

Myocardial Cleft: An Anatomical Anomaly to Bear in Mind

To the Editor:

The doubts in the interpretation of images, whether angiographic or echocardiographic, due to clefts in the left ventricular myocardium, may lead to a chain of complementary explorations, more or less aggressive, to clarify their origins. Cardiac magnetic resonance imaging (CMRI) is a non-invasive imaging technique with an excellent spatial resolution, that allows for the anatomical diagnosis to be made of these myocardial clefts or crypts that may appear in healthy individuals as well as in patients with some kind of cardiovascular disorder.¹⁻³

We present a case of a 58-year-old male who, after seeking medical care for atypical chest pain, underwent a diagnostic coronary catheterization due to discrepancies between the clinic signs that he presented and the complementary explorations carried out. The coronary catheterization did not show any lesions in the coronary arteries, but in the ventriculography, a finger-shape image was observed, with contrast penetration, in the inferior basal segment (Figure 1). In the echocardiography performed afterwards, various myocardial protrusions were observed that corresponded to the endocardial edge of the cleft which were interpreted as corresponding to a myocardial mass, and therefore a CMR was requested to complete the etiological study. In both the MR-film sequences, where no contractility alterations were observed, and in the sequences of the late enhancement after the administration of contrast, that showed the existence of a focal fibrosis, a characteristic image of a myocardial cleft was observed, located in the basal segment of the inferior portion (Figure 2). The patient

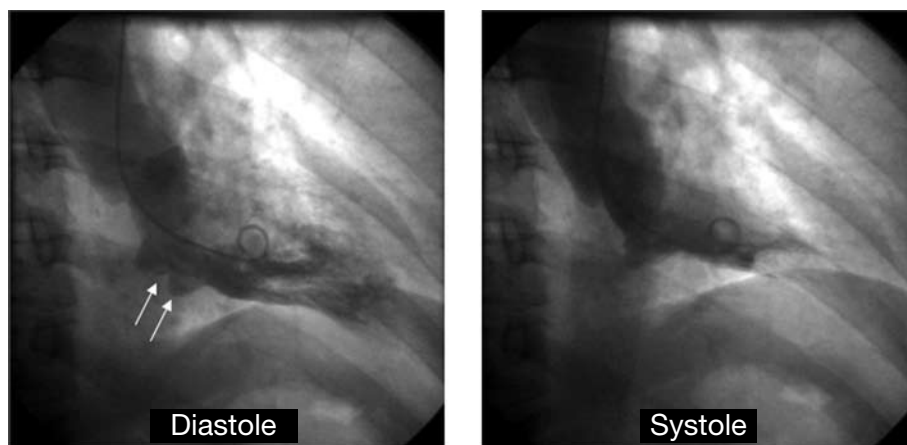


Figure 1. Systolic and diastolic images from the ventriculography, where a finger-shape protrusion with contrast in its interior can be observed in diastole (arrow), of unknown aetiology.

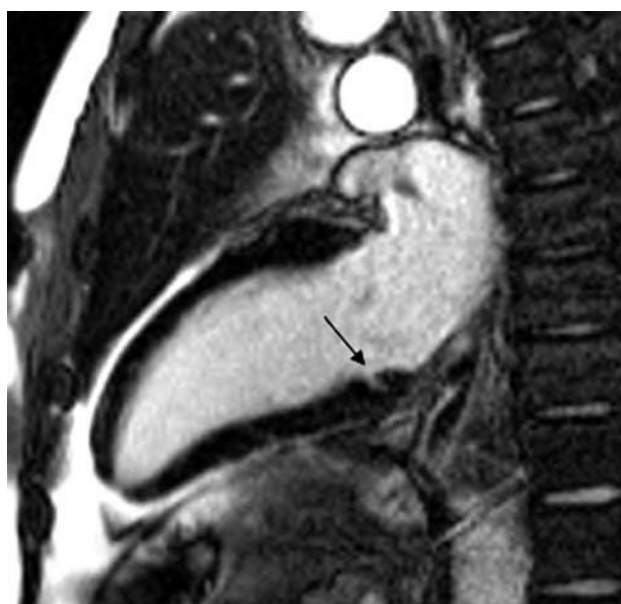


Figure 2. Diastolic image corresponding to a late enhancement sequence (inversion–recuperation) in a vertical longitudinal plane (2 chambers), where a myocardial cleft or crypt can be observed in the inferior basal segment (arrow), that characteristically does not surpass the epicardial edge, without signs of contrast retention.

was discharged without needing any treatment or clinical follow-up.

The identification of the clefts using CMR was described by Germans et al¹ in patients with genetic mutations related to hypertrophic cardiomyopathy, as they were found in 81% of the cases, with an inferoseptal localisation. The importance of this finding lies in that these patients had the mutation but they had not developed the ventricular hypertrophy, which led to the hypothesis that the presence of clefts could determine an early stage of this disease. More recently, Johansson et al² published a longer series. These characteristics are found in 8% of the healthy volunteers studied and they describe 2 different localisations, one at the

level of the inferior basal segment, only observed in healthy volunteers, and one at the mid-apical septal level, observed both in healthy volunteers and in patients sent for a CMRI for other conditions. The importance of this series lies in that it demonstrates that in more than 6% of healthy individuals CMRI detects myocardial clefts. This finding has no pathological meaning, but it is important to know it given that an erroneous diagnosis, such as non-compaction cardiomyopathy,³ could be harmful to the patient.

The cause of the clefts is unknown, although it has been postulated that in patients with hypertrophic cardiomyopathy it could be due to myocardial ischemia from micro-vascular dysfunction¹ and/or myocardial disarray, an alteration that could be related with the spiral position of the myocardial fibres. Nevertheless, until now, it has not been demonstrated that its identification in healthy individuals implies myocardial disease.

To conclude, the CMR allows for the identification of the presence of clefts in the left ventricle that, although it may be an infrequent finding, is important to know about to avoid an incorrect diagnosis. According to the information found in the literature, it would seem that the most characteristic localisation in healthy individuals is the inferior basal segment.

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REFERENCES

1. Germans T, Wilde AA, Dijkmans PA, Chai W, Kamp O, Pinto YM, et al. Structural abnormalities of the inferoseptal left ventricular wall detected by cardiac magnetic resonance imaging in carriers of hypertrophic cardiomyopathy mutations. *J Am Coll Cardiol.* 2006;48:2518-23.

2. Johansson B, Maceira AM, Babu-Narayan SV, Moon JC, Pennell DJ, Kilner PJ. Clefts can be seen in the basal inferior wall of the left ventricle and the interventricular septum in healthy volunteers as well as patients by cardiovascular magnetic resonance. *J Am Coll Cardiol*. 2007;50:1294-5.
3. Germans T, Dijkmans PA, Wilde AA, Kamp O, van Rossum AC. Prominent crypt formation in the inferoseptum of a hypertrophic cardiomyopathy mutation carrier mimics noncompaction cardiomyopathy. *Circulation*. 2007;115:e610-1.
4. Baliga RR, Young JB. The concertina pump. *Heart Failure Clin*. 2008;4:13-4.