or to confirm echocardiographic findings has become increasingly popular, because it can be performed rapidly and is readily available in urgent

Figure 1. A 59 year-old man with unruptured calcified aneurysm of the left sinus of Valsalva. Curve-like calcified contour of the aortic root was noted on the PA view and lateral view of his chest radiograph (white arrow in 1a and 1b).
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Figure 2. Oblique coronal (a), oblique axial (b) and axial(c) thin-section maximum intensity projection (MIP) images (d) three-dimension reconstruction angiogram obtained by ECG-gated CT showed an unruptured 3.5cm aneurysm of left sinus of Valsalva (black arrow in 2a) with mild compression of the left atrium. The right sinus of Valsalva had a normal appearance (white arrow in 2b). Calcification of the aneurysm wall (white arrow in 2b) was also seen. The left coronary artery is seen arising from the apex of the aneurysm (arrow in 2c and curve arrow in 2d)

care settings. ECG-gated contrast material-enhanced multissection CT provides excellent spatial resolution of the cardiac structures. It accurately assesses the origin and the size of the aneurysm of sinus of Valsalva, and provides detailed anatomic depiction of the surrounding cardiac structures. Multiplanar magnetic resonance imaging (MRI) with sequences such as balance SSFP gradient-echo and half-Fourier acquisition single-shot turbo spin-echo also can provide good anatomical information. The advantages of performing MR imaging in cases of aneurysm of sinus of Valsalva include the ability to identify aortic regurgitation, evaluate the left ventricular hemodynamic pattern, and
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quantify aortocardiac shunt flow [3].

Urgent surgical repair is recommended in all patients with ruptured aneurysm of sinus of Valsalva [7, 8]. Unruptured aneurysms of sinus of Valsalva with complications (such as ventricular outflow tract obstruction, interventricular dissection and atroventricular conduction disturbance) also need surgical treatment. However, surgical intervention for asymptomatic unruptured aneurysms of sinus of Valsalva is controversial [3]. Regardless of surgery or not, once aneurysms of sinus of Valsalva are diagnosed, serial monitoring has to be initiated because most unruptured aneurysms of sinus of Valsalva have been found to progress and rupture [5]. Therefore some authors believe that aggressive early surgical correction is necessary due to its potential risk of rupture and other complications [7, 8].

REFERENCES

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