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3D echo imaging of tricuspid valve: new look at the tricuspid valve

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Introduction
"En face" visualisation of the tricuspid valve (TV) leaflets and commissures is not possible using two-dimensional transthoracic echocardiography (TTE) unless the right ventricle (RV) is dilated via parasternal short axis or subcostal views. With the aid of three dimensional echocardiography (3DE), complete assessment of the TV apparatus including the leaflets, annulus and subvalvular apparatus can be easily accomplished.

Aim: To use different modes of three dimensional (3D TTE) to assess TV in three standard views in different diseases.

Methods: 6 patients with different tricuspid valve diseases (mean age is 29±18 years, 3 were women) were studied. We used three-dimensional echocardiography to acquire zoomed mode and multi-beat, full-volume data sets of the TV to assess the leaflets and commissures. Moreover, tricuspid valve area (TVA) was assessed by direct planimetry of the valve orifice at the level of the leaflets tips at end diastolic frame in cases of TV stenosis.

Results: Direct visualization of the leaflets motion and number, commissures and TVA were achieved in all patients. Tricuspid valve posterior leaflet prolapse was seen in two patients (figures A, B). 2 patients had tricuspid valve stenosis; one showed characteristic commissural fusion in a rheumatic heart (3D TVA= 1.2 cm²) (Figure D) and the other has a peculiar commissural sparing in a carcinoid pathology (3D TVA= 1.9 cm²) (Figure E). One patient revealed rudimentary anterior leaflet suggesting unguarded TV orifice (Figure F). Regarding the numerical variations: one patient got 4 leaflets (Figure C) while another one had 2 leaflets only.

Conclusion
Simultaneous visualization of the three TV leaflets is limited by using 2DE. On the other hand, RT-3DE allows better understanding of the anatomy and mechanisms of the TV diseases. Comprehensive assessment of the morphology and function using RT-3DE can provide a valuable road map to guide the intervention according to each individual case.
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