Abstract:
A 78-year-old woman was referred to our hospital because of repetitive suppurative arthritis at the artificial left knee joint. Her plasma brain natriuretic peptide level was 122 pg/mL. A 12-lead electrocardiogram showed a QS pattern in the inferior leads. A two-dimensional echocardiogram revealed hypokinesis at the inferior wall and hypertrophy at the apical lateral wall. Color flow imaging revealed this hypertrophic region to be a myocardial sinusoid, demonstrating diastolic coronary to left ventricular flow and early systolic flow vice versa. This was a very rare case of coronary to left ventricular fistula through a sinusoid without cyanotic congenital heart disease or severe coronary artery disease.

Key words: Coronary Artery-Left Ventricular Fistula, sinusoid, Systolic Regurgitant Flow

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Figure 1. (a) A 12-lead electrocardiogram showed a sinus rhythm with a QS pattern in leads II, III, and aVF. (b) A chest radiograph showed pleural effusion.

Figure 2. An apical four-chamber view showed a normal LV wall motion with hypertrophy at the apical lateral wall (arrows).

showed several tubular flow signals from the epicardium to the LV chamber during diastole and an opposite flow from the LV lumen to the epicardium during systole. As these findings are not observed in LV noncompaction and are specific for sinusoid, the apical lateral region was deemed to have been formed by a porous sinusoid (Fig. 4) (3). Pulsed-wave Doppler echocardiography at the sinusoid showed peak diastolic flow toward the LV cavity velocity of 1.6 m/s (Fig. 5, arrows) and a reverse flow from the LV cavity (Fig. 5, arrowheads). Coronary angiography or coronary computed angiography was not performed because of severe infection.

Although the present patient underwent debridement of the infected knee joint, she ultimately died of sepsis. Con-
sent for an autopsy was not obtained.

**Discussion**

Wearn et al. classified the CCF into two categories: arterio-luminal and arterio-sinusoidal vessels (4). In the present case, coronary to left ventricle shunt during diastole and left ventricle to epicardium shunt through the sinusoid were observed (5). Before birth, an LV sinusoidal pattern is initially present in normal fetuses, and myocardium is perfused directly from the cavity to a sinusoidal network. As vasculogenesis of the coronary artery is completed, the myocardium is compacted, and the primitive sinusoids disappear. Persistent myocardial sinusoids may be present in new-
Figure 5. Pulsed-wave Doppler echocardiography at the sinusoid showed a peak diastolic flow velocity of 1.6 m/s (arrows), which was higher than the coronary artery flow. In early systole, the reversed flow from the LV cavity to the compacted layer was observed (arrowheads).

borns with other congenital heart diseases, such as pulmonary atresia or hypoplastic left ventricle (6). In adults, sinusoid may be present in rare cases of severe coronary artery stenosis (7). Although its significance is unclear, some studies of transmural laser revascularization technique for the alleviation of ischemia have been performed (3).

The present case was a very rare case of coronary to LV fistula through a sinusoid without cyanotic congenital heart disease or severe coronary artery disease at the sinusoid. In our patient, collateral flow from the lateral wall to the inferior wall might have been present. Thus, coronary steal phenomenon through collateral flow might have caused myocardial ischemia and sinusoid formation at the lateral wall. Chronic inflammation might have also contributed to athrogenesis and myocardial ischemia (8). Although this anomaly may be asymptomatic throughout a patient’s life, chest pain, exertional dyspnea, and fatigue may develop in some cases due to myocardial ischemia from coronary steal or heart failure from diastolic overload (9). The present patient had suffered from repetitive suppurative arthritis for several years, and this chronic infection as well as CCF into the left ventricle and old inferior myocardial infarction might have caused heart failure that was demonstrated by a high plasma BNP level, general edema, and pleural effusion.

Conclusion

This was a rare case of coronary artery to left ventricle fistula through a sinusoid without any other congenital heart disease or myocardial ischemia in the region.

The authors state that they have no Conflict of Interest (COI).

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References


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