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CME Article

Electrocardiographical case. Young woman with frequent syncope attacks

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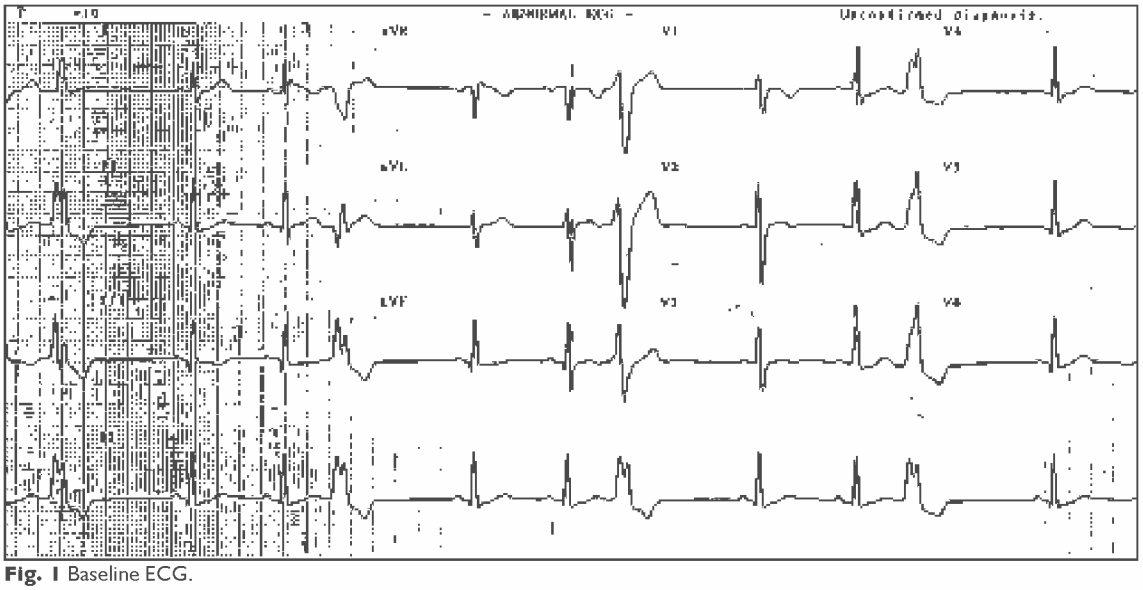

Fig. 1 Baseline ECG.

CLINICAL PRESENTATION

A 29-year-old woman complained of recurrent episodes of palpitation and giddiness for one year. She had seven episodes of syncopal attacks. There was no family history of sudden death. She was reviewed by a cardiologist and was referred to us for electrophysiological study and consideration for radiofrequency ablation of her ventricular arrhythmias. Clinical examination was unremarkable. The 12-lead electrocardiogram (ECG) is shown in Fig. 1. What is the diagnosis?

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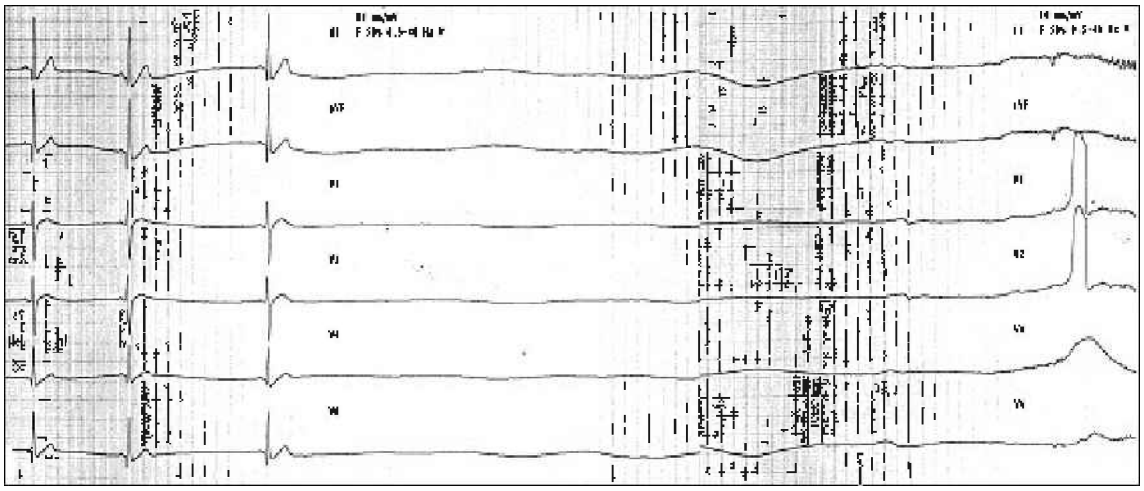

Fig. 2 ECG tracing at the 20th minute of tilt. The patient developed syncope with asystole.

ECG INTERPRETATION

The ECG shows repetitive bursts of premature ventricular contractions with a left bundle branch block, inferior-axis QRS morphology. These ECG features are characteristic of right ventricular outflow tract premature contraction (RVOT-VPC).

DIAGNOSES

Differential diagnoses for the cause of syncope in this patient include:

1. Right ventricular outflow tract tachycardia (RVOT-VT).
2. Arrhythmogenic right ventricular dysplasia (ARVD).
3. Neurocardiogenic syncope.

CLINICAL COURSE

The patient underwent a treadmill exercise stress test up to stage 4 Bruce protocol. It was negative for ischaemia and there was no ventricular tachycardia during exercise or recovery. She underwent a transthoracic echocardiogram, which showed normal left ventricular systolic function and size. The right ventricular function was within normal limits. 24-hours Holter monitoring showed frequent ventricular ectopics and couplets as well as bigeminy. Her signal average ECG was negative for ventricular late potentials. Cardiac magnetic resonance imaging was unsuccessful because the patient had claustrophobia. Finally, she underwent a tilt table test, which showed a malignant cardioinhibitory response (Fig. 2). The patient developed abrupt syncope with 32 seconds of asystole during the test. She was given intravenous atropine and was resuscitated. A dual chamber rate-responsive (DDDR) pacemaker was implanted for her the next day. She was discharged well subsequently.

DISCUSSION

The evaluation of patients with syncope of undetermined origin should take into account clinical status, and care should be taken not to overlook other more serious causes of syncope, such as ventricular tachyarrhythmias. Tilt table testing is important in diagnosing the cause for syncope. Without the tilt table test, the above-mentioned patient would most likely have had to undergo an electrophysiological study and radiofrequency ablation for her RVOT ectopics.

Neurocardiogenic syncope refers to a variety of clinical scenarios in which triggering of a neural reflex results in a usually self-limited episode of systemic hypotension, characterised by both bradycardia and peripheral vasodilation.[1] Neurocardiogenic syncope accounts for 10%–40% of syncope episodes. Patients classically have a prodrome of nausea and diaphoresis (often absent in the elderly), and there may be a positive familial history of the condition. Spells may be triggered by pain, anxiety, stress, or crowded conditions. Typically, no evidence of structural heart disease is present.

The role of permanent pacing in neurocardiogenic syncope associated with significant bradycardia or asystole is controversial. One group of investigators have noted some benefit of pacing in these patients,[2,3] while another study using a pacing rate 20% higher than the resting heart rate demonstrated that pacing did not prevent syncope any better than pharmacotherapy.[4] Because most individuals with neurocardiogenic syncope have a fall in blood pressure preceding slowing of the heart rate, pacing may be ineffective in these patients.

Dual-chamber (DDD) pacing, especially DDD pacing

with rate-drop response function carefully prescribed on the basis of tilt-table test results, may be effective in reducing symptoms, if the patient has a significant cardioinhibitory component to the cause of their symptoms.[5] Results from a randomised trial in highly symptomatic patients with bradycardia demonstrated that permanent pacing increased the time to first syncopal event.[6,7] In one of these trials, the actuarial rate of recurrent syncope at one year was 18.5% for pacemaker patients and 59.7% for control patients.[6] The specific modality of pacing under these circumstances is still under active investigation. The prognosis in patients with prolonged systole in malignant vasovagal syncope is unknown.[8] However, most doctors will still choose to implant a permanent pacemaker for patients with malignant neurocardiogenic syncope when the sinus arrest is prolonged.

ABSTRACT

A 29-year-old woman with frequent syncope attacks was referred for electrophysiological study and consideration for radio-frequency ablation of her ventricular arrhythmias. Her ECG showed features of right ventricular outflow tract premature contraction. Differential diagnoses for the causes of syncope in this patient include: right ventricular outflow tract tachycardia, arrythmogenic right ventricular dysplasia, and neurocardiogenic syncope. She underwent a tilt table test, which showed a malignant cardioinhibitory response. She developed abrupt syncope with 32 seconds of asystole during the test. She was given intravenous atropine and was resuscitated. A dual chamber rate-responsive pacemaker was implanted for her the next day. She was discharged well subsequently. Although the prognosis in patients with prolonged aystole in malignant vasovagal syncope is unknown, most doctors will still choose to implant a permanent pacemaker for patients with malignant neurocardiogenic syncope when the sinus arrest is prolonged.

Keywords: asystole, malignant neurocardiogenic syncope, permanent pacing, right ventricular outflow tract premature contraction, tilt table test

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SINGAPORE MEDICAL COUNCIL CATEGORY 3B CME PROGRAMME
Multiple Choice Questions (Code SMJ 200711B)

	True	False
Question 1. What does the ECG in Fig. 1 show?		
(a) Ventricular premature capture.	☐	☐
(b) Ventricular trigeminy.	☐	☐
(c) Ventricular premature capture, with LBBB morphology and superior axis.	☐	☐
(d) Ventricular premature capture, with RBBB morphology and inferior axis.	☐	☐
Question 2. Based on the ECG in Fig. 2, what are the likely causes for the syncope in this patient?		
(a) Complete atrioventricular block.	☐	☐
(b) RVOT ventricular tachycardia.	☐	☐
(c) Asystole due to vasovagal response.	☐	☐
(d) Fine ventricular fibrillation due to ARVD.	☐	☐
Question 3. Regarding vasovagal syncope:		
(a) It is also known as neurocardiogenic syncope.	☐	☐
(b) It accounts for 10%–40% of syncope episodes.	☐	☐
(c) Cardiac pacing is always indicated.	☐	☐
(d) Permanent pacing can fully prevent syncope.	☐	☐
Question 4. Concerning diagnosis and investigations for vasovagal syncope:		
(a) It is suggested by a specific history with well-known triggers, but a classic history is not always required.	☐	☐
(b) A patient with vasovagal syncope needs to undergo electrophysiological study.	☐	☐
(c) A positive upright tilt table test is characterised by the development of syncope or pre-syncope, in association with cardioinhibitory responses, vasodepressive responses, or both.	☐	☐
(d) A negative tilt table test excludes vasovagal syncope.	☐	☐
Question 5. Patients with malignant vasovagal syncope:		
(a) Are usually from the older age group.	☐	☐
(b) Have structural heart disease.	☐	☐
(c) Have neurological disorders.	☐	☐
(d) Have metabolic disorders.	☐	☐

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Doctor's particulars:

Name in full: _____

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SUBMISSION INSTRUCTIONS:
(1) Log on at the SMJ website: **www.sma.org.sg/cme/smj** and select the appropriate set of questions. (2) Select your answers and provide your name, email address and MCR number. Click on "Submit answers" to submit.

RESULTS:
(1) Answers will be published in the SMJ January 2008 issue. (2) The MCR numbers of successful candidates will be posted online at **www.sma.org.sg/cme/smj** by 15 January 2008. (3) All online submissions will receive an automatic email acknowledgment. (4) Passing mark is 60%. No mark will be deducted for incorrect answers. (5) The SMJ editorial office will submit the list of successful candidates to the Singapore Medical Council.

Deadline for submission: (November 2007 SMJ 3B CME programme): 12 noon, 25 December 2007