ECG OF THE MONTH

Suicide

D. Luke Glancy, MD

FIGURE. A depressed 25-year-old man committed suicide by overdose. Above is his electrocardiogram shortly before death. See text for explication.

What is your diagnosis?

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**DIAGNOSIS:** Regular wide-QRS (188 ms) tachycardia (140 beats/min), probably sinus tachycardia; a long QT interval (372 ms; QTc, 567 ms); marked right axis deviation of the QRS (167° in the frontal plane) with right axis of the terminal 40 ms of the QRS; and skeletal muscle artifact at the beginning of the tracing suggesting seizure activity. All of these findings suggest tricyclic antidepressant cardiotoxicity.1

**DIAGNOSIS**

Apparently depression ran in this man’s family, and when he took an overdose of his tricyclic antidepressant, he also took the tricyclics of his mother and his sister. Most patients who die of an overdose of a tricyclic antidepressant are pronounced dead without reaching a hospital, and those who die after arriving in the emergency room do so within a few hours.2 Central nervous system toxicity of tricyclic antidepressants may manifest as confusion, agitation, hallucinations, coma, myoclonus, or seizures. Generalized seizures often presage cardiopulmonary arrest,2 and within 20 seconds of the ECG with evidence of generalized seizure activity shown here, the QRS duration increased from 188 ms to 212 ms, and the patient died soon thereafter.

Tricyclic antidepressants block the reuptake of serotonin and norepinephrine, are competitive inhibitors of H1 and H2 histamine receptors, have anticholinergic effects, and have quinidine-like effects on cell membranes. Sinus tachycardia, the result of anticholinergic effects, often is present with therapeutic doses of tricyclic antidepressants. QRS prolongation, probably a manifestation of the quinidine-like effects that appear with toxic levels of the drugs, has been a far better predictor of seizures and ventricular arrhythmias than serum levels of the tricyclic antidepressants.3 Other cardiovascular manifestations of tricyclic overdose include hypotension, infranodal atrioventricular block, ventricular tachycardia and fibrillation, asystole, and intractable myocardial depression.1,4

Fortunately, tricyclic antidepressants have been replaced by less toxic drugs and now are used far less frequently than 30 years ago when they were responsible for an estimated 500,000 overdoses per year with a higher mortality than most other drug ingestions.2

**REFERENCES**


Dr. Glancy is an emeritus professor of medicine (cardiology) at the LSU Health Sciences Center in New Orleans.