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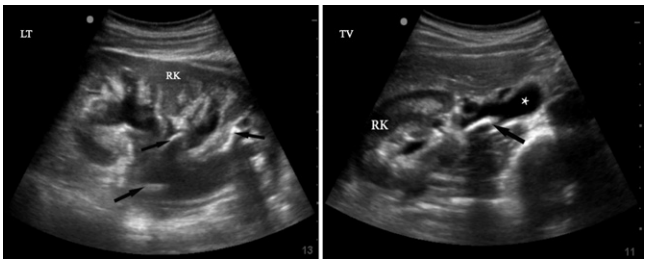

Figure 1. The longitudinal (LT) image shows large renal calculi (black arrows) within the right kidney (RK). The transverse view (TV) depicts a calculus (black arrow) and the dilated proximal ureter (*). These images were obtained with a large curvilinear probe positioned over the right midaxillary line, just posterior to the ribs.

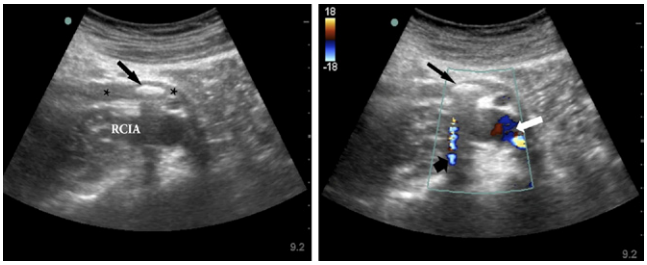

Figure 2. B-mode ultrasonography (left) shows a large stone (black arrow) within the dilated ureter, with shadowing over the right common iliac artery (RCIA). The same structures are visualized with duplex color Doppler (right). A comet tail–shaped twinkling artifact (thick black arrow) is shown running with the stone shadow through and posterior to the RCIA (white arrow). These images were obtained with the transducer placed over the right lower abdomen.

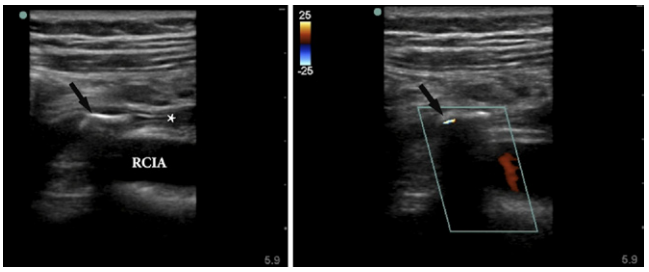

Figure 3. The right ureteral stone (black arrow) is now shown with a linear transducer in B-mode (left). The ureter appears 3 layered (*) and is found directly over the RCIA. The color Doppler image (right) shows a classic "twinkling" deep to the calculus (black arrow).

Figure 4. Coronal CT image. Used with permission of Tiffany C. Fong, MD, Department of Emergency Medicine, Johns Hopkins University School of Medicine, Baltimore, MD.

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A 26-year-old woman presented to the emergency department with 2 weeks of intermittent right-sided flank pain, nausea, and vomiting. She reported several days of hematuria but denied dysuria, fever, or chills. Vital signs were unremarkable, and physical examination demonstrated moderate right costovertebral angle tenderness. Urine studies showed RBCs and WBCs too numerous to count, few bacteria, and a negative pregnancy test result. After emergency ultrasonography was performed (Figures 1 to 3), a urology consultation and computed tomography (CT) of the abdomen and pelvis were obtained (Figure 4). Real time ultrasonographic images are available for viewing at http://www.annemergmed.com.

For the diagnosis and teaching points, see page 188.
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Patient 3 was a 21-year-old man who presented with agitation and repeated emesis an unknown time after smoking spice. Pupils were equal and reactive. ECG showed mild tachycardia with normal intervals. Laboratory studies included a WBC count of 18.8×10^9/L and a potassium level of 3.3 mmol/L. The urine drug screen result was negative. The patient received 2 L of normal saline solution and lorazepam 2 mg, with improvement of his symptoms. He was admitted overnight because of sedation and fully recovered before discharge the next day.

Although we were unable to objectively confirm the presence of synthetic cannabinoids in these patients with currently available urine drug screens, each presented after witnessed exposure to a spice product. For the 2 patients with known time of exposure, time to symptom onset was relatively short. Common clinical features in our patients included agitation, vomiting, somnolence, tachycardia, mydriasis, and a fairly protracted duration of symptoms. Hyperreflexia was observed in 2 of the 3 patients.

According to our experiences, after appropriate evaluation for altered mental status, treatment of strongly suspected cases of spice intoxication should be supportive. Agitation and tachycardia respond to benzodiazepines and intravenous fluids. Symptoms are expected to resolve in 8 to 12 hours.

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DIAGNOSIS:

Obstructing midureteral calculus with moderate hydronephrosis. Transabdominal B-mode sonography of the right flank demonstrated 2 large intrarenal calculi, moderate hydronephrosis, and a dilated proximal ureter (Figure 1). Given these findings, an additional source of obstruction was suspected distally. Indeed, a calculus with shadowing and color Doppler "twinkling artifact" was detected midureter (Figures 2 and 3). Subsequent CT revealed multiple large stones in the lower kidney pole and one 8-mm midureteral stone with moderate hydronephrosis (Figure 4).

The sonographic twinkling artifact is generated when color Doppler is applied to a strongly reflecting medium with a rough interface.[1] The Doppler waves create a random, rapidly changing color artifact in place of the stone's shadow. This phenomenon is well documented in sonography of urolithiasis, observed in up to 86% of cases.[2,3] The twinkling artifact may be considered an additional sonographic feature of urinary stones because of the frequent observation of its presence and its utility in identifying calculi in cases in which no abnormality is detected in B-mode.[4]

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