However, the EMB could give additional information such as the inflammation process.

MA is an emerging drug in Europe with increasing consumption reports, especially in Southeast Asian communities (5). In this context, CMR may be a good tool to evaluate the cardiac morphology and predict LVEF recovery in MACM. Further studies are needed to assess the association between LGE, fibrosis, and MACM prognosis.

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REPLY: Cardiac Magnetic Resonance as an Alternative to Endomyocardial Biopsy to Predict Recoverability of Left Ventricular Function in Methamphetamine-Associated Cardiomyopathy

We appreciate the interest of Dr. Pujol-López and colleagues in our work (1). We entirely agree that late gadolinium enhanced (LGE) cardiac magnetic resonance (CMR) may be an alternative to invasive endomyocardial biopsy (EMB) for quantifying diffuse myocardial fibrosis and disease extension in patients with methamphetamine-associated cardiomyopathy (MACM).

In their letter, Dr. Pujol-López and colleagues show in a small patient cohort with MACM that the presence of LGE may predict the recovery of left ventricular ejection fraction (LVEF). This would be in line with data derived from other nonischemic cardiomyopathies (NICMP) (2,3), suggesting that the presence of LGE predicts a nonresponse to medical therapy (3) and the occurrence of adverse events (2).

One limitation of LGE is that this method predominately detects regional and focal areas of fibrosis/necrosis but might be not sensitive to more subtle and diffuse pathologies. In the last years, native and post-contrast T_1 mapping techniques and calculation of the extracellular volume fraction have been proven to correlate with histological collagen volume fraction as a marker of diffuse myocardial disease/fibrosis (4). Recently, Puntmann and colleagues (5) revealed in a cohort of 637 patients with NICMP that native T_1 mapping measurement is able to identify patients at risk for all-cause mortality, heart failure mortality, and heart failure rehospitalization.

Due to the fact that the extent of myocardial fibrosis assessed by EMB independently predicts the recoverability of LVEF in MACM patients (1), one may hypothesize that noninvasive assessment of myocardial fibrosis using CMR parameters, that is, T_1 mapping and LGE, could represent an integral part of risk assessment in MACM and could predict both response to medical therapy and the incidence of adverse events. The data described by Dr. Pujol-López and colleagues are promising but still limited by the small number of patients examined. Future studies in this cohort of critical patients with MACM are necessary to prove the concept of risk stratification by using CMR-derived parameters quantifying diffuse changes to the extracellular space.

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