Peripartum cardiomyopathy prognostication using cardiac magnetic resonance imaging

Julien Feghaly[1]
James Ampadu[2]
Ariana Mooradian[1]
Elsayed Abo Salem[3]

Author details can be found at the end of this article

Correspondence to:
Julien Feghaly; julien.feghaly@health.slu.edu

Introduction

Peripartum cardiomyopathy is a life-threatening form of cardiomyopathy affecting women in the last month of pregnancy and up to 5 months postpartum. Cardiac magnetic resonance imaging evaluating for late gadolinium enhancement has been used to assess prognosis and functional recovery in these patients. The presence of late gadolinium enhancement appears to be associated with a poor prognosis. This article demonstrates the absence of late gadolinium enhancement as a marker for a good prognosis in a woman with peripartum cardiomyopathy.

Discussion

This patient had several of the known risk factors for peripartum cardiomyopathy: African ancestry, pre-eclampsia and multiparous pregnancy. Protective factors included a low level of troponin and diagnosis following delivery. Cardiac magnetic resonance did not reveal any late gadolinium enhancement and the patient had functional recovery with a

Case report

A 28-year-old African American woman (gravida 3, 2 full-term deliveries, 0 pre-term deliveries, 1 abortion, 2 living children) with a past medical history of asthma and pre-eclampsia presented with a 6-day history of shortness of breath, in addition to reporting paroxysmal nocturnal dyspnoea, orthopnoea requiring three pillows at night to sleep, chest tightness on inhalation and cough productive of white sputum. One month earlier she had a successful normal vaginal delivery of her second child, complicated by pre-eclampsia. On presentation, chest X-ray showed pulmonary oedema, pleural effusions and cardiomegaly. B-type natriuretic peptide levels were elevated at 1651 pg/ml and troponin I levels were within normal limits. Electrocardiogram showed sinus tachycardia at 117 beats per minute (bpm) with QTc prolongation at 599 ms. She was admitted and treated for heart failure in the setting of peripartum cardiomyopathy, given intravenous furosemide for diuresis and started on metoprolol, spironolactone and enalapril.

Transthoracic echocardiography revealed severe concentric left ventricular hypertrophy with akinesis of the inferior wall and a left ventricular ejection fraction of 35%, in addition to a dilated left atrium, severe mitral regurgitation, elevated left ventricular filling pressures and moderate pericardial effusion. There was concern that the findings may not have been acute and the cardiomyopathy might have been present before the pregnancy. Cardiac magnetic resonance imaging was performed to better characterise the cardiomyopathy. Cardiac magnetic resonance imaging showed no abnormal myocardial enhancement, moderate global left ventricular hypokinesis with an ejection fraction of 31%, normal left ventricular size with moderate global hypokinesia, moderate mitral regurgitation and a small pericardial effusion. In view of the absence of myocardial enhancement it was evident that there were no signs of fibrosis, inflammation or previously existing cardiomyopathy. The patient was continued on guideline-directed medical therapy for heart failure with reduced ejection fraction, which included furosemide, metoprolol, spironolactone and enalapril. Once clinically improved she was successfully discharged home.

On follow up 3 months later, a repeat transthoracic echocardiography demonstrated normalised left ventricular size and systolic function, improved left ventricular ejection fraction of 55%, a normal left atrial size and trivial mitral regurgitation. B-type natriuretic peptide levels had normalised to 38 pg/ml and repeat electrocardiogram showed a normal sinus rhythm at 61 bpm with a QTc of 471 ms. The patient reported no recurrence of shortness of breath, dyspnoea, oedema or chest pain. She was placed on medroxyprogesterone contraceptive injection and the risks of future pregnancy were explained to her. Follow up as an outpatient was continued, and she remained on metoprolol, spironolactone and enalapril.

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Learning points

- While the presence of late gadolinium enhancement predicts a high likelihood of a poor outcome, the lack of late gadolinium enhancement can predict a good outcome, potentially myocardial recovery.
- Further large-scale studies are needed to examine late gadolinium enhancement on cardiac magnetic resonance as well as other prognostic factors for peripartum cardiomyopathy, to better understand the disease course and predict outcomes.
- Cardiac magnetic resonance provides useful diagnostic data for assessing cardiac structure and function, and evaluating myocardial oedema, fibrosis and necrosis.

good prognosis following appropriate treatment. Several case reports and small studies have examined the prognostic association between peripartum cardiomyopathy and the observation of late gadolinium enhancement on cardiac magnetic resonance, the majority of which concluded that the presence of late gadolinium enhancement was linked to a poor outcome (Marmursztejn et al, 2009; Barone-Rochette et al, 2011; Renz et al, 2011; Arora et al, 2014). Given the lack of late gadolinium enhancement and the positive outcome, this case linked the absence of late gadolinium enhancement to a good prognosis.

Arora et al (2014) examined ten women diagnosed with peripartum cardiomyopathy; four of whom had cardiac magnetic resonance revealing late gadolinium enhancement and they all developed decompensated heart failure during delivery; the signs and symptoms of heart failure persisted or recurred post-delivery and required readmission. All four women had left ventricular ejection fractions of <45% on follow up, while women who lacked late gadolinium enhancement had a favourable outcome. Two women with late gadolinium enhancement had future pregnancies and developed heart failure exacerbations (Arora et al, 2014). Repeat pregnancies have been associated with an increased risk of cardiac dysfunction and mortality, especially in a patient with persistent left ventricular dysfunction (Elkayam, 2011).

In contrast, Mouquet et al (2008) examined eight women with peripartum cardiomyopathy whose cardiac magnetic resonance did not reveal any late gadolinium enhancement suggestive of myocardial fibrosis. Half of these regained normal cardiac function, suggesting that late gadolinium enhancement may or may not play a role in predicting recovery of cardiac function. Mouquet et al (2008) concluded that cardiac magnetic resonance is not a useful prognostication tool but is only useful in the acute stage assessing cardiac function and the presence of myocarditis.

Author details

[1]Department of Internal Medicine, St. Louis University, St. Louis, Missouri, USA

[2]Department of Cardiology, University of California San Diego, San Diego, California, USA

[3]Department of Cardiology, St. Louis University, St. Louis, Missouri, USA

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