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Digitalis Intoxication or Intrinsic Conduction System Disease

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Case Report

An 82-year-old female with a history of hypertension, congestive heart failure, and paroxysmal atrial fibrillation on long-term therapy with furosemide, digoxin, captopril, and potassium supplements presented to the emergency room with weakness and anorexia. The electrocardiogram was initially erroneously interpreted as normal sinus rhythm at the rate of 90 beats/min with first degree atrioventricular (AV) block (Fig 1). A diagnosis of gastritis was made. A serum digoxin level was obtained, and the patient was discharged.

A few hours later the digoxin level was found to be 6.8 nmol/L (5.3 ng/mL). The patient was called back for reevaluation and found to have high degree AV block with a ventricular rate of 45 beats/min (Fig 2). The patient denied any history of palpitations, visual changes, nausea, or vomiting. There was no history of chest pain, shortness of breath, orthopnea, or paroxysmal nocturnal dyspnea. Physical examination revealed a blood pressure of 90/70 mm Hg with an irregular pulse of 40 beats/min. Jugular venous pressure was normal. A left carotid bruit was heard. The apical impulse was displaced 2 cm lateral to midclavicular line. No extra cardiac sounds were heard. A grade III/VI holosystolic murmur was heard at the apex with radiation to the axilla.

Initial laboratory results included a potassium level of 5.3 mmol/L, sodium 140 mmol/L, BUN 22.1 mmol/L (62 mg/dL), creatinine 129 μ mol/L (1.7 mg/dL), and hemoglobin 131 g/L (13.1 g/dL). Chest x-ray showed cardiomegaly and a few bands of atelectasis.

The diagnosis of digitalis intoxication was made, and digoxin-specific antibody binding fragments (Digibind™, Burroughs Wellcome Co, Research Triangle Park, NC) (1) were administered in the emergency room.

On the following day anorexia and weakness were alleviated. Blood pressure was 140/80 mm Hg and pulse 54 beats/min and irregular. However, repeat electrocardiogram still showed atrial tachycardia with a variable block and a ventricular response of 50 to 70 beats/min (Fig 3). On day 3 the patient had several episodes of high grade heart block with three- to four-second pauses between ventricular beats (Fig 4). An external pacemaker was applied. The digoxin level remained above 1.3 nmol/L (1 ng/mL) for the next six days.

On day 7 intrinsic conduction system disease was confirmed when atrial tachycardia with high degree AV block persisted despite a serum digoxin level of 1.0 nmol/L (0.8 ng/mL). On day 14 a permanent single-chamber pacemaker was implanted. Several episodes of supra-ventricular tachycardia were detected by telemetry monitoring during her hospitalization. The patient was discharged on 0.125 mg of digoxin three days per week.

Discussion

This elderly woman presented with anorexia and weakness, atrial arrhythmias, high degree AV block, and a high serum di-

goxin level. The diagnosis of digitalis intoxication was initially based on symptoms, electrocardiographic abnormalities, and a high serum digoxin level, and the patient was treated with di-



Fig 1—Paroxysmal atrial tachycardia with 2:1 atrioventricular block interpreted initially as sinus tachycardia.

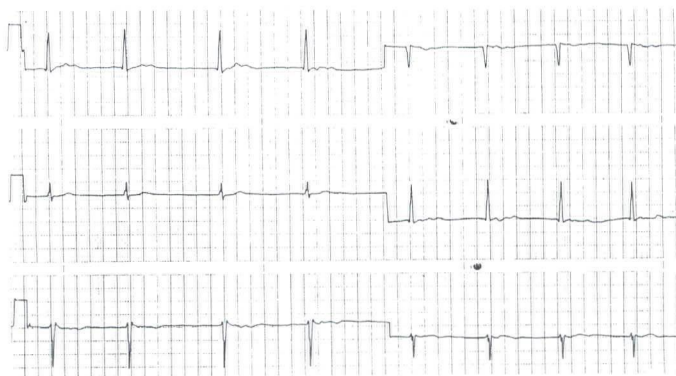


Fig 2—Possible atrial fibrillation with a very slow ventricular response consistent with high degree atrioventricular block.

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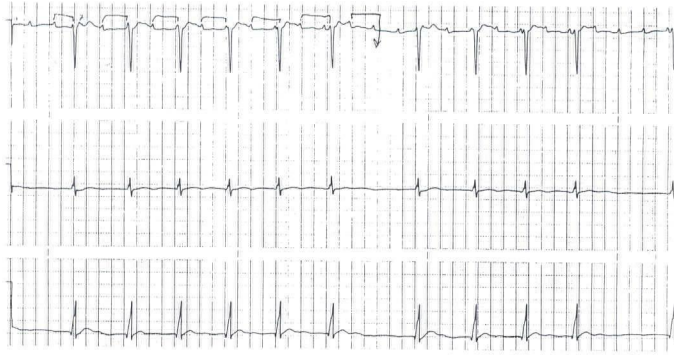


Fig 3—Paroxysmal atrial tachycardia with variable block.

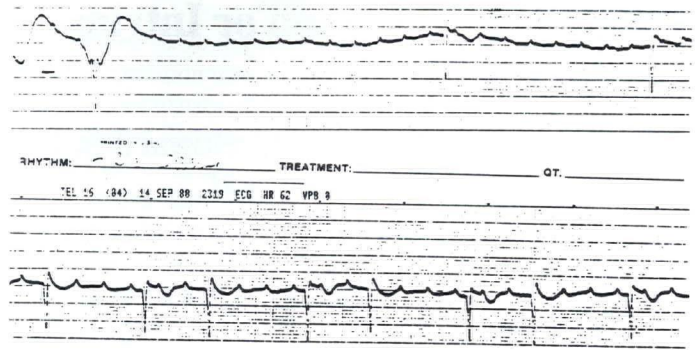


Fig 4—Paroxysmal atrial tachycardia with high degree atrio-ventricular block.

gxin-specific antibody binding fragments. Despite gradual decrease of the serum digoxin level, the patient continued to have atrial tachycardia with high degree AV block and four-second pauses that required permanent pacemaker implantation.

The diagnosis of digoxin intoxication remains difficult (2). Symptoms are nonspecific, as are the electrocardiographic abnormalities. There is a considerable overlap of serum digoxin concentrations between groups with and without digitalis toxicity (3). Furthermore, electrolyte imbalance and concomitant medications alter the response to a given dosage or level (4).

The serum digoxin level in this patient was two to three times above therapeutic range and highly suggestive of digitalis intoxication. However, after seven days of hospitalization, it was clear that the intrinsic conduction system disease caused the severe heart block. Therapy with digoxin-specific antibodies is highly effective (1) in correcting the symptoms and signs of digitalis intoxication, including electrocardiographic abnormalities (ie, complete AV block).

In retrospect, although the symptoms of weakness and anorexia were abolished by digoxin-specific antibody therapy, which is suggestive of digitalis intoxication, lack of improvement within 30 to 90 minutes of the AV block offered an impor-

tant clue on day 1 that digoxin toxicity did not cause the conduction abnormalities. Thus the prolonged hospitalization while awaiting a decrease in the serum digoxin level prior to pacemaker implantation might have been avoided. This case supports the hypothesis that lack of response to digoxin-specific antibody therapy excludes the diagnosis of digitalis intoxication and that this intervention, in addition to clinical presentation and serum digoxin level, can be used not only to treat but also to diagnose digitalis intoxication.

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