

MARY WASHINGTON HEALTHCARE IMAGING SERVICES

RENAL ARTERY ULTRASOUND CRITERIA

Renal artery:

- Normal: PSV < 180, RAR < 3.5, absence of post-stenotic turbulence, acceleration time < 70ms
- < 60%: PSV \geq 180, RAR < 3.5 with turbulence present, acceleration time < 70ms
- \geq 60%: PSV \geq 180, RAR of \geq 3.5 with post-stenotic turbulence, acceleration time may be > 70ms
- Occluded:
 - No flow detected in the renal artery
 - The ipsilateral kidney typically measures < 9.0 cms
 - Flow found throughout the kidney parenchyma is diminished (usually < 10 cm/s)

RAR are generally not accurate if the aortic velocity is < 40cm/s or > 110cm/s.

The presence of a tardus parvus waveform in the kidney suggest renal artery stenosis in > 70% stenosis, however may not be present in < 70% RAS. It may also be seen with hydronephrosis, renal vein thrombosis, chronic renal disease or **anything** that increases vascular resistance & decreases compliance of renovascular tree.

If two renal arteries are present, if both are the same size, there is duplicate renal arteries. If one is smaller, that is an accessory renal artery.

Renal vein:

- Normal renal vein has phasic flow.

Kidney length:

- Normally ranges from 9-12 cms. The length of the right and left kidneys are usually within 2 cm of one another. A difference of > 3cm suggests either very tight stenosis on that side or total occlusion of the main renal artery supplying the small kidney. However, it should be noted there are numerous nonvascular reasons for small kidneys.

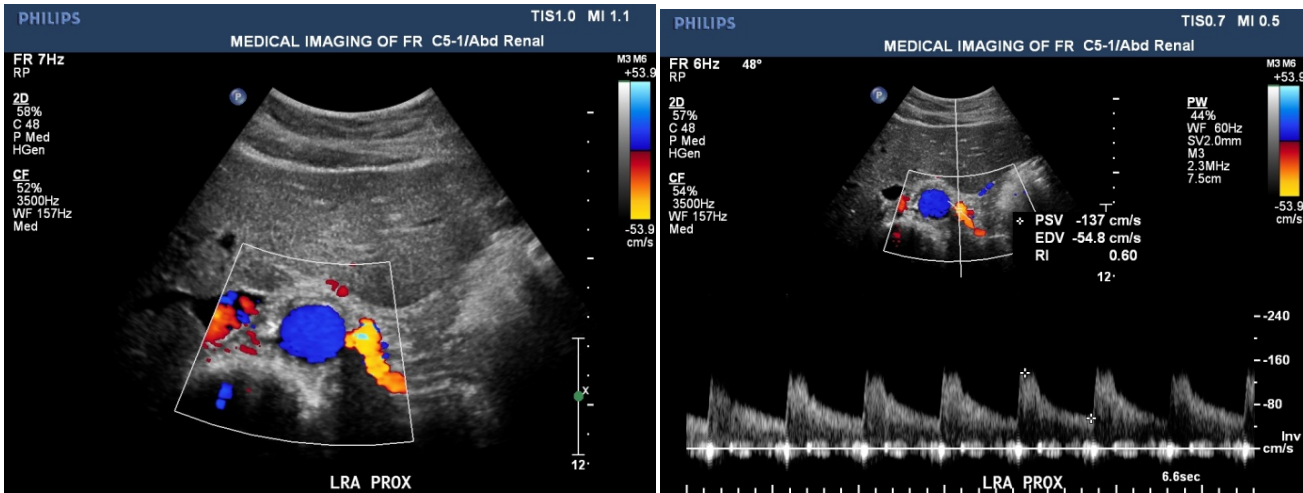
Parenchymal disease:

- Normal RI within the arcuate or interlobar arteries in the kidney: < .75
- Normal parenchymal flow is low resistant. Parenchymal disease is suggested when there is a loss of reduction of the diastolic flow (increased renovascular resistance). A resistive index (RI) is taken from the arcuate arteries.

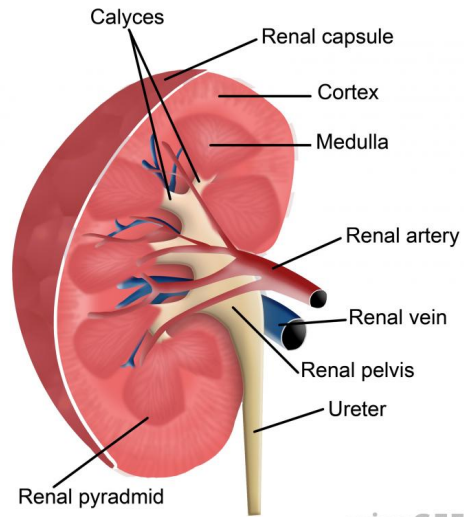
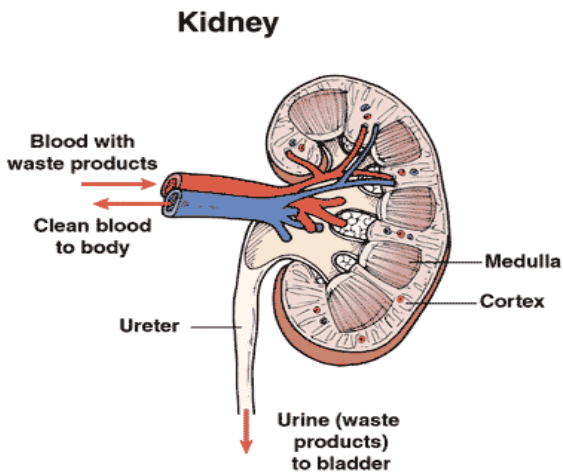
Reference:

- 1) Allan and Baxter: Clinical Ultrasound, 3rd Edition, Chapter 25, Vascular disorders of the kidney.
- 2) Neumyer, Marsha M. B.S. RVT Duplex Scanning /color flow Imaging for the evaluation of renal artery stenosis and renal parenchymal disease, syllabus pp 611-617, presented at 6th San Diego Symposium on vascular Diagnosis, 1992
- 3) Hoffman, U. et al. Role of duplex Scanning for the detection of atherosclerotic renal artery disease, Kidney Int. 1991; 39: 1232.

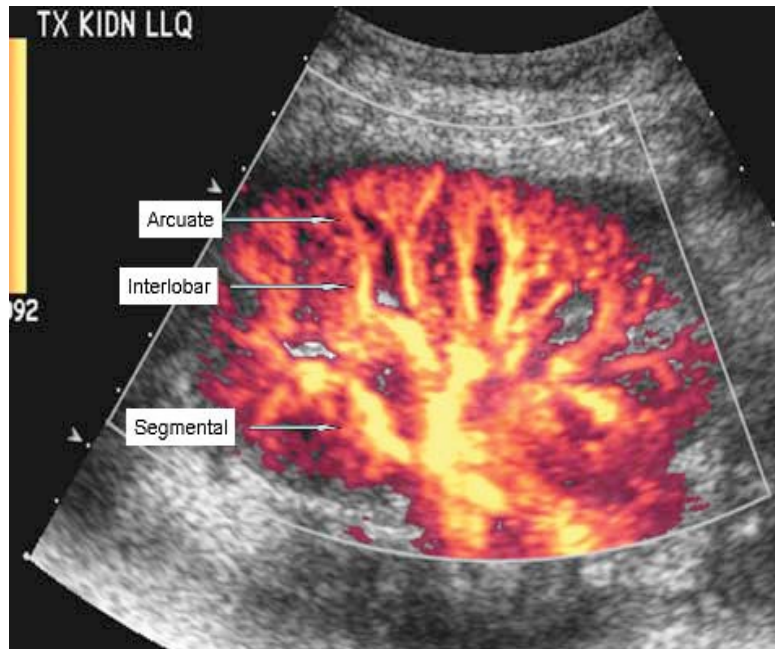
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ANATOMY OF THE KIDNEY



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