Etiology of CMP

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Indications and purpose of the scan

- In patients with suspected cardiomyopathy, cardiovascular magnetic resonance (CMR) is uniquely suited to identify the presence or absence of a cardiomyopathy (CMP) with high accuracy, and in the same setting, differentiate between ischemic and non-ischemic cardiomyopathy.

Description

- A typical CMR scan takes approximately one hour, prior to the scan careful review of the patient’s history leads to a prescription of a personalized protocol for each patient to answer the clinical question. Standardized CMR protocols are available on JCMR. [1]
- The presence or absence of cardiomyopathy has significant clinical implications, the ability of CMR in identifying the etiology of cardiomyopathy is critical for selection of patient’s treatment and prognosis. [2]

Why CMR (specific advantages)

- No radiation exposure.
- No limitations of acoustic window, the average CMR scanner can accommodate up to 550 lbs and a large bore scanner up to 70 cm diameter.
- Uniquely suited to identify the presence of cardiomyopathy.
- Identifying the etiology of cardiomyopathy.
- Differentiate between ischemic and non-ischemic CMP.
- Helps identifying the type of non-ischemic CMP. [3]

Evidence

- A systematic approach using patterns of delayed enhancement CMR (DE-CMR) to identify the etiology of CMP was proposed by Senthilkumar et al. This systematic approach assist the diagnosis of ischemic or non-ischemic CMP and in selected cases with the addition of ischemic evaluation it helps determinate the presence of mixed CMP. [3]
- Felker et al. showed in a study of 1230 patients that the etiology of heart failure has prognostic implications, e.g. patients with peripartum CMP have better prognosis compared to other forms of CMP and patients with infiltrative myocardial disease have poor prognosis, thus accurate diagnosis of CMP is critical for this patient. [2]
- Prior data has shown that DE-CMR has a high accuracy identifying the etiology of CMP when compared to coronary angiogram (CA) in patients with dilated CMP. In a cohort of 90 patients with heart failure the use of CA as gold standard led to 13% errors identifying the etiology of CMP compared to CMR; this is likely due to recanalization after myocardial infarction. This study illustrates the accuracy of DE-CMR even in patients with non-obstructive CAD but with ischemic CMP. [4]
- Assumull et al. in a cohort of 120 consecutive patients who underwent CMR and CA showed that CMR is not only non-inferior to CA to identify the etiology of CMP, but also is safe and an economical gatekeeper to CA in patients with heart failure of unknown etiology. [5]

Contraindications

- Any implanted device that is not MRI conditional
- Inability to lie flat
- Inability to tolerate the scan
- Altered mental status/ inability to follow verbal commands in scanner
- Severe arrhythmias
- Patients renal disease and GFR<30 mL/min or patients with selected metallic implants or prostheses non-compatible to MRI. [6]
Appropriateness

- CMR is appropriate to evaluate the etiology of cardiomyopathy with the use of delayed enhancement imaging. [7]

Reference