A concealed sinus rhythm can be a cause of misdiagnosis of digitalis intoxication. This report describes a patient who presented with a regular rhythm and absent P waves on the surface electrocardiogram. When digitalis was withdrawn, the rhythm did not change, indicating that it was not due to digitalis intoxication. The electrocardiogram showed a regular rhythm and a narrow QRS complex, with no evidence of atrial activity. The serum digoxin level was 1.0 ng/ml and the serum K was 4.2 mEq/L.

Because of apparent A-V nodal block with junctional escape, digoxin was withheld. The patient's rhythm was normal, with the serum digoxin level remaining constant and the rhythm unchanged. A His bundle electrogram showed atrial depolarizations preceding each His and ventricular potentials. Conduction intervals were constant and prolonged (A-H was 150 msec and H-V was 70 msec). The atrium was paced with a second catheter at progressively faster rates until Mobitz type I exit block appeared from the pacing electrode at a rate of 85 per minute. Small 'a' waves coincided with each atrial depolarization. The mean right atrial pressure was 12 mm Hg. The surface ECG during the study was similar to the admission ECG.

**Discussion**

Right atrial depolarizations followed by His and ventricular potentials establishes the presence of sinus rhythm in our patient. A more definitive demonstration of sinus rhythm by the direct recording of sinus node potentials is not yet possible in man. Because no evidence of atrial activity was present on the surface ECG, this rhythm may appropriately be called concealed sinus rhythm.

Two mechanisms may produce concealed sinus rhythm. Sinus ventricular conduction, in which impulses proceed only through specialized internodal pathways, is always associated with concealed sinus rhythm.
CONCEALED SINUS RHYTHM

rhythm because atrial depolarization does not occur. Normal conduction (sino-atrial-ventricular conduction), which proceeds through both atrial fibers and specialized internodal pathways, usually produces a P wave on the surface ECG but, as we have shown, may also be associated with concealed sinus rhythm. Khan et al.7 have suggested that extensive destruction of atrial myocardium in advanced rheumatic heart disease may result in failure to record P waves on the surface ECG. The small size of the ‘a’ waves in the face of an elevated right atrial pressure in our patient is consistent with substantial loss of atrial “contractility.”

Continuing atrial fibrillation with superimposed A-V block and junctional escape, sinus arrest with junctional escape, and concealed sinus rhythm may be indistinguishable on the surface ECG, each producing a regular rhythm without P waves. A presumptive diagnosis of digitalis intoxication must be made whenever A-V block is suspected in a patient receiving digitalis. However, when the atrial rhythm is not clearly defined, the ventricular rhythm is regular and the serum level of digitalis is not in the toxic range, right atrial electrocardiography is indicated. Inappropriate withdrawal of digitalis can be avoided in those instances when a concealed sinus rhythm is demonstrated.

Addendum

Since submission of this manuscript we have examined another patient with a similar presentation in whom His bundle electrocar-

Figure 1

The His bundle electrogram (HBE) shows atrial depolarization (A) preceding each His potential (H) and ventricular depolarization (V). The A-H interval is 150 msec and the H-V interval 70 msec.

Figure 2

A small ‘a’ wave coincides with each atrial depolarization. Low atrial depolarizations (A) precede each His bundle potential (H) and ventricular depolarization (V). The ventricular rate is regular.

References


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