Protocol: Mouse Cardiac CINE Protocol

Purpose

- Basic cardiac movies with 20 frames per cycle.

<table>
<thead>
<tr>
<th>Type</th>
<th>Scan Name</th>
<th>In-plane res, slice thickness</th>
<th>Scan time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Localizer (for animal positioning)</td>
<td>1_MouseCardiacTripilot</td>
<td>625 μm x 625 μm, 2.0 mm</td>
<td>1 min</td>
</tr>
<tr>
<td>Localizers (for prescription), 4 slices, 4 frames</td>
<td>2_MouseCardiacCoronal, 3_MouseCardiacSagittal, 4_MouseCardiacAxial</td>
<td>100-200 μm, 1.0 mm</td>
<td>~1 min each w/ECG+resp gating</td>
</tr>
<tr>
<td>FLASH CINE</td>
<td>5_MouseFLASHCINE</td>
<td>156 μm x 156 μm, 1.0 mm</td>
<td>~5 min</td>
</tr>
</tbody>
</table>

Protocol Steps

1. **Set up the physio equipment.** Follow the instructions below and the operator manual. You will need ECG, respiratory and temperature monitoring.
2. **Set up the RF Coil.** Use Coil C, at 35mm inside diameter, 300W Quad Transceiver coil.
3. **Prepare the animal and physio equipment.** See the “Positioning” section below.
4. **Protocol directory.** The protocols can be loaded from the directory named “C_MouseCardiacCine.”
Animal Bed
Use the sliding mouse bed. Place the mouse in the prone position and adjust so that the mouse heart is at isocenter.

Physiological Gating

Anesthesia
Anesthesia should be regulated carefully to bring the heart period to about 120 ms. In this case, it is possible to acquire 20 move frames through the cardiac cycle. If the cardiac cycle is shorter, fewer movie frames can be acquired.

ECG and Respiratory Gating
We have found that setting up ECG and respiratory gating are critical in these scans. Be sure that leads are twisted as much as possible and are passed under the subject to the ECG monitor. The leads should be twisted along their entire length and never form a loop. Tape leads securely at multiple places along the sample bed and check for loops after insertion into the scanner.

A good respiratory signal is equally important for collection of artifact free images. Be sure to position the respiratory bellows between the animal and a hard surface so the respiratory signal is reliable. Set the bladder below the diaphragm. If the bladder is too high you may observe the heart beat in the respiratory signal. In the physio software set respiratory begin delay to 0 and max width to 600 ms to collect data along the plateau of the respiratory signal. The screenshot below shows a typical setup of physio equipment. Keep in mind that the respiratory and ECG signals can take 30 seconds to update after they are disturbed or changed during setup.