GUNDERSEN HEATLH SYSTEM
NUCLEAR MEDICINE DEPARTMENT
PROTOCOL MANUAL

PROCEDURE: **Renogram with and without Lasix**

SECTION: **GENITOURINARY 5.1**

ORIGINAL DATE: **9 - 21 - 99**

DATE REVISED: **10 – 1 - 20**

REVIEWED: **ANNUAL**

Renogram W/ and W/out Lasix

Indications	Renal scintigraphy is used to assess renal perfusion, function and excretion. Lasix administration may be added to evaluate obstruction from those without obstruction. In obstructed hydronephrosis, no washout of activity may occur, or a blunted response may occur after furosemide administration, whereas washout should be good for unobstructed patients.
Contraindications	Radiographic contrast agents may interfere with kidney function. If contrast studies have been performed, the renal scan should be deferred for 24 hours. If the patient has undergone renal angiography or angioplasty, the study should be deferred for 3 days, if clinically feasible. Allergy to furisomide for LASIX RENOGRAM studies
Exam time length	1 hr – renogram 1 ½ hrs Lasix renogram
Patient Prep	PEDIATRIC patients: Use of sedation, see Policy GL-6005, Procedural Sedation. General guidelines for Peds Renograms: *Under 1 year old, patient starts in Urology for catheter, comes to Nuclear Medicine Imaging and we call Imaging RN for IV start. Mom feeds babe and then use infant immobilizer. *1 year old-ish on up, patients start with Pediatric Sedation Service for IV and Catheter placements. Patients are previously scheduled with the Pediatric Sedation Service and family is advised by Sedation Service pre-call to come with child appropriately NPO to receive sedation. ADULT patients should drink fluids 2-3 hrs prior to exam + 300-500ml of water approximately 10-15 minutes prior to the exam. Pt should void prior to the exam. **LASIX PEDS** patients will be NPO if receiving sedation, otherwise children can be breastfed (or bottle fed) ad lib. 1) After IV access is established, give Normal Saline Bolus of 10mL/kg over 15 minutes. (For children weighing less than 3kg contact the ordering physician or PICU doctor for confirmation of bolus volume.) 2) Following the saline bolus infusion continue maintenance IV fluids with Normal Saline to run at 4mL/kg/hr until the end of the study. 3) In the case of need for IV flushes, use Normal Saline, 1mL/kg up to 10mL volumes. An indwelling urinary catheter may be helpful in patients with outlet obstruction or obstruction of the ureterovesical junction; helping avoid a false-positive test that is due to pressure from urine retained in the bladder. Contact the ordering physician regarding the catheter use. If present, an existing catheter should be unclamped.

	All patients should void (or empty by catheter) just prior to the exam
Radiopharmaceutical	Radiopharmaceutical: Tc99m MAG3 (Tc99m DTPA if MAG3 is unavailable) **For Dr. Orozco – use Tc99m DTPA for 'GFR only' Exam Indication. The renogram is done prior to a child undergoing a procedure like a bone marrow transplant. No Lasix. ** Cardinal Health will make a note that we request a 60 min post calibration expiration for our MAG3; all 2:00 and 3:00 patients will probably be a 2nd isotope run.
Dose (MAG3/DTPA)	ADULT Dose: 10 mCi (5 mCi if only one kidney) in ≤0.5ml o Adults are automatically calibrated for 30 min post-arrival time.
	PEDIATRIC DOSES: 0.15 mCi/kg (Dosing Range 1 – 10 mCi) o Pediatrics must be calibrated 90 minutes after arrival time.
LASIX Dose For patients with both 1 and 2 kidneys	**ADULT:** 0.5mg/kg body weight, up to a maximum of 40 mg injected slowly over a 1-2 minute period followed by a saline flush **PEDS:** 1.0mg/kg body weight, up to a maximum of 40 mg injected slowly over a 1-2 minute period followed by a saline flush. Furosemide is usually injected 15 minutes after the start of the study. **Alternative diuretics (not for pediatrics):** Bumex (Bumetanide) Dosing equivalent * 1 mg Bumex = 40 mg Lasix Demadex (Torsemide) Dosing equivalent * 10 mg Demadex = 20 mg Lasix
Dose/Scan Interval/Injection guidelines:	LEAP Collimator. (peds) Imaging begins immediately after the bolus injection. Intravenous (bolus) – Large antecubital vein site is accessed using a large bore needle. - Use a 3-way stopcock and extension tubing to administer the dose as a bolus with a rapid saline flush. -The camera should be started at this point. - measure syringe and tubing residual PEDS IV: The order of preference for I.V. placement is: Antecubital, hand, foot then last chance scalp. ***Suction vacuum immobilizer mattress (stored in MRI LEGACY) uses our suction machine to suck the air out of it, compresses to immobilize the patient.

Renogram Processing

*****For pediatric exams,** Dynamic motion correction protocol on Xeleris. All Applications/Miscellaneous/ Dynamic Motion Correction.

1. Have the following information available for processing:
   A. # of kidneys
   B. RRX
   C. Clearance Method - Camera Based
      a. MAG3 – Schegel
      b. DTPA - Gates
   D. pt age
   E. Ht in cm
   F. Wt in kg
   G. Pediatric state
   ~~H. Kidney depths for pediatric patients~~ (No longer necessary per Radiologist)
   I. Diuretic: type, dose and time given
   J. Injected dose – (pre-injected – residual)
   K. Counted dose – pre-injected

2. Select patient data sets and select Renal Analysis
3. Complete information concerning the study. Select Okay
4. Draw ROI's around kidneys as directed.
   A. Renogram without lasix should be around the kidney not including the extending renal pelvis
   B. Renogram with lasix should be around the kidney and include the extended renal pelvis
5. Draw ROI for aorta
6. The computer will display the kidney, aorta and computer-generated kidney backgrounds. Review all and modify as needed.
   A. Bkg: All backgrounds should represent what is anatomically behind the kidney. For MAG3 renograms this would include a correct percentage of liver activity.
   B. When all are correct hit proceed
   C. The computer will complete the renal analysis
      i. For <u>Lasix Renograms</u>: Please ask Radiologist to review the generated Function curves, specifically looking at the start and end of slopes for T-1/2 calculations. If they need to be adjusted, see notes below**

7. Select Camera Based Adjust ROI's to include all of the pre and post syringe activity. Hit proceed. The processing portion of the renogram is complete. Continue to make the screen caps.
8. Select the review icon.
9. Select Renogram QC
    A. Select Perfusion QC
        i. Screen cap this page without inverting
    B. Select Function QC
        i. Screen cap this page without inverting
    C. Select Back

10. Select **Dynamic Image Review**
    A. The summed images will be displayed. Adjust intensity and save as an inverted screencap.
11. Select **Renogram Review**
    A. Screen cap this page without inverting
12. Select **Clinical Summary**
    A. Screen cap this page without inverting

14. Send Dynamic Image Review, Renogram Review and Clinical Summary screen caps to Fuji.

**Adjusting the Slopes for T-1/2 calculations, Dr. Manske would like the Lasix injection time to correspond to the start of the Lasix washout curve.

After patient information is entered and ROI's are drawn, go into the Renogram Analysis program.

- The program will then display a function graph with a blue line marking the Lasix injection time. Check to make sure it is lined up with the peak or start of the Lasix washout.

- To adjust, go into 'Options', then study information and type in the time that corresponds to the peak and hit OK.