Impact of Implantable Transvenous Device Lead Location on Severity of Tricuspid Regurgitation

ASE University Correct Answer Guide

1. Functional tricuspid regurgitation (TR) is usually associated with an anatomically preserved valve. With which of the following is TR not frequently associated?
   a. Enlarged tricuspid annulus
   b. Dilated right ventricle (RV)
   c. Ventricular premature depolarizations
   d. Tricuspid leaflet tethering due to RV remodeling

2. Which of the following represents the post-device TR vena contracta (VC) width categories used to separate degrees of TR?
   a. Moderate (VC>0.5); <moderate (VC <0.7); severe (VC>0.9); <severe (VC<0.9)
   b. Moderate (VC>0.7); <moderate (VC<0.7); severe (VC>0.9); <severe (VC <0.9)
   c. Moderate (VC≥0.5); <moderate (VC<0.5); severe (VC≥0.7); <severe (VC <0.7)
   d. Moderate (VC>0.3); <moderate (VC<0.3); severe(VC>0.5); <severe  (VC<0.5)

3. When the authors compared pre and post lead implantation echocardiographic data, parameters that were significantly increased post implantation included all but which of the following?
   a. Left ventricular ejection fraction (LVEF) and tricuspid annular diameter
   b. RV end systolic and end diastolic area
   c. The area of the right atrium (RA)
   d. The VC width of the TR

4. On 2D images, when little or no post-implantation TR was present
   a. Lead interference was assumed
   b. Non-interference was assumed
   c. It was assumed that 2D images were not adequate to assess TR
   d. It was assumed the septal tricuspid leaflet was dominant

5. Leaflet interference was easier to detect on dynamic 3D images of the TV when visualized from the RV perspective. Forty-five patients showed device lead interference. Findings in these 45 patients included
   a. Leads were seen in the posteroseptal commissures or the middle of the valve
   b. Leaflet interference was most commonly due to lead fractures
   c. The septal leaflet was the most commonly affected followed by the posterior leaflet and the anterior leaflet
   d. Leaflet interference was most commonly due to leaflet perforation by the device
6. There were no significant intergroup (those with/without device-lead associated leaflet interference) differences on pre-device echocardiograms. On the post-device echos, when an interfering lead was noted, which of the following parameters changed?
   a. Vena contracta of the TR jet
   b. TR gradient and the right ventricular systolic pressure (RVSP)
   c. Right atrial area
   d. All of the above
   e. A and B only

7. The four factors significantly associated with TR development after device placement include all but which of the following?
   a. RA dimensions
   b. RV dimensions
   c. LV systolic failure
   d. Tricuspid annular dimension
   e. The presence of an interfering lead

8. The strength of this retrospective study was that it was designed to determine whether TR which occurred after device lead placement could be directly attributable to RA, RV, or TA dilatation; increased RVSP; or device lead interference with normal tricuspid leaflet motion. Systematic comparison of the contribution of these factors in a multivariate model did not in fact demonstrate that there were any independent factors associated with TR after device lead implantation
   a. True
   b. False

9. TR was quantitated using vena contracta width. The VC width was defined as
   a. The distance between a straight line connecting both sides of the tricuspid leaflet attachment points.
   b. A trace of the border of the TR jet at end-systole.
   c. The narrowest portion of the TR jet at or downstream from the orifice in mid-systole
   d. Distance from the lateral hinge point of the anterior tricuspid leaflet to the hinge point of the septal tricuspid leaflet in end-diastole

10. The advantages of 3D transthoracic imaging over 2D imaging for the assessment of device lead placement include
    a. Determination of the culprit leaflet in lead-interfering TR
    b. Device leads can and should be placed in the commissural or middle valve position using 3D guidance, as these lead positions are not associated with TR development
    c. Determination of mechanisms of TR due to device-leaflet interference, whether lead leaflet impingement or adherence to the leaflet
    d. All of the above