Ruptured Sinus of Valsalva Aneurysm into the Interventricular Septum: Report of a Case

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A ruptured sinus of Valsalva aneurysm into the interventricular septum is rare. (1-5) We hereby present such a case, with illustration by means of three-dimension echocardiography (3-D echocardiography).

Case Report

A 31 year-old male patient had been in a “good” condition without any limitation of activity until 3 months before presentation, when he began to complain of anterior chest pain without radiation during exercise. The pain subsided after rest. A grade II ~ III/VI diastolic murmur was heard along the left parasternal border. A chest x-ray revealed a widened mediastinum.

The 2-D and 3-D echocardiography after his arrival at out hospital showed normal heart function and chamber size (Fig 1 & 2). The long axis view of 2-D transthoracic echocardiography showed a 3 × 5 cm aneurysm arising from the proximal aorta and extending into the interventricular septum. Color echocardiography showed a continuous flow in the aneurysm. Severe aortic insufficiency and mitral insufficiency were also revealed. This lesion was further demonstrated by 3-D echocardiography. An aneurysmal sac with an outlet was traced into the interventricular septum. No ventricular septal defect was noted. Aortography during diastole showed severe aortic insufficiency and a continuous flow was noted in the sinus of Valsalva aneurysm of the right coronary cuspid (Fig 3). The long axis view of MRI showed the relationship between the aortic valve and the ruptured sinus of Valsalva aneurysm (Fig 3).

Surgical repair was done under cardiopulmonary bypass. After transecting the aorta, the proximal aorta and aortic valve were exposed, and revealed a sinus of Valsalva aneurysm above the right coronary cuspid. The aneurysm was ruptured at the base of the right coronary cuspid and then into the septum. An outlet was found in the mid-left ventricle (Fig 4). The aortic valve repair was not feasible because of severe prolapse. The aneurysmal sac was obliterated in the mid-left ventricle by four interrupted 4-0 prolene sutures. Then a No. 23 St. Jude...
Fig 1. A. 2D Transthoracic echocardiography, parasternal long axis view. B. 2D color transthoracic echocardiography, parasternal long axis view. The color Doppler echo showed severe aortic insufficiency in the diastolic phase. Communication between the sinus of Valsalva and left ventricle was noted. C. 3-D transthoracic echocardiography, short axis view. The image was acquired from the aortic valve level. A huge coronary sinus of Valsalve aneurysm over the right coronary cuspid was noted. D. 3D transthoracic echocardiography, parasternal long axis view. (“*” indicates the Valsalva aneurysm. The red small arrow indicates the aortic valve. LV: left ventricle, LA: left atrium)

Fig 2. A. 3-D transesophageal echocardiography. The image showed the aneurysm compressing the aortic valve during diastole. And the outlet was seen also. B. 3D color transesophageal echocardiography. The aortic insufficiency and the color flow to the left ventricle were shown. (“*” indicates the Valsalva aneurysm. The red small arrow indicates the aortic valve. LV: left ventricle, LA: left atrium)

Fig 3. A. Aortography. During diastole, the image showed severe aortic insufficiency and the flow form the rupture sinus of Valsalva aneurysm. B. MRI of the heart, long axis view. The image showed the relationship of the aortic valve and the sinus of Valsalva aneurysm. (“*” indicates the Valsalva aneurysm. The red small arrow indicates the aortic valve. LV: left ventricle, LA: left atrium)

Fig 4. A. Photography taken during surgery. The aorta was transected and the aneurysmal sac was traced to the middle of the left ventricle septum area. The outlet in left ventricle was repaired by several interrupt sutures. Then aortic valve was replaced because repair of the valve was infeasible. The right upper figure shows findings during operation. The blue dot line indicates the sutures started from outside the aorta. (“*” indicates the Valsalva aneurysm. The red small arrow indicates the aortic valve. LV: left ventricle, LA: left atrium, RAA: right atrial auricle, NCC: non-coronary cuspid, LCC: left coronary cuspid)
mechanical prosthesis was implanted. The valve sutures over the right coronary cuspid started from the outside of the aorta, then included the aneurysmal sac wall, and finally was fixed unto the aortic valve suture ring. A mitral valve annuloplasty was performed with a No. 32 Edward Physio ring. Then the patient was weaned from cardiopulmonary bypass without difficulty. There was no AV block after operation. He was discharged from hospital without complications. After 6 months of follow-up, the patient was in a good condition.

Discussion

A ruptured sinus of Valsalva aneurysm into the interventricular septum is sometimes called dissecting aneurysm into the interventricular septum in the literature. Such a lesion is rare, and most of reports came from Asian countries.1-5 This condition is usually associated with aortic valve insufficiency and annular dilatation, and it often accompanied by AV block, obstruction of the ventricular outflow tract, and heart failure. Surgical management strategies have been suggested, especially in the presence of aortic valve disease.3 In most cases, rupture of the sinus of Valsalva aneurysm is the causative mechanism. Other etiological factors reported in the literature are trauma, bacterial endocarditis, congenital defects and prosthetic aortic valve replacement.1,6

In some reports, aortic valve repairing was attempted.3,6 In this case, however it was impossible to repair the aortic valve on account of severe prolapse and thickening. The most frequent complication after surgery is the conduction disturbance due to compression of the aneurysm on the conducting system or placement of the sutures over the conduction system.2-4 In this case, the patient was free from arrhythmia after operation. To avoid the conduction disturbance after surgery, the suture should be made carefully, especially near the right coronary artery. The suture could start from outside the aorta, into the annulus and then be fixed unto the suture ring of the aortic valve prosthesis. This outside-in suture method could prevent conduction disturbance.

The diagnosis of dissecting aneurysm into the interventricular septum often needs 2-D echocardiography, angiography, and MRI.7 The MRI of the heart needs the contrast injection and is time-consuming. Angiography is an invasive procedure. Real-time 3-D echocardiography can be done easily at bedside in the ICU. Besides, the 3-D echocardiography can also provide information on heart function, valve structure, and their anatomic relationship to the adjacent tissue, as is showed by MRI and cardiac angiography.

Conclusions

We have reported a case of a ruptured sinus of Valsalva aneurysm into the interventricular septum. The patient underwent surgery without complications. Surgical management is absolutely indicated in such a case. The 3-D echocardiography is a good tool for diagnosis.

References

破裂至心室中隔的主動脈竇瘤：病例報告

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破裂至心室中隔的主動脈竇動脈瘤極為少見，並且病患常合併有程度不一的主動脈瓣閉鎖不全。本篇文章報告一個三十一歲，從前無任何症狀之男子因胸痛就醫，經診發現左前胸有一純張期心雜音，及胸部X光影像有中隔腔擴大狀況。經一系列包括立體心臓超音波的檢查，診斷為破裂至心室中隔之主動脈竇動脈瘤及重度主動脈瓣逆流，病人接受主動脈瓣置換手術治療並且追蹤六個月之後無併發症。