

## Abdominal Pain in a Patient with Hypercalcemia

Prince Singh , Sandhya Manohar, and Stephen Erickson

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### Clinical Images in Nephrology and Dialysis

#### Case Answer

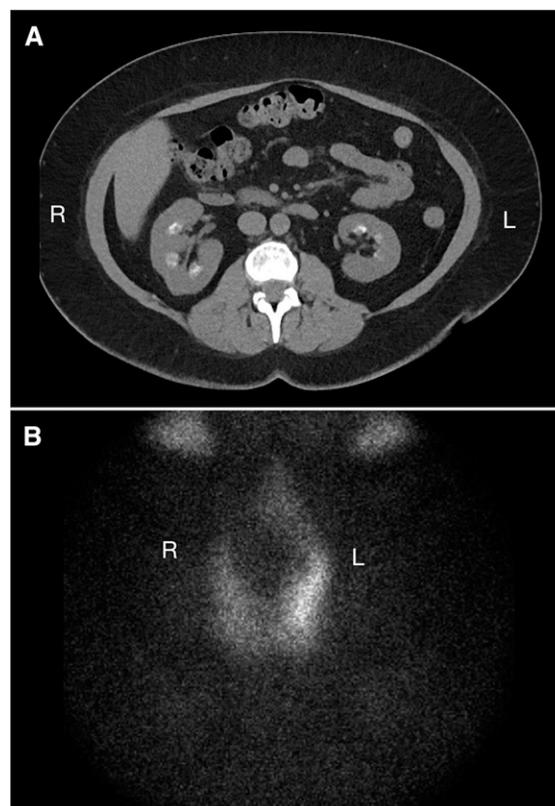
A 56-year-old woman with a medical history of hypertension, diabetes, and obesity presented to the emergency room with abdominal pain. She was on losartan/hydrochlorothiazide and dapagliflozin. Computed-tomography imaging of her abdomen revealed bilateral medullary nephrocalcinosis with a few calyceal tip stones (Figure 1A). She did not have any prior history of kidney stones or a family history of kidney stones. Serum chemistry was remarkable for hypercalcemia at 11 mg/dl, serum phosphorous of 2.9 mg, elevated serum parathyroid hormone level of 74 pg/ml, and normal serum creatinine of 0.82 mg/dl. Her 25-hydroxyvitamin D level was normal at 52 ng/ml (normal, 51–80 ng/ml). The rest of her laboratory results were normal. She underwent a 24-hour urine supersaturation study that showed mild hypercalciuria at 201 mg and marked hyperphosphaturia at 1148 mg with urine volume of 1823 ml. A presumed diagnosis of primary hyperparathyroidism was made. She underwent a sestamibi scan of her neck which was suspicious of a large parathyroid adenoma in the posterior aspect of the left thyroid lobe (Figure 1B). She was recommended to increase her fluid intake along with limiting salt intake (to help reduce her hypercalciuria) and was referred to the endocrine department for surgical removal of parathyroid adenoma.

#### Case Description

Nephrocalcinosis may be defined as a generalized increase in the calcium content of the kidney (1). Nephrocalcinosis differs from nephrolithiasis with regards to the location of the calcification; in nephrolithiasis there is discrete collection in the collecting system, whereas in nephrocalcinosis it is diffusely seen within the renal parenchyma (2). Although nephrocalcinosis can be radiologically confused with nephrolithiasis, the two pathologies are distinct and hence need to be treated differently. Chronic hypercalcemia is generally present with or without hypercalciuria in nephrocalcinosis and should certainly raise the suspicion of primary hyperparathyroidism, especially if both nephrocalcinosis and nephrolithiasis are present. Nephrocalcinosis can also be caused by other conditions such as distal renal tubular acidosis, primary hyperoxaluria, and vitamin D toxicity. The common denominators appear to be metabolic disturbance leading to an

increase in calcium, oxalate, and/or phosphate load presented to the kidney which leads to supersaturation and eventual precipitation occurring as an interstitial or intratubular event.

Primary hyperparathyroidism is the third most common endocrine disease and its effect on the kidney is closely linked to the parathyroid hormone's effect in renal calcium and phosphate handling (3). As such, the most common metabolic consequence of increased parathyroid hormone is hypercalciuria which leads to renal complications such as stones, nephrocalcinosis, and in some cases kidney failure (4). Kidney stones are commonly seen in patients with primary hyperparathyroidism, with a prevalence



**Figure 1.** | **Computed-tomography scan.** (A) Dual energy computed-tomography scan showing medullary nephrocalcinosis (right) and calyceal calcification (left). (B) Increased technetium-99 sestamibi uptake seen in left posterior thyroid lobe.

Department of Nephrology and Hypertension, Mayo Clinic, Rochester, Minnesota

**Correspondence:** Dr. Prince Singh, Department of Nephrology and Hypertension, Mayo Clinic, 200 First Street SW, Rochester, MN 55905. Email: [singh.prince@mayo.edu](mailto:singh.prince@mayo.edu)

ranging from 25% to 55% which includes patients who are asymptomatic as well.

We present a case where workup of abdominal pain led to a radiologic diagnosis of nephrocalcinosis with nephrolithiasis. A search for metabolic cause/etiology in such patients is important as patients with nephrocalcinosis often present with chronic hypercalcemia, with or without hypercalciuria.

### Teaching Points

- Nephrolithiasis is a discrete calcification in the collecting system and much more common than the more-diffuse parenchymal calcification of nephrocalcinosis.
- Radiologic diagnosis of nephrocalcinosis warrants a search for an underlying metabolic disturbance.
- Hypercalcemia, hypercalciuria, and hyperphosphaturia seen in conjunction with nephrocalcinosis should prompt a search for underlying diagnosis of primary hyperparathyroidism.

### Author Contributions

Dr. Singh wrote the original draft; Dr. Singh, Dr. Manohar, and Dr. Erickson reviewed and edited the writing; and Dr. Manohar provided supervision.

### Disclosures

Dr. Erickson, Dr. Manohar, and Dr. Singh have nothing to disclose.

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