LETTERS TO THE EDITOR

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Two tricuspid asymmetric parachutes: a double diagnostic odyssey

We read with interest (and a jolt of recognition) the article by Biaggi et al. entitled ‘A diagnostic odyssey: detection of an unusual anterior papillary muscle of the tricuspid valve’ published in the journal.1

The authors describe a patient with an unusual thickened and dysplastic papillary muscle running between the interventricular septum and anterior tricuspid valve leaflet (ATVL). Of note, they do not label the abnormality but describe it in admirable detail, commenting that the excellent spatial resolution of transoesophageal echocardiography (TOE) proved superior to cardiac magnetic resonance imaging (cMR) in defining the chordal apparatus. They were not able to find a similar published case at the time of submission.

We have published a very similar case in the journal.2 Our patient presented with a murmur and had an elongated, thickened, and dysplastic papillary muscle running from the right ventricular free wall (in this case) to the ATVL, associated with tricuspid regurgitation. Like Biaggi et al., we found that cMR was disappointing in delineating chordal detail and that TOE yielded best results.

We demonstrated the images to colleagues in various institutions but beyond agreeing that appearances were ‘unusual’, no diagnostic label was put on the case. Thus, we undertook our own diagnostic odyssey to name the condition. Rarely, one papillary muscle is much larger than its peers and is characteristically elongated towards the valve annulus. The condition is known as a parachute-like asymmetric valve and is best described in the mitral position.3,4 Our patient fulfilled the necessary criteria but in the tricuspid position.

At the time of submission of our article, we were unaware of any similar published case but we believe that the case described by Biaggi et al. is another parachute-like asymmetric tricuspid valve but with an unusual proximal attachment to the interventricular septum. We congratulate our colleagues on their work and hope they agree with our diagnostic label.

References


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Of parachutes and tricuspid valves

We would like to congratulate Purvis et al. on their marvellous images of a dysplastic tricuspid valve apparatus3 and thank them for their interest in our own case report on an unusual anterior papillary muscle of the tricuspid valve.2

Before discussing their proposed label ‘parachute-like asymmetric tricuspid valve’ for both our cases, it is worth reflecting on the normal anatomy of the tricuspid valve apparatus. As the name implies, the tricuspid valve consists of three leaflets, named according to their location: septal, posterior (often the smallest), and anterior (mostly the largest) leaflet. From an anatomical study published in 1971, we know the anterior leaflet often shows a notch close to the anteroseptal commissure, which in three-dimensional transoesophageal echocardiography (3D TEE) may give the impression of a fourth small leaflet.3

Of equal interest are the chordae tendineae and the corresponding papillary muscles. Silver et al.3 describe five different types of chordae tendineae (not distinguishable by 3D TEE). They also showed that there is a considerable variation on how these cords are anchored. Most of the septal chords insert directly into tiny papillary muscles arising from the septum. The rather small posterior papillary muscle (sometimes we see two) gets chords from the posterior part of the septal leaflet, the posteroseptal commissure, and the septal part of the posterior leaflet. The anterior papillary muscle, often a prominent trunk arising from the right ventricular free wall or the moderator band, gets chords from the posterior leaflet, the anteroseptal commissure, and the posterior part of the anterior leaflet. Last but not the least, there is the medial papillary complex with its main muscle (Lancis’ muscle) at the bifurcation of the septomarginal trabeculation.4 The chords inserting here support mainly the anteroseptal commissure and small parts of the adjacent septal and anterior leaflets.

We can summarize (and simplify) that there are four different papillary muscles or muscle groups that stretch the complex geometry of the tricuspid valve.

Let us now discuss the proposed nomenclature ‘parachute-like asymmetric tricuspid valve’. Oosthoek et al. defined a parachute-like (mitral) valve as a valve that has two very asymmetric papillary muscles, with one of them being elongated, located higher in the left ventricle with its tip reaching to the annulus, and attached at both its base and lateral side to the left ventricular wall.5 They further report that in the majority of their cases ‘the valve leaflets could be directly attached to this abnormal muscle (…). Neither of these conditions is present in our case. Also, our understanding of a parachute (even as non-parachutists) is that there are two main bundles of strings (chords) that connect the parachute (leaflet) to one human (papillary) body.

Taking all this into consideration, we feel that the term ‘parachute-like tricuspid valve’...