

CASE STUDY

Prolonged asystole induced by head up tilt test. Report of four cases and brief review of the prognostic significance and medical management

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Abstract

Head up tilt is an established test for assessing patients with vasovagal syncope. Prolonged asystole during the test has previously been reported in patients suffering from the malignant form of this syndrome. Little is known about the prognostic significance of this response and there is no consensus about the optimum treatment. Four such patients are reported who were treated pharmacologically. During follow up they remained free from major events and their symptoms were well controlled. Conservative management is the initial method of choice and only if this fails should implantation of a dual chamber permanent pacemaker be considered.

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Case reports

CASE 1

A 17 year old girl had a one year history of five syncopal episodes preceded by nausea and lightheadedness. Physical examination was normal. The electrocardiogram, chest x ray, echocardiogram, 24 hour Holter monitoring, EEG, and computed tomographic (CT) brain scan were normal. A tilt test was performed: at 13 minutes of head upright tilting she became bradycardic and there was a ventricular asystolic pause lasting 18 seconds, associated with loss of consciousness and mild generalised twitching. She recovered after being moved to the supine position. Treatment with disopyramide, 250 mg twice a day, was started and a month later a repeat tilt test was negative. She did not have any further syncope or presyncope in a follow up period of 14 months.

CASE 2

A 54 year old man had a syncopal episode without warning when getting up from a chair. He had two further episodes of presyncope while lying down in hospital two hours later. The physical examination, ECG, and exercise test were normal. A tilt test was performed and at 50 seconds it provoked sudden syncope and

an asystolic pause of 26 seconds. He was started on disopyramide, 100 mg three times a day; tilt test was repeated and it was positive at 17 minutes with presyncope and hypotension (98/75 mm Hg), but only modest bradycardia (55 beats/min). Disopyramide was increased to 250 mg twice a day and in 38 months of follow up he was free from symptoms.

CASE 3

A 72 year old woman presented with a five year history of recurrent syncope occurring about once a week. The episodes were preceded by lightheadedness and once resulted in head injury. Physical examination was normal. The ECG, echocardiogram, and x ray of the cervical spine were normal. A 48 hour tape showed asymptomatic episodes of bradycardia at 41 beats/min. She underwent a tilt test and at four minutes she developed abrupt syncope. The ECG showed asystole for 30 seconds, followed by complete atrioventricular block. She was returned to supine position and 0.6 mg of atropine was given, after which she recovered completely. Metoprolol, 25 mg three times a day, was prescribed and she remained asymptomatic for the following 15 months.

CASE 4

A 20 year old woman gave a 10 year history of recurrent syncope occurring almost daily, preceded by nausea and vertigo and associated with occasional incontinence. Physical examination was normal apart from a soft systolic murmur. Her electrocardiogram showed non-specific T changes; a 24 hour tape was normal and an echocardiogram showed mild mitral regurgitation. The tilt table test was positive, producing a 48 second asystolic pause at 40 minutes of head upright position, associated with incontinence. Cardiopulmonary resuscitation was started and the patient resumed sinus rhythm a few seconds later and regained consciousness. She was started on disopyramide, 250 mg twice a day, and after 13 months she still suffers infrequent presyncopal episodes but she has not had any further syncope.

Discussion

There is limited knowledge about the natural history of recurrent syncope although a documented non-cardiac cause as well as a normal

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electrophysiological study are associated with reduced morbidity.¹⁻³ Kapoor *et al* reported a morbidity of 5% and an injury rate of 7% in a mean follow up period of 30 months in the general population of patients with recurrent syncope, but the mortality rate was markedly lower in patients with a non-cardiovascular cause, or syncope of unknown origin.¹ Vasovagal syndrome is believed to carry a good prognosis, although less is known about patients who are severely symptomatic, whose condition has been termed "malignant".⁴

Neurocardiogenic syncope incorporates a number of syndromes, including the vasovagal syndrome, which all have a common efferent limb of the reflex arch resulting in withdrawal of sympathetic stimulation and increase in vagal tone. The clinical response generally follows one of three patterns: (1) primarily vasodepressor with symptomatic hypotension, (2) primarily cardioinhibitory with bradycardia or even asystole, and (3) a combination of both. All these changes can be observed during head up tilt testing. Although hypotension is almost invariably present to some degree, it is usually the marked bradycardia or asystole that causes medical concern, raising questions about its prognostic significance. Such concerns are well founded given that bradyarrhythmias are an infrequent but well recognised mode of sudden cardiac death.⁵ Severe bradycardia, as well as prolonged asystole with collapse, has been reported in apparently healthy individuals during or after strenuous exercise⁶ and in an endurance athlete before exercise.⁷ Milstein *et al*⁸ have proposed that life threatening cardiac asystole may occur in patients with the malignant form of neurocardiogenic syncope and that this possibility should be considered when studying survivors of sudden death. In their study, all six survivors of suspected asystolic arrest with normal conventional baseline electrophysiological evaluation developed syncope during upright tilt provocation, with pauses of 16 and 20 seconds in two of them. Interestingly, the electrophysiological and haemodynamic findings during tilt, even though markedly different from control subjects, were indistinguishable from those of other patients presenting with the self limiting form of syncope. Others looking at a different population of patients with possible neurocardiogenic syncope found that bradycardia and asystole occurred in up to 15% of patients undergoing tilt testing, with one of the asystolic pauses lasting for 73 seconds.^{9,10} Brignole *et al*, in a non-randomised trial,¹¹ studied 12 treated patients with tilt induced mean (SD) asystolic pauses of 7.5 (5.9) seconds (range 3 to 21) for an average period of 17 (14) months and concluded that the clinical outcome in terms of recurrences and untoward events was comparable to the patients with syncope but no asystole, and was benign overall. This was supported further by the results reported by Dhala *et al*, who followed 19 patients with mean asystole of 15.1 (10.5) seconds (range 5 to 39) on tilt testing, who were treated pharmacologically for an average of 2.1 (1.4)

years.¹² Overall the recurrence of symptoms in this group was similar to that in patients who did not have an asystolic response during tilt testing.

It is now well accepted that in the large majority of patients the onset of bradycardia is consistently preceded by hypotension.¹³ Fitzpatrick *et al* found that dual chamber pacing ameliorated or even aborted symptoms in repeated tilt tests.¹⁴ However, despite the intrinsic logic of preventing the bradycardia or asystole with pacing, no clear advantage has been shown over pharmacological agents in preventing syncope; in a comparison of pharmacological treatment with artificial pacing in 22 patients, Sra *et al*¹³ showed that dual chamber pacing did not prevent hypotension and syncope or presyncope, even though they confirmed that hypotension was less severe during pacing. They concluded that pharmacological treatment was as effective as pacing. While Sra *et al* did not specifically study patients with asystolic pauses, a subsequent study by Dhala *et al* did so and concluded that pharmacological treatment is effective in patients with asystole.¹² Even though there is no unanimous agreement with respect to the indications for permanent pacing, there appears to be a consensus that if a decision in favour of pacemaker implantation is finally made, the method of choice is atrioventricular sequential pacing with rate hysteresis.¹⁵

We report our experience in the management of four patients who had a prolonged asystolic response, from an experience of over 400 who have undergone tilt table testing. All our patients were treated with pharmacological agents. During follow up, no major events occurred and symptoms were well controlled. In the light of our experience and the data presented, patients with prolonged asystole during tilt testing have a good prognosis and should initially be treated pharmacologically. Only if this fails should dual chamber pacing be considered.

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