EPICARDIAL CYST
— Report of a Case with Successful Resection —

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As a result of mass-screening, a 7-year-old girl was noted to have an abnormal
shadow and was subsequently diagnosed as having a pericardial cyst. During
surgery, we discovered that the cyst originated from the epicardium, and only
its free wall was resected with the cyst left open to the pericardial cavity.
The postoperative course was uneventful. This is presumed to be the first
case of epicardial cyst ever reported in Japan.

In diagnosing the epicardial cyst, the use of chest films, echocardiography
and computed tomography assist angiography in making a differential diag-
nosis from intracardiac lesion. In treatment, surgical resection is advised.
Even though the cyst may be asymptomatic, the possible compression on the
surrounding organs and possible rupture into the pericardial cavity must be
avoided.

SINCE the first pericardial cyst was identified
by Edwards in 1927, many cases have been
reported. Among pericardial cysts, however,
the epicardial cyst that originates from the
epicardium is extremely rare. We found only one
case report in the literature of an epicardial cyst,
which was made by Edwards in 1972. To
date, no Japanese case has been described.
We recently diagnosed an epicardial cyst and
accomplished a successful resection.

CASE REPORT
A 7-year-old Japanese girl was admitted to
Tenri Hospital in September, 1982, following
abnormal findings on a chest film.

Although her birth and subsequent develop-
ment were normal, upon her elementary school
screening examination, cardiomegaly was noted
in her chest x-ray and she was referred to this
hospital for further evaluation. Catheterization
was performed and a pericardial cyst was
suspected.

Physical examination
The patient had a normal developmental
history. She was 125 cm in height and 24.3 kg in
weight. Her blood pressure was 114/52 mmHg
and pulse rate was 70/min and regular. She was
not cyanotic. There were no abnormal physical
findings in the chest, abdomen, or extremeties.

Laboratory findings
Laboratory data on admission were as follows:
RBC 388 x 10⁶, Ht 38.5%, platelet 19 x 10⁴,
WBC 7,900 (Lym 53%, Mono 5%, N.Seg 37%,
N.Band 4%), glucose 81 mg/dl, cholesterol
139 mg/dl, cholinesterase 1.28ΔPH, total protein

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7.4 g/dl, albumin 4.2 g/dl, globulin 3.2 g/dl, total bilirubin 0.5 mg/dl, SGOT 19 Karmen Unit, SGPT 13 Karmen Unit, LDH 37.4 Unit, hamma GTP 14 mIU, alkaline phosphatase 7.5 B.U., BUN 11.5 mg/dl, creatinine 0.4 mg/dl, uric acid 3.7 mg/dl, Na 143 mEq/l, K 4.6 mEq/l, Cl 105 mEq/l, Ca 4.7 mEq/l, P 4.3 mEq/l.

Evaluation
The patient's chest film showed a projection of the right border of the heart, and CTR was 60% (Fig. 1). The electrocardiogram revealed a normal sinus rhythm and normal electrical axis. There were no findings suggesting atrial or ventricular overload (Fig. 2). On echocardiogram, both the four-chamber view and the short-axis view revealed a cystic structure located on the atroventricular groove and overriding the right atrium and right ventricle. The long-axis view gave normal results (Fig. 3). Enhanced computed tomography showed a low density area in the right side of the heart which suggested a cystic structure in the heart (Fig. 4).

Cardiac catheterization and angiographic examination were performed, and the cardiac index determined by Fick's principle was 4.6 L/min/M². Other results of the catheterization were as follows: 6 mmHg in superior vena cava, 5 mmHg in inferior vena cava, 5 mmHg in right atrium 25/0–5 mmHg in right ventricular inflow portion, 25/0–5 mmHg in right ventricular outflow portion, 23/9(15) mmHg in main pulmonary artery, 116/56(80) mmHg in femoral artery. There was no elevation of O₂ suggesting shunt. A superior vena cavography taken from an antero-posterior view showed the right atrium was compressed and deformed by the cyst from the lateral side (Fig. 5). From the above findings, pericardial cyst was diagnosed.

Surgical procedures
An incision was made along the median line, and median sternotomy was performed. After pericardiectomy, the heart and the cyst were exposed. The cyst was 55 x 33 mm in size, elastic soft, and well-tensioned. It overrode the area between the right atrium and right ventricle and was covered by the epicardium on its surface. There was no adhesion between the cyst and the pericardium. The right coronary artery was curved along the cyst on the apical side.

From these findings, we judged the cyst originated from the epicardium of either the right atrium or the right ventricle. Therefore, we resected only its free wall, taking care not to injure the coronary artery and its branches. The cyst wall was 3 mm in thickness and richly vascularized. In the cyst, there were many trabecular structures and, in some parts, membranous or muscular structures. Brown-colored effusion was retained (Fig. 6A). The cyst was left open into the pericardial cavity and its cut

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edge was hemostated. The wound was closed in the routine manner (Fig. 6B).

Pathological findings
The inner surface of the cyst was covered by flat cells, which were judged to be mesothelium. For this reason, the cyst was thought to have originated from the pericardium or epicardium (Fig. 7).

From both macroscopic and microscopic findings, the diagnosis of epicardial cyst was confirmed. The patient's postoperative course
was uneventful, and she was discharged on the 12th postoperative day. Since that time she has been followed-up in the outpatient clinic and she is now leading a normal life. Her chest film 2 years after the operation showed normal cardiac configuration (Fig. 8).

DISCUSSION

Since the first autopsy case was reported by Edwards\(^1\) in 1927 and the first case of resection by Pickhardt\(^2\) in 1934, pericardial cysts have been reported by many authors. According to LeRoux\(^3\), the incidence is 1:100,000. In Japan, the first case of pericardial cyst was reported by Kasai et al\(^4\) in 1957 and more than 150 cases have been reported to date.

Grundman\(^5\) studied the localization of pericardial cysts in 92 cases, and reported that 51% of the cysts originated from the right cardio-

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Fig.7 Pathological findings suggest pericardial or epicardial origin of the cyst.

Fig.8. Follow-up chest film 2 years after the operation.

phrenic angle and 38.3% originated from the left cardiophrenic angle. Thus, most of pericardial cysts originate from cardiophrenic angles. In Japan, Fujimoto et al. reported that in 138 cases the right cardiophrenic angle accounted for 52%, the left cardiophrenic angle 17%, and the right superior mediastinum 16% of pericardial cysts.

However, epicardial cysts originating from epicardium in the pericardial cavity are extremely rare: we found only one case report of resection by Edwards in 1972.

The patient with an epicardial cyst is generally asymptomatic, but when the cyst grows large enough to compress the surrounding organs, symptoms will inevitably appear. Our case was found incidentally by chest x-ray on a screening examination. Chest film, two-dimensional echocardiography, and computed tomography are useful in diagnosing pericardial cyst. For differential diagnosis between intracardiac and extracardiac lesions, however, an angiocardiogram is mandatory.

Considering the probability of compression by the cyst on the heart, great vessels, and trachea and the possibility of rupture into pericardial cavity or thorax, surgical resection is recommended. In resecting the cyst, if the coronary artery runs along the margin of the cyst, as in our case, it is necessary to take great care not to injure the artery.

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REFERENCES