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## Editorial

## Editorial: What is this cleavage of mitral valve – Commissure, indentation, cleft, or cleft-like indentation?



## Keywords:

Mitral valve  
Commissure  
Cleft  
Indentation  
Congenital heart disease

The mitral valve (MV) consists of a continuous veil hanging around the entire circumference at the junction of atrium and left ventricle (LV). It also divides the inlet and outlet portions of LV like a curtain. The free edge of the veil shows several cleavages. The two major cleavages are located at anterolateral and posteromedial position of LV and divide the veil into anterior and posterior leaflets, which are commissures [1]. But, what differentiates a commissure from other forms of cleavage like an indentation or a cleft? One of the most important clues to define commissure is the shape of chordae tendineae inserting into the commissural area, which arise from the tip of papillary muscle as a single stem that branches radially resembling the ribs of a fan, and hence referred to as a fan-shaped chordae [1,2]. This fan-shaped arrangement of chordae works like a hinge and brings anterior and posterior leaflets into close contact during systole. However, to define the branching pattern of chordae noninvasively is extremely difficult. Rusted et al. suggested that the presence of papillary muscle underneath can be used as a guide to identify the commissure [3]. To use papillary muscle as a landmark for the commissures is useful in clinical practice.

Another question is what is the difference between a normal indentation of leaflet and a cleft? Now there is a newly coined, more confusing, term “cleft-like indentation” [4]. Since the anterior leaflet normally does not have any indentations, if there is a cleavage in the anterior leaflet, it is considered as a cleft. On the other hand, the posterior leaflet usually has 2 indentations along its free margin making tri-scalloped leaflets, which are referred to as the anterolateral (P1), middle (P2), and posteromedial section (P3). These indentations are important for normal functioning of the posterior leaflet and act as pleats of the clothing facilitating a wide opening of the leaflet during diastole and accommodating to fit the curved line of coaptation during systole [5]. Although there

is still a lack of consistent definition of the cleft, it is generally accepted as a congenitally abnormal cleavage of the leaflet that extends from its free margin to at least one-half of the way to the annulus, which are not supported by proper chordae, and hence it is usually associated with regurgitation [6–8]. The cleft in the posterior leaflet is located in the middle of the leaflet and divides it in two equal remnants [4,6,9,10]. The reason why there is still confusion of the definition of the cleft is that people started to call any cleavage in the leaflet related to the occurrence of degenerative MV diseases as a cleft or if it is located at inter-scallop position a cleft-like indentation [4,8]. The establishment of general consensus about the definition of cleft is in urgent need; however, I prefer to call the cleavage in the posterior leaflet as a cleft on the either following conditions: (1) if it causes regurgitation; (2) if it is located on the leaflet different from normal inter-scallop position and most frequently located at the center of the posterior leaflet. Conversely, the deep cleavage on the inter-scallop position without regurgitation, no matter how deep it is, should be called deep indentation rather than cleft.

In this issue of Journal of Cardiology Cases, Chachoua et al. reported a case with trileaflet mitral valve, which is a rare congenital heart anomaly with only two previous case reports in the literature [11–13]. They showed three equal-sized leaflets of mitral valve. Although the shape of the leaflet bears much resemblance to the isolated posterior mitral valve cleft, the presence of three equally spaced independent papillary muscles beneath the respective three cleavages of leaflet verifies that these are commissures [3,6,10].

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