MR SCANNING PROCEDURE FOR HALT PKD

Form # 21A

Before each study, the MR scanner will be adjusted for proper shimming.

1. An angiocatheter will be placed for Gadolinium study (20 cc or 0.1 mmole/kg). A slow-flow infusion with normal saline will be used to keep the vein open during the course of the study.

2. (Optional) EKG pads will be placed over the chest. If EKG gating is not available or functioning, it may be replaced with a peripheral pulse gating.

3. Subjects will be placed supine on the MR table with their arms to their side.

4. (Optional) A phased-array surface coil will be positioned with its center over the heart. Breath-holding instruction will be coached prior to MR scanning. For a MR scanner with a moving table technology, a second surface coil will be positioned with its center over the inferior costal margin, i.e. over the expected location of the kidneys.

5. (Optional) Cardiac-gated, breath-hold 2D true-FISP (FIESTA) short-axis cine images will be obtained to cover the left ventricle from the AV ring to the apex (10 mm slice thickness, no gap, FOV 250-320 mm; typically 10-15 breath-holds to cover the whole left ventricle).

6. Subjects will be moved out. A phased-array surface coil will be positioned with its center over the inferior costal margin, i.e. over the expected location of the kidneys. For a MR scanner with a moving table technology, the MR table will be moved to center over the second coil to image the abdomen.

7. Scout scan to locate the scan range of the entire kidneys. A stack of axial images to cover the most anterocaudal and posterocranial aspects of the kidneys is highly recommended.

8. The field-of-view (FOV) should be kept as small as possible (30-35 cm) without producing wrap-around artifacts.

9. Breath-hold coronal T2 scan (SSFSE/HASTE **with** fat sat) with 9mm fixed slice thickness, usually achievable in a single breath-hold.

10. Breath-hold coronal T2 scan (SSFSE/HASTE **with** fat sat) with 3mm fixed slice thickness, which would require 1-4 breath-holds depending on the kidney size. Use as few breath-holds as possible. The first scan should cover the posterior aspect of the kidney. Neighboring image groups should be overlapped by a single 3mm slice. To determine correct table position choose the “shift-mean (starting point in GE)” of the second scan for example: the first shift-mean = -60mm, the number of slices in the first set =23, (23- 1)x3=66mm, new shift mean =-60+66=6mm.

11. Breath-hold coronal T2 scan (SSFSE/HASTE **without** fat sat) of the kidneys with adjusted slice thickness, 3-6 mm, i.e. the slice thickness best attainable with a single breath-hold (The adjusted slice thickness may not remain the same in a follow-up MR scan if there is a change in the subject's breathhold capacity or kidney size.) Repeat the scan over the liver with the same slice thickness. This scan and the scan for the kidney should share one overlapping liver slice (i.e., the most posterior slice of the liver scan should be identical to the most anterior slice imaging the liver in the kidney scan. If more than two scans are required to cover the anterior liver, again the neighboring scans should be overlapped by one slice.

12. Coronal PreT1 scan (3D VIBE/FMPSPGR without fat sat) with 3mm fixed slice thickness.

13. (Optional) (For renal blood flow measurement) MRA of renal arteries will be performed with Gadolinium injected at 1 cc/s for 20 cc. You have two minutes for the MRA acquisition from the start of the injection.

14. PostT1 scan: Repeat T1 scan (3D VIBE/FMPSPGR without fat sat) with 3mm fixed slice thickness twice: 120 and 180 sec after the start of the Gadolinium injection performed above.

15. (Optional) Breath-hold, phase-contrast technique of renal blood flow measurement. From the MRA images, the renal arteries will be identified. To accurately measure velocity, it is important to choose the imaging slice perpendicular to a vessel. Velocity encoding (VENC) value of 100 cm/sec will be used. Small FOV (14-16 cm) and large matrix (256x192 or 512x512) are important for an accurate measurement of the vessel size. Segmented, prospectively cardiac-triggered phase contrast flow measurements will be obtained to compute the mean and peak velocities, as well as the total mean flow, during the cardiac cycle. Please, refer to Renal Blood Flow Assessment Methods section for detailed procedural description.

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