

Paroxysmal Atrioventricular Block by the Triggering of Vagal Stimulus with Recurrent Syncopal Episodes

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SUMMARY

Paroxysmal complete atrioventricular block (CAVB) with normal electrocardiogram at rest is uncommon. A 34 year-old two month-pregnant woman consulted for recurrent syncope. After screening assessment with electrocardiogram, cardiac echo-Doppler, tilt test, electroencephalogram, brain computerized tomography and magnetic resonance imaging, cardiopathy was ruled out and a diagnosis of neurocardiogenic syncope was made. As symptoms persisted, a 5 day-Holter monitoring was performed until she presented a new episode of syncope and paroxysmal CAVB was diagnosed. A definite VDD pacemaker was implanted and six months later she remained free of symptoms.

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Key words >

Paroxysmal Complete Atrioventricular Block - Syncope - Pacemaker

Abbreviations >

CAVB Complete atrioventricular block
ECG Electrocardiogram

MRI Magnetic resonance imaging
CT Computed tomography

CASE DESCRIPTION

A 34 year-old two month-pregnant woman was admitted for 40 episodes of recurrent syncope within the last 8 months. The episodes occurred under different circumstances, during the day or at night, and generally at rest; some episodes took place after standing for long periods in poorly ventilated indoor places, though sometimes they were related to stressful situations. All episodes were always preceded by prodromes (dizziness) and followed by post-ictal fatigue described by the patient as “a great tension and tiredness”. Urinary incontinence was present in almost all episodes. As some witnesses had reported the presence of tonic rigidity in some occasions, neurological causes had to be ruled out. The patient was referred to a tertiary center where screening assessment was performed with computed tomography scan of the brain and brain magnetic resonance imaging, electroencephalogram, electrocardiogram, cardiac echo-Doppler and tilt test. The results of all these studies were informed as normal; nevertheless, she presented hypotension, bradycardia and dizziness during the tilt test. The Doppler echocardiogram was repeated at another Echocardiography Laboratory with similar results. A diagnosis of neurocardiogenic syncope was made and counseling was provided to prevent adverse outcomes, with a relative success. Nevertheless, as the patient remained symptomatic, especially at night, she made a medical consultation with our Department.

She had no history of coronary risk factors, cardiovascular disease or family history of heart disease. She was not under treatment and her pregnancy was free of obstetric complications. Curiously, the condition coin-

ceded with the insertion of a hearing aid due to hypoacusis. However, the withdrawal of the device two months after the onset of symptoms produced no changes. Cardiovascular examination and basal ECG were normal (Figure 1). During a 24-hour Holter monitoring the patient remained asymptomatic and no rhythm disturbances were observed. Subsequently, a Holter monitoring was performed during 5 consecutive days until she presented a new episode of syncope. The study showed a complete atrioventricular block (CAVB) with a 15-second long asystole during which the atrial sinus rhythm had a heart rate of 55 bpm; progressive recovery of atrioventricular conduction with complete normalization was achieved in 20 seconds (Figure 2). A diagnosis of paroxysmal complete atrioventricular block was made and a definite VDD pacemaker was implanted at week 14 of pregnancy with abdominal lead shielding. No adverse outcomes were observed. Five months after the procedure, the patient remained free of symptoms.

DISCUSSION

The assessment of a patient with syncope is focused on determining the risk of death. (1) Mortality rates range from 20-30% per year in patients with heart disease to 5-10% per year in those without cardiopathy. (2) History, questioning patient's witnesses, physical examination and ECG are helpful to determine the etiology in less than 60% of cases. (3) The presence of prodromes, the relationship of syncope with standing during long periods and its association with nausea or vomiting are suggestive of a neuro-cardiogenic etiology and rule out

the probability of cardiac causes. The absence of an underlying heart disease also excludes a cardiac etiology. (4) A risk score which might predict arrhythmias in patients with unexplained syncope with findings at admission has been published. In patients < 65 years old, without heart failure and with a normal rest ECG the probability of an arrhythmic cause of syncope was <6%. (5) These high-risk parameters were not present in this case report. On the other hand, neurocardiogenic syncope may be prevented by certain maneuvers such as leg crossing and muscle tensing, and hand grip. (6) In our patient, the use preventive movements had a partial success in controlling few episodes. Although the clinical picture, the results of the complementary studies and the response to preventive maneuvers were suggestive of neurocardiogenic syncope, we found it necessary to perform a Holter monitoring until the advent of syncope based on two particular issues: 1) the sudden onset of symptoms in the previous 8 months, and the high

frequency of syncopal episodes, and 2) the presence of hypoacusis and syncope; these findings made it necessary to rule out long-QT syndrome. In patients with a genetic diagnosis of long-QT syndrome, 12% to 30% may have a normal rest ECG. (7) We decided to perform a Holter monitoring until the advent of a new syncopal episode based on the impossibility to carry out pharmacological maneuvers and the high frequency of the episodes (more than 18 episodes in 6 months). (8) Although an external Loop Recorder might be indicated in this case, this technology is not available in our environment and, instead, a 24-hour Holter monitoring was performed practically continuously during more than 5 days until the advent of a new syncope.

Paroxysmal CAVB with basal normal ECG is an infrequent condition. The atrial rate < 60 bpm during CAVB suggests triggering of strong vagal stimulation (Figure 3). The vague nerve innervates the sinus node, the atrial muscle and the AV node and de-

Fig. 1. Rest electrocardiogram

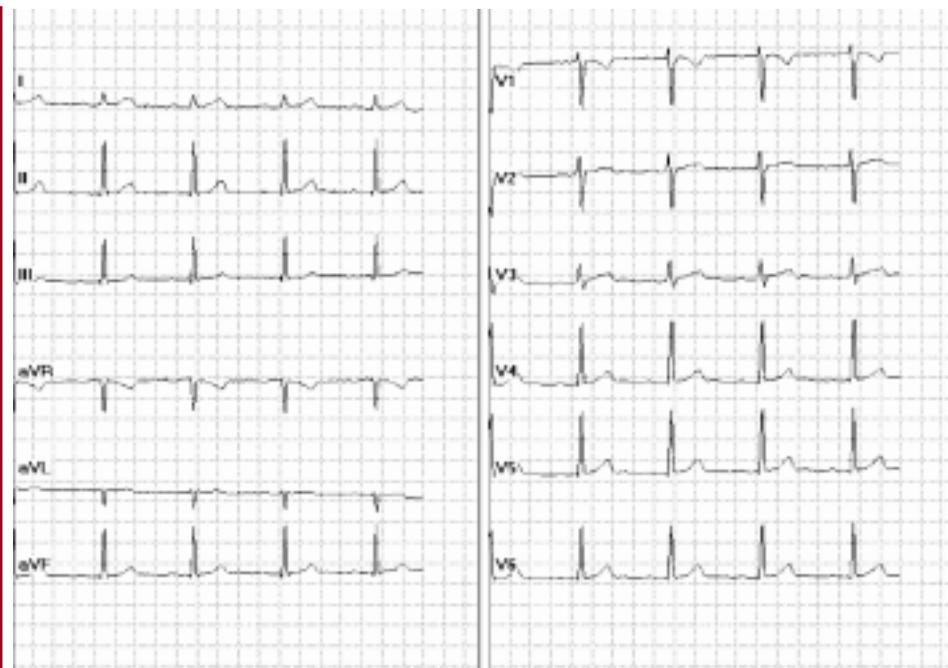


Fig. 2. Holter record during syncope, showing complete AV block with progressive recovery of AV function and normal AV conduction 20 seconds after the episode.



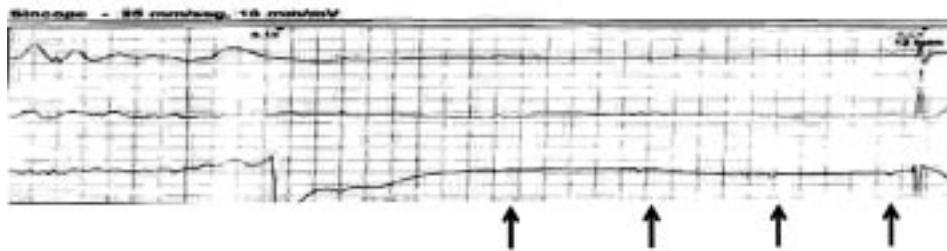


Fig. 3. Detail of the last seconds of complete AV block and the first beat normally conducted; slow sinus rhythm is appreciated during AV block.

presses AV conduction with no effect on ventricular conduction. These episodes have been associated with an exaggerated response of the AV node to vagal stimulus. (9) In addition, bradycardia-dependent paroxysmal AVB is secondary to hypopolarization with spontaneous diastolic depolarization. (10)

A definite pacemaker was implanted according to the ACC guidelines for the management of symptomatic complete AVB. (11) Although these recommendations suggest implanting a DDD pacemaker in neurocardiogenic syncope, in this particular case we prioritized a VDD pacemaker as the implant of this stimulation mode is faster. The National Council on Radiation Protection in USA published that a cumulative effective dose to the fetus of less than 50 millisieverts (5 rem) is not associated with any increased carcinogenic and teratogenic risks if the exposure takes place after 8 weeks of pregnancy. (12)

RESUMEN

El bloqueo auriculoventricular completo (BAVC) paroxístico con ECG de reposo normal es una entidad poco frecuente. Se presenta el caso de una paciente de 34 años que cursaba el segundo mes de embarazo y consultó por cuadros sincopales recurrentes. Luego de ser evaluada con ECG, eco-Doppler cardíaco, *tilt test*, estudio electroencefalográfico, TAC y RM de cerebro se descartó cardiopatía de base y se interpretó que se trataba de síncope neurocardiogénico. Por persistencia de los síntomas se realizó un Holter de 5 días hasta que presentó un nuevo síncope y se arribó al diagnóstico de BAVC paroxístico. Se indicó un marcapasos definitivo VDD y seis meses después persistía asintomática.

Palabras clave > Bloqueo auriculoventricular completo paroxístico - Síncope - Marcapasos

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BIBLIOGRAPHY

1. Strickberger SA, Benson DW, Biaggioni I, Callans DJ, Cohen MI, Ellenbogen KA, et al; American Heart Association Councils on Clinical

Cardiology, Cardiovascular Nursing, Cardiovascular Disease in the Young, and Stroke; Quality of Care and Outcomes Research Interdisciplinary Working Group; American College of Cardiology Foundation; Heart Rhythm Society. AHA/ACCF scientific statement on the evaluation of syncope: from the American Heart Association Councils on Clinical Cardiology, Cardiovascular Nursing, Cardiovascular Disease in the Young, and Stroke, and the Quality of Care and Outcomes Research Interdisciplinary Working Group; and the American College of Cardiology Foundation In Collaboration With the Heart Rhythm Society. *J Am Coll Cardiol* 2006;47:473-84.

2. White CM, Tsikouris JP. A review of pathophysiology and therapy of patients with vasovagal syncope. *Pharmacotherapy* 2000;20:158-65.

3. Linzer M, Yang EH, Estes NA 3rd, Wang P, Vorperian VR, Kapoor WN. Diagnosing syncope. Part 1: Value of history, physical examination, and electrocardiography. Clinical Efficacy Assessment Project of the American College of Physicians. *Ann Intern Med* 1997;126:989-96.

4. Alboni P, Brignole M, Menozzi C, Raviele A, Del Rosso A, Dinelli M, et al. Diagnostic value of history in patients with syncope with or without heart disease. *J Am Coll Cardiol* 2001;37:1921-8.

5. Krediet CT, van Dijk N, Linzer M, van Lieshout JJ, Wieling W. Management of vasovagal syncope: controlling or aborting faints by leg crossing and muscle tensing. *Circulation* 2002;106:1684-9.

6. Sarasin FP, Hanusa BH, Perneger T, Louis-Simonet M, Rajeswaran A, Kapoor WN. A risk score to predict arrhythmias in patients with unexplained syncope. *Acad Emerg Med* 2003;10:1312-7.

7. Vetter VL. Clues or miscues? How to make the right interpretation and correctly diagnose long-QT syndrome. *Circulation* 2007;115:2595-8.

8. Brignole M, Alboni P, Benditt DG, Bergfeldt L, Blanc JJ, Thomsen PE, et al; Task Force on Syncope, European Society of Cardiology. Guidelines on management (diagnosis and treatment) of syncope-update 2004. Executive Summary. *Eur Heart J* 2004;25:2054-72.

9. Strasberg B, Lam W, Swiryn S, Bauernfeind R, Scagliotti D, Palileo E, et al. Symptomatic spontaneous paroxysmal AV nodal block due to localized hyperresponsiveness of the AV node to vagotonic reflexes. *Am Heart J* 1982;103:795-801.

10. Rosenbaum MB, Elizari MV, Levi RJ, Nau GJ. Paroxysmal atrioventricular block related to hypopolarization and spontaneous diastolic depolarization. *Chest* 1973;63:678-88.

11. Gregoratos G, Abrams J, Epstein AE, Freedman RA, Hayes DL, Hlatky MA, et al; American College of Cardiology/American Heart Association Task Force on Practice Guidelines/North American Society for Pacing and Electrophysiology Committee to Update the 1998 Pacemaker Guidelines. ACC/AHA/NASPE 2002 guideline update for implantation of cardiac pacemakers and antiarrhythmia devices: summary article: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/NASPE Committee to Update the 1998 Pacemaker Guidelines). *Circulation* 2002;106:2145-61.

12. Lockwood D, Einstein D, Davros W. Diagnostic imaging: radiation dose and patients' concerns. *Cleve Clin J Med* 2006;73:583-6.