Supplemental Information

CMR Tissue Characterization

CMR is useful to visualize tissue changes. It can reveal markers of inflammation as well as cardiomyocyte damage.[4–6,23]

In acute myocarditis, expected tissue pathology includes interstitial and/or intracellular edema, hyperemia, capillary leak and, in severe cases, cardiomyocyte necrosis and subsequent fibrosis.

In inflammation, increased permeability of cellular membrane results in edema. Imaging markers for edema include high signal intensity of cardiac muscle compared with skeletal muscle on T2-weighted imaging (Fig 3 A and B) or increased T2 relaxation time on T2 mapping (Fig 3 C). Rapid uptake of contrast in the myocardium (EGE) is a sign of hyperemia or capillary leak.

Areas of acute myocardial injury and/or necrosis or subsequent scarring are detected by contrast retention 10 to 15 minutes after injection of a gadolinium contrast agent, indicated by LGE (Fig 3D, Figs 4–7).

As per the 2009 Lake Louise criteria, in clinically suspected cases of myocarditis, the diagnosis is likely if 2 of 3 criteria from elevated signal on T2-weighted imaging, EGE, and LGE are present. In 2018, these criteria were updated to include edema markers, such as T2 time, and fibrosis markers, including T1 time and ECV fraction, for improved diagnostic accuracy.