CASE REPORT

Intrapericardial Doppler Flow Signals in a Patient with Postsurgical Pericardial Effusion

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Abstract A 62-year-old female patient was admitted to our hospital because of a relapse of pericardial effusion complicating a recent aortic root replacement.

At admission to our hospital, echocardiogram showed the reappearance of pericardial effusion and the presence of intrapericardial clots. Color Doppler and Pulsed-wave examinations showed a localized systolic flow within the pericardial space. Contrast enhanced computed tomography excluded abnormal communications with the cardiac chambers or with the aorta.

The possible causes of this unusual Doppler finding are discussed.

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Introduction

The occurrence of pericardial effusion after cardiac surgery is a frequent event.

However, even in cases of large sero-hematic effusion, intrapericardial Doppler flow signals do not usually appear.

In fact, Doppler flow effect would imply a definite movement of intrapericardial blood cells toward or away from ultrasound source, and this does not occur within the closed pericardial space.

Therefore, in a patient with recent cardiac surgery, the presence of intrapericardial Doppler flows should evoke a communication of the pericardial space with a cardiac chamber or with the aorta. However, in rare cases Doppler flow signals have been reported within the pericardial effusion also in absence of abnormal communications [1,2].

Herein we report a similar case, and hypothesize the possible mechanisms of this very unusual finding.
Case report

A 62-year-old female patient was admitted to hospital because of a relapse of chest pain and progressive shortness of breath. One month before, a valve-sparing aortic root replacement had been performed because of severe dilatation of the aorta. One week after the intervention, a relevant, symptomatic pericardial effusion had been treated with pericardial drainage of 800 cc of sero-hematic fluid.

At admission to our hospital, transthoracic echocardiogram showed the reappearance of a large circumferential pericardial effusion and the presence of intrapericardial fibrin clots more evident at the level of the proximal tract of the lateral wall of the left ventricle (Fig. 1). Echocardiogram also showed a rigid parietal pericardium. Color Doppler examination revealed the presence of a localized systolic flow directed toward the apex, within the pericardial space adjacent to the proximal tract of the lateral wall of the left ventricle (Fig. 2). Flow velocity was 0.8 m/s (Fig. 3). Contrast Enhanced Computed Tomography excluded abnormal communications with the cardiac chambers or with the aorta. Following treatment with colchicine and steroids the pericardial effusion disappeared and the patient was discharged (see Fig. 4).

Discussion

Evidence of intrapericardial flow by means of Doppler examination in a patient with postsurgical pericardial effusion should evoke an abnormal communication between the pericardial space and the cardiac chambers or, as in our case, with the aorta.

Even though the low velocity of the Doppler signal (0.8 m/s) did not support the presence of similar abnormal communications, Contrast Enhanced Computed Tomography was performed in order to exclude them.

On the contrary, in absence of these communications, it is very unusual to find intrapericardial flow signals by means of Doppler examination. To the best of our knowledge, only two similar cases have been reported [1,2].

In our case, probably because of the rigid parietal pericardium and of a localized narrowing of the pericardial space due to the presence of fibrin clots, the vortex motion of the left ventricle during contraction could determine a systolic suction effect with a localized movement of the pericardial fluid, so that the shift of blood cells, and probably of free fibrin clots, might generate Doppler signals.

Human rights statements and informed consent

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later revisions. Informed consent was obtained from the patient for being included in the study.

Figure 1  Echocardiogram from long-axis transducer position (modified) showing circumferential pericardial effusion with evidence of intra-pericardial fibrin clot adjacent to the proximal segment of the posterolateral lateral wall of the left ventricle (arrow). LV = Left ventricle.
Figure 2  Echo Color Doppler from four-chamber position showing intra-pericardial signal and fibrin clot adjacent to the proximal segment of the lateral wall of the left ventricle (arrow). LV = Left ventricle.

Figure 3  Echo Color Doppler from four-chamber position (modified) magnifying intra-pericardial color signal adjacent to the proximal segment of the lateral wall of the left ventricle.
Figure 4  Pulsed-Wave Doppler of the intrapericardial flow. Systolic flow velocity is 0.8 m/s, and direction is toward the ventricular apex.

References

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