Right Atrial Aneurysm

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Brief Report

Right atrial aneurysm

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Summary Aneurysmal dilation of the right atrium is described in a four-year-old boy who presented with cardiomegaly and symptoms of congestive heart failure. Echocardiography revealed the aneurysmal dilation of the right atrium, but a definite diagnosis was obtained only after surgical exploration. This had caused compression of the other cardiac chambers resulting in congestive heart failure. Surgical resection was successful and the patient was discharged on the eleventh postoperative day with good results.

Key words: Right atrial aneurysm

ANEURYSMAL DILATION OF THE RIGHT ATRIUM USUally occurs in conjunction with enlargements of other chambers, such as the right ventricle, and can be seen in a variety of conditions such as tricuspid stenosis, regurgitation, right atrial tumors, Ebstein's malformation, or cardiomyopathy. It can also be seen as a part of generalized cardiac enlargement. We report here a child with a right atrial aneurysm that was not associated either with other intracardiac anomalies or with enlargement of other chambers.

Case report

A four-year-old boy was admitted to the hospital with vomiting and cardiomegaly detected only one day earlier. He had been delivered at term by cesarean section without perinatal problems. Precordial bulging had been noted since the age of one year, but was not seen as a matter for concern. At the time of his initial examination in the emergency room, his systemic blood pressure was 90/50 mm Hg, the pulse rate was 120 bpm, the respiratory rate was 30 breaths per minute, and the body temperature was 36.3 °C. Physical examination revealed mild hepatomegaly and precordial bulging. The heart sounds were regular and louder at the back without any audible murmurs. The electrocardiogram demonstrated regular sinus rhythm (100 bpm), a QRS axis of 45°, low QRS voltage, and a negative T-wave in lead II. Laboratory tests were within normal limits except for raised cardiac enzymes (SGOT/SGPT) at 1000/721 U/l. Chest X-ray revealed a large mass in the anterior mediastinum. When the patient was admitted, the heart rate had risen to 220-260 bpm. Paroxysmal supraventricular tachycardia was noted on the electrocardiogram. After treatment with verapamil, the heart rate decreased to 150-220 bpm. An echocardiogram showed a large cystic mass communicating with the right atrium and compressing the heart just beneath the sternum. A small echogenic mass in the cystic cavity was also detected, suggesting a large right atrial aneurysm with calcified thrombus (Figure 1). A computed tomographic scan of the chest and ultrasonography demonstrated a large cystic mass in the anterior mediastinum, containing fluid and calcified material, which did not communicated with the heart. Because of this observation, the diagnosis "cystic teratoma" was considered most likely and ultrasonographically guided aspiration was performed. Cardiac arrest developed immediately after aspiration of the dark blood, and the patient was transferred to the operating room under cardiopulmonary resuscitation for the management of cardiac tamponade.

Exploration of the mediastinum revealed a large mass covered by pericardium. The intrapericardial cystic mass measured 12 x 10 cm, had a soft and smooth surface, and a thrill was not palpable. It was anchored to the right anterior portion of the heart, and compressed the remaining portion of the heart posteriorly. The aorta and the superior and inferior caval veins were cannu-

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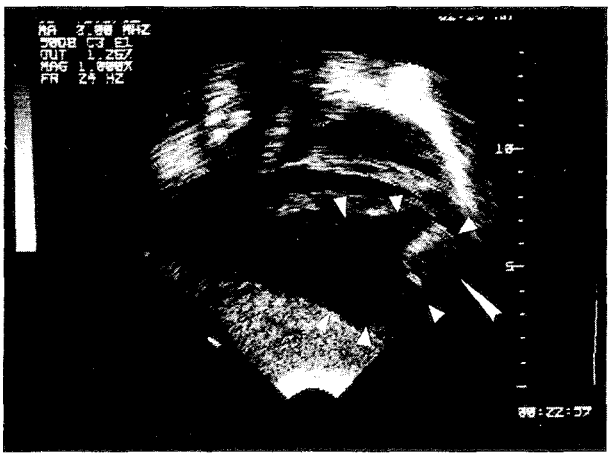

Figure 1. *Preoperative echocardiography. Arrow head indicates the intracystic echogenic mass (calcified thrombi). Small heads indicate the aneurysmal portion.*

Figure 2. *Resected right atrial aneurysm with a large thrombus which contains a calcified (white) nodule.*

lated and cardiopulmonary bypass was established without hypothermia. Immediately after commencing cardiopulmonary bypass, the mass collapsed. On making a linear incision, the wall of the mass was found to be thin and was continuous with the right atrium without interruption. A 3 x 3 cm calcified thrombus was detected in the cavity. After removal of the thrombus, the atrial cavity was irrigated with saline to remove any residual thrombus. The tricuspid valve was normal in appearance and no insufficiency was detected with a saline leakage test. The dilated aneurysmal portion of the atrium was resected and the remainder of the atrial wall was closed with a continuous suture of 5-0 polypropylene. The resected portion of atrium measured 9 x 8 cm. Total cardiopulmonary bypass time was 41 minutes. Aortic cross-clamping was not used. The patient was weaned from bypass without difficulty. Pathologic examination revealed that the resected portion of the dilated atrial wall was compatible with the diagnosis of atrial aneurysm, while the mass was an organizing thrombus with dystrophic calcification (Figure 2).

Postoperatively, the hemodynamics were stable and the patient became conscious on the second postoperative day with left side hemiparesis, most likely a sequel of the preoperative cardiac arrest. The neurologic deficit improved and the patient could walk unaided on the seventh postoperative day. The computed tomographic scan of the chest, the echocardiogram, and electrocardiograms taken postoperatively were normal. Eleven days after operation, the patient was discharged with minimal weakness of the left leg. At one year of follow-up, he was asymptomatic and the gait was normal.

Discussion

Aneurysmal dilation of the right atrium is a rare condition, first described in 1676.[1] As far as we are aware, only four cases have been reported in the literature since that time.[2-4] It is difficult on occasion to distinguish cardiac aneurysms from tumors contiguous with the heart, particularly when thrombus is present within the cavity. Our particular case was misdiagnosed until the time of surgical exploration. Cross-sectional echocardiography may be the preferred method for diagnosis and to exclude other conditions, such as a loculated pericardial effusion, pericardial cyst, or other extrathoracic cystic structures.[5,6]

Three major problems were associated with our case: congestive heart failure, arrhythmia, and mural thrombus. Congestive heart failure was due to the mass effect of aneurysmal portion of the right atrium compressing the heart posteriorly. As the right atrium dilates, in accordance with Laplace's law, the wall tension increases and the factors that further increase global or regional atrial dilation themselves increase rapidly.

The second problem was paroxysmal supraventricular tachycardia. The thin wall of the aneurysm and the adjacent atrial tissue might have caused inhomogeneous refractoriness to induce the re-entrant tachyarrhythmia. Such an arrhythmia may not be easily controlled by medical management, and resection of the aneurysmal portion is the treatment of choice. Relative stasis resulting from the conformational changes and rough endocardium contributed to formation of thrombus, which may increase the potential for pulmonary embolization. Although mural thrombus was found in the aneurysmal cavity of our case, there was no evidence of distant embolization. Our experience showed that surgical resection of the aneurysm and reduction plasty are appropriate procedures for correcting the abnormalities that are the result of right atrial aneurysm.

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