中文題目：第三型腎小管性酸中毒可以是多發性骨髓癌的表現
英文題目：Type III Renal tubular acidosis can be a manifestation of multiple myeloma
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***Background**:*

Multiple myeloma (MM) is a cancer of plasma cells in bone marrow. These cancerous plasma cells produce abnormal immunoglobulins and indirectly damage other vital organs in the body. The MM causes various clinical manifestations ranging from asymptomatic, anemic symptoms to pathological fracture, sepsis, and renal failure. MM with the type III renal tubular acidosis in adults is very rare clinically. We reported one patient of refractory hypokalemia and hyperchloremic metabolic acidosis associated with the monoclonal free kappa chain gammopathy of multiple myeloma.

Method and Results:

A non-smoker, 69-year-old female had 7 years of diabetes mellitus and hypertension as well as 2 years of depressive disorder in the outpatient clinic treatment with the following medications: vildagliptin (50 mg/day), metformin (500 mg/day), valsartan (80 mg/day), propranolol (40 mg/day), paroxetine (20 mg/day), rivotril (2 mg/day), and methylcobal (750 mg/day). The patient had multiple non-specific somatic complaints for more than one year, but the complaints were completely ignored due to her psychological symptoms. The patient had a stage 3 chronic kidney disease for 6 years. The laboratory results showed that the patient had a 1.0-1.5 mg/dl of serum creatinine, 37-59 ml/min/1.73 m^2 of eGFR, and the urine total protein to urine creatinine ratio (Upcr) of 2,315 to 7,849 mg/g. The Upcr elevated within a year from 11,755 to 25,313 mg/g, which accompanied by the results of urine dipsticks from 1+ to 2+ for proteinuria and the serum albumin level from 3.8 to 3.6 g/dl before the clinical admission. At admission, the hemoglobin level was 5.9 g/dl and a 2+ occult blood reaction was found in the stool examination. The patient suffered from the multiple fractures of bilateral ribs, the erythematous gastritis, a suspicious case for ischemic colitis, which was confirmed by CXR, esophagogastroduodenoscopy, colonoscopy and colon biopsy, respectively. The patient was subjected for an abdominal CT scan due to elevated carcinoembryonic antigen (CEA) level of 9.05 ng/ml, the CA-199 level of 40.54 U/ml, and cachexia. The CT scan found three different sizes, from 1.0 cm to 2.8 cm in diameter, of hepatic hemangiomas and a 2.5 cm diameter of gallstone.

The patient with the refractory hyperchloremic metabolic acidosis (pH, 7.304 and HCO_3^-, 14.2 mEq/L) and hypokalemia (K^+, 2.72 mEq/L) was obvious. The results of biochemistry and gas analysis of serum and urine showed a normal serum anion gap (AG, 11.2 mEq/L), hyperchloremic metabolic acidosis, hypouricemia (uric acid, 1.6 mg/dl), hypophosphatemia (PO_4^{3-}, 0.7 mg/dl) with an elevated fractional excretion of phosphate (F_EPO_4, 85%), uric acid (F_EUA, 65.7%), bicarbonate (F_EHCO_3, 10.3%), elevated urinary glucose level (797 mg/dl), and an exaggerated heavy proteinuria. All these results illustrated the Fanconi syndrome (proximal renal tubular dysfunction). Additionally, the testing results of a positive urine anion gap (UAG, 37.5 mEq/L), a lower urinary osmolarity gap (UOG, 29 mOsm/L), an lower estimated urinary NH_4^+ (14.5 mEq/L), a urine PCO_2 minus blood PCO_2 [(U-B) PCO_2] value of less than 20 mmHg, and a higher urinary pH (> 5.5) value all pointed to an impairment of H^+ secretion of distal renal tubules. The combination of Fanconi syndrome and distal renal tubular acidosis (RTA) led to the diagnosis of type III RTA. Immunology studies showed normal results for C3, C4, ANA, rheumatoid factor, antibodies against SSA/Ro and SSB/La, but abnormal serum levels of IgG (165 mg/dl), IgA (18.2 mg/dl), and IgM (8.5 mg/dl), which has a normal range of 680-1620, 84-438, and 57-288 mg/dl, respectively. Blood levels of lead, mercury and aluminum were all within the normal limits. No concomitant Chinese herbal treatment was found. The result of urinary protein electrophoresis identified the gammaglobulinemia, which has the light-chain M component of 5.81 gm/day in 1,700 ml of 24-hour urine collection. The results of serum and urine immunoelectrophoresis confirmed the monoclonal free kappa chain gammopathy of multiple myeloma.

These findings established the basis of diagnosis of light chain myeloma with monoclonal free kappa chain gammopathy stage IIIA by Durie-Salmon Staging System criteria for multiple myeloma. The patient and family declined for further aggressive treatment. The patient expired from recurrent urinary tract infections and pneumonia after 7 months of initial diagnosis.

Conclusion:

Plasma cell dyscrasia may have a variety of symptoms since the disease affects different organs in the body. We reported a rare case of type III renal tubular acidosis as the manifestation of multiple myeloma with monoclonal free kappa chain gammopathy. Multiple myeloma should be in the lists of clinical differential diagnosis of elderly with chronic kidney disease, anemia, multiple bony fracture and/or recurrent infections.