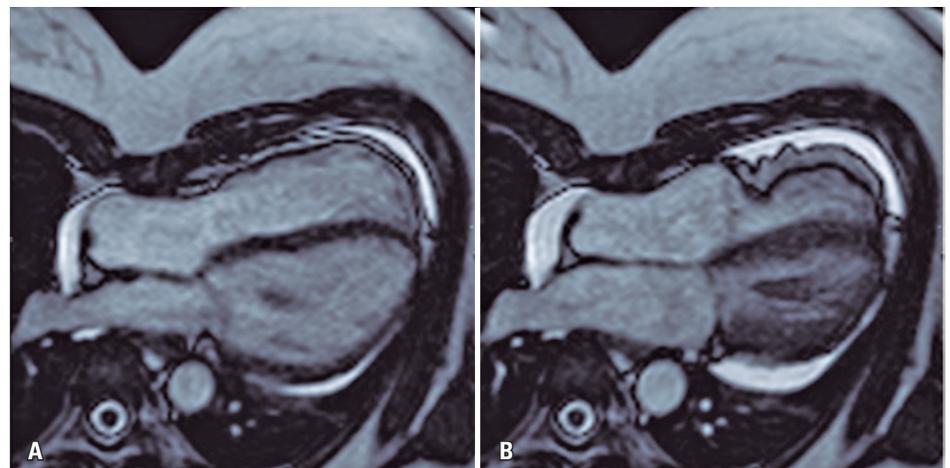


## Tricuspid valve prolapse and annular disjunction evaluated by cardiac magnetic resonance: a new method

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**Figure 1.** Steady-state free precession sequence for cardiovascular magnetic resonance. Longitudinal plane of the four chambers in (A) diastole and (B) systole showing tricuspid annulus disjunction and tricuspid valve prolapse

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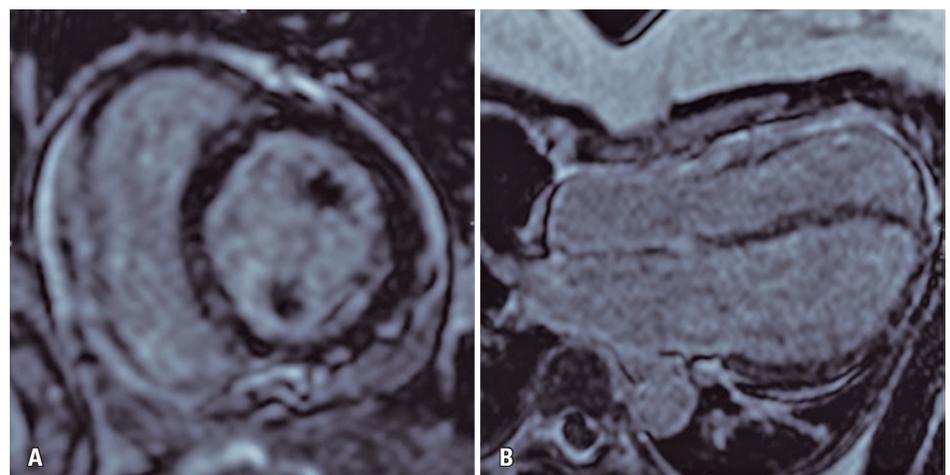
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**Figure 2.** Tissue characterization by late gadolinium enhancement. (A) Short-axis view and (B) Four-chamber view during diastole, without evidence of myocardial fibrosis

A 49-year-old woman with a history of pulmonary thromboembolism and right ventricular dysfunction sought consultation with a pulmonologist at our hospital, reporting exertion dyspnea and four episodes of syncope with prodromal palpitations. Physical examination results were unremarkable, and the patient had no history of heart disease.

Cardiac magnetic resonance imaging was performed for proper evaluation of the right ventricle. Cardiac magnetic resonance showed normal biventricular function; however, tricuspid valve prolapse and tricuspid annulus disjunction were observed (maximum separation between the tricuspid valve and the free wall of the right ventricle was 5mm) (Figure 1), along with pectus excavatum and mild pericardial effusion. Late gadolinium enhancement sequences revealed non-myocardial fibrosis (Figure 2).

A recent study showed that one-half of the patients with mitral annulus disjunction had concomitant tricuspid annulus disjunction. However, this presence was not associated with an increased number of ventricular arrhythmias. Factors such as age (patients with biannular disjunction were older), origin of ventricular arrhythmias (most commonly originating from the left ventricle), and structural changes (the tricuspid apparatus has structural and functional differences compared with the mitral annulus) may explain the results.<sup>(1)</sup>

In contrast, evidence suggests an association and increased risk of mortality in patients with isolated tricuspid valve prolapse<sup>(2)</sup> with some case reports having demonstrated that tricuspid annulus disjunction may be related to ventricular arrhythmias.<sup>(3,4)</sup> More importantly, right-sided overload is a common finding<sup>(4)</sup> and may play a vital role in the development of arrhythmias in patients with predisposing structural alterations in the tricuspid annulus.

Cardiac magnetic resonance findings along with a history of palpitations and syncope led to a high suspicion of ventricular arrhythmias, and the patient was referred to the cardiology department for further examination.

## AUTHORS' CONTRIBUTION

Kevin Rafael De Paula Morales: conceptualization, visualization, writing – original draft, and writing – review and editing. Eduardo Kaiser Ururahy Nunes Fonseca, Artur Ramos Sarmet dos Santos, Gabriela Ribeiro Prata Leite Barros, and Walther Yoshiharu Ishikawa: visualization, writing – original draft, and writing – review and editing.

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## REFERENCES

1. Aabel EW, Chivulescu M, Dejgaard LA, Ribe M, Gjertsen E, Hopp E, et al. Tricuspid Annulus Disjunction: Novel Findings by Cardiac Magnetic Resonance in Patients With Mitral Annulus Disjunction. *JACC Cardiovasc Imaging*. 2021;14(8):1535-43.
2. Lorinsky MK, Belanger MJ, Shen C, Markson LJ, Delling FN, Manning WJ, et al. Characteristics and Significance of Tricuspid Valve Prolapse in a Large Multidecade Echocardiographic Study. *J Am Soc Echocardiogr*. 2021;34(1):30-7.
3. Tong J, Yew M, Huang W, Yong QW. The dance of death: cardiac arrest, mitral and tricuspid valve prolapses, and biannular disjunctions. *CASE (Phila)*. 2021;6(3):95-102.
4. Mangini F, Muscogiuri E, Del Villano R, Rosato R, Casavecchia G, Pigazzani F, et al. Tricuspid annular disjunction can be isolated and even arrhythmogenic. A cardiac magnetic resonance study. *Arch Clin Cases*. 2022;9(2):41-9.