American Journal of Transplantation Images in Transplantation – Continuing Medical Education (CME)

Each month, the *American Journal of Transplantation* will feature Images in Transplantation, a journal-based continuing medical education (CME) activity, chosen to educate participants on current developments in the science and imaging of transplantation. Participants can earn 1 *AMA PRA Category 1 Credit*™ per article at their own pace.

This month's feature article is titled: "A Renal Transplant Recipient With Weakness and Dyspnea."

Accreditation and Designation Statement

This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of Blackwell Futura Media Services, the American Society of Transplant Surgeons and the American Society of Transplantation. Blackwell Futura Media Services is accredited by the ACCME to provide continuing medical education for physicians.

Blackwell Futura Media Services designates this journal-based CME activity for a maximum of 1 *AMA PRA Category 1 Credit*™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Statement of Need

Transplant recipients remain at high risk for developing a myriad of serious and often life-threatening complications. Most physicians focus on renal function and the drug levels of immunosuppressant agents for renal transplant recipients. The serum electrolytes, acid–base status, and their sequelae are not routinely monitored, except in patients with advanced chronic kidney disease. To care effectively for a renal transplant recipient, transplant clinicians need an up-to-date knowledge and understanding to better manage transplant recipients with electrolyte, acid–base problems, and renal calcifications.

Purpose of Activity

This activity is designed to increase knowledge and skills on how to evaluate scientific evidence and improve personal practice.

Identification of Practice Gap

This activity will bridge clinical practice gaps in the management of renal transplant recipients with acid-base problems and renal calcifications by addressing diagnostic challenges and reviewing evidence-based treatment in improving patient outcomes.

Learning Objectives

At the end of this activity, the learner will be able to:

- Diagnose and recognize metabolic acidosis
- Interpret the KUB of nephrocalcinosis
- Describe the common etiologies of nephrocalcinosis in general population and renal transplant recipients and its treatment options

Target Audience

This activity is designed to meet the educational needs of transplant surgeons, physicians, clinicians, and others involved in the health care of renal transplant recipients.

Disclosures

No commercial support has been accepted related to the development or publication of this activity. Blackwell Futura Media Services has reviewed all disclosures and resolved or managed all identified conflicts of interest, as applicable. The following authors, editors, and staff reported no relevant financial relationships with respect to this activity.

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Instructions on Receiving CME Credit

This activity is designed to be completed within an hour. Physicians should claim only those credits that reflect the time actually spent in the activity. This activity will be available for CME credit for twelve months following its publication date. At that time, it will be reviewed and potentially updated and extended for an additional twelve months.

Follow these steps to participate, answer the questions and claim your CME credit:

- Log on to https://www.wileyhealthlearning.com/ajt.aspx
- Read the target audience, educational objectives, and activity disclosures.
- Read the article in print or online format.
- Reflect on the article.
- Access the CME Exam, and choose the best answer to each question.
- Complete the required evaluation and print your CME certificate.

Images in Transplantation

Look and Learn

A Renal Transplant Recipient With Weakness and Dyspnea

A 46-year-old man who received renal transplantation 6 years ago presented to the emergency department with general weakness and dyspnea. Two months ago, there was an episode of obstructive nephropathy of the graft kidney caused by a neoureteral stone. It was complicated by acute renal failure and urinary tract infection. Infection and acute renal failure resolved after ureteroscopic lithotripsy and antimicrobial treatment. The patient had been well until one week ago, when progressive anorexia, weakness, and dyspnea developed. On examination, he breathed hard with a respiratory rate of 22 beats/minute. There was symmetric flaccid paralysis with areflexia of the upper and lower extremities. The arterial blood gas analysis revealed pH 7.3 (normal 7.35–7.45), PCO_2 30.2 (normal 35–45) mmHg, PO_2 124 (normal 75–100) mmHg, and bicarbonate 14.5 (normal 22–26) mmol/L. The serum sodium level was 134 (normal 135–148) mmol/L, potassium 1.6 (normal 3.5–5.0) mmol/L, chloride 109 (normal 98–107) mmol/L, calcium 9.1 (normal 8.5–10.5) mg/dL, phosphorus 3.0 (normal 2.7–4.5) mg/dL, magnesium 2.3 (normal 1.6–2.6) mg/dL and creatinine 1.6 (normal 0.5–1.3) mg/dL. The levels of uric acid, cortisol, thyroid and parathyroid hormones were within normal limits. Urinalysis was negative for protein, red blood cell, white blood cell with a pH of 7.0 and specific gravity of 1.005. The spot urine sodium level was 34 mmol/L, potassium 10 mmol/L and chloride 27 mmol/L. His daily urinary potassium loss was 32 mmol. The fractional excretion of bicarbonate was 4.6% under normal serum bicarbonate concentration. A KUB and a renal ultrasonography were depicted in Figures 1 and 2, respectively.

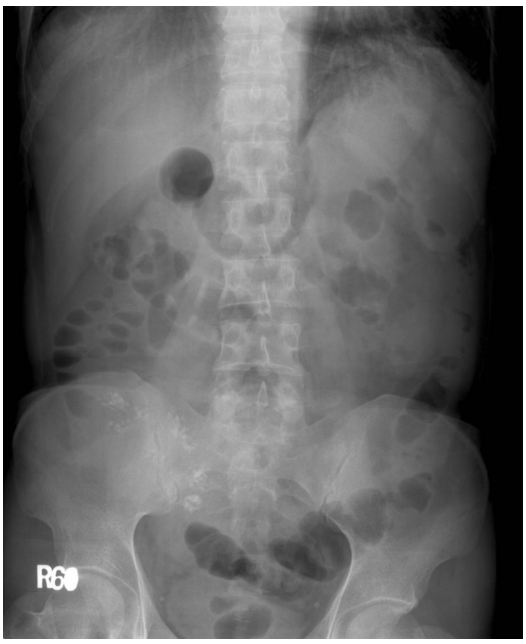

Figure 1

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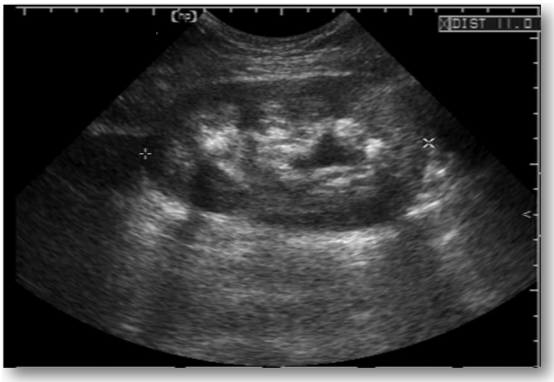

Figure 2

Questions:

1. What acid–base problem did this patient have?

a. Lactic acidosis
b. Ketoacidosis
c. Type 1 RTA
d. Type 2 RTA
e. Type 4 RTA

2. What did the KUB show?

a. Renal stone of the native kidneys
b. Ureter stone of the native kidneys
c. Ureter stone of the graft kidney
d. Nephrocalcinosis of the graft kidney
e. Nephrocalcinosis of the native kidneys

3. Which of the following is not the common cause of the disease in question 2?

a. Hyperparathyroidism
b. Hypercalcemia
c. Oxalosis
d. Renal papillary necrosis
e. Idiopathic hypocalciuria

4. Which of the following is not the possible cause of the disease in question 2 in this patient?

a. Renal transplantation
b. Acidosis
c. Hypokalemia
d. Obstructive nephropathy
e. Urinary tract infection

5. Which of the following oral medication is most suitable for this patient?

a. Potassium citrate
b. Potassium chloride
c. Sodium bicarbonate
d. Calcium carbonate
e. Calcium acetate