

### QUESTION

1. A patient with a long history of chronic kidney disease (CKD) is being treated with a diuretic. The patient's serum potassium level is 2.8 mEq/L. The patient is also taking a beta-blocker and a calcium channel blocker. The patient's blood pressure is 150/90 mmHg. The patient's creatinine level is 2.5 mg/dL. The patient's hemoglobin level is 10 g/dL. The patient's hematocrit level is 30%. The patient's serum calcium level is 8.5 mg/dL. The patient's serum phosphorus level is 4.5 mg/dL. The patient's serum parathyroid hormone-related protein (PTHrP) level is 150 pg/mL. The patient's serum parathyroid hormone (PTH) level is 100 pg/mL. The patient's serum vitamin D level is 10 ng/mL. The patient's serum albumin level is 3.5 g/dL. The patient's serum total protein level is 7.5 g/dL. The patient's serum globulin level is 4.0 g/dL. The patient's serum immunoglobulin G (IgG) level is 1.5 g/dL. The patient's serum immunoglobulin A (IgA) level is 0.5 g/dL. The patient's serum immunoglobulin M (IgM) level is 0.5 g/dL. The patient's serum ferritin level is 100 ng/mL. The patient's serum transferrin level is 2.5 g/L. The patient's serum transferrin saturation level is 20%. The patient's serum iron level is 50 µg/dL. The patient's serum total iron-binding capacity (TIBC) level is 250 µg/dL. The patient's serum free iron level is 10 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL.

Parameter	Value	Reference Range
Serum potassium	2.8 mEq/L	3.5-5.0 mEq/L
Serum calcium	8.5 mg/dL	8.8-10.0 mg/dL
Serum phosphorus	4.5 mg/dL	2.5-4.5 mg/dL
Serum PTHrP	150 pg/mL	<10 pg/mL
Serum PTH	100 pg/mL	<100 pg/mL
Serum vitamin D	10 ng/mL	>20 ng/mL
Serum albumin	3.5 g/dL	3.5-5.0 g/dL
Serum total protein	7.5 g/dL	6.0-8.0 g/dL
Serum globulin	4.0 g/dL	2.0-4.0 g/dL
Serum IgG	1.5 g/dL	<1.5 g/dL
Serum IgA	0.5 g/dL	<0.5 g/dL
Serum IgM	0.5 g/dL	<0.5 g/dL
Serum ferritin	100 ng/mL	<100 ng/mL
Serum transferrin	2.5 g/L	2.0-4.0 g/L
Serum transferrin saturation	20%	20-50%
Serum iron	50 µg/dL	50-150 µg/dL
Serum TIBC	250 µg/dL	250-450 µg/dL
Serum free iron	10 µg/dL	10-30 µg/dL
Serum fTIBC	100 µg/dL	100-200 µg/dL

2. A patient with a long history of chronic kidney disease (CKD) is being treated with a diuretic. The patient's serum potassium level is 2.8 mEq/L. The patient is also taking a beta-blocker and a calcium channel blocker. The patient's blood pressure is 150/90 mmHg. The patient's creatinine level is 2.5 mg/dL. The patient's hemoglobin level is 10 g/dL. The patient's hematocrit level is 30%. The patient's serum calcium level is 8.5 mg/dL. The patient's serum phosphorus level is 4.5 mg/dL. The patient's serum parathyroid hormone-related protein (PTHrP) level is 150 pg/mL. The patient's serum parathyroid hormone (PTH) level is 100 pg/mL. The patient's serum vitamin D level is 10 ng/mL. The patient's serum albumin level is 3.5 g/dL. The patient's serum total protein level is 7.5 g/dL. The patient's serum globulin level is 4.0 g/dL. The patient's serum immunoglobulin G (IgG) level is 1.5 g/dL. The patient's serum immunoglobulin A (IgA) level is 0.5 g/dL. The patient's serum immunoglobulin M (IgM) level is 0.5 g/dL. The patient's serum ferritin level is 100 ng/mL. The patient's serum transferrin level is 2.5 g/L. The patient's serum transferrin saturation level is 20%. The patient's serum iron level is 50 µg/dL. The patient's serum total iron-binding capacity (TIBC) level is 250 µg/dL. The patient's serum free iron level is 10 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL.

### ANSWER

The patient has a long history of chronic kidney disease (CKD) and is being treated with a diuretic. The patient's serum potassium level is 2.8 mEq/L, which is significantly below the normal range of 3.5-5.0 mEq/L. The patient is also taking a beta-blocker and a calcium channel blocker. The patient's blood pressure is 150/90 mmHg, which is above the normal range of 120/80 mmHg. The patient's creatinine level is 2.5 mg/dL, which is above the normal range of 0.6-1.2 mg/dL. The patient's hemoglobin level is 10 g/dL, which is below the normal range of 12-16 g/dL. The patient's hematocrit level is 30%, which is below the normal range of 37-47%. The patient's serum calcium level is 8.5 mg/dL, which is below the normal range of 8.8-10.0 mg/dL. The patient's serum phosphorus level is 4.5 mg/dL, which is at the upper limit of the normal range of 2.5-4.5 mg/dL. The patient's serum parathyroid hormone-related protein (PTHrP) level is 150 pg/mL, which is significantly above the normal range of <10 pg/mL. The patient's serum parathyroid hormone (PTH) level is 100 pg/mL, which is at the upper limit of the normal range of <100 pg/mL. The patient's serum vitamin D level is 10 ng/mL, which is below the normal range of >20 ng/mL. The patient's serum albumin level is 3.5 g/dL, which is at the lower limit of the normal range of 3.5-5.0 g/dL. The patient's serum total protein level is 7.5 g/dL, which is at the lower limit of the normal range of 6.0-8.0 g/dL. The patient's serum globulin level is 4.0 g/dL, which is at the upper limit of the normal range of 2.0-4.0 g/dL. The patient's serum immunoglobulin G (IgG) level is 1.5 g/dL, which is at the upper limit of the normal range of <1.5 g/dL. The patient's serum immunoglobulin A (IgA) level is 0.5 g/dL, which is at the upper limit of the normal range of <0.5 g/dL. The patient's serum immunoglobulin M (IgM) level is 0.5 g/dL, which is at the upper limit of the normal range of <0.5 g/dL. The patient's serum ferritin level is 100 ng/mL, which is at the upper limit of the normal range of <100 ng/mL. The patient's serum transferrin level is 2.5 g/L, which is at the lower limit of the normal range of 2.0-4.0 g/L. The patient's serum transferrin saturation level is 20%, which is at the lower limit of the normal range of 20-50%. The patient's serum iron level is 50 µg/dL, which is at the lower limit of the normal range of 50-150 µg/dL. The patient's serum total iron-binding capacity (TIBC) level is 250 µg/dL, which is at the lower limit of the normal range of 250-450 µg/dL. The patient's serum free iron level is 10 µg/dL, which is at the lower limit of the normal range of 10-30 µg/dL. The patient's serum free iron-binding capacity (fTIBC) level is 100 µg/dL, which is at the lower limit of the normal range of 100-200 µg/dL.