Prominent Crista Terminalis Appearing as a Right Atrial Mass on Transthoracic Echocardiogram

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The crista terminalis is a fibromuscular ridge formed by the junction of the sinus venosus and primitive right atrium. In these case reports, transthoracic echocardiography suggested the presence of a right atrial mass. However, subsequent transesophageal echocardiography revealed that the “right atrial mass” was actually a prominent crista terminalis. An understanding of the anatomy and the echocardiographic appearance of a prominent crista terminalis will minimize the misdiagnosis of this structure. (J Am Soc Echocardiogr 2002;15:753-5.)

CASE REPORTS

Case 1
A 77-year-old woman with known chronic obstructive pulmonary disease presented to her internist with a sudden increase in the severity of her dyspnea. A transthoracic echocardiogram (TTE) revealed normal chamber size and function with a “mass” in her right atrium (Figure 1). Because of this finding, the patient and referring physician agreed to a transesophageal echocardiogram (TEE) the same day. The TEE showed that the right atrial “mass” was actually a prominent crista terminalis (Figures 2 and 3). The superior portion of crista terminalis was most prominent and appeared largest during atrial systole (Figure 3). At her 4-month follow-up, the patient’s dyspnea has improved after treatment in pulmonary clinic. She is free of cardiac symptoms.

Case 2
A 74-year-old woman presented to her physician with lower extremity edema. Despite being treated with diuretics, the patient had gained 12 lbs in 2 weeks. A TTE was ordered to rule out congestive heart failure (CHF) as the cause of the edema. The TTE findings revealed normal chamber size and function, a pulmonary pressure of 27 mm Hg, and a mass in her right atrium (Figure 4). After discussions with the referring physician, a TEE was performed 3 weeks after the TTE. The apparent right “mass” was determined to be a prominent crista terminalis (Figure 5). At her 3-month follow-up, the patient’s edema had improved with life-style changes and continued medical therapy. She is free of cardiac symptoms.

DISCUSSION

The crista terminalis is a well-defined fibromuscular ridge that extends along the posterolateral aspect of the right atrial wall. It begins at the upper portion of the septal surface and passes anteriorly to the opening of the superior vena cava and terminates at the lateral side of the entrance of the inferior vena cava.1,2 The crista terminalis divides the trabeculated anterolateral atrium proper and auricle from the smooth-walled posterior portion of the atrium known as the sinus venarum.1,2
The crista terminalis that is observed in developed hearts is derived from the regression of the septum spurium as the sinus venosus is incorporated into the right atrial wall. This process of regression varies widely and thus the prominence of the crista terminalis varies widely in adults. If the prominence of the crista terminalis is superior, it can appear as a “right atrial mass” on TTE when captured on tangent (Figure 6). One should suspect that a “right atrial mass” is instead a superiorly prominent crista terminalis if the superior vena cava appears in the TTE image. However, if this diagnosis cannot be made with a high degree of certainty or if clinically indicated, a TEE should be performed to determine that the “right atrial mass” is a superiorly prominent crista terminalis and not an intracardiac tumor.

Two studies have looked at prominent crista terminalis appearing as a right atrial mass during magnetic resonance imaging (MRI). Mirowitz and Gutierrez randomly analyzed 20 MRI examinations and found that in 90% there was a soft tissue structure along the posterior lateral wall that extended between the superior vena cava and the inferior vena cava. Anatomically, the location of this structure correlated with the crista terminalis.

Meier and Harnell’s study reviewed 149 MRI examinations to determine the frequency of a prominent crista terminalis. Fifty-nine percent of the subjects were shown to have a prominent intra-atrial structure diagnosed as a prominent crista terminalis. In both studies, the conclusion was that an awareness of the location, anatomic, and MRI features of the crista terminalis would help prevent misdiagnosis of this structure as an intracardiac tumor.
To date, no studies have been performed to evaluate the prevalence of a prominent crista terminalis observed by TTEs. As the sensitivity of imaging equipment continues to improve and intracardiac structures are more clearly visualized by ultrasound imaging, an appreciation for the appearance of a prominent crista terminalis on a TTE will minimize the misdiagnosis of this right atrial structure.

REFERENCES


Figure 6 Schematic of lateral right atrium (RA) demonstrating how a superiorly prominent crista terminalis (CT) will appear as a “right atrial mass” when imaging plane is directed upward (arrow). Crista terminalis is captured tangentially and superior vena cava (SVC) appears in image (see Figures 1 and 4). Tricuspid valve (TV).