

## A Rare Varieties of Diabetic Autonomic Neuropathy: Carotid Sinus Hypersensitivity, Case Report

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### Abstract

Carotid sinus hypersensitivity is a common cause of fainting and falls in older adults and can be diagnosed by carotid sinus massage. We have presented a 67-year-old diabetic male patient who was admitted to our clinic because of hyperglycemia. In thyroid examination, clouding of consciousness occurred with unilateral palpation. Documented 4,8 seconds and undocumented 7 seconds of asystole were detected during the carotid sinus massage. An implantable cardioverter defibrillator was implanted in our patient. Carotid sinus hypersensitivity should be kept in mind in the examination of diabetic patients.

**Key Words:** Carotid sinus hypersensitivity, diabetes mellitus, diabetic autonomic neuropathy

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### Introduction

Carotid sinus reflex plays a central role in the blood pressure homeostasis. Carotid sinus hypersensitivity (CSH) is the exaggeration of baroreflex that is present in healthy individuals which is activated by stimulation of local mechanoreceptors in response to intra-arterial pressure changes. The European Society of Cardiology defined this condition as asystole lasting for at least 3 seconds, or a drop in systolic blood pressure (BP) of at least 50 mmHg, provoked by 5 to 10 seconds of carotid sinus massage (CSM) (1). CSH has been classified as "cardioinhibitory" (asystole >3 s), "vasodepressive" (if systolic arterial pressure (SAP) falls to >50 mmHg), or "mixed" forms (2). Autonomic dysfunction in diabetic patients may lead to CSH. In this paper, we present a patient with CSH due to thyroid palpation during physical examination.

### Case Report

A 67-year-old diabetic male patient was admitted to our clinic with the complaints of polyuria, polydipsia and weight loss. He was hospitalized because of hyperglycemia (480 mg/dL). The patient's history did not reveal any coronary artery disease, cardiac or neurological disorder. On physical examination, heart rate was 72/min, blood pressure was 130/80 mmHg (left arm) and 125/80 mmHg (right arm). In thyroid examination, clouding of consciousness occurred with unilateral palpation. Laboratory results in admission were Hb:10.5 gr/dL, glucose:539 mg/dL, HbA1c:11.4%. 12-lead ECG was normal (figure 1). Unilateral carotid sinus massage was performed with ECG monitoring. Documented 4,8 seconds and undocumented 7 seconds of asystole were detected during the massage (Figure 2). The patient had no postural blood pressure change. His insulin treatment

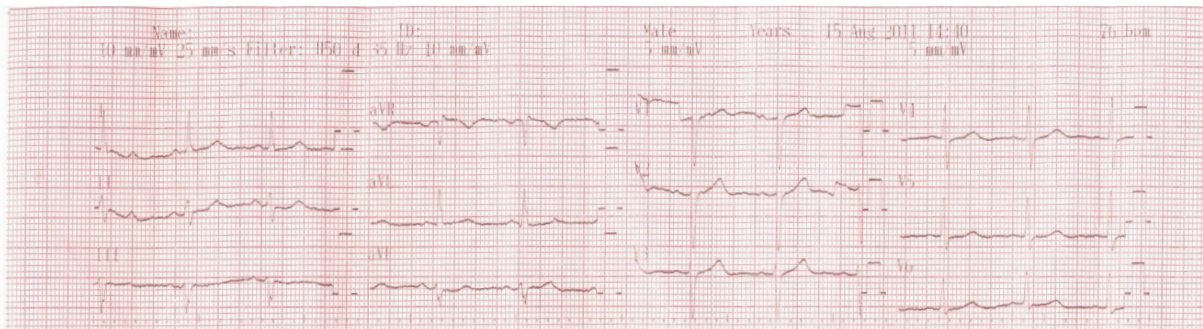


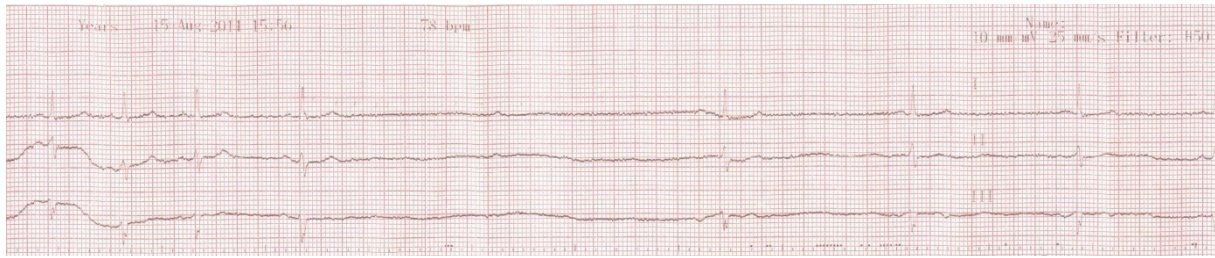
Figure 1. Basal ECG



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**Figure 2.** 4 second asystole after carotid sinus massage.

was regulated. On detailed anamnesis, he had several syncope for 3 years, especially in the barber. He had no use of propranolol, methyldopa or clonidine, which may increase carotid sinus hypersensitivity. Mixed polyneuropathy in electromyography was detected. The patient was referred to the cardiology clinic for further investigation. Nonsustained ventricular tachycardia with a duration of 23 beats was documented at 24-hour ECG Holter monitoring. There was no pause in holter monitoring. An asystole of 8 seconds was detected with carotid sinus massage in the coronary care unit. Coronary angiography was consistent with normal coronary anatomy and the carotid arteries were also normal. An implantable cardioverter defibrillator was implanted. He was discharged with his medication.

## Discussion

Carotid sinus hypersensitivity, is an exaggerated response to carotid baroreceptor stimulation. CSH is a disease of older people, with a prevalence of between 25% and 48% in patients referred to hospital for unexplained syncope, falls or dizziness (1). The incidence increases with age with an average age of onset at 61 to 74 years. Men are more affected than women (2:1). CSH is rarely seen in patients younger than 50 years. CSH is less frequently the result of secondary causes and these may be unheeded. There may be in fact local or regional causes that irritate the area where the carotid sinus reflex begins. Secondary causes of CSH do not include external mechanical stimulation such as shaving or strangulation, since these are considered simply to precipitate an abnormal reflex. In a study by Graux (2) of 246 patients with CSH and mean age of 74 years, it was found that a third had hypertension, 15% had heart failure and 35% had coronary artery disease. Half were taking cardiovascular medication, mainly diuretics. It was also found that a local or regional secondary cause was present in only 1.2% of the patients, while CSH as a result of pharmacological iatrogenic cause was observed in 45% (30% in the pure cardioinhibitory coexist form, 45% mixed and 60% as pure vasodepression). In our

case he had no hypertension, no drug history, but he had uncontrolled type 2 diabetes mellitus.

Brignole et al. followed up 262 patients, identified over a 6-year period who presented with syncope and were found to have CSH as a cause of their symptoms. The follow-up period was between 2 and 8 years. The control group was 55 patients who had unexplained syncope, matched for age and sex. The mortality rate after 5 years was 34% in the CSH group, compared with 27% in the control group. The mortality rate in the CSH group was not influenced by CSH subtype. Similar findings were reported by Sutton et al; the 5-year mortality rate was 36% (3).

Cardiac autonomic neuropathy is a serious complication among diabetic patients. It occurs in both type 1 and type 2 diabetes, and its progression results in poor prognosis and increased mortality. In a randomly selected cohort of asymptomatic individuals with diabetes, 20% had an abnormal cardiovascular autonomic function. Parasympathetic and sympathetic nerve fibers of the cardiovascular system are damaged, resulting in potentially serious cardiac complications and even death. Poor glycemic control is believed to play a pivotal role in the pathogenesis of cardiac autonomic neuropathy. Underlying etiology is not well understood; however, several potential pathologic mechanisms have been identified. Several clinical manifestations of cardiac autonomic neuropathy have been reported, including resting tachycardia, exercise intolerance, loss of heart rate variability, orthostatic hypotension, prolonged QT interval, silent ischemia, and sudden death (4). Parasympathetic damage occurs earlier in the course of diabetes than extracardiac sympathetic activity (5). An overreaction of the carotid sinus baroreceptors stimulated by sympathetic activity may cause CSH in diabetic patients.

In conclusion, CSH may be due to autonomic neuropathy in diabetic patients. CSH may cause serious complications. CSH should be considered in the primary diagnosis in diabetic patients with a history of syncope. Carotid sinus massage may be performed in appropriate circumstances for diagnosis.

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