Published in final edited form as:

Eur J Cardiovasc Med. 2011 February 1; 1(3): 22–23. doi:10.5083/ejcm.20424884.22.

Malign Asystole During Head-up Tilt Test: A Case Report and Overview

Yahya Islamoglu, MD¹, Musa Cakici, MD², Hayri Alici, MD², and Vedat Davutoglu, MD²

¹ Cardiology Department, Dicle University, School of Medicine. Diyarbakir, Turkey

² Cardiology Department, Gaziantep University, School of Medicine. Gaziantep, Turkey

Keywords

Cor triatriatum sinister; adulthood; three dimensional echocardiography

INTRODUCTION

The head-up tilt (HUT) test is a standard diagnostic test that is widely accepted in the evaluation of patients with recurrent syncope of unknown etiology. Prolonged asystole during the HUT test is rarely encountered in patients with neurocardiogenic syncope. The incidence of prolonged asystole in patients with neurocardiogenic syncope is 18% (>3 seconds) and 9.1% (>5 seconds) ^(1–3). According to our knowledge, there have been few reports related to prolonged asystole longer than 30 seconds during the HUT test ^(4–8). Asystole lasting for approximately 30 seconds during a HUT test was observed in the present case, which was presented due to its rarity, and we review the importance and prognostic significance of prolonged asystole during HUT.

CASE REPORT

A 37-year-old female patient was admitted to our clinic with seven episodes of syncopal attacks within the last year. All syncope attacks had occurred while standing for a long time and each lasted for two to three minutes. She described no prodromal symptoms prior to the syncopal attacks. She did not experience any muscle contractions or urinary incontinence during syncope. Her medical history was unremarkable.

Her family history did not reveal sudden death or syncopal attacks. Her physical examination, chest radiography, electrocardiography, complete blood count, thyroid function, serum electrolyte levels, echocardiography, exercise test and neurologic examination were normal. Thus, it was decided that the HUT test should be performed. Prior to performing a HUT test, her blood pressure was 110/70 mmHg and the heart rate was 80/minute. The HUT test was performed at an angle of 75°, and nitroglycerin was administered sublingually at the 30th minute of the test. Three minutes later, asystole occurred following hypotension and bradycardia.

The HUT test was immediately terminated and intravenous administration of atropine was commenced. After a 30-second asystole, the patient returned to normal sinus rhythm (Figure 1).

For treatment, lifestyle changes including not standing in the upright position for a long time, crossing legs while sitting, a moderate increase in salt intake, increasing liquid intake, laying down, if possible, in case of dizziness while standing in the upright position, or if not possible, contracting and relaxing the calf muscles several times, and avoiding diuretics or medications that would lead to orthostatic hypotension were recommended to the patient.

The patient had no recurrent syncopal attacks in the course of a one-year outpatient clinic follow-up. She was successfully treated with these simple recommendations alone.

DISCUSSION

The present case was admitted to our clinic with recurrent syncopal attacks. Asystole lasting for 30 seconds occurred after the administration of sublingual nitroglycerin on the 30th minute during the HUT test. Prolonged asystole during the HUT test is rare and prognostically may lead to misleadingly aggressive approach; however, to date it has been demonstrated that prolonged asystole does not necessarily imply or mean a prognostically malign outcome and recurrence.

The pathophysiologic mechanism underlying asystole that occurs during the HUT test is still controversial. The most assumed hypothesis is as follows: passive orthostatism during HUT testing the abnormal reflex is triggered and leads to activation of the ventricular mechanoreceptors which cause a forceful contraction of the heart and consequently increased sympathetic tone results in the sudden withdrawal of the adrenergic drive which leads to vasovagal reflex reaction including vasodepression or cardioinhibition^(9,10).

To date there are scarce reports related to prolonged asystole during the HUT test^(6,11–14). The mean incidence of a tilt-induced asystole ranges from 4% to 33%⁽¹⁴⁾.

The incidence was higher during nitrate provocation. The longest reported asystole were 73 seconds⁽⁶⁾ and 70 seconds during HUT test⁽⁷⁾. Patients with prolonged asystole during HUT testing were younger rather than elderly patients⁽¹⁴⁾. To date, among those patients with prolonged asystole during HUT test, there are no reports of major cardiac consequences, including important trauma, cardiopulmonary resuscitation or sudden death after initial evaluation^(6,12,13). Thus, prolonged asystole does not mean or imply recurrence of syncope or malignant consequences according to the reports of relevant studies^(7,14). In accordance with those studies, we did not observe recurrent syncope or major cardiac event in our case during long term follow-up.

The treatment of patients with neurocardiogenic syncope should be recommended to avoid predisposing factors and simple lifestyle changes. The majority of patients with prominent asystole during a HUT test respond well to simple lifestyle changes and non-pharmacologic approaches⁽¹⁵⁾. In the present case, the treatment method was simple lifestyle changes alone, and the patient was treated successfully.

Pharmacologic agents used in the treatment of neurocardiogenic syncope are generally preferred for the patients with recurrent syncope. Fludrocortisones, serotonin reuptake inhibitors and midodrine are the most commonly used agents⁽¹⁶⁾. It has been reported that pacemaker or drug therapy does not significantly influence outcome in patients with prolonged asystole during a HUT test^(7,14). Moreover, development of asystole during the HUT test is not considered as an absolute criterion for pacemaker implantation.

Generally observing prolonged asystole during the HUT test misleadingly leads to consideration of pacemaker implantation; however, to date there are no studies revealing the role of pacemaker implantation in those patients. Finally, aggressive treatment with

pacemakers should not represent the standard therapy of tilt-induced asystole^(7,14), but should be individualised only for selected cases.

In summary, prolonged asystole observed during HUT testing is not indicative of more advanced disease or major cardiac events. A malignant HUT test does not imply a malignant outcome. It is recommended that the patients should be informed about simple, low-cost and effective methods, and that clinicians have to make considerable effort in educating such patients.

References

1. Dhala A, Natale A, Sra J, Desphande S, Blanck Z, Jazayeri MR, et al. Relevance of asystole during head-up tilt testing. *Am J Cardiol.* 1995; 75:251–254. [PubMed: 7832133]
2. Brignole M, Menozzi C, Gianfranchi L, Bottoni N, Lolli G. The clinical and prognostic significance of the asystolic response during head-up tilt test. *Eu:J Cardiac Pacing Electrophysiol.* 1992; 2:109–113.
3. Sucu M, Sari I, Davutoglu V. A case of prolonged asystole during head-up tilt testing. *Arch Turk Soc Cardiol.* 2009; 5:345–347.
4. Pentousis D, Cooper JP, Cobbe SM. Prolonged asystole induced by head-up tilt test. Report of four cases and brief review of the prognostic significance and medical management. *Heart.* 1997; 77:273–275. [PubMed: 9093049]
5. Van Dijk N, Velzeboer SC, Destree-Vonk A, Linzer M, Wieling W. Psychological treatment of malignant vasovagal syncope due to bloodphobia. *Pacing Clin Electrophysiol.* 2001; 24:122–124. [PubMed: 11227958]
6. Maloney JD, Jaeger FJ, Fouad-Tarazi FM, Morris HH. Malignant vasovagal syncope: prolonged asystole provoked by head-up tilt. Case report and review of diagnosis, pathophysiology, and therapy. *Cleve Clin J Med.* 1988; 55:542–548. [PubMed: 3067910]
7. Baron-Esquivias G, Pedrote A, Cayuela A, Vale JI, Fernandez JM, Arana E, et al. Long-term outcome of patients with asystole induced by head-up tilt test. *Eur Heart J.* 2002; 23:483–489. [PubMed: 11863351]
8. Leftheriotis DI, Theodorakis GN, Kremastinos DT. Prolonged asystole during head-up tilt testing with cloimipramine infusion. *Europace.* 2003; 5:313–315. [PubMed: 12842650]
9. Epstein S, Beiser G, Stampfer M, Braunwald E. Role of the venous system in baroreceptor mediated reflexes in man. *J Clin Invest.* 1968; 47:139–152. [PubMed: 16695936]
10. Thoren P. The role of cardiac C fibers in cardiovascular control. *Rev Physiol Biochem Pharmacol.* 1979; 86:1–94. [PubMed: 386467]
11. Milstein S, Buetikofer J, Lesser J, et al. Cardiac asystole: A manifestation of neurally mediated hypotension-bradycardia. *J Am Coll Cardiol.* 1989; 14:1626–1632. [PubMed: 2685076]
12. Folino A, Buja GF, Martini B, Miorelli M, Nava A. Prolonged cardiac arrest and complete AV block during upright tilt test in young patients with syncope of unknown origin prognostic and therapeutic implications. *Eur Heart J.* 1992; 13:1416–1421. [PubMed: 1396818]
13. Natale A, Beheiry S, Wase A, et al. Occurrence of clinical asystole in patients without evidence of structural heart disease: response to tilt test and follow-up. *Circulation.* 1999; 100:I–245.
14. Raviele A. Tilt-induced asystole: a useful prognostic marker or clinically irrelevant finding? *European Heart Journal.* 2002; 23:433–437. [PubMed: 11863344]
15. Sheldon R, Rose S, Flanagan P, Koshman ML, Killam S. Risk factors for syncope recurrence after a positive tilt table test in patient with syncope. *Circulation.* 1996; 93:973. [PubMed: 8598089]
16. Atiga W, Rowe P, Calkins H. Management of vasovagal syncope. *J Cardiovasc Electrophysiol.* 1999; 10:874. [PubMed: 10376927]

Figure 1.
Electrocardiogram of asystole occurring at the 30th minute during the HUT test and lasting for 30 seconds.