ECG CASE OF THE MONTH

Mental Disturbance for 4 Days

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A family brought their 61-year-old mother to the emergency department because for 4 days she had been confused, incoherent, and somnolent. She also had dysphagia, dysarthria, diplopia, and had fallen out of bed. She had been in the hospital 3 weeks earlier for atrial fibrillation and an exacerbation of congestive heart failure. She also carried a diagnosis of chronic obstructive pulmonary disease and used an albuterol inhaler. She was obese (BMI of 45) and had adult-onset diabetes mellitus. She had a 43 pack-year history of cigarette smoking but had recently quit. Soon after arriving in the emergency department, she had an ECG (Figure).

FIGURE: Admission electrocardiogram of a 61-year-old mentally disturbed woman. See text for explication.

What is your diagnosis? Explication is on page 59.
DIAGNOSIS: Atrial flutter/fibrillation with a rapid (111 beats/minutes) and variable ventricular response; right axis deviation of the QRS complex (+124°); a tall monophasic R wave in lead V1 that was taller than the R wave in V6 and was accompanied by a negative T wave; a tall R wave in lead aVR; and deep S waves in leads I, V5, V6.

Throughout most of the tracing the rhythm suggested atrial flutter, but occasionally the morphology changed and resembled coarse atrial fibrillation. The other ECG features were highly specific for right ventricular hypertrophy, in this patient a manifestation of cor pulmonale.¹ The echo-Doppler study of her heart on this admission showed a markedly enlarged right atrium and right ventricle with a flat ventricular septum and a pulmonary arterial systolic pressure of 52 mmHg. The left atrium and ventricle were of normal size, but the left ventricle was hypokinetic with an ejection fraction of 40-45%.

Arterial blood gases on this admission with her breathing 3 liters/min of O₂ via nasal cannulae were grossly abnormal with a pH of 7.25, a pCO₂ of 54 mmHg, a pO₂ of 80 mmHg, a bicarbonate of 22 mEq/L, and an O₂ saturation of 93%. The respiratory acidosis, hypercarbia, and hypoxia were not, however, the major cause of her mental dysfunction. Her blood glucose on admission was 26 mg/dL. The hypoglycemia was the result of her taking 1,000 mg of metformin qd and 10 mg of glipizide XL bid. Other home medications may have accentuated hypoglycemia: digoxin and ranitidine by competing with metformin for common renal tubular transport systems and furosemide which may increase metformin plasma levels without altering renal clearance.² Ranitidine may also increase serum concentrations of glipizide.³

The hypoglycemia was treated by stopping the hypoglycemic medications and administering hypertonic glucose intravenously. An octreotide drip was given for 8 hours to inhibit insulin synthesis, and her serum insulin level decreased from 44.7 to 20.8 μ U/mL (reference, 6-27). The patient’s mental status returned to normal, and she was discharged on the 11th hospital day.

REFERENCES

3. Ibid. 363-365.

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