EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE

Care Warriors

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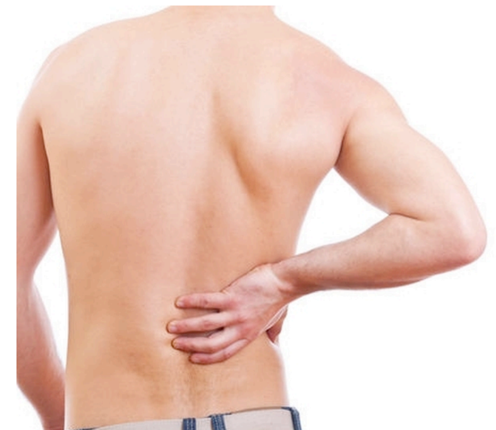
Patient Case

A 37-year-old male presents to the ED with RLQ pain. The pain started in his right lower back a few hours earlier while he was stretching. The pain is constant and sharp in quality. It is an 8/10 and is exacerbated by movement. Nothing seems to relieve the pain. The patient has never experienced anything like this before. He has experienced two episodes of non-bilious, non-bloody emesis but denies any fever, weakness, diarrhea, constipation, or urinary changes. He has no significant past medical history or prior surgeries, and does not take any medications. On exam the patient appears in mild distress and is unable to find a comfortable resting position. The patient is afebrile and all other vital signs are within normal limits. The abdomen is non-distended, bowel sounds are normoactive, and there is no rebound tenderness or guarding. The patient denies tenderness to palpation and states that the "pain is deeper." All other exam findings were unremarkable. Initial labs were significant for a slightly elevated WBC count. Urinalysis was significant for hematuria (see side panel).

What is the imaging test of choice to further evaluate this patient?

a. CT of the abdomen and pelvis with IV contrast
b. CT of the abdomen and pelvis without contrast
c. Abdominal ultrasound
d. Kidneys, ureters, and bladder (KUB) radiograph



http://www.enkivillage.com/pain-in-right-side-of-back.html

Urinalysis

- U Color: Yellow
- U Glucose: Neg.
- U Bilirubin: Neg.
- UA Ketones: Neg.
- **U Blood: Mod (A)**
- U pH 5.5
- U Protein: Neg.
- U Urobil.: < 2.0 mg/dL
- U Nitrite: Neg.
- U Leuk Est: 1/hpf
- U RBC: **11/hpf (H)**
- U Mucous: Rare (A)

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

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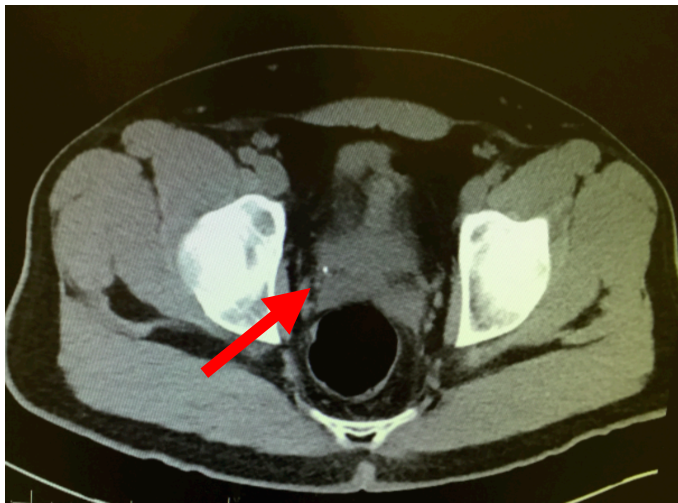
Answer: B. CT of the abdomen and pelvis ***without*** contrast

Based on the patient's presentation of acute onset flank pain with hematuria, the most likely diagnosis is nephrolithiasis.



The patient was found to have a **3 mm** stone present at the right ureterovesicular junction.

The majority of renal stones are radiopaque (vs. gallstones) and can be seen on x-ray or CT as well as with ultrasound. CT of the abdomen and pelvis without contrast is the imaging test of choice because it is more sensitive than ultrasound (88% vs 57%). CT can also be helpful in ruling out alternate diagnoses that may present with acute onset of flank pain and hematuria such as pyelonephritis, bleeding within the kidney secondary to renal cell carcinoma, ovarian torsion or rupture of an ovarian cyst. Ultrasonography is the imaging test of choice to evaluate nephrolithiasis in women who are pregnant.

Acute Management

The likelihood that a patient will pass the stone without intervention is dependent on stone size and location. Most stones **< 5 mm** will pass spontaneously. This patient can be treated conservatively with pain medication and hydration as his stone is 3 mm. NSAIDs and opioids are commonly used for pain control in patients with nephrolithiasis. Studies have shown there is no significant difference in efficacy between the two classes of pain medications for the treatment of renal colic[2].

Our patient was given IV morphine and ondansetron due to nausea and vomiting. He was also given a 1 L bolus of normal saline and started on tamsulosin (alpha-blocker) to facilitate stone passage. Once his pain was adequately controlled, he was discharged with Percocet and a 7 day course of tamsulosin. He was instructed to strain his urine for the next few days and to follow-up with his primary care physician in order to determine the composition of the stone and preventive therapy if necessary.

Stones that do not pass or are > 10 mm in size require evaluation by urology as they may require interventions such as shock wave lithotripsy, percutaneous nephrolithotomy, or laparoscopic stone removal.

Red Flags: evidence of urosepsis, acute kidney injury, anuria, unyielding pain, nausea, or vomiting should prompt **urgent urologic consultation.**

For a list of educational lectures, grand rounds, workshops, and didactics please visit ***BrowardER.com*** and **click** on the ***"Conference"*** **link**.

All are welcome to attend!

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Types of Stones

Calcium Oxalate

- **70-80%** of stones contain calcium oxalate.
- Risk factors: low urine volume, high urine calcium excretion (history of use of loop diuretics, hyperparathyroidism), high urine oxalate excretion (history of gastric surgery, inflammatory bowel disease), and low urine citrate excretion

Calcium Phosphate

- **15%** of stones contain calcium phosphate.
- Risk factors: low urine volume, high urine calcium excretion, low urine citrate excretion, and high urinary pH.

Uric Acid

- **8%** of stones contain urate.
- Risk factors: low urine volume, high urine uric acid excretion (history of gout, use of uricosuric drugs such as thiazide diuretics), and lower urinary pH.

Struvite

- **< 1%** of stones.
- Form in the presence of urease-producing bacteria such as Proteus or Klebsiella.
- If stone is not completely removed or infection remains untreated, patient may form staghorn calculi which overtime can lead to scarring of the renal pelvis.

Take Home Points

- Nephrolithiasis commonly presents with acute onset flank pain and hematuria.
- The imaging test of choice for suspected nephrolithiasis is a non-contrast CT of the abdomen and pelvis.
- Stones < 5 mm in size will likely pass with hydration and pain control.
- Urgent urologic consultation is required for stones > 10 mm and if there is evidence of urosepsis, anuria, or AKI.

About the Author

Erica Bass is a fourth year medical student at FIU-HWCOM. She did her Emergency Medicine Rotation at BHMC in September 2016. She plans to pursue a career in primary care medicine.

References:

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