

Urolithiasis: Review Questions

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QUESTIONS

Choose the single best answer for each question.

- In industrialized countries, what is the most common type of urinary stone?**
 - Calcium phosphate
 - Calcium oxalate
 - Ammoniomagnesium phosphate (struvite)
 - Uric acid
 - Cystine
- All of the following are common signs and symptoms of renal colic EXCEPT:**
 - Nausea and vomiting
 - Pain relief while the patient is lying still on the unaffected side
 - Pain in the testicle or labia
 - Costovertebral angle tenderness with radiation
 - Urinary frequency and urgency
- A 48-year-old woman is admitted to the hospital for intravenous hydration and analgesics after experiencing her third bout of renal colic in the past year. Previous intravenous pyelograms revealed recurrent right- and left-sided 3-mm caliceal stones. A current sonogram shows a 3-mm right caliceal stone and a 2-mm distal ureteral stone. Physical examination of the heart and lungs is unremarkable. Abdominal examination reveals right flank tenderness. Which of the following is the LEAST likely diagnosis?**
 - Hyperparathyroidism
 - Gout
 - Rheumatoid arthritis
 - Sarcoidosis
 - Renal tubular acidosis
- Which of the following is the most common site of urinary stone impaction?**
 - Renal calix
 - Ureteropelvic junction
 - Near the pelvic brim, where the ureter arches over the iliac vessels
 - Posterior pelvis, where the ureter is crossed anteriorly by pelvic blood vessels and the broad ligament
 - Ureterovesical junction
- Hospitalization for renal stones is recommended in all cases EXCEPT:**
 - A patient whose symptoms are not controlled by oral analgesics
 - A patient with an obstructing stone and infected urine on urinalysis
 - A patient with an obstructing stone and fever
 - A patient with calculous anuria (usually seen in patients with one kidney)
 - A patient with multiple recurrences of renal stone formation
- Patients who have had ileostomies are at increased risk for urinary stones composed of which one of the following substances?**
 - Calcium monophosphate
 - Calcium phosphate
 - Cystine
 - Uric acid
 - Xanthine
- Prostatic stones are usually formed of which of the following substances?**
 - Calcium oxalate
 - Calcium phosphate
 - Cystine
 - Ammoniomagnesium phosphate (struvite)
 - Uric acid

(turn page for answers)

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EXPLANATION OF ANSWERS

- (B) Calcium oxalate.** In industrialized countries, calcium oxalate is the most common type of urinary stone. Multiple series report that 36% to 59% of all stones are calcium oxalate stones.¹ The remaining stones (in descending order of prevalence) are calcium phosphate, struvite (which is associated with infection), uric acid, and cystine. Many stones are made up of a combination of compounds.
- (B) Pain relief while the patient is lying still on the unaffected side.** Renal or ureteral colic is characteristic of a urinary tract stone. The crescendo of pain begins in the flank and commonly radiates to the anterior abdomen and ipsilateral testicle or labia. If the stone is near the bladder, irritant symptoms (eg, urinary frequency and urgency) are common. Because of the common innervation of the kidneys and stomach by the celiac ganglion, nausea and vomiting are frequent complaints noted in patients with stones. Patients with renal or ureteral colic typically do not lie still but writhe in pain, unable to find a comfortable position.
- (C) Rheumatoid arthritis.** Hyperparathyroidism is associated with calcium stones caused by the increase of parathyroid hormone and subsequent hypercalcemia/hypercalciuria. Sarcoidosis and other granulomatous diseases cause calcium stones due to the granuloma secreting 1,25-dihydroxyvitamin D₃. Gout is associated with hyperuricemia and hyperuricosuria, which promote uric acid, and calcium oxalate stone formation. Renal tubular acidosis is a defect in the ability of renal tubular cells to secrete hydrogen ions with a subsequent increase in the pH of urine. The urine's higher pH leads to increases in divalent and trivalent phosphate, which leads to calcium phosphate supersaturation and stone formation. Rheumatoid arthritis is not associated with urinary stones.
- (E) Ureterovesical junction.** Stones can be found in all the areas listed, but the ureterovesical junction is the most common site of impaction because of its smaller diameter compared with the other 4 locations listed. For a stone to become impacted, it must have at least one diameter that is 2 mm or greater. Stones can also be impacted at the ureteropelvic junction, at the bifurcation of the iliac vessels, and over the pelvic brim.
- (E) A patient with multiple recurrences of renal stone formation.** Hospitalization is recommended in patients with pain that is not controlled by oral analgesics, in patients who are experiencing severe vomiting that is unresponsive to oral medications, in patients with one kidney, and in patients with an infection that is noted due to fever or on urinalysis. Also, patients with very large stones are often admitted to the hospital for early procedural therapy. All other stones can be managed on an ambulatory basis.
- (D) Uric acid.** The chronic diarrhea associated with ileostomies leads to bicarbonate loss, systemic acidosis, and acidic urine. All of these factors increase the risk of uric acid stone disease. Uric acid stone disease should also be considered in patients with inflammatory bowel disease who have undergone small bowel resection with stoma creation.
- (B) Calcium phosphate.** Most prostatic stones are composed of calcium phosphate. Calcium carbonate may be a secondary component of these stones. Typically found in men older than 50 years, prostatic stones can also be observed during transurethral resection of the prostate for benign prostatic hyperplasia. Specific treatment of prostatic stones is not usually necessary. However, these stones may harbor chronic infection.

REFERENCE

1. Preminger GM: Medical management of urinary calculus disease. Part II. Classification of metabolic disorders and selective medical management. *AUA Update Series* 1995;14:1–8.

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