

Renal



Indications

- ◆ Abdominal, flank and/or back pain
- ◆ Hematuria
- ◆ Abnormal lab values or abnormal findings on other imaging exams suggesting pathology
- ◆ Palpable abnormality such as abdominal mass or organomegaly
- ◆ Follow-up known or suspected abnormalities
- ◆ Evaluate for primary neoplasm or metastatic disease
- ◆ Evaluation for UTI, hydronephrosis, stones, infection, post void residual
- ◆ Evaluation of suspected congenital abnormalities
- ◆ Evaluation of abdominal trauma
- ◆ Planning and guidance for invasive procedure
- ◆ Evaluation of free fluid

Equipment

- ◆ Curvilinear or sector transducer
 - 2-7 MHz

Patient Position

- ◆ Supine, decubitus, prone

Patient Prep

- ◆ None
- ◆ Full bladder for bladder volume if needed



Evaluation

Kidneys

- ◆ Longitudinal
 - Lateral, mid, medial
- ◆ Transverse
 - Superior, mid, inferior poles
- ◆ Cortical thickness and echogenicity
 - Compare to adjacent liver or spleen
- ◆ Renal pelvis
- ◆ Pathology
 - Hydronephrosis
 - Stones
 - Masses/Cysts
 - Perfusion abnormalities
- ◆ Assess for renal and perirenal abnormalities

Bladder

- ◆ Longitudinal & transverse planes
- ◆ Bladder wall thickness
- ◆ Diverticula or masses
- ◆ Distal ureters/UVJ, if dilated
- ◆ Volume and post void residual, if indicated

Contrast

- ◆ *Ultrasound contrast may be used to evaluate focal renal lesions*

Renal



Images

Full Protocol

Kidneys (Right & Left)

- ◆ Longitudinal
 - Lateral
 - Mid
 - Medial
 - Measurement
 - Length
 - Color *perfusion*
 - Cine clip
 - Lateral to medial
- ◆ Transverse
 - Superior
 - Mid
 - Inferior
 - Color *hilum*
 - Cine clip
 - Superior to inferior

Bladder

- ◆ Longitudinal
- ◆ Transverse
- ◆ Measurements (*if indicated*)
 - Volume
 - Post void volume
 - Bladder wall thickness

Abbreviated Protocol*

Kidneys (Right & Left)

- ◆ Longitudinal
 - Cine clip
 - Lateral to medial
 - Measurement
 - Length
 - Color *perfusion*
- ◆ Transverse
 - Cine clip
 - Superior to inferior

Bladder

- ◆ Longitudinal
- ◆ Transverse
- ◆ Measurements (*if indicated*)
 - Volume
 - Post void volume
 - Bladder wall thickness

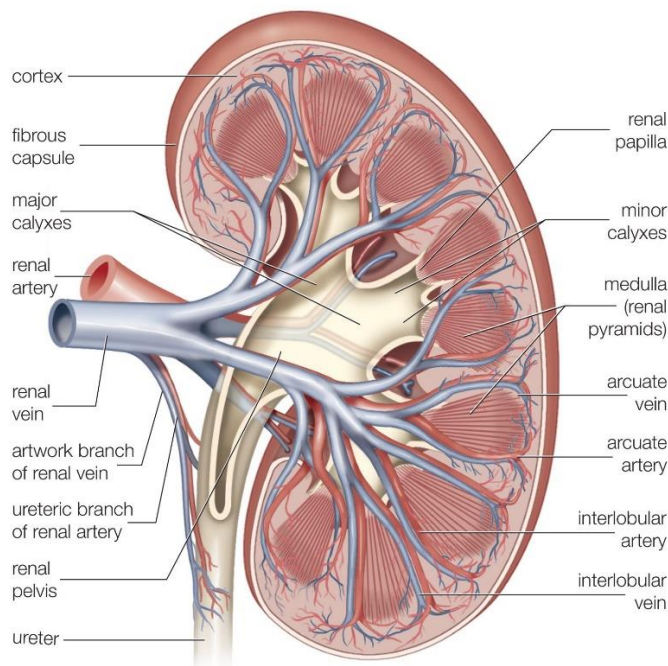
** Abbreviated protocol can be used if recent **CT/MR w/& w/out Contrast** w/in 24 hrs for inpatient, outpatient and ER. Include additional images if needed per clinical concern or CT/MR findings.*

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Additional Information

◆ Renal Anatomy



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◆ Tips for Pathology

- Pyelonephritis:
 - Power Doppler or B-Flow imaging looking for wedge artifacts devoid of flow
- Stones:
 - “Twinkle” setting & try long and trans of ROI
- Cysts/Masses:
 - Decrease sector width & depth to increase frame rate
 - Harmonics
 - Color Doppler decrease scale, increase gain
 - US Contrast

References

- ACR–AIUM–SPR–SRU PRACTICE PARAMETER FOR THE PERFORMANCE OF AN ULTRASOUND EXAMINATION OF THE ABDOMEN AND/OR RETROPERITONEUM Revised 2021 <https://www.acr.org/-/media/ACR/Files/Practice-Parameters/US-Abd-Retro.pdf>
- American College of Radiology. Ultrasound Evaluation Attributes. <https://accreditation.support.acr.org/support/solutions/articles/11000062867-exam-requirements-general-ultrasound> Updated Nov 9, 2022. Accessed Mar 14, 2024.
- <https://www.britannica.com/science/human-renal-system>