Aortic-Left Atrial Communication

A Diagnostic and Therapeutic Problem

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In recent years, aneurysms of the
sinus of Valsalva with communication be-
tween the root of the aorta and intracardiac
chambers as well as communication between
the aorta and pulmonary artery, mediastinum,
periocardium, superior vena cava, or pleural
cavity have been reported fairly frequently.
Only rarely has an aortic-left atrial communi-
cation been reported.1-3 The present report
concerns a young woman with chronic rheu-
matic heart disease with severe mitral insuffi-
ciency, moderately severe aortic insuffi-
ciency, and a communication between the
noncoronary sinus of Valsalva and the left
atrium. The reasons for reporting this case
are: (1) An aortic-left atrial communication
is a rare lesion. (2) Sinus of Valsalva aneu-
rysms with fistulous communications have
only uncommonly been reported with rheu-
matic heart disease.2,4 (3) In the presence of
aortic and mitral insufficiency, the diagnosis
of such a lesion can be extremely difficult.
(4) Such a lesion may present special prob-
lems for the cardiovascular surgeon at the
time of cardiopulmonary bypass.

Report of Case

The patient was a 28-year-old Puerto
Rican female who was referred to the hospital because of
rheumatic heart disease and progressive symp-
tomatology. She had rheumatic fever at age 18
and did fairly well until 1957 when atrial fibril-
lation and congestive heart failure developed.
In 1958, she had her first child and after this
she did poorly with bouts of atrial fibrillation
and congestive failure. During the past 1½ years,
she had had a progressive downhill course with
marked easy fatigability, weakness, severe dysp-
nea on exertion, and frequent attacks of atrial
fibrillation.

Physical examination revealed a chronically ill
female in no distress. The pulse was 88 and ir-
regular, blood pressure 120/70/50 mm Hg in
either arms. The peripheral pulses were collapsing
in quality. The cardiac apex was in the sixth
intercostal space at the anterior axillary line
with a prominent left and right ventricular heave
and a systolic apical thrill. The second heart
sound was palpable. A grade III-IV/VI pansys-
tolic blowing murmur was present at the apex
with radiation to the axilla and left infrascapular
area. A grade II-III high-pitched blowing dias-
tolic murmur maximal in the right second inter-
costal space was heard also along the lower
left sternal border. A grade I-II systolic ejection
murmur was heard along the lower left sternal
border. The second heart sound was moderately
increased in intensity and narrowly split. There
was a prominent protodiastolic filling sound fol-
lowed by a very short diastolic rumble at the
apex.

Routine laboratory studies including complete
blood count, urinalysis, and serology were nor-
mal. A sedimentation rate, C-reactive protein and
antistreptolysin-O (ASO) titer were negative or
within normal limits.

The electrocardiogram revealed atrial fibrillation,
right axis deviation, digitalis effect, and evidence
of biventricular hypertrophy.

Cardiac x-ray series showed marked cardiac
enlargement of all chambers, especially the left
atrium, and passive pulmonary congestion.

Cardiac Catheterization

The patient was considered to have marked
mitral insufficiency and moderately severe aortic
insufficiency and underwent left and right heart
catheterization prior to surgery. There was no
step-up in oxygen saturation. Arterial saturation
was 98%. Pressure in the pulmonary artery was
42/22 with a mean of 28 mm. The mean right
atrial pressure was 5 mm. No systolic gradient
was present across the pulmonary valve and no
diastolic gradient across the tricuspid valve. The retrograde left heart catheterization revealed an aortic pressure of 105/60 with a mean of 80 with no systolic gradient across the aortic valve. The left atrium was not entered, and the pulmonary arterial wedge pressure could not be obtained. The cardiac output by the Fick method was 3.4 L per minute (index of 2.1 L). A cineangiogram with injection into the left ventricle revealed marked mitral regurgitation, a very large left atrium, and rather limited motion of the mitral valve. Injection into the aortic root demonstrated at least moderate regurgitation of dye, some of which was directed eccentrically rightward and inferiorly in the left anterior oblique projection. The results of the catheterization indicated rather marked mitral insufficiency, aortic insufficiency, and mild to moderate pulmonary hypertension.

Surgical replacement of the mitral and possibly the aortic valve as well was recommended.

Operative Report

Initial exploration revealed incompetence of the aortic root in diastole, and digital exploration of the left atrium showed overwhelming mitral incompetence. Marked enlargement of all chambers was present.

The aortic cusps were scarred and grossly deformed with the noncoronary one being greatly dilated and displaced into the ventricle. A large sinus aneurysmal orifice was then noted in the depth of this sinus which had ruptured into the left atrium. Replacement of the aortic valve with a Starr-Edwards valve restored competence to the aorta and the cuff of the valve effectively was utilized to repair the aortic-left atrial fistula.

Further repair was effected by buttressing the left atrial aspect of the lesion with Teflon felt after excising the “grape-like” sac so characteristic of this lesion.

The mitral valve was typically rheumatic and was replaced. Effective cardiac activity, however, was never obtained although circulation was supported for approximately 1 hour following repair.

Pathological Findings

Postmortem examination revealed the presence of visceral passive congestion. The 550-g heart showed marked dilatation of all chambers, and both the aortic and mitral valve prostheses were securely placed. After removal of the prosthetic valves at the base of the noncoronary sinus of Valsalva a 5 to 6 mm circular defect was noted which communicated with the left atrium. The orifice in the left atrium was approximately 4 mm in diameter (fig. 1). The right and left sinuses and coronary vessels were unremarkable.

Microscopic studies of the myocardium showed numerous Aschoff bodies in various stages of development.

Discussion

Sinus of Valsalva aneurysms and fistulae have been associated with syphilitic aortitis, bacterial endocarditis, Marfan’s syndrome, coarctation of the aorta, penetrating wounds, and dissecting aneurysms of the aorta, and may occur iatrogenically following repair of a ventricular septal defect; sinus aneurysms may certainly occur as an uncomplicated con-

Figure 1

(A) Aortic root with the valve cusps removed and the arrow pointing to the orifice of the aorto-atrial communication. It arose from the noncoronary sinus of Valsalva. (B) Atrial aspect of the communication. The mitral and aortic valves have been removed.
genital malformation. The unruptured aneurysms may be symptomless and discovered only incidentally in the course of x-ray examination. Ruptured aneurysms present usually with pain, signs of congestive heart failure, and murmurs of a continuous or to-and-fro nature.

Rheumatic heart disease has only uncommonly been associated with a sinus aneurysm. Whether the valvular disease was related in any way to the communication in our patient is unknown. We postulate, however, that the rheumatic mitral valvular insufficiency permitted such gross enlargement of the left atrium so as to allow the noncoronary sinus to become adjacent thereto. Normally this sinus is in relation to the septal wall of the right atrium. We further estimate that 40% of the aortic insufficiency was due to the fistula.

The diagnosis of an aortic-left atrial communication such as occurred in this patient, particularly in the presence of acquired aortic and mitral valvular insufficiency is very difficult. An aortic-left atrial communication produces a left-to-left shunt and should theoretically present with a continuous murmur, signs of aortic runoff, and left heart enlargement in the absence of other cardiac disease. The findings of elevated pressure and moderately large V waves on the left atrial pressure tracing like those of mitral insufficiency would be helpful.

Injection of contrast material into the aortic root should afford the best means of diagnosis, particularly if there is no associated mitral or aortic valvular regurgitation. Ideally, passage of the catheter from the aortic root into the left atrium would be diagnostic.

Summary

A case of aortic-left atrial communication is presented in a patient with chronic rheumatic heart disease. The rarity of this lesion, especially in association with rheumatic heart disease, is stressed and the diagnostic and therapeutic problems inherent in such a lesion are briefly discussed.

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