

## Nephrology-oriented [Point-of-care Ultrasonography](#) Program for every fellow

### Our mission:

The goal of our Point-of-care ultrasonography (POCUS) program is to train nephrology fellows in performing and interpreting both basic and advanced ultrasound applications pertinent to nephrology practice. We ensure that each fellow gets adequate hands-on experience with emphasis on integrating the POCUS findings into clinical decision making. In addition to performing focused examinations, we train nephrology fellows to perform and report comprehensive renal ultrasound examinations analogous to a radiologist.

### Why ultrasound?

POCUS is an invaluable adjunct to physical examination and is being increasingly adopted by health care professionals from various medical specialties. POCUS performed at the bedside is primarily intended to provide answers to focused questions such as: “Does the patient have hydronephrosis?”, “Is there a pericardial effusion?”, “what is the volume status?” etc. and narrow the differential diagnosis. Moreover, it serves as a non-invasive and a dynamic clinical tool that helps us monitor the response to interventions such as dialysis or diuretic therapy. It also enhances the care of end-stage renal disease patients on dialysis by allowing the physicians to detect subclinical hypervolemia and titrate the ultrafiltration goals.

### Faculty:

The program is led by Dr. Abhilash Koratala, who has extensive experience in performing and teaching



POCUS. He has developed a nephrology-oriented POCUS program for internal medicine residents and nephrology fellows at the University of Florida, where he worked as a faculty before moving to University of Texas Health. He has designed the first ever comprehensive POCUS [video curriculum](#) encompassing all the diagnostic applications, currently considered to be within the scope of

nephrology practice. Dr. Koratala promotes POCUS on various [online platforms](#) and currently authors a series of posts titled [Focus on POCUN](#) on the Renal Fellow Network, a nephrology-specific blog that partners with the American Society of Nephrology.

### **The curriculum:**

Our POCUS curriculum is designed to provide longitudinal training spread out over the 2-year fellowship training to facilitate long-term skill retention. Each fellow rotates 2-3 half days per week roughly amounting to a total of 8 weeks during this period. There are didactics in the form of lectures and grand rounds in addition to the above video curriculum. We have divided the learning objectives/milestones on a 6-month basis (levels I, II, and III in the order of increasing skills) for the first 18 months of fellowship. The rest is reserved for continued practice of the acquired skills. The detailed list of applications is mentioned in reference 2. We also conduct live demonstrations and practice sessions on model patients at the Long school of Medicine's state of the art [Center for Clinical Ultrasound Education](#). For interested fellows, opportunities exist to learn POCUS applications that are beyond the scope of nephrology practice in collaboration with other medical specialties such as critical care medicine. Fellows are strongly encouraged to participate in ultrasound-related research activities and publish their work in peer reviewed medical journals.

### **Equipment:**

The division of Nephrology has procured a hand-held ultrasound machine for patient care and fellowship training. Enhanced portability makes it easier to perform ultrasound examinations in multiple practice settings such as outpatient clinics and dialysis units. The fellows will have access to additional ultrasound machines in the intensive care unit and wards, which provides the opportunity to gain experience with the use of modes such as spectral Doppler that are not available in the hand-held devices to assess portal venous waveform and calculate renal resistive indices. Special emphasis is laid on administrative aspects of maintaining an ultrasound program including machine care, image archiving, billing and coding.

### **Competency assessment and certification:**

At this time, there are no universally accepted guidelines on competency assessment and there exists substantial variation among different professional organizations in terms of minimum number of procedures required for certification. At the end of nephrology fellowship, each fellow will have performed at least the minimum number of procedures (20-30) in 'each application' as required by the

[Point-of-care ultrasound Certification Academy](#), though the actual number is expected to be much higher than that. Each time a study is performed, the fellow is expected to log it in the online fellowship management system. We do understand that competency is not just about the number of studies, and in our program, we monitor error rates through a quality assurance process that involves both providing feedback in real time by the bedside and retrospective review of the saved images performed by each trainee using standardized tools.

Here are some infographics designed by Dr. Koratala on urinary tract sonography and volume status assessment:

**Kidney & bladder POCUS - Common abnormalities II**

This infographic displays four ultrasound images of the kidney and bladder with labels for various abnormalities:

- Advanced CKD:** Shows a kidney with "Thick echogenic parenchyma" and "Loss of C-M differentiation".
- Pyonephrosis:** Shows a kidney with "Debris/Pus" and "Hydro" (hydronephrosis).
- Complex cyst:** Shows a cyst with "Septae" and "Acoustic enhancement".
- Solid tumor:** Shows a "Heterogeneous mass" in the kidney.

Bladder abnormalities shown include:

- Enlarged prostate:** Shows a large prostate gland.
- Debris s/o Infection:** Shows "Debris" in the bladder.
- Distal ureteral stone:** Shows a "Stone" in the distal ureter with "Acoustic shadowing".
- Occlusive bladder tumor:** Shows a "Heterogeneous mass" in the bladder.

The infographic also includes a central anatomical diagram of the human torso showing the location of the kidneys and bladder, and the AK NephroPOCUS logo.

**Kidney & bladder POCUS - Common abnormalities I**

This infographic displays four ultrasound images of the kidney and bladder with labels for various abnormalities:

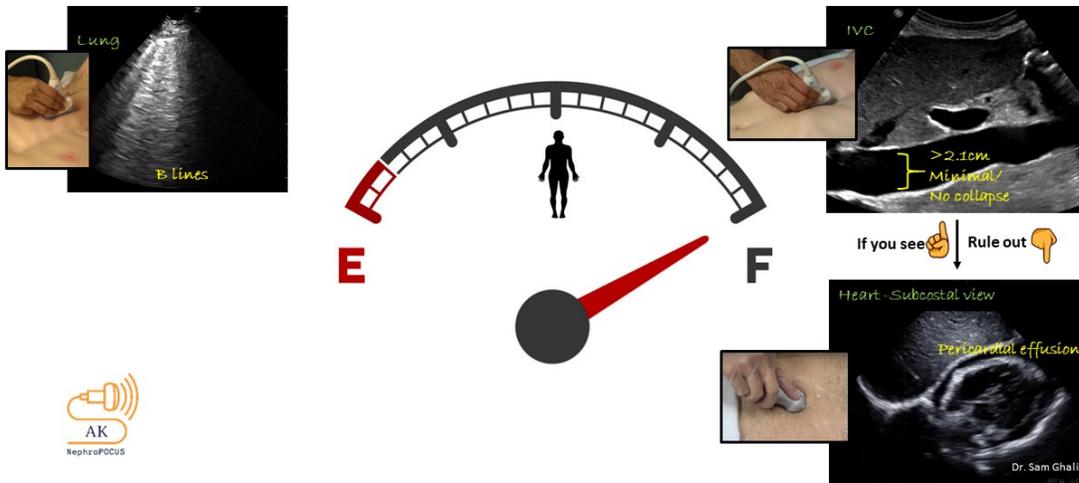
- Normal Kidney:** Shows a normal kidney.
- Hydronephrosis:** Shows "Distended ureter" and "Distended bladder".
- Cyst:** Shows a "Cyst" with "Acoustic enhancement".
- Stone:** Shows a "Stone" with "Acoustic shadowing".

Bladder abnormalities shown include:

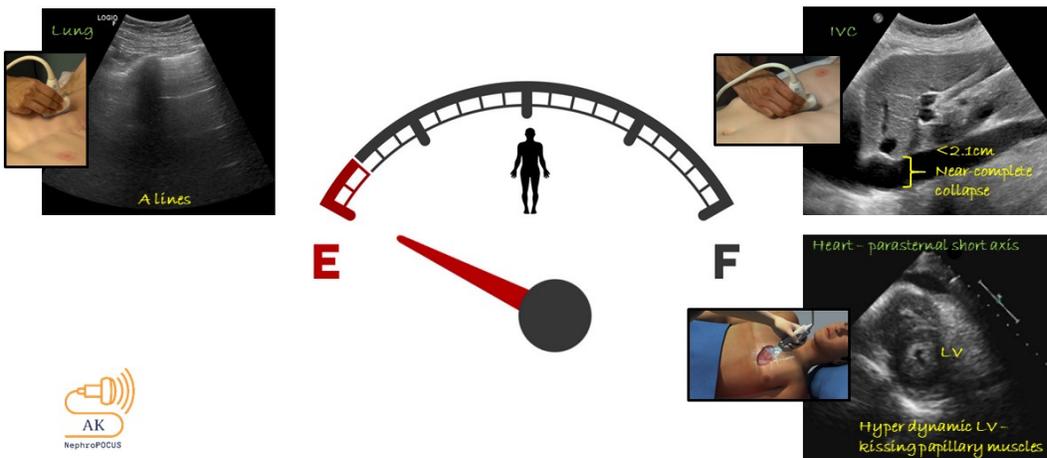
- Normal urinary bladder:** Shows a normal bladder.
- Decompressed bladder:** Shows a "Bulb of Foley catheter" in the bladder.
- Stone:** Shows a "Stone" in the bladder with "Acoustic shadowing".
- Distended bladder:** Shows a "Bulb of Foley catheter" in the bladder.

The infographic also includes a central anatomical diagram of the human torso showing the location of the kidneys and bladder, and the AK NephroPOCUS logo.

## Full Tank



## Empty Tank



### References:

1. Koratala A, Bhattacharya D, Kazory A. Point of care renal ultrasonography for the busy nephrologist: A pictorial review. World J Nephrol 2019 [In press]
2. Koratala A, Segal MS, Kazory A. Integrating Point-of-Care Ultrasonography into Nephrology. Fellowship Training: a Model Curriculum. Am J Kidney Dis 2019; doi: 10.1053/j.ajkd.2019.02.002
3. Koratala A. Focus on POCUS: It is time for the kidney doctors to upgrade their physical examination. Clin Exp Nephrol 2019; doi: 10.1007/s10157-019-01707-8
4. Koratala A, Bhattacharya D, Kazory A. Helping Patients and Profession; Nephrology-oriented Pointof-care Ultrasound Program for the Internal Medicine Residents. Clin Nephrol 2018; doi:10.5414/CN109652