The Heart Surgery Forum #2015-1293
18 (5), 2015 [Epub October 2015]
doi: 10.1532/hsf.1293

Online address: http://journal.hsforum.com

An Epicardial Mesothelial Cyst Attached to the Ascending Aorta

Yoshihito Suenaga, Tomonobu Abe, Masato Mutsuga, Yoshimori Araki, Akihiko Usui

Department of Cardiac Surgery, Nagoya University Graduate School of Medicine, Nagoya, Japan

ABSTRACT

An epicardial mesothelial cyst, which can be defined as a mesothelial cyst attached to the epicardium surrounding the heart and the great vessels inside the pericardial sac, is a rare condition. We herein report a case of epicardial cyst, which was attached to the ascending aorta. The patient was a 76-year-old male who underwent coronary artery bypass surgery, and the cyst was found incidentally. It was approximately 5 cm in diameter, and histological examination confirmed mesothelial cell origin. The ascending aorta has not previously been reported as the origin of an epicardial mesothelial cyst. This case gives new insight into the embryology of these cysts.

BACKGROUND

An epicardial mesothelial cyst, which can be defined as a mesothelial cyst attached to the epicardium surrounding the heart and the great vessels inside the pericardial sac [Omeroglu 2004], is a rare condition. We herein report a case of epicardial cyst, which was attached to the ascending aorta. To our knowledge, only nine cases with clear documentation of mesothelial cell origin have been reported to date [Beirne 1954; Debus 2001; Edwards 1972; Hatemi 2012; Komeda 1985; Omeroglu 2004; Ozasa 1991; Scrofani 2002] and the attachment to the ascending aorta has never been reported before.

CASE REPORT

A 76-year-old male with Canadian Class 3 angina was referred to undergo coronary artery bypass grafting (CABG) for double vessel disease. He also was noted to have a cyst inside the pericardium, which was incidentally found by a preoperative computed tomography scan, and was thought to be a pericardial cyst by the radiologists. He had undergone replacement of the infra-renal aorta for an abdominal aortic aneurysm three years earlier. He was hypertensive, and had chronic kidney disease. A coronary angiogram showed 75% stenosis at the proximal left descending artery, and 100% occlusion of the right coronary artery. CABG was scheduled as an elective surgery, and we planned to excise the suspected pericardial cyst at the same time.

Received May 23, 2015; accepted August 10, 2015.

Correspondence: Tomonobu Abe, MD, Department of Cardiac Surgery, Nagoya University Graduate School of Medicine, 65 Tsurumai-cho, Showa-ku, Nagoya, Japan 466-8550; 052-741-2111 (e-mail: tomonobuabe@med.nagoya-u.ac.jp).

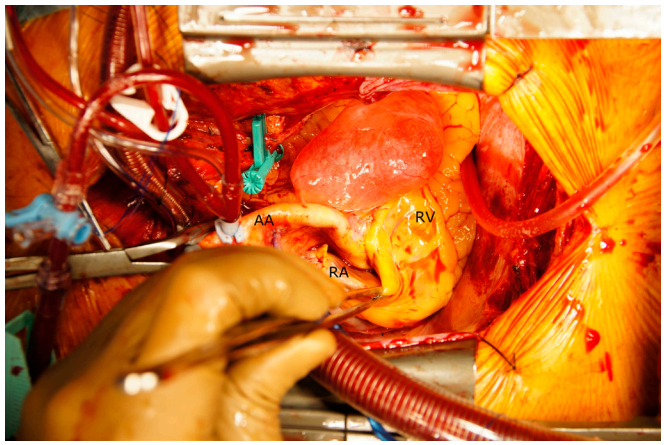

Figure 1. AA indicates ascending aorta; RA, right atrium; RV, right ventricle; LV, left ventricle.

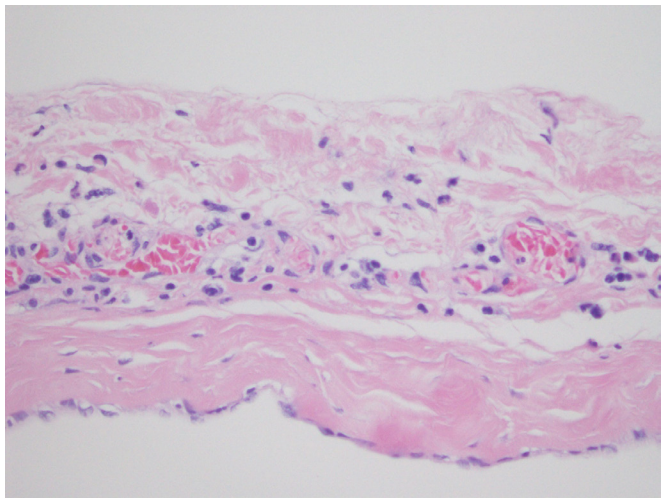

Figure 2. Monolayer of flattened mesothelial cells on the cyst lumen.

At surgery, a median sternotomy was made. The pericardial sac was carefully opened. Unexpectedly, the cyst was not attached to the pericardium, but to the visceral epicardium. The cyst was located over the right ventricle, the right atrium, and the aortic root (Figure 1). It was thin-walled, and 5.5 × 4.0 cm. The coronary artery bypasses were performed first with a standard on-pump technique. The cyst was then resected under cardiac arrest after all of the anastomoses for the coronary artery bypass had been performed. It became apparent that the cyst was attached to the epicardium of the

Case Reports of Patients with Epicardial Cysts

Report/Year in the pericardial sac	Spatial position of the cyst	Location of attachment of the cyst
Beirne/1954	Upper anterior	Pulmonary artery
Komeda/1985	Upper anterior	RA and RV
Scrofani/2002	Upper anterior	RA
Present Case	Upper anterior	Ascending aorta
Edwards/1972	Posterior	Posterior LV
Debus/2001	Posterior	Posterior LV
Hatemi-2/2012	Posterior	Posterior LV
Ozasa/1991	Middle anterior	Anterior ventricles
Omeroglu/2004	Middle anterior	Anterior ventricles
Hatemi-1/2012	Multiple	Whole surface

RA indicates right atrium; RV, right ventricle; LV, left ventricle.

ascending aorta, not to the heart. The rest of the surgery was completed in the usual manner. The patient's postoperative course was uneventful.

On histological examination, the cyst lumen was found to be lined by a monolayer of flattened mesothelial cells (Figure 2).

DISCUSSION

An epicardial mesothelial cyst, which can be defined as a mesothelial cyst attached to the epicardium surrounding the heart and great vessels inside the pericardial sac, is an extremely rare condition [Omeroglu 2004] . To our knowledge, only nine cases with a clear pathological documentation of mesothelial cell origin have been reported to date [Beirne 1954; Debus 2001; Edwards 1972; Hatemi 2012; Komeda 1985; Omeroglu 2004; Ozasa 1991; Scrofani 2002]. Epicardial cysts are histologically identical to pericardial mesothelial cysts, which are much more common.

There are three major theories about the origin of pericardial mesothelial cysts. Lambert considered that extrapericardial cysts develop as a result of a failure of coalescence of the mesodermal spaces [Lambert 1940]. Lillie et al, however, suggested that these malformations occur at a later date when the coalescence is complete [Lillie 1950]; at this stage, the pericardial cavity possesses two ventral recesses which end in the septum transversum. Lillie's theory explains the high percentage (50-77%) of pericardial cysts located at the right cardiophrenic angle. In addition, some believe that cysts are an acquired disease [Omeroglu 2004].

The positions of the mesothelial cysts are important when discussing these theories. We found that the cysts were present in the upper anterior part of the pericardial sac in front of the aortic root in four of ten cases, including our present case [Beirne 1954; Komeda 1985; Scrofani 2002] (Table). Interestingly, although they existed at the same place inside the pericardial sac of the heart, they attached to different parts of the heart; to the right atrium and right ventricle [Komeda 1985], to the right atrium [Scrofani 2002], to the pulmonary trunk [Beirne 1954], and to the ascending aorta in our case.

It would be natural to speculate that an uncoalesced cyst existed first, which subsequently became attached to the adjacent structure. Lambert's theory seems to be acceptable for the etiology of the epicardial cysts. Since two of ten cases were found in children [Debus 2001; Komeda 1985], it may be natural to speculate that this condition would be congenital rather than acquired.

In conclusions, we observed a patient with an epicardial cyst attached to the ascending aorta. This area has not previously been reported as the origin of an epicardial mesothelial cyst, and gives new insight into the origin of these cysts.

REFERENCES

Beirne MF, Berkheiser SW. 1954. Benign epicardial cyst: a case report. J Thorac Surg 27:603-4.

Debus V, Krasemann T, Semik M. 2001. An epicardial cyst in a child. Cardiol Young 11:660-2.

Edwards MH, Ahmad A. 1972. Epicardial cyst: a case report. Thorax 27:503-6.

Hatemi AC, Kumbasar U, Servet E, et al. 2012. Epicardial cysts: report of two rare cases. Heart Surg Forum 15:E49-50.

Komeda M, Miki S, Kusuhara K, et al. 1985. Epicardial cyst. Report of a case with successful resection. Jpn Circ J 49:1201-5.

Lambert A. 1940. Etiology of thin-walled thoracic cysts. J Thorac Surg 10:1-7.

Lillie WI, Mc DJ, Mc, Clagett OT. 1950. Pericardial celomic cysts and pericardial diverticula; a concept of etiology and report of cases. J Thorac Surg 20:494-504.

Omeroglu SN, Omeroglu A, Ardal H, et al. 2004. Epicardial mesothelial cyst located over the left anterior descending coronary artery. Tex Heart Inst J 31:313-5.

Ozasa A, Nakazawa K, Kamegai M, et al. 1991. A case of epicardial cyst. Jpn Circ J 55:53-7.

Scrofani R, Carro C, Beretta L, et al. 2002. Successful resection of an epicardial cyst. Ann Thorac Surg 73:1633-4.