Resuscitated sudden cardiac death in Andersen-Tawil syndrome

Kelly J. Airey, MD,* Susan P. Etheridge, MD,† Rabi Tawil, MD,‡ Martin Tristani-Firouzi, MD†

*From the Divisions of *Cardiology and †Pediatric Cardiology, University of Utah, Salt Lake City, Utah, and the ‡Department of Neurology, University of Rochester, Rochester, New York.*

Introduction

Andersen-Tawil Syndrome (ATS) is an autosomal-dominant or sporadic disorder characterized by ventricular arrhythmias, periodic paralysis, and distinctive facial and skeletal dysmorphology.[1–3] ATS is notable for its variable penetrance (not all subjects manifest all 3 phenotypes) and variable expressivity (the severity of the expressed phenotype varies considerably). The neuromuscular manifestations of ATS consist of intermittent weakness, often in the setting of progressive interictal weakness. The distinctive physical characteristics include low-set ears, micrognathia, syndactyly, clinodactyly, short stature, and scoliosis. Cardiac manifestations of ATS include QT and QU interval prolongation, prominent U waves, frequent premature ventricular contractions (PVCs), polymorphic ventricular tachycardia (VT), and bidirectional VT.[3,4] Although the burden of ventricular ectopy is often high in patients with ATS,[5] degeneration into life-threatening arrhythmias is relatively uncommon.[6] Distinguishing individuals with stable but frequent ventricular ectopy and those at risk of sudden cardiac death remains a challenge.

Dominant-negative mutations in *KCNJ2*, the gene encoding the inward rectifier potassium channel Kir2.1, account for the majority of ATS cases. However, nearly 30% of ATS patients do not have an identifiable mutation in *KCNJ2*, confirming the genetic heterogeneity of this disorder.[7] Interestingly, there are no obvious phenotypic differences that distinguish individuals with and those without a mutation in *KCNJ2*. Likewise, it is not clear that patients with *KCNJ2* mutations are at greater, lower, or similar risk of life-threatening arrhythmias compared with those who are *KCNJ2*-mutation negative. In this report, we present a 15-year-old female patient with *KCNJ2*-mutation-negative ATS who experienced a life-threatening cardiac event with devastating clinical consequences.

Clinical course

This subject is a female patient who first developed symptoms of intermittent muscle weakness at 8 years of age. She developed progressive, significant weakness such that she required a scooter for ambulation. At 12 years of age, she developed several self-limited episodes of shortness of breath associated with palpitations, which the family described as a panic attack. She was evaluated at a local emergency department during one such episode, where she was noted to have runs of nonsustained VT on an electrocardiogram rhythm strip. A subsequent Holter monitor showed frequent single PVCs, bigeminy, and nonsustained bidirectional VT up to 14 beats in duration (rate 120 to 150 beats/min). She was referred to the Division of Pediatric Electrophysiology at the University of Utah for further evaluation and management. On physical examination, she was noted to have hypertelorism, micrognathia, clindactyly of the fifth digit and 2- to 3-toe syndactyly. Her cardiac examination and echocardiogram were normal. The 12-lead electrocardiogram showed sinus rhythm with a normal QTc (430 ms) and prominent U waves in leads V2 and V3 (Fig. 1). A rhythm strip showed bigeminy and nonsustained polymorphic VT. She underwent genetic testing, and no mutation, insertion, or deletion was identified in *KCNJ2* by direct sequencing. Of note, her family history was negative for periodic paralysis, syncope, seizures, or sudden death. Neither parent had any physical stigmata of ATS.

Over the course of the next 2 years, the patient underwent 24-h Holter monitoring on 4 occasions. On her initial study, ventricular ectopic beats constituted 2.3% of all recorded ventricular complexes (Table 1 and Fig. 2). After starting extended-release metoprolol 100 mg once daily, a repeat Holter monitor showed ventricular ectopic complexes constituting 1.5% of all beats. Although most of her serum potassium levels were within the normal limits, she did have a single episode of borderline hypokalemia (3.5 mM/l), after which she was placed on 40 mEq KCl orally 3 times daily. The combination of metoprolol and KCl was temporally related to an improvement in the frequency of ventricular ectopy (0.6% ectopic beats). However, 6 months later a Holter monitor showed an interval increase in the frequency of ventricular ectopy up to 10% of all complexes. Thus, we concluded that medical management was not effective in suppressing her ventricular arrhythmias. Interestingly, her ventricular ectopy transiently resolved during administration of propofol anesthesia for a tonsillectomy and adenoidectomy. Before propofol infusion, her telemetry showed ventricular bigeminy and frequent ventricular couplets. She received a loading dose of 240 mg of propofol, followed by a continuous infusion. Throughout the hour-long infusion, the patient remained in sinus rhythm with no

KEYWORDS Bidirectional ventricular tachycardia; Ion channelopathy

ABBREVIATIONS **ATS** = Andersen-Tawil Syndrome; **PVC** = premature ventricular contractions; **VT** = ventricular tachycardia (Heart Rhythm 20092009;66:1814–1817)

Address reprint requests and correspondence: Dr. Martin Tristani-Firouzi, Pediatric Cardiology, University of Utah School of Medicine, Salt Lake City, Utah 84112. E-mail address: mfirouzi@cvrti.utah.edu. (Received July 8, 2009; accepted August 24, 2009.)

1547-5271/$ -see front matter © 2009 Heart Rhythm Society. All rights reserved. doi:10.1016/j.hrthm.2009.08.032

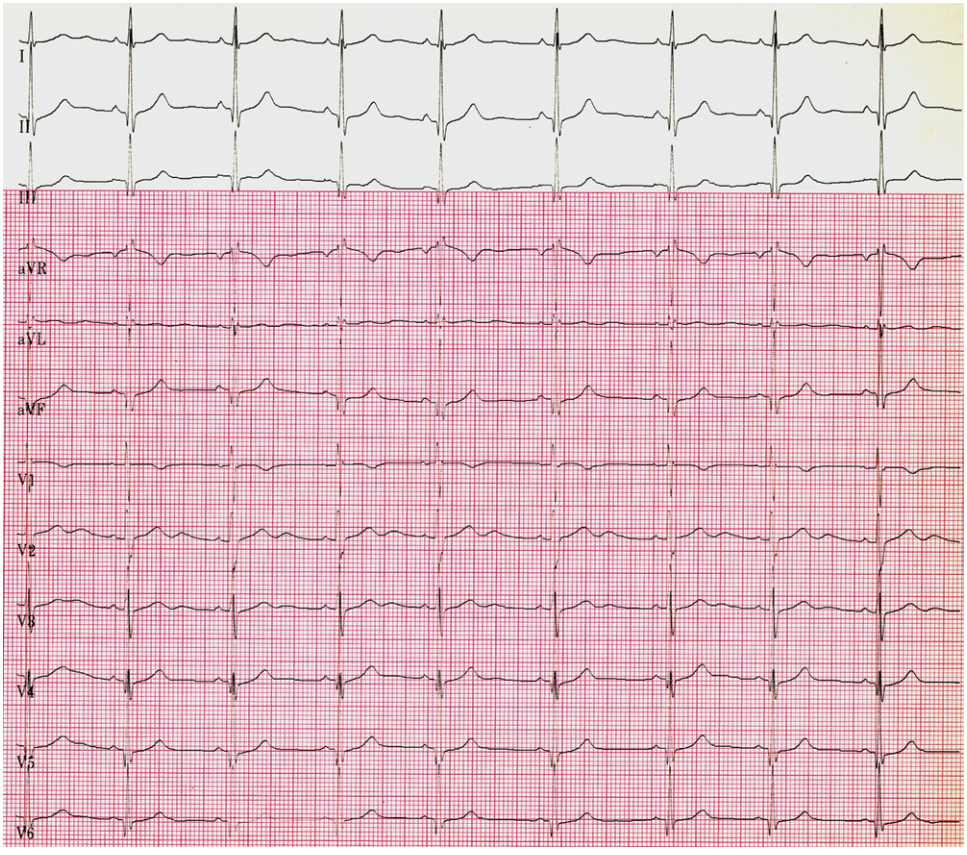

Figure 1 12-lead electrocardiogram rhythms strip obtained on first evaluation in pediatric cardiology clinic. Manual QTc 430 ms. Note prominent U waves in leads V2 and V3.

ventricular ectopy. However, within minutes after discontinuation of the propofol infusion, her ventricular ectopy returned to a baseline of bigeminy with ventricular couplets.

Over the 2 years after her diagnosis of *KCNJ2*-mutation-negative ATS, the patient had acute paroxysms of apparent paralysis preceded by lightheadedness and diaphoresis. During these episodes, she collapsed to the ground and was unable to move or respond, although she was aware of her surroundings. On average, the episodes lasted 45 min, but some lasted as long as 2 h. These episodes tended to occur at school and emergency services were frequently mobilized. On arrival of emergency services, her blood pressure was always noted to be normal and she was in her baseline sinus rhythm with frequent PVCs. An event recorder during one of the episodes also captured sinus rhythm with frequent PVCs. Palpitations or post-ictal symptoms were never associated with these episodes. Although no obvious precipitating factors were identified, the episodes tended to occur during periods of anxiety. Therapy for her episodic weakness consisted of acetazolamide 500 mg twice daily. This did not alter the frequency or severity of her neurological manifestations.

The patient had at least 2 episodes of syncope, interspersed between the more frequent episodes of acute collapse. One episode occurred in the shower, where the patient fell and hit her head, requiring evaluation in the emergency department. With further questioning, it was not clear whether this episode represented a true syncopal event or whether this was a consequence of her severe muscle weakness. Subsequently, the patient had a brief episode of loss of consciousness that occurred just after urinating. She stood up, felt dizzy, sat back down again and then collapsed to the ground. The mother discovered her on the floor. In light of these episodes of apparent vasovagal syncope in the setting of the more bizarre episodes of acute collapse, we elected to implant an insertable loop recorder (ILR). The first ILR interrogation included 3

Table 1 24-h Holter monitor results

Average heart rate (beats/min)	Total ventricular beats	Ventricular (%) beats	Couplets	Runs > 3	Longest run	Fastest run (beats/min)
72	2,254	2.3	79	3	14	153
78	1,359	1.5	3	1	4	150
66	571	0.6	0	0		
58	8,171	10	471	105	7	153

Download English Version:

https://daneshyari.com/en/article/2923569

Download Persian Version:

https://daneshyari.com/article/2923569

Daneshyari.com