LETTER / Cardiovascular imaging

The contribution of MRI in the diagnosis of acute myocarditis following a spider bite: A case report

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Acute myocarditis (AM) can be life-threatening in the short or medium term, accounting for 8 to 20% of sudden deaths in young subjects [1] The clinical presentation lacks specificity. Myocardial biopsy has been the standard examination to the present time but has the drawback of being invasive. Cardiac MRI, a rapidly expanding technique [1], is very effective for confirming a positive diagnosis, assisting with differential diagnosis and helping to monitor development. We illustrate this important role of cardiac MRI by presenting a rare case of a spider bite complicated by AM.

Observation

A 35-year-old patient, with no pathological history, was hospitalised in the Intensive Care Unit with acute cardiogenic pulmonary oedema, after being bitten by a black spider. On D4 he had an echocardiogram (repeated on D24) together with a cardiac MRI on the same day.

The echocardiogram showed hypokinesia of the middle segments of the posterior and inferior wall of the left ventricle (LV) with an ejection fraction (EF) of 48% on D4 and 50% on D24.

An MRI was performed using a 1.5 Tesla machine with a cardiac coil, with morphological, dynamic and perfusion sequences with three basic incidences: four chambers, long axis and short axis. It showed an intramyocardial signal anomaly in the basal posterolateral wall of the LV, slightly hyperintense in T1, markedly hyperintense in T2 (Fig. 1a and b), and intensely enhancing and nodular in the late phase after injection of gadolinium (Fig. 2a and b). Discrete hypokinesia of the LV was noted in the area of the signal abnormality with a normal EF of 57% and no perfusion abnormality. The diagnosis of AM was thus confirmed and the patient recovered well with careful monitoring.

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Figure 1. T2-weighted (a) and T1-weighted (b) sequences: hypersignal of the basal posterolateral wall of the left ventricle (LV).

Figure 2. Short axis (a) and long axis left ventricle (LV) (b) slices in a delayed enhancement sequence (10 min); central myocardial nodular enhancement of the lateral wall of the LV.

Discussion

Acute myocarditis (AM) is an inflammation of the myocardium associated with a cellular infiltrate without any significant coronary lesion. There are three major immunohistological varieties, viral, parvovirus B19 and herpes virus HSV6 [1,2], the commonest, autoimmune or idiopathic varieties.

Acute myocarditis secondary to spider bite poisoning is very rare. It has been described following a scorpion sting but rarely following a spider bite [3]. Spiders, members of the arthropod phylum, are widespread throughout the world. They generally appear between April and November, and their venom is very toxic. They can cause a wide variety of symptoms in humans but cardiovascular symptoms are rare with the exception of hypertension/hypotension and bradycardia/tachycardia [3].

To our knowledge, this case is the fourth to be reported in the literature. The first case was a 16-year-old boy in Italy, the second a 19-year-old woman in Greece [4] and the third a 65-year-old man in Turkey [4]. The main component of spider venom is α-latrotoxin which is responsible for a massive release of adrenaline and noradrenaline. This release of catecholamines generally affects the nervous system but it may also affect the heart, as in our case, and result in myocarditis. The exact mechanism of AM following spider bite poisoning is still not fully understood and is open to discussion [3,4].

The clinical presentation of AM is usually polymorphic. It lacks specificity. Paraclinical examinations are often disappointing. A resting ECG may show a number of features: the appearance of a bundle branch block or a Q wave, more or less diffuse repolarisation anomalies, including ST segment elevation. Inflammatory signs may appear in laboratory tests, such as raised troponin I, and sometimes cardiac enzymes (CPK-MB) may be present [1]. Echocardiography is the primary examination for determining the left ventricular ejection fraction (LVEF), recording segmental kinetic
anomalies and detecting right ventricular dysfunction or associated pericardial effusion. However, echocardiography alone is insufficient for making a diagnosis and may prove disappointing for this purpose. It is above all useful for detecting complications and seeking a differential diagnosis [1]. Myocardial scintigraphy with antomyosin antibodies is an interesting technique. However, the examination involves irradiation and it is not always available [1]. Only myocardial biopsy can confirm the diagnosis, based on the Dallas histological criteria. Presented as the gold standard, this invasive examination has the drawback of low sensitivity (10 to 20%) with risks of mortality estimated at between 0.25 and 0.5% [2].

Cardiac MRI is a non-invasive alternative to biopsy in the acute stage (in the first 5 days). It shows a T2 myocardial hypersignal, sub-epicardial focal uptake of contrast agent on delayed sequences after injection, without systematisation within a vascular territory, remaining in the sub-endocardium and thus eliminating a diagnosis of infarction. In the subacute stage (after 10 days), the spread of myocardial involvement makes diagnosis much more difficult; this was not the case in our observation. MRI evaluates the topography and extent of lesions and allows monitoring at 3 months [1,2,5,6].

Conclusion

When performed early on, cardiac MRI is a valuable tool for positive or differential diagnosis of acute myocarditis and for determining its severity, and is also useful for later monitoring. We recommend using it when faced with an abnormal ECG after a spider bite.

Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

References