



## Visual Case Discussion

## A rare cause of hematuria suspected with Point-of-Care Ultrasonography

Yale Tung-Chen\*, Tomás Villén-Villegas, César Carballo-Cardona

Servicio de Urgencias, Hospital Universitario La Paz, Paseo de la Castellana, 261.28046, Madrid, Spain



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Acute renal colic is one of the most common reasons for emergency department (ED) visits, with an up to 12% lifetime risk. The hallmark is an anguishing flank pain, along with constitutional symptoms (anorexia, nausea, vomiting) and hematuria (gross or microscopic). We must not forget that renal colic has a broad differential diagnoses, where as much as 1/3 of the patients, will have another cause other than nephrolithiasis.<sup>1</sup> In these cases point-of-care ultrasound (POCUS) could be of help. We describe a previously healthy 35-year-old man presented to the ED with gross hematuria and left flank pain for 5 days. He was treated with dexamethasone without improvement. Physical examination and complete blood tests were unremarkable. A POCUS was performed using a curvilinear transducer (Fig. and video 1), showing a left renal vein (LRV) compressed between a reduced Aortic (Ao)-Superior Mesenteric Artery (SMA) angle, becoming thin before merging into the inferior cava vein (ICV). No signs of hydronephrosis or nephrolithiasis were detected. Nutcracker syndrome was suspected on the basis of these results, and confirmed with angiogram CT. Because of the good response to minor-opioids (tramadol) he was discharged and currently is being followed in the nephrology outpatient-clinic. The nutcracker syndrome refers to the vascular compression of the LRV between the Ao and SMA, causing renal venous hypertension.<sup>1-3</sup> The clinical presentation is intermittent hematuria (from left ureteric orifice) and left flank pain, otherwise, it is a physiological development-related change that is not causing any pressure of the vein.<sup>3</sup> The typical ultrasound findings are a reduced Ao-SMA angle (normal value 45°) and a left renal vein stenosis. POCUS can be useful to exclude other differential diagnoses, like nephrolithiasis, gynecologic problems, bowel disease or vascular complications. Although the diagnosis of Nutcracker Syndrome is challenging, POCUS is worth consideration since it is non-invasive and helpful in sorting out the differential diagnosis, in the assessment for further imaging studies and to prevent potential serious

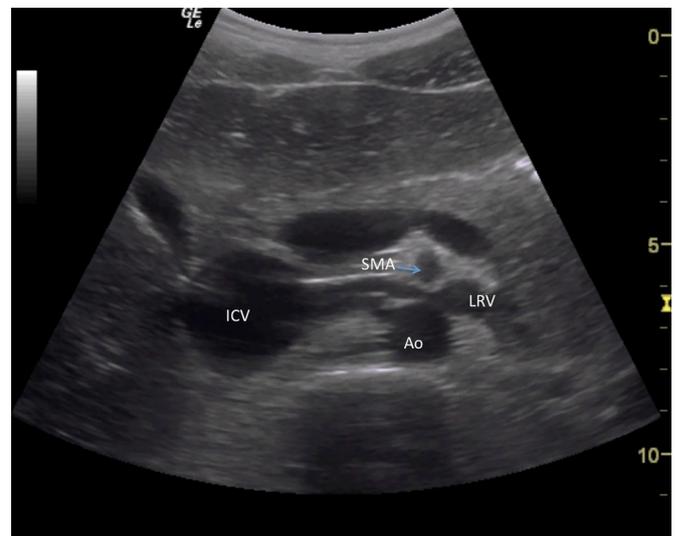


Fig. 1. Curvilinear probe. Midline abdominal transverse view, showing left renal vein stenosis (LRV). Ao: aorta; SMA: superior mesenteric; ICV: inferior cava vein.

complications: renal vein thrombosis or harmful treatments (e.g. NSAIDs).<sup>2,3</sup>

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.visj.2019.100595](https://doi.org/10.1016/j.visj.2019.100595).

\* Corresponding author.

E-mail address: [yale.tung@salud.madrid.org](mailto:yale.tung@salud.madrid.org) (Y. Tung-Chen).

## References

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## Questions

1. What investigations are needed when a renal colic episode is suspected?
  - a. Any patient with arteriopathy or older than >60 years old need urgent imaging.
  - b. Ultrasonography is the most sensitive and specific test to rule in the presence of a kidney stone.
  - c. The presence of hematuria on urinalysis and flank pain is highly specific for renal colic.
  - d. Blood investigation is not useful in complicated renal colic.
2. About nutcracker syndrome, it is true...
  - a. All patients should receive surgical therapy, before causing symptoms.

- b. The flank pain can be left-sided or right-sided, depending on the renal vein compressed.
- c. Intermittent macroscopic hematuria is the most common clinical presentation.
- d. Any renal vein stenosis, should be labeled as nutcracker syndrome, even asymptomatic.
- e. Diagnostic features are different on ultrasound, CT, MRI and angiography.

## Answers

1. Any patient with arteriopathy or older than >60 years old need urgent imaging. Explanation: Left flank pain has a broad differential diagnosis. In patients at high risk for cardiovascular diseases, abdominal aortic aneurysm should be ruled out. Reference: Bultitude Matthew, Rees Jonathan. Management of renal colic BMJ 2012; 345 :e5499.
2. Intermittent macroscopic hematuria is the most common clinical presentation. Explanation: Repeated episodes of gross hematuria and left flank pain should be present to suspect Nutcracker Syndrome. Reference: Hacking C, D'Souza. Nutcracker syndrome. Radiopaedia, 2017. Retrieved from: <https://radiopaedia.org/articles/nutcracker-syndrome?lang=us>.