



Jeri's Rolling Stone!



Stephen G. Miller, BSc, MD, FCFP(EM), ABFP, and
Jamie Szabo, BA, BSc, MA, Med III, Dalhousie University

Jeri's Case

Jeri is a healthy 59-year-old female who presents to the ED with a one-hour-history of right flank pain that has begun to radiate to her groin. She describes the pain as a steady burning feeling with episodes of more intense, radiating pain. She finds it hard to get in a comfortable position due to the pain. She also feels like she needs to constantly void, though she is not passing much urine. She has nausea but no fever/chills or diarrhea. She has never had an episode of pain like this before. Her brother has a history of kidney stones.

Upon examination, Jeri looks well but is in severe discomfort. She is pale and sweaty and begins to vomit. Her abdomen is soft and non-tender with quiet bowel sounds, although her right flank and costovertebral angle are quite tender to palpation.

Her vital signs are:

Temperature: 36.9°C

Pulse: 94 beats/min

BP: 159/94

Respiratory rate: 18 breaths/min

Read on for more on Jeri.

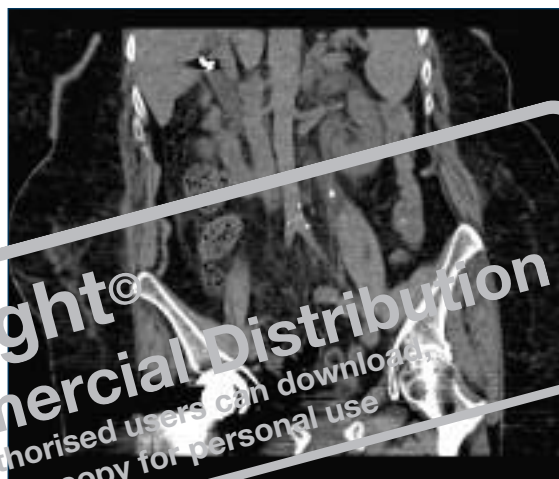


Figure 1: Spiral Stone Protocol.

nephrolithiasis includes acute, colicky, ipsilateral, costovertebral, or flank pain, which may radiate to the groin. Dysuria and urinary urgency and frequency are common, as are nausea and vomiting; however, patients may appear relatively asymptomatic depending on the size and location of the stone. The risk of kidney stones is increased by male gender, caucasian ancestry, a previous history of kidney stones, a positive family history, a high fat, protein, or salt diet, obesity, and dehydration.

Questions and Answers

1. *Is this nephrolithiasis?*

Severe, acute flank pain points to an obstructive renal or ureteric stone, which can often be suspected based on clinical presentation. The classic presentation of

2. *Could it be something else?*

While Jeri presented with a fairly typical picture of nephrolithiasis, it is important to rule out several other conditions that account for up to 20% of renal colic-like presentations.¹ The following conditions

should be considered before confirming a diagnosis of nephrolithiasis:

- Acute appendicitis – negative urinalysis and the presence of peritoneal signs can help exclude this, although approximately 10 to 20% of renal colic episodes will lack microscopic hematuria
- Abdominal aortic aneurysm – pain typically presents as sudden onset of abdominal pain that may radiate to the back; it can be excluded by abdominal ultrasound or CT
- Pylonephritis – positive urinalysis and culture can help to distinguish between nephrolithiasis and conditions with a similar presentation
- Bowel obstruction – abdominal distension with tinkling bowel sounds on physical exam, volvulus, ileus, and air/fluid levels on X-ray, or typical CT findings

In Women:

- Ovarian cyst – pain may be cyclical, mass may be palpable on pelvic exam or present on pelvic ultrasound
- Ectopic pregnancy – can usually be differentiated by a positive pregnancy test and by obtaining a renal and pelvic ultrasound

Other diagnoses to consider include diverticular disease, acute pancreatitis, peptic ulcer disease, and gastroenteritis.

3. *How should Jeri be investigated?*

The first step in diagnosing our patient is laboratory testing, including urinalysis,

CBC, and serum chemistry (to include electrolytes, BUN/creatinine, calcium, phosphorus, and uric acid). While 80 to 90% of renal stones will present with microscopic hematuria, it is important to remember that the absence of hematuria does not exclude the presence of a stone.²

In patients for whom nephrolithiasis is suspected based on presentation and laboratory testing, non-contrast helical CT is the preferred modality of imaging to detect both stones and urinary tract obstruction. It has a very high sensitivity and can rule out other possible diagnoses. In patients with recurrent kidney stones, and a similar presentation to past episodes, a plain abdominal radiograph (KUB) will pick up a moderate amount of stones, while renal ultrasound can detect hydronephrosis and help to reduce radiation exposure.³ Ultrasound can also be used in other circumstances where radiation should be avoided, such as pregnancy.

4. *How should nephrolithiasis be managed?*


Treatment of nephrolithiasis is based on a number of different factors, including the size and location of the stone, evidence of obstruction, whether or not infection is present, and if the composition of the stone is known.

Most patients can be conservatively managed with pain medication and hydration until the stone passes. Stone passage is often based on size, and stones <8 to 10 mm can often pass spontaneously in two days to four weeks. NSAIDs and opioids are frequently used to

manage pain; some evidence suggests that the use of morphine and ketorolac together may be associated with greater and/or more complete pain relief than either alone.⁴ Antiemetics can also be used if needed. Medical expulsive therapy (an alpha-blocker such as tamsulosin or a calcium-blocker such as nifedipine) can relax the ureter and reduce spasm, also helping a stone spontaneously pass. Antibiotic therapy should also be added in patients with evidence of an infection, and with this particular group it may be wise to consult with urology.

Evidence of obstruction, stones over 10 mm in size, or failed medical therapy require a urological consult and possible surgical intervention, which may include extracorporeal shock wave lithotripsy, ureteroscopy, laparoscopic stone removal, or percutaneous nephrostolithotomy.

5. *Is this going to happen to our patient again?*

The rate of recurrence of kidney stones is 50% in five years; therefore, steps should be taken to try and reduce recurrence.² Jeri should be encouraged to strain her urine so that the stone composition can be examined. While 80% of stones are calcium (calcium oxalate or calcium phosphate), stones may also be composed of uric acid, struvite, cystine, or a combination, each of which may involve different ongoing therapy. Serum studies and a 24-hour urine profile may help identify metabolic abnormalities that can contribute to stone formation, and all patients should be advised to have a fluid intake of at least 2 L per day, as well as a low protein and salt diet. 

Back to Jeri

Jeri's routine blood work came back within normal ranges (although a leukocytosis is common in renal colic and does not necessarily imply infection), and her urinalysis indicated amber coloured urine with 50 to 100 RBCs. Her spiral stone protocol CT (Figures 1) indicated a 5mm stone in the proximal to mid left ureter with secondary hydronephrosis and hydroureter and mild perinephric and periureteric stranding. She was treated with a 1 L bolus of normal saline, IV fentanyl and dimenhydrinate. Her pain settled nicely, and she was discharged with a prescription for an NSAID, an alpha-blocker to be taken regularly for several days. Hydromorphone was given, in small quantity, only to be taken if the pain escalated. She was advised to return to the ED if the pain worsened or persisted for several days. She was given a urine strainer and advised to see her family doctor to arrange possible urologic follow-up. A week later she presented to her family doctor with a small stone in a jar and complete relief of symptoms.

References

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Dr. Miller is a Lecturer with the Department of Emergency Medicine, Faculty of Medicine, Dalhousie University, Halifax, Nova Scotia.

Jamie Szabo is entering her Third Year of Medical School at Dalhousie University, Halifax, Nova Scotia.

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