

## SUPPLEMENTAL MATERIAL – DETAILED CMR PROTOCOL

Cardiac magnetic resonance (CMR) will be performed using preferentially 1.5 Tesla- scanners, a dedicated body coil for cardiac measurements, and electrocardiographic gating.

The standardised protocol consists of:

- (1) standard cardiac localizers
- (2) modified Dixon sequence (lumbar spine)
- (3) balanced turbo field echo cine imaging of long-axis views (two-, three-, and four-chamber left ventricle views, right ventricle outflow tract, pulmonary artery; field of view (FOV): 400 mm x 400 mm; voxel size: 2,1 x 2,1 x 6 mm; echo time (TE): 1,19 ms; repetition time (TR): 40,65 ms; flip angle: 70°)
- (4) native T1 shortened modified look locker inversion recovery sequence (ShMOLLI) mapping on short-axis view in three slices (FOV: 400 mm x 400 mm; voxel size: 1,6 x 1,6 x 8 mm; 12 mm gap; TE: 1,09 ms; TR: 298,6ms; flip angle: 35°). Same position as slices of 2D balanced turbo field echo cine imaging SA.
- (5) intravenous gadolinium (Dotarem®, Guerbet, Roissy, France) body weight dependent bolus injection (0.2 ml/Kg)
- (6) 2D balanced turbo field echo cine imaging stack of 9-17 contiguous short-axis slices, covering both ventricles from apex to base, using balanced turbo field echo cine imaging (FOV: 400 mm x 400 mm; voxel size: 1,6 x 1,6 x 8 mm; 8 mm gap; TE: 1,16 ms; TR: 41,4 ms; flip angle: 70°)
- (7) late gadolinium enhancement (LGE) 'overview' images (phase-sensitive inversion recovery sequence; PSIR) in two-, three-, four-chamber and short-axis views (identical to cine imaging localization and voxel size; TE: 1,03 ms; TR: 700 ms; flip angle: 40°), after a minimum of 8 minutes of intravenous Gadolinium injection. Same position as balanced turbo field echo cine imaging SA, 2,3 and 4 CH.
- (8) LGE 'high-resolution' PSIR images (identical to LGE overview location; voxel size 1,6 x 1,6 x 8 mm; TE: 1,55 ms; TR: 750; flip angle: 20°)
- (9) Post-contrast (15 minutes after Gadolinium injection) T1 ShMOLLI mapping (identical to native settings positions not parameters)
- (10) three-dimensional whole heart dataset using respiratory navigator gating and electrocardiograph triggered isotropic 1.5 mm in diastole.