



## **Current Management of Renal Colic**

The emergency physician is often faced with the patient in severe pain who has suspected renal colic. The lecturer will present information on current diagnostic and imaging modalities used to evaluate the patient with suspected renal colic. Pain management and admission criteria will be reviewed.

- Discuss the various diagnostic and imaging modalities available in the evaluation of patients with renal colic.
- Describe the pain management in these patients.
- Discuss the criteria for admission.

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## **FACULTY**

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Current Management of Renal Colic  
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Instructor: David F. M. Brown, MD, FACEP

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1 Hour

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## **CURRENT MANAGEMENT OF RENAL COLIC**

### **I. Introduction**

#### **A. Definitions**

1. urolithiasis – stone disease in the urinary tract – is characterized by the precipitation of crystals in the renal collecting systems and subsequent growth into macroscopic stones.
2. Calcium-containing stones >80%

#### **B. Incidence/Prevalence**

1. ~12% of US population will form a stone during their lifetime
2. Men:women = 3:1
3. Incidence in men who have never had a stone is 3/1000/year.

#### **C. Etiology**

1. multifactorial
2. calcium-containing and uric acid stones derive from a combination of environmental factors and genetic predisposition
3. cystine stones are due to autosomal recessive genetic abnormality
4. struvite stones form in the presence of urease-producing bacteria

#### **D. Prognosis**

1. stones <5mm tend to pass spontaneously
2. stones >10mm usually require urological intervention
3. 5 year recurrence for untreated calcium stone formers is 30-50%

### **II. Clinical Presentation/Differential Diagnosis**

#### **A. symptoms are determined by stone location**

1. ureteral: abrupt severe pain in the back, flank, groin associated with nausea, vomiting, and diaphoresis is classic
2. kidney: dull flank/back pain, +/- n/v
3. bladder: dysuria or urinary retention
4. atypical presentations may occur – abdominal pain in the affected upper quadrant

#### **B. Physical examination**

1. vital signs – hypertension/tachycardia common, check temperature
2. abdomen usually benign
3. genitalia normal
4. CVA tenderness

#### **C. differential includes**

1. abdominal aortic aneurysm rupture – must be considered in ALL PATIENTS with suspected renal colic, may cause GU symptoms and/or microscopic hematuria
2. appendicitis - can cause microscopic hematuria but time course usually different
3. aortic dissection, especially involving a renal artery
4. pyelonephritis
5. renal artery embolus

6. testicular/ovarian torsion
7. ectopic pregnancy
8. musculoskeletal back pain/spasms
9. biliary colic
10. urethritis
11. lower lobe pneumonia

### **III. Emergency Physician's Responsibilities in Suspected Renal Colic**

- A. relieve pain rapidly
- B. exclude the dangerous diagnoses
- C. provide appropriate disposition and follow-up care
- D. you do not have to make a definitive diagnosis in every patient

### **IV. Analgesia**

- A. before diagnostic tests
- B. evidence from multiple randomized controlled trials show that NSAID's are as effective as narcotics in relieving pain of renal colic
  1. no clinically important differences in terms of onset of action
  2. no clinically important differences in terms of magnitude of pain relief
  3. variety of medications, dosages, routes of administration tested without a clearly superior approach
  4. NSAIDs block prostaglandin E2 synthesis
- C. most studies used narcotics as the "rescue medication" for refractory pain
- D. advantages of NSAIDs
  1. non-sedating
  2. little/no effect on hemodynamics
  3. will not cause ureteral spasm
- E. less common treatments
  1. acupuncture as effective as NSAIDs in one RCT (N=38) with a more rapid onset of action and no observed side effects
  2. glucagon intravenously may be effective in causing ureteral relaxation
- F. suggested regimen
  1. parenteral or rectal NSAID's as first line agent
    - a. ketorolac
    - b. naproxen
    - c. indomethacin
    - d. ibuprofen
  2. parenteral narcotics for refractory pain
  3. anti-emetics for vomiting

### **V. Diagnosis**

- A. Urinalysis
  1. hematuria in ~90% of patients with urolithiasis
  2. pyuria –may indicate infected stone or simple pyelonephritis
- B. Bedside EP-performed ultrasound
  1. identify unilateral hydronephrosis

2. assess size of abdominal aorta (r/o AAA)
  3. look for perinephric fluid –sign of ruptured calyx
  4. usually cannot identify stones unless intrarenal
  5. rapidly performed, cheap, immediately available, no contrast or radiation
- C. Formal radiographic studies
1. None
    - a. young, otherwise healthy patients
    - b. classic history AND hematuria
    - c. no h/o IVDU (at risk for renal embolus)
    - d. readily available prompt follow-up
    - e. other diagnoses considered and excluded in reasonable manner
    - f. h/o previously recovered stone is very helpful
  2. plain radiographs (KUB)
    - a. 80% of stones are contain calcium (doesn't mean you'll see 80% of stones on KUB)
    - b. helpful in patients with documented stones who re-present to the ED
    - c. otherwise of limited utility
    - d. charge: \$100-150
  3. helical CT scanning
    - a. advantages
      - ii. rapidly performed
      - iii. highly accurate
      - iv. identifies stone anywhere along GU tract
      - v. accurately sizes the stone
      - vi. gives information about other intra-abdominal structures
      - vii. no contrast
    - b. disadvantages
      - i. less information about degree of obstruction than IVP
      - ii. radiation exposure similar to IVP
      - iii. not widely available
      - iv. charge: ~\$600
  4. intravenous pyelogram (IVP)
    - a. advantages
      - i. detailed anatomic and functional information, including degree of obstruction
      - ii. widely available
    - b. disadvantages
      - i. may not directly visualize stone on scout film and, even if identified, inaccurately sized c/w CT
      - ii. time-consuming
      - iii. no information about other intra-abdominal structures
      - iv. contrast administration
      - v. radiation exposure
      - vi. charge: \$500-700 depending on type of contrast
  5. formal ultrasonography
    - a. advantages

- i. non-invasive
  - ii. accuracy approaches IVP, esp. when combined with KUB
  - iii. provides excellent anatomic detail
  - iv. provides information about other abdominal and pelvic structures
  - v. no radiation or contrast
  - vi. relative cost advantage (charge \$300-\$400), unless KUB performed as well
- b. disadvantages
  - i. does not assess renal function
  - ii. operator-dependant
  - iii. difficult to visualize the actual calculus
  - iv. images often obscured by bowel gas or body habitus
- 6. suggested approach for a patient who requires a formal imaging study
  - a. helical CT as the first choice if available
  - b. IVP as second choice
  - c. formal renal US for pregnant patient and, in centers where helical CT not available, for those with diabetes, renal insufficiency, or a history of contrast allergy

## **VI. Disposition**

- A. Most patients will be discharged
  - 1. with analgesia (NSAID vs. narcotic)
  - 2. with a urine strainer – stone analysis is critical in determining further treatment and should be stressed to the patient
  - 3. with a prompt follow-up appointment with a urologist or the PCP
  - 4. with clear instructions on when/why to return to the ED
- B. Indications for admission
  - 1. intractable pain
  - 2. persistent vomiting/dehydration
  - 3. fever/pyuria – requires immediate urological intervention
  - 4. high grade obstruction or stones >8mm are likely to require intervention and generally are criteria for admission
  - 5. patients with a solitary kidney or underlying intrinsic renal disease
  - 6. social reasons

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