

Providence St. Joseph Health

Providence St. Joseph Health Digital Commons

[View All Washington/Montana GME](#)

[Washington/Montana GME](#)

2022

POCUS Evaluation in Acute Kidney Injury

Vanessa Hoytfox

Brittney Ward

Kang X Zhang

Follow this and additional works at: https://digitalcommons.psjhealth.org/gme_wamt_all



Part of the [Endocrinology, Diabetes, and Metabolism Commons](#)

POCUS Evaluation in Acute Kidney Injury

Vanessa Hoytfox, MD

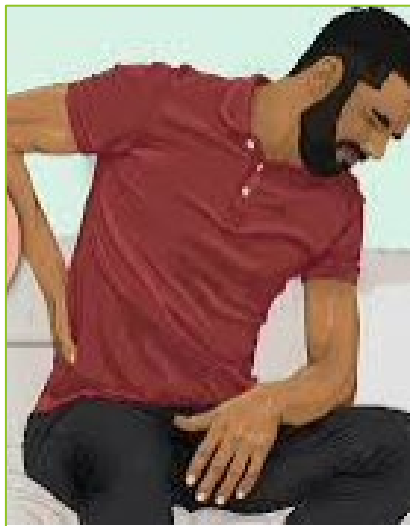
Brittney Ward, DO

Kang Zhang, MD

Internal Medicine Residency

Written consent was obtained from patient and PSJH HRPP has determined that this case report, as submitted, does not meet the definition of research and does not require IRB review as defined in the federal regulations.

Case Description



- ▶ A 67 year old male, previously healthy
- ▶ P/W 4 days dysuria, fevers, chills, lower abdominal and bilateral flank pain with urinary hesitancy and frequency
- ▶ VITALS: afebrile and hemodynamically stable
- ▶ Physical exam: lower abdominal and left costovertebral angle tenderness.

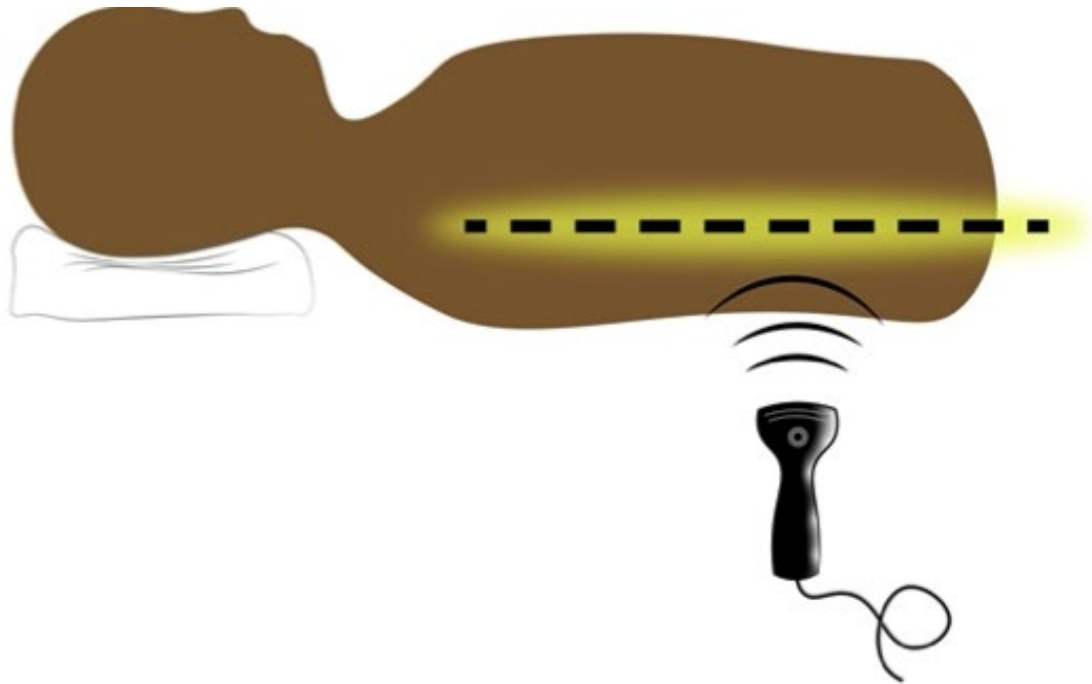
Case Description



- ▶ Labs showed leukocytosis (22K) with bands(13%), creatinine of 2.61 mg/dL
- ▶ Urine was positive for pyuria (>180), blood, and nitrates
- ▶ The patient received broad spectrum antibiotics for presumed pyelonephritis complicated by AKI

POCUS

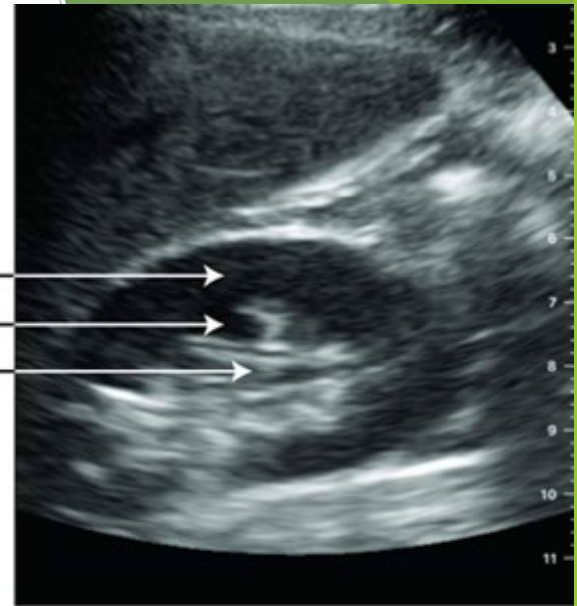
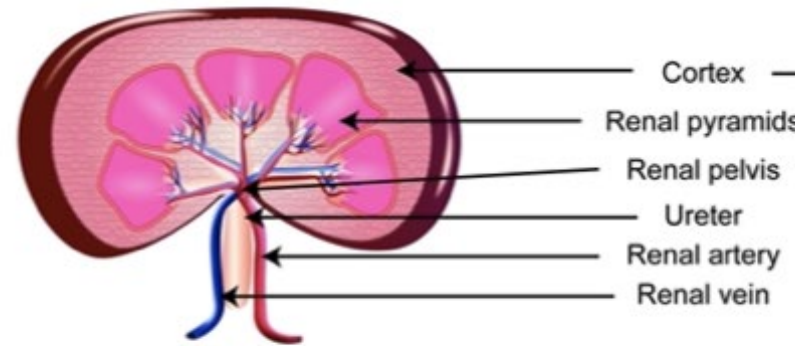
- ▶ Admitting resident team performed POCUS evaluation of kidneys



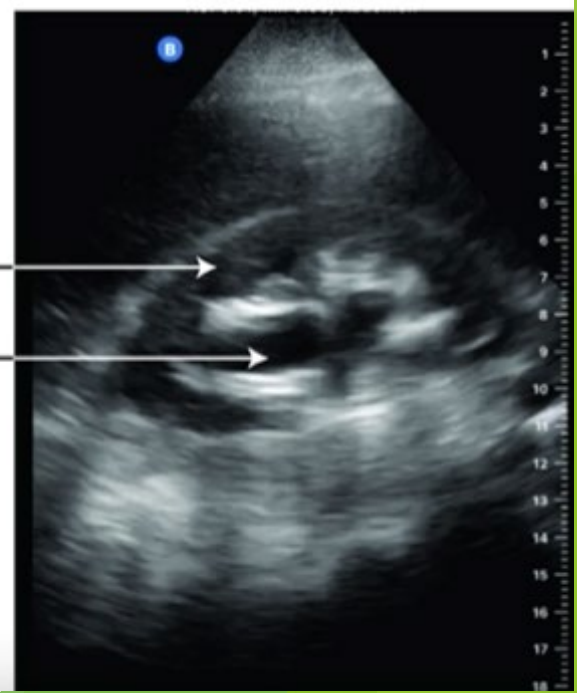
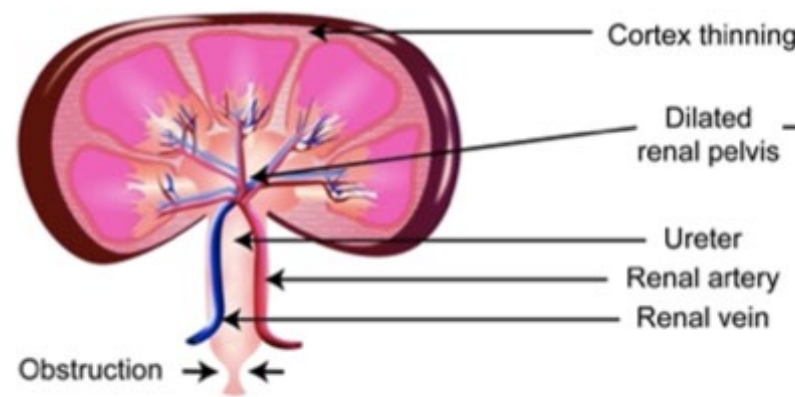
POCUS Findings

- ▶ Bilateral anechoic collection within the kidney sinus
- ▶ Dilated calyces and loss of outer cortex suggesting severe bilateral hydronephrosis
- ▶ Color flow doppler was applied without any differentiated blood vessels

Normal kidney



Hydronephrosis



Case Resolution

- ▶ A Foley catheter was placed immediately for bladder decompression
- ▶ Comprehensive kidney and bladder ultrasonography was performed by radiology within 2 hours of POCUS exam
- ▶ Confirming severe bilateral hydronephrosis as well as mobile echogenic debris and thickened bladder wall suggestive of cystitis
- ▶ Urology was consulted and the patient required bilateral ureteral stent placement

Current Evidence

- ▶ POCUS can quickly detect hydronephrosis with a sensitivity of 77-90%, specificity of 71-96% and positive LR +2.91
- ▶ Initial POCUS can decrease cumulative radiation exposure without significant differences in diagnostic accuracy, treatment outcomes, or re-admissions
- ▶ Skill acquisition is a minimal barrier: indeed, accuracy of POCUS is not significantly limited by training level or scanning experience

Conclusion

- ▶ POCUS is fast, accurate, and is an easy skill to acquire and train
- ▶ Integrating POCUS in the evaluation of AKI may:
 - ▶ Decrease time to intervention
 - ▶ Avoid/decrease radiation exposure
 - ▶ Control associated costs
 - ▶ Reduce length of stay without variation in quality of diagnostic accuracy

References

- ▶ 1. Nikolaidis P, Dogra V, Goldfarb S, et al. ACR Appropriateness criteria: Acute pyelonephritis. *Journal of American College of Radiology* 2018; 12(11S): S232-S239.
- ▶ 2. Smith-Bindman R, Aubin C, Bailitz J, et al. Ultrasonography versus computed tomography for suspected nephrolithiasis. *New England Journal of Medicine* 2014; 371: 1100-1110. DOI: 10.1056/NEJMoa1404446
- ▶ 3. Sibley S, Roth N, Scott C, et al. Point-of-care ultrasound for the detection of hydronephrosis in emergency department patients with suspected renal colic. *Ultrasound J* 2020; 12(1):31. <https://pubmed.ncbi.nlm.nih.gov/32507905/>.
- ▶ 4. Riddell J, Case A, Wopat R, Beckham S, et al. Sensitivity of emergency bedside ultrasound to detect hydronephrosis in patients with computed tomography-proven stones. *Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health* 2014; 15 (1). <https://pubmed.ncbi.nlm.nih.gov/24578772/>.
- ▶ 5. Watkins S, Bowra J, Sharma P, et al. Validation of emergency physician ultrasound in diagnosing hydronephrosis in ureteric colic. *Emerg Med Australasia* 2007;19(3):188-95. <https://pubmed.ncbi.nlm.nih.gov/17564683/>.
- ▶ 6. Nixon G, Blattner K, Muirhead J & Kerse N. Rural point-of-care ultrasound of the kidney and bladder: quality and effect on patient management. *Journal of primary health care* 2018; 10(4), 324-330. <https://doi.org/10.1071/HC18034>. <https://pubmed.ncbi.nlm.nih.gov/31039961/>.
- ▶ 7. Leo M, Langlois B, Pare J, et al. Ultrasound vs. computed tomography for severity of hydronephrosis and its importance in renal colic. *West J Emerg Med* 2017; 18(4): 559-568.
- ▶ 8. Javaudin F, Mounier F, Pes P, et al. Evaluation of a short formation on the performance of point-of-care renal ultrasound performed by physicians without previous ultrasound skills: prospective observational study. *Crit Ultrasound J* 2017; 9(1):23. <https://pubmed.ncbi.nlm.nih.gov/29124412/>.
- ▶ 9. Schoenfeld E, Pekow P, Shieh M, et al. The diagnosis and management of patients with renal colic across a sample of US Hospitals: high CT utilization despite low rates of admission and inpatient urologic intervention. *PLoS ONE* 2017; 12(1):e0169160. <https://pubmed.ncbi.nlm.nih.gov/28046001/>.
- ▶ 10. Herbst M, Rosenberg G, Daniels B, et al. Effect of provider experience on clinician-performed ultrasonography for hydronephrosis in patients with suspected renal colic. *Annals of Emergency Medicine* 2014; 64(3):269-76. <https://pubmed.ncbi.nlm.nih.gov/24630203/>.
- ▶ 11. Ma I, Arishenkoff S, Wiseman J, Desy J, et al. Internal medicine point-of-care ultrasound curriculum: consensus recommendations from the Canadian internal medicine ultrasound (CIMUS) group. *Journal of general internal medicine* 2017; 32(9):1052-1057. <https://doi.org/10.1007/s11606-017-4071-5>. <https://pubmed.ncbi.nlm.nih.gov/28497416/>.

Questions?

