

## General Ultrasound Renal / Retroperitoneal

### PURPOSE:

1. To determine the presence or absence of disease.
2. To identify and quantify pathology, which may be present by evaluating echo characteristics, organs, and vessels for focal or diffuse abnormalities.
3. To improve patient outcomes by identifying abnormalities and disease, categorizing severity, and planning for interventional and/or medical correction.

### PROCEDURE:

1. Only qualified personnel may perform this evaluation.
  - a) To check post void residual, patients must have a full bladder.
2. Qualified technical personnel may initiate a preliminary report.
3. Study data is documented and stored by:
  - a) digital storage
4. At conclusion of test sonographer will complete:
  - a) appropriate technologist worksheets with findings
  - b) complete appropriate charging/billing information
5. Follow preliminary report protocols as indicated.

### STATEMENT OF INDICATIONS: One or more of the following indications must be present

1. Metastatic disease
2. Hypertensive renal disease
3. Renal transplant
4. Mid-abdominal trauma
5. Abnormal diagnostic tests
6. Pain
7. Additional indications maybe used following ICD guidelines.

### EQUIPMENT:

1. Real-time scanner using:
  - a) sector narrow near field
  - b) linear (straight or curved) transducers wide near field
2. Spectral Doppler
3. Color Doppler
4. Ultrasound acoustic gel
5. Appropriate patient drape
6. Towels
7. Appropriate cleaning solution for transducer

### PROCEDURE FOR RETROPERITONEAL ULTRASOUND:

1. With the patient in a supine position, apply ultrasound gel to the patient's abdomen region (RUQ)
2. In transverse, begin by imaging the right kidney using the liver as an acoustic window. View the right kidney coronally

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3. Image the right kidney through the superior pole, the mid-pole (renal hilum), and through the inferior pole. Measure in the greatest transverse diameter. Also measure the renal cortical thickness if it appears thinned.
4. In sagittal, move the transducer medially, and view the proximal portion of inferior vena cava (IVC) from diaphragm to mid abdomen. View distal portion of IVC from mid abdomen to confluence of iliac veins. Move the transducer toward the patient's left and view the proximal, mid and distal aorta.
5. In transverse, view aorta/IVC at level of celiac axis, pancreatic head, and just above the bifurcation. Move the transducer anterior to the aorta/IVC, angling up through the liver and view the pancreas in long axis, including head and body.
6. Apply ultrasound gel to the patient's left upper quadrant of the abdomen, using the spleen as an acoustic window, and view the left kidney coronally.
7. In transverse, image the left kidney through the superior pole, the mid-pole (renal hilum), and through the inferior pole. Measure in the greatest transverse diameter. Also measure the greatest renal cortical thickness.
  - a) When possible obtain long axis and transverse images of the adrenal glands.
8. Note: Any organ that is enlarged or noted as a pathologic lesion should be measured, in three dimensions. If there are too many lesions, measure the largest and smallest.

### PROCEDURE FOR RENAL ULTRASOUND:

1. With the patient in a supine position, apply ultrasound gel to the patient's abdomen region (RUQ).
2. Begin by imaging the right kidney using the liver as an acoustic window. View the long axis of the right kidney demonstrating the central echo complex and renal cortex. Include the right lobe of the liver to compare echogenicity of the kidney to the liver.
3. In sagittal, measure the right kidney's long axis from greatest cephalocaudal length.
4. In transverse, view the right kidney through the superior, mid, and inferior poles. Measure the greatest diameters transverse and AP.
5. Doppler arcuate arteries superior, mid, and lower pole to obtain RI's.
6. Apply ultrasound gel to the patient's left upper quadrant of the abdomen. Using the spleen as an acoustic window, view the long axis of the left kidney, demonstrating the central echo complex and renal cortex. Include the spleen to compare echogenicity of the kidney to the spleen from the greatest cephalocaudal length, and AP diameter through the renal hilum.
7. In transverse view the left kidney through the superior, mid, and inferior poles. Measure the greatest diameters transverse and AP.
8. When possible, images of the distended urinary bladder and its wall should be obtained. A full bladder technique allows visualization of the ureteral-bladder junction and the urinary bladder. The bladder wall thickness and focal lesions should be noted. Dilatation or other distal ureteral abnormalities should be documented.
9. View the bladder in both transverse and sagittal planes taking measurement for bladder volume.
10. Have patient empty bladder and then document bladder volume for post void residual.

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**SPECIAL STATEMENT REGARDING PROTOCOL:** This document is not meant to be a statement of standard. It is not meant to deter the professional sonographer from interrogating any disease or suspected pathology with whatever means they deem appropriate and necessary. It is understood that other additional views, Doppler sampling sites, color settings, velocity ratios and measurements etc., will be used in evaluating any pathologic or suspected pathologic condition.

**EVALUATION AND DIAGNOSTIC CRITERIA:** Real-time and Doppler evaluation and documentation, when indicated, should include but not be limited to:

1. **KIDNEY**
  - a) Size and Shape (norm.10-12 cm in length)
  - b) Echogenicity
  - c) Perirenal fluid collection
  - d) Hydronephrosis
  - e) Renal calculi
  - f) Mass
    - i) Location
    - ii) Size
    - iii) Cystic or solid
2. **URINARY BLADDER AND ADJACENT STRUCTURES**
  - a) Size and Shape
  - b) Wall thickness (> 3mm indicates pathology)
  - c) Calculi
  - d) Clots
  - e) Dilatation or other distal ureteral abnormalities
  - f) Post void residual
  - g) Out pouching of bladder wall
3. **SIMPLE VS. SOLID MASS**
  - a) Simple Cyst
    - i) Anechoic
    - ii) Good acoustic enhancement
    - iii) Thin, well-defined cyst wall
    - iv) Spherical shape
  - b) Solid Mass
    - i) Internal echoes (echoic)
    - ii) Lack of acoustic enhancement
    - iii) Poorly defined far wall
  - c) Doppler/Color Doppler should include but not be limited to:
    - iv) The presence or absence of blood flow:
      - a) Internal in mass
      - b) External to mass
      - c) Laminar flow patterns
      - d) Normal vascularity
      - e) Turbulence and Mosaics

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4. VENOUS DOPPLER - may be performed on the following sites:
  - a) Renal Veins
    - i) Constant forward velocity with slight variations by respiration
    - ii) Directional (Forward flow)
    - iii) Absence or presence of flow
    - iv) Highlighted color for clot
5. ARTERIAL DOPPLER - may be performed on the following sites:
  - a) Renal Arteries
    - i) Low resistance flow pattern
    - ii) Stenosis

### GUIDELINES FOR CALLING PRELIMINARY REPORTS:

1. Reporting preliminary or technical findings is both desirable and necessary in clinical practice.
2. The sonographer may not make the preliminary nature of the report known to the referring physician unless directed to do so by the interpreting physician.

### REFERENCES:

1. ACR Standard for the Performance of Abdominal, Renal, or Retroperitoneal Ultrasound examination in children and adults. Revised 1997 (Res.27). Effective 1/1/98.
2. AIUM Standards and Guidelines for the Accreditation of Ultrasound Practices.
3. Ultrasound Procedure Protocol-The Jefferson Ultrasound Research and Education Institute. Second edition. June 1995
4. SDMS GUIDELINES FOR ABDOMEN REVIEW. Revised 1994.
5. Sarti, D. Diagnostic Ultrasound Text and Cases Yearbook Medical Publishers, Chicago. 1987, second edition.
6. Sanders, Roger. Clinical Sonography A Practical Guide. 1991, second edition