Application of contrast echocardiography in the evaluation of a right-sided vegetative lesion

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Abstract Transesophageal echocardiography has significantly improved the detection of vegetative lesions, including those associated with indwelling central venous lines. However, in certain cases, the increased mobility of these lesions as well as the presence of indwelling catheters obscure the precise delineation of their origin and the detection of attachment to adjacent structures. We report a case of right-sided endocarditis in which the use of contrast was instrumental to the comprehensive evaluation of the lesion and to subsequent patient management.

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Introduction

Transesophageal echocardiography (TEE) has significantly improved the detection of vegetative lesions, including those associated with indwelling central venous lines. However, in certain cases, the increased mobility of these lesions as well as the presence of indwelling devices obscure the precise delineation of their origin and the detection of possible attachment to adjacent structures. We report a case of right-sided endocarditis in which a contrast agent was used during TEE in order to better define the characteristics of the vegetation and facilitate management.

Case report

A 55-year-old male was readmitted with fevers and chills following multiple abdominal surgeries for transitional cell carcinoma of the bladder and carcinoid of the appendix. During this admission, the patient’s blood cultures were positive with methicillin resistant *Staphylococcus aureus*.

A transthoracic echocardiogram (TTE) revealed a severely depressed left ventricular systolic function (Fig. 1a), while contractility of the right ventricle was relatively preserved. Within the right atrium (RA), a large mobile mass (>3 cm) consistent with a vegetative lesion was visualized (Fig. 1b); of note, only mild tricuspid regurgitation was present.

However, it was unclear whether the mass originated from the adjacent cardiac structures, namely the RA wall and the tricuspid valve leaflets, or from the indwelling central line. Thus, a conventional TEE was performed which confirmed the presence of a large vegetation measuring approximately 3.6 cm adjacent to the atrial aspect of the tricuspid valve (Fig. 2). The tip of the catheter was also visible in close proximity to the lesion. However, despite imaging at various planes and angles, we still could not be confident about the origin of the vegetation, and importantly, about its relation to the central venous catheter.

From a clinical point of view, immediate removal of a vegetation-laden catheter could be
problematic, since detachment of bulky infectious debris could lead to septic pulmonary embolism.\textsuperscript{2} On the other hand, prompt cardiac surgery for vegetation removal, although occasionally successful in similar cases,\textsuperscript{2} would pose significant risk to this patient due to multiple comorbidities and poor overall performance. To clarify this issue, we injected contrast agent (Definity\textsuperscript{R}, DuPont Pharmaceuticals, Newark, DE) through a peripheral IV line. This allowed us to precisely delineate the attachment site, unequivocally showing the vegetation being in continuity with the posterior tricuspid annulus. In contrast, the valve leaflets and the central venous line were clearly separated from the lesion by contrast-filled space throughout the cardiac cycle (Fig. 3). The catheter was removed, and despite a prolonged hospitalization, the patient recovered on medical therapy.

Discussion

Currently, most studies with contrast echocardiography involve the assessment of wall motion...
such as during stress echocardiography, delineation of endocardial borders, and visualization of mural thrombus or PFO. While TEE probes do not support harmonic imaging, which is often needed for better visualization of contrast agents, this does not preclude the use of contrast agents with TEE. In fact, this modality has been employed for the detection of left atrial appendage thrombi and even for aortic dissections.

Within the context of endocarditis, TTE with contrast infusion has proven useful for evaluating complications arising from bacterial endocarditis. The agent used in these cases was agitated saline. Agitated saline disappears quickly, often not allowing for detailed evaluation of the structures of interest. Definity® is a contrast agent based on perflutren lipid microspheres which, like agitated saline, remarkably enhance visualization of endocardial borders and intracardiac structures; however, Definity® lasts longer (1–3 min), thus allowing more time for evaluating the regions under investigation against a contrasted background. In this way, we were able to determine that this patient’s vegetation was attached only to the tricuspid valve annulus. The leaflets did not appear to be directly involved, which could explain the minimal degree of tricuspid regurgitation. Importantly, the lesion was not attached to the catheter, thus allowing for immediate removal of the central venous line on safe ground.

In summary, we report a case of right-sided endocarditis in which the use of contrast agent during TEE was instrumental in identifying the precise attachment sites of the vegetation.

References


Is this a double aortic valve?

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