Communications

Lithium-Induced Dysrhythmias as a Marker for Sick Sinus Syndrome

Wm. MacMillan Rodney, MD, Peter Chopivsky, MD, and Jim H. Hara, MD
Los Angeles, California

Lithium treatment has been associated with an increasing number of cardiac complications.[1-4] Emerging among these is cardiac sinus node dysfunction.[5-7] Other investigators have reported cases of sinus node dysfunction that reversed upon withdrawal of lithium.[8] Reported here is a case of sinus node dysfunction associated with lithium therapy that did not reverse to normal after cessation of lithium. Lithium may play a role in inducing dysrhythmias, including sinoatrial node dysfunction.

Case Report

A 59-year-old retired opera singer followed at the UCLA Family Medicine Clinic since November 1979 was admitted to UCLA Hospital in January 1980 for asymptomatic bradycardia. She had been treated with 750 mg of lithium carbonate twice daily since 1977 for manic-depressive illness. There was no history of ischemic heart disease, rheumatic fever, or diphtheria.

On the day of her admission, she was seen in routine follow-up by her psychiatrist, who noted an irregularly irregular slow pulse. He referred the patient to her family physician, who obtained an electrocardiogram showing a junctional rhythm of 30 beats/min. P wave activity was random with intermittent gaps greater than 20 seconds. Atropine, 0.5 mg intravenously, was given twice within 5 minutes without effect. The patient was admitted to the coronary observation unit and all medications were withdrawn.

Lithium levels on hospital days 1, 2, 5, and 7 were 1.3 mEq/L, 1.1 mEq/L, 0.2 mEq/L, and 0.1 mEq/L, respectively. Cardiac ambulatory (Holter) monitor on the second hospital day continued to show a junctional rhythm with ventricular bigeminy (Figure 1). Rates ranged from 40 to 65 beats/min at rest to 50 to 100 beats/min with activity. Sinoatrial blocks of up to 2.92 seconds were recorded (Figure 2). By the third hospital day, the predominant rhythm was sinus, but sinoatrial blocks of up to 2 seconds continued to occur. On hospital day 8, Holter monitor showed sinus rhythm of 60 to 85 beats/min, PR intervals of 180 ms, and QRS duration of 80 ms. Yet, frequent premature atrial contractions and supraventricular and ventricular tachycardia were also recorded. Reinstitution of lithium therapy was advised by the psychiatrist, but after consideration of the above Holter findings, it was decided to proceed with discontinuation of all medications. Asymptomatic sinus rhythm continued, and the patient was discharged on no medications on the 11th hospital day.

Two weeks after discharge, repeat Holter monitor showed evidence of sinoatrial node disease: paired atrial extrasystoles, occasional one- to four-beat junctional escape rhythm, one episode of supraventricular tachycardia, and two premature ventricular contractions. Five months after discharge, the Holter revealed sinus rhythm with periods of first-degree and second-degree Wenckeback-type atrioventricular block.

Comment

Reversible cardiac sinus node dysfunction induced by lithium carbonate has been reviewed recently.[7,8] Sinus bradycardia has been found to be the most frequent dysrhythmia; however, sinus

From the Division of Family Practice, School of Medicine, University of California, Los Angeles, California. Requests for reprints should be addressed to Dr. Peter Chopivsky, UCLA Family Health Center, CHS–BH-134, Los Angeles, CA 90024.

© 1983 Appleton-Century-Crofts

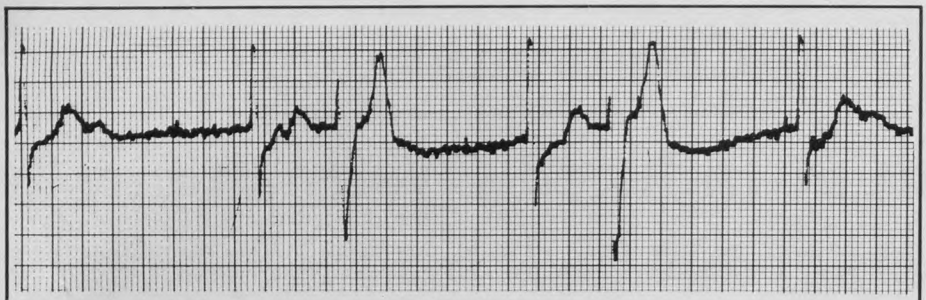

Figure 1. Holter monitor tracing showing junctional rhythm with ventricular bigeminy

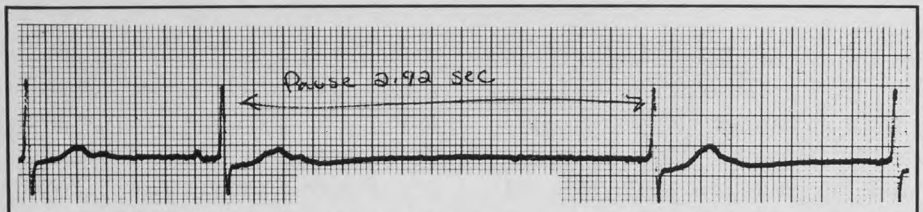

Figure 2. Holter monitor tracing showing sinoatrial blocks of up to 2.92 seconds

pauses of up to 4.6 seconds have been reported.[5] European investigators have reported two cases of nodal rhythm with sinoatrial block.[9,10] It has been postulated that lithium alone is not sufficient to cause the above dysfunction.[5]

This case report describes a prolonged period of junctional rhythm with sinoatrial node activity suppressed to the point of sinoatrial arrest. Neither this degree of sinoatrial dysfunction in association with the use of lithium nor the persistence of sinoatrial node dysfunction following cessation of lithium has been reported previously. As in a majority of similar cases, this case raises the suspicion of underlying organic heart disease aggravated by lithium. As in many of the previously reported cases, this patient was originally asymptomatic in spite of the existence of impressive dysrhythmia. In this case, the persistence of sinoatrial and atrioventricular node dysfunction, despite the cessation of lithium, raises the possibility that lithium unmasked an ongoing but silent (asymptomatic) sinus node dysrhythmia.

The natural history and etiology of sinoatrial disorder (sick sinus syndrome) are not well known. A prospective eight-year survey revealed that 47 percent of patients with this disorder were free of significant complication.[11] The long-term prognosis cannot be stated with certainty, but cases that have been studied over periods ranging from 10 to 31 years have been reported.[12] These cases confirm earlier descriptions of an erratic, slowly progressive course in which escape rhythms occur with increasing frequency.[13,14] Initially these rhythms may be only escape rhythms, but eventually they can become the basic pacemakers with increased risk of sudden death.[15]

Because of the reported linkage of sinus node dysfunction to lithium therapy, Roose et al[8] have suggested regular pulse readings with semiannual electrocardiogram rhythm strips for "all lithium-treated patients who are over the age of 50 or who have a history of heart disease." Though the idea of a pulse diary is laudable, there is strong evidence to support Holter monitoring in contrast to rhythm strip recording because of the Holter monitor's greater sensitivity in detecting dysrhythmias.[16,17]

This case suggests that lithium may play a role in inducing dysrhythmias, especially those due to sinoatrial node dysfunction. Physicians should be alert to this possible association. Patients in whom the use of lithium is contemplated warrant careful pretherapy cardiac investigation. Medical history and physical examination may suffice for the majority. High-risk subsets include those with a history of syncope, dizziness, transient ischemic attacks, palpitations, and recent worsening of cardiac symptoms such as angina or dyspnea on exertion.

Age itself is a relative risk marker, since the mean age of presentation for sinoatrial disorder in the Shaw and Kekwick study[11] was 62 years. Because of their frequency in this population, spells of lightheadedness, momentary lapses of memory, nocturnal awakening, and generalized fatigue are probably of insufficient sensitivity to warrant extensive routine investigation; nevertheless, these may also be markers for sick sinus syndrome.[15]

High-risk patients should receive 24-hour ambulatory cardiac monitoring prior to and after the initiation of lithium therapy. Atrial pacing and measurement of sinus node recovery time is felt to be the most reproducible diagnostic evaluation for sinus node disease.[12] This invasive procedure is not a reasonable screening test, however, and cardiology consultation would be required for its use. The intervals needed for periodic ambulatory cardiac monitoring for the best cost-benefit ratio are unknown. Further study will be required. At present, however, monitoring is recommended once when therapeutic levels are established, then annually in follow-up. Holter monitoring should be performed immediately if the patient reports symptoms associated with increased incidence of sick sinus syndrome. When cardiac dysfunction is diagnosed, cardiology consultation is suggested. In sinoatrial disorder, pacemaker implantation is indicated in symptomatic bradycardiac patients.[12,18]

It is hoped that health care providers involved with disorders requiring lithium therapy will collaborate with colleagues in cardiology in the study of these dysrhythmias.

References

1. Tangedahl TN, Gan GT: Myocardial irritability associated with lithium carbonate therapy. N Engl J Med 287: 867, 1972
2. Demers RG, Heninger GR: Electrocardiographic T-wave changes during lithium carbonate treatment. JAMA 218:381, 1971
3. Tseng HL: Interstitial myocarditis probably related to lithium carbonate intoxication. Arch Pathol 92:444, 1971
4. Tilkian AG, Schroeder JS, Kao JJ, et al: The cardiovascular effect of lithium in man. Am J Med 61:665, 1976
5. Wilson JR, Kraus ES, Bailas MM, et al: Reversible sinus node abnormalities due to lithium carbonate therapy. N Engl J Med 294:1223, 1975
6. Wellens HJ, Cats VM, Duren DR: Symptomatic sinus node abnormalities following lithium carbonate therapy. Am J Med 59:285, 1975
7. Rector WG, Jarzobski JA, Levin HS: Sinus node dysfunction associated with lithium therapy: Report of a case and review of the literature. Nebr Med J, July 1979, pp 193-196
8. Roose SP, Nurnberger JI, Dunner DL, et al: Cardiac sinus node dysfunction during lithium treatment. Am J Psychiatry 136:804, 1979
9. Kleinert M: Myokardiopathie unter lithiumtherapie. Med Klin 69:494, 1974
10. Humbert G, Fillastre JP, Leroy J, et al: Intoxication par le lithium. Sem Hop Paris 50:509, 1974
11. Shaw DB, Kekwick CA: Potential candidates for pacemakers: Survey of heart block and sinoatrial disorder (sick sinus syndrome). Br Heart J 40:99, 1978
12. Ferrer MI: The heart's primary pacemaker: Types of dysfunction. Hosp Physician, June 1980, pp A15-A30
13. Ferrer MI: The sick sinus syndrome in atrial disease. JAMA 206:645, 1968
14. Rubenstein JJ, Schulman CL, Yurchak PM, et al: Clinical spectrum of sick sinus syndrome. Circulation 41:5, 1972
15. Ferrer MI: The sick sinus syndrome. Circulation 47:635, 1973
16. Schultze RA, Strauss HW, Pitt B: Sudden death in the year following myocardial infarction. Am J Med 62:192, 1977
17. Zomeraich S: Ambulatory ECG in the detection of arrhythmias. Practical Cardiol 6(4):43, 1980
18. Miller RB: Current concepts in sick sinus syndrome. Cont Educ 13(2):75, 1980

Rickets in a Breast-Fed Infant

Kathleen A. Baron, MD, and Constantine E. Phiripes, PA-C
Fresno, California

A 9-month-old breast-fed infant whose parents were Saudi Arabian is reported. The literature has some references to young infants with rickets,[1-4] but there is evidence that in otherwise healthy breast-fed white infants (less than 6 months old), clinical rickets may be virtually nonexistent.[5-7] Reported cases of rickets suggest such causes as ill health in the mother causing congenital (prenatal) rickets, unsupplemented breast-feeding after six months of age, vegetarian or other unusual diet, pigmented skin, inner-city dwelling, excessive clothing that exposes very little or none of the skin to the sun, increased genetic requirement for vitamin D, or a combination of these factors.

From the Department of Family Practice, Fresno-Central San Joaquin Valley Medical Education Program, University of California, San Francisco, and the Department of Family Practice, School of Medicine, University of California, Davis, California. At the time this paper was written, Mr. Phiripes was a medical student at The Hahnemann Medical College, Philadelphia, Pennsylvania. Requests for reprints should be addressed to Dr. Kathleen A. Baron, 1163 East Warner, Fresno, CA 93710.

© 1983 Appleton-Century-Crofts