

ECHO ROUNDS Section Editor: Edmund Kenneth Kerut, M.D.

Particulate Matter Within the Inferior Vena Cava

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(*ECHOCARDIOGRAPHY*, Volume 25, August 2008)

echocardiography, IVC, flow

Our group has noted inferior vena cava particulate matter (PRM) at times (Fig. 1 and Video clips 1 and 2), while imaging from the subcostal window, using fundamental or tissue harmonics. When observed in our laboratories, PRM will often be observed in patients with no known

cardiac pathology who are not tachycardic. We have also found this phenomenon in athletes who are relatively bradycardic,¹ and also in patients with LV dysfunction and a low cardiac output.

We have observed that PRM does not appear to have the same ultrasound characteristics as spontaneous echo contrast (SEC). Most often found in the left atrial appendage, but also in the left ventricle, right atrium and aorta, SEC is defined as the presence of dynamic swirling smoke-like echoes within a cavity.^{2,3} It is our observation that particles of PRM are somewhat larger and more discrete than SEC. Also, they appear to move quickly through the IVC, as opposed to near stasis when SEC has been observed in a vessel (aorta).

PRM has a different ultrasound appearance from that of micro-gas emboli produced by mechanical heart valves.⁴⁻⁷ These transient embolic “sparkles” are thought to result from gas bubble formation at a local site of rapid pressure decrease as the mechanical disk opens. When observed, they are not indicative of any valvular dysfunction or clotting abnormality.

To our knowledge PRM, whose etiology and significance are unknown at this time, has not been studied in patients either with or without cardiac pathology. However, a study from 1985 evaluated 100 patients for SEC within the IVC. Ten patients, of which four had essentially normal echocardiograms otherwise, were identified as having SEC. Of these, heart rate was not mentioned, and an image or description of its appearance within the IVC was not provided.⁸

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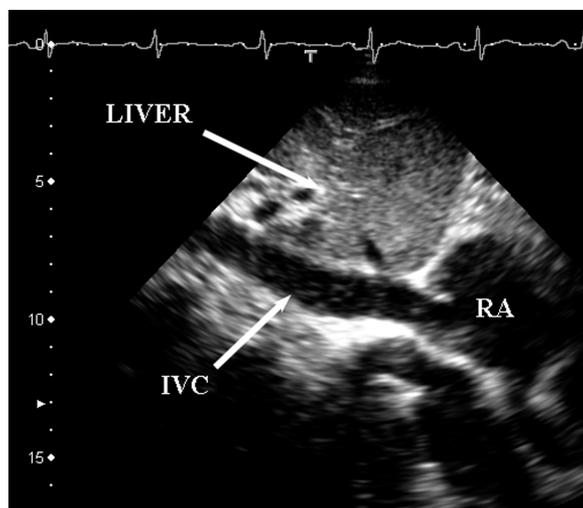


Figure 1. Particulate matter moving within the inferior vena cava (IVC) in an asymptomatic 51-year-old male with no identifiable cardiac pathology. The heart rate was 76 beats/min. The study was performed using tissue harmonics at 2.8 MHz. RA = right atrium.

References

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Supplementary Material

The following supplementary material is available for this article online:

Video Clips 1 and 2: Video clips of the patient in Figure 1. Particulate matter is noted within the IVC, moving with each cardiac cycle.