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USEFULNESS OF INTRAVENOUS CONTRAST ECHOCARDIOGRAPHY FOR THE DETECTION OF A RUPTURED SITE OF SINUS OF VALSALVA ANEURYSM

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Abstract: A sinus of Valsalva aneurysm rupture into the right atrium was detected by intravenous contrast echocardiographic negative jet, although transthoracic color Doppler flow mapping suggested that the rupture communicated with the right ventricle.

Index Terms

contrast echocardiography, sinus of Valsalva aneurysm

Sinus of Valsalva aneurysms present with rupture, heart failure, and a loud continuous murmur. Determination of the site of rupture is crucial for operative treatment. Noninvasive diagnosis of sinus of Valsalva aneurysms is now performed entirely with echocardiography. Doppler color flow mapping is useful for detecting the site of rupture[1]. However, the Doppler flow signal is theoretically limited with respect to the direction of the blood flow. In the present study, we describe a case of sinus of Valsalva aneurysm in which color Doppler flow mapping incorrectly identified the site of rupture. However, intravenous contrast echocardiography correctly identified the site of rupture by the production of a negative contrast jet in the right atrium.

CASE REPORT

A 24-year-old man was referred to our hospital because of dyspnea on exertion. On physical examination, a continuous grade IV/VI murmur was appreciated at the fourth left intercostal space lateral to the sternal edge. Chest radiographs showed mild pulmonary congestion. Transthoracic echocardiography was performed. The parasternal short axis view revealed a "wind sock" aneurysm of the right coronary sinus communicating with the right ventricle (Fig. 1). Pulsed Doppler echocardiography revealed turbulence throughout the cardiac cycle. Color Doppler flow mapping demonstrated flow from the aorta into the right ventricular inflow tract (Fig. 2). Intravenous contrast echocardiography using Albnex demonstrated a negative contrast jet in the right atrium and a negative contrast jet in the aneurysm along the border between the right atrium and ventricle (Fig. 3).

Aortic root angiography confirmed an aneurysm of the right aortic sinus communicating with the right atrium (Fig. 4). The aneurysm was successfully resected and the aortic root was repaired surgically.

DISCUSSION

Sinus of Valsalva aneurysm arises from the right coronary sinus in 80% of the cases, and the

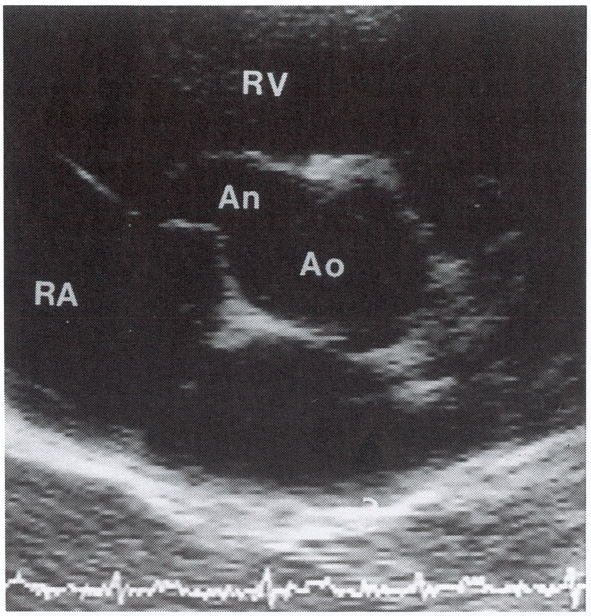

Fig. 1. Transthoracic echocardiography.
A wind sock aneurysm was seen in the right ventricle. RV : right atrium, RA : right atrium, Ao : aortic root, An ; sinus of Valsalva aneurysm.

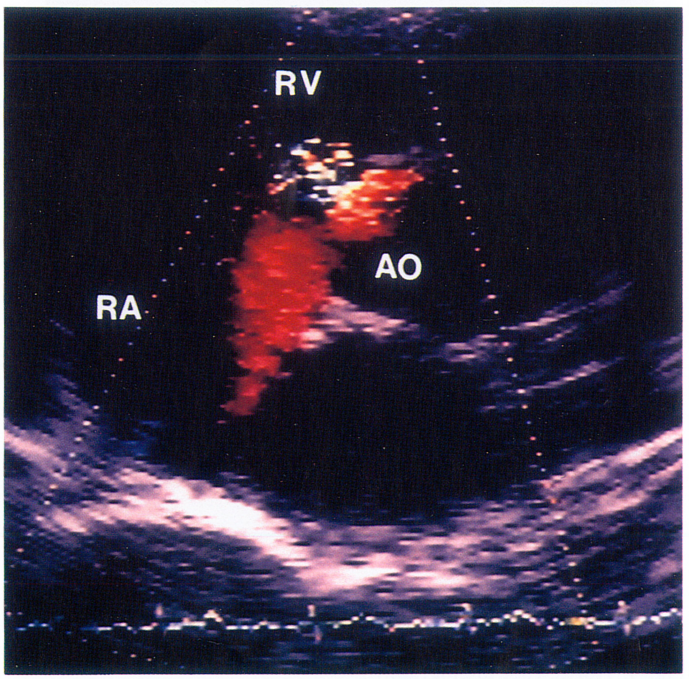

Fig. 2. Color Doppler flow imaging.
Turbulent flow within the aneurysm was noted. RV : right ventricle, RA : right atrium, Ao : aortic root.

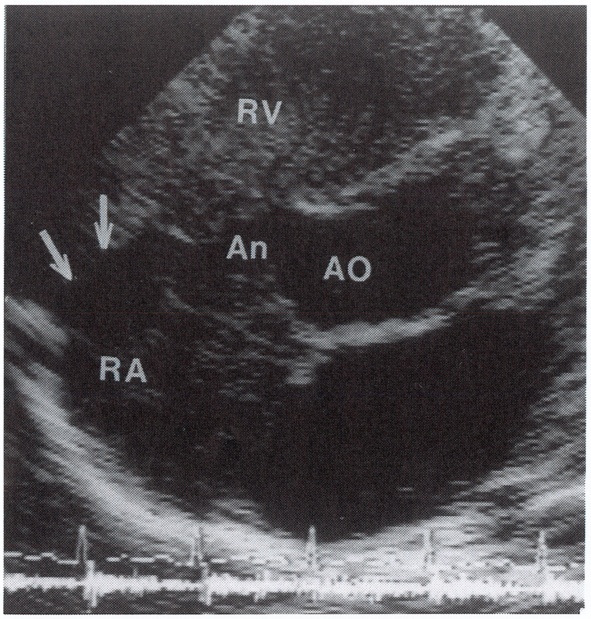

Fig. 3. Intravenous contrast echocardiography.
A negative contrast jet (arrows) was seen within the right atrium. RV : right ventricle, RA : right atrium, Ao : aortic root, An : sinus of Valsalva aneurysm.

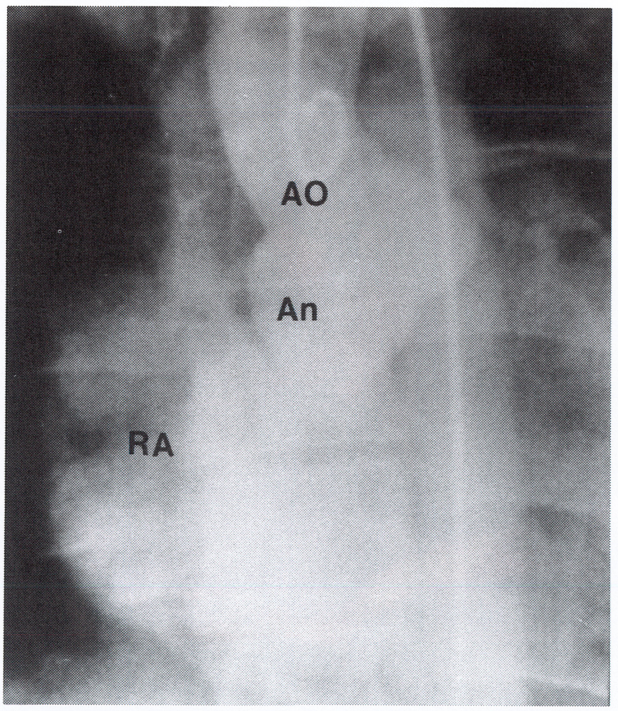

Fig. 4. Aortic root angiography.
Angiography showed that the sinus of Valsalva aneurysm communicates with the right atrium. RA : right atrium, Ao : aortic root, An : sinus of Valsalva aneurysm.

most common sites of rupture of the aneurysm are into the right ventricle and right atrium (63 % and 32 % respectively)[2]. Color Doppler flow mapping is useful for detecting shunt flow in such cases[1]. Color Doppler flow mapping is considered to be an easy and reliable tool to detect the intracardiac flow dynamics[2]. Transesophageal echocardiography also is useful for the detection of the shunt flow in patients with sinus of Valsalva aneurysms[3]. However, Doppler flow determination is limited to identifying the flow only along the echobeam. Therefore, blood flow in a direction vertical to the echobeam may be missed.

Classic intravenous contrast echocardiography is still an important tool to detect flow vertical to the transducer[4]. Intravenous contrast echocardiography may therefore be useful for the noninvasive detection of blood flow from a ruptured sinus of Valsalva aneurysm. There are two reasons that the site of the rupture of sinus of Valsalva aneurysm was confusing in this patient. First, the turbulent flow within the sinus of Valsalva aneurysm resembles flow into the right ventmicle. Second, blood flowing in variable directions from the sinus of Valsalva aneurysms may be difficult to detect by Doppler echocardiography.

New techniques, such as magnetic resonance imaging, may be useful for the detectien of the flow in the aneurysm[5]. Katz et al.[6] have shown that a multifaceted echocardiographic approach, using transthoracic, transesophageal, and intravascular echocardiography, is useful for determining the site of rupture of sinus of Valsalva aneurysms. Intravascular ultrasund may overcome the limitations of other echocardiographic techniques. However, classic intravenous contrast echocardiography is inexpensive, and, based on the present findings, can easily diagnose ruptured sinus of Valsalva aneurysm.

In summary, we demonstrated the clinical usefulness of intravenous contrast echocardiography for the detection of the site of ruptured sinus of Valsalva aneurysm.

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