CASE REPORT

CAROTID SINUS SYNDROME - CASE REPORT

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ABSTRACT

Syncope caused by carotid sinus syndrome due to malignancy of the head and neck is rare. The aim of this paper is an inspection into current knowledge of this syndrome, its clinical characteristics, differential diagnosis and current treatment modalities. We present a case of recurrent syncope resulting from extreme bradycardia based on a malignant process in the neck area that compresses the carotid sinus. To discover the cause of syncope, an extensive diagnosis was made including electrocardiography, 24h holter electrocardiography, computed tomography of the neck, biopsy of the lump on the right side of the neck. In order to perform the biopsy, the patient was implanted with a temporary pacemaker. Pathohistological processing of biopsy showed the existence of squamous cell carcinoma of the neck region. Due to localization of the malignant change, surgical resection was contraindicated, so the patient was treated with radiotherapy. Syncope based on carotid sinus hypersensitivity caused by a malignant process of the neck region is a significant diagnostic challenge for any clinician. Neck tumor is rarely thought of, since its frequency is rare in the general population. The disease is mostly recognized in the advanced stages when episodes of syncope are more frequent.

Keywords: *Carotid sinus syndrome, neck tumor, bradycardia.*

INTRODUCTION

Syncope is defined as a sudden, transient inability of the autonomic nervous system to maintain adequate blood pressure necessary for cerebral perfusion despite gravity. Although it is a relatively benign condition, it can be caused by a number of disorders in the body that are sometimes difficult to diagnose (1). The differential diagnosis is extensive, and the treatment largely depends on the underlying disorder. Carotid sinus is an enlargement in the bifurcation of the great arteries of the neck that plays a significant role in maintaining of systemic blood pressure, and carotid sinus syndrome (CSS) is a type of neuro-cardiogenic syncope in which minimal pressure on the carotid sinus leads to peripheral vasodilation and/or bradycardia (2,3). Syncope caused by carotid sinus syndrome due to the presence of head or neck tumor is very rare, and this disorder is often not recognized in milder forms (4). CSS accounts for 1% of syncope cases, among these, head and neck tumors are rare (<1/250) (2). Head and neck malignancies are not widely recognized as causes of syncope and therefore the diagnosis of recurrent or primary malignancy in this group of patients is often elusive (5). It is found in elderly patients, with a predominance in males, and often includes extensive cervical lymphadenopathy (6). Computed tomography is the most effective tool in mapping and evaluating tumor changes in the neck (7). In order to treat syncopal episodes of this etiology, it is sometimes necessary to implant a temporary or permanent pacemaker (2). Radiotherapy plays a key role in the treatment of these conditions, either as monotherapy or in combination with surgical resection or chemotherapy (8).

CASE REPORT

A 71-year-old man was hospitalized at the Cardiology Clinic of University Clinical Center Kragujevac in April 2022, due to repeated loss of consciousness, which was accompanied by a slowing of the heart rate and a drop in blood pressure. Anamnestic data showed that he had lost consciousness at home in a sitting position ten days before being hospitalized, and that eight months ago he noticed a lump on the right side of the neck that was gradually increasing. During the observation in the admission department, the patient has lost consciousness while walking, in that moment heart rate of 43 beats per minute was registered on the electrocardiography tape (ECG) (Figure 1). The patient was hospitalized in the department for heart rhythm disorders for additional diagnostics. 24h holter ECG monitoring showed episodes of sinus bradycardia (Figure 2), subsequent analysis showed that these episodes coincided with changes in body position as well as periods when the patient had a meal, which raised suspicion that the described neck mass may compress the carotid sinus. Computed tomography (CT) of the neck was performed, on which a tumor change located right prevertebrally, retro and lateropharyngeally was described. Tumor envelops the right common carotid artery and jugular vein (Figure 3). In addition, jugular vein thrombosis was observed, as well as right-sided cervical lymphadenopathy, the size of the largest lymph node is 24x27 mm. It was concluded that the described change causes a cardioinhibitory and vasodepressor response by pressing the carotid sinus. An ENT specialist was consulted, who indicated an examination of the larynx under a microscope in general anesthesia (directoscopy) with a biopsy of the tumor change, but as it was estimated that the cardiac operative risk was high, a temporary pacemaker was placed before the intervention. Subsequent pathohistological analysis of biopsy showed poorly differentiated squamous cell carcinoma. Patient was presented to the council of oncologists and oncological surgeons. Decision was made that further treatment should be continued with the use of external beam radiation therapy, because tumor is inoperable due to its localization, regional expansion and involvement of the common carotid artery. Thirty cycles of radiation therapy were planned, but the patient stopped radiation therapy on his own initiative after 22 cycles due to worsening of his general condition. The severe general condition eventually resulted in patient`s death.

DISCUSSION

Through this review, we have presented a rare case of recurrent syncope caused by compression of the right carotid sinus by tumor mass. Carotid sinus hypersensitivity was first described 65 years ago, and is an important and often undiagnosed cause of syncope, especially in the elderly population. The pathophysiological mechanisms involved in syncope-associated CSS are complex and insufficiently studied (9). Establishing an adequate diagnosis for the causal mechanism of syncope is still a medical challenge and requires numerous medical tests to rule out possible causes (10). Precipitating factors such as neck hyperextension, constrictive clothing, cough, and sneezing were not present in our patient. The literature states that although stimulation of both carotid sinuses causes a decrease in frequency, stimulation of the left carotid sinus was associated with third-degree atrioventricular block, while stimulation of the right carotid sinus led to sinus bradycardia. Asystole was more common with right carotid sinus stimulation (2). In our case, stimulation of the right carotid sinus resulted in sinus bradycardia and syncope. Neoplastic invasion and compression of the carotid sinus as a cause of syncope is a rare situation. The exact mechanism is not clear, but it is assumed that the invasion of the carotid sinus by neoplastic cells causes its dysfunction, and the presence of tumor mass causes direct compression and syncope (11). The response of the carotid sinus to stimulation is higher in men (4: 1), as well as the degree of decrease in heart rate, especially in patients with atherosclerotic heart disease and hypertension (12). CSS is a poor prognostic factor due to the associated higher stage of malignant disease, as in our patient (13). Definitive treatment consists of surgical removal of the tumor responsible for compression of the carotid sinus, when that is possible (2).



Figure 1. Synus bradycardia on admission ECG

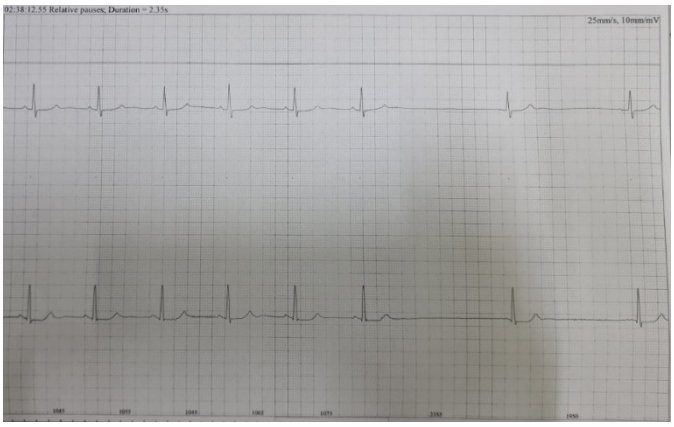


Figure *2.* Holter ECG showing bradycardia when changing head position

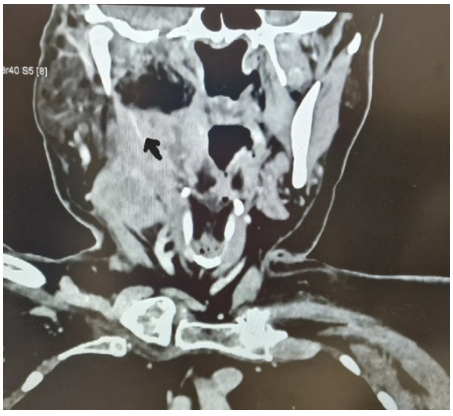


Figure 3. Neck CT showing compression on carotid sinus

CONCLUSION

In patients with unexplained syncope or seizure-like episodes and a background of head and neck cancer, clinicians should consider the diagnosis of CSS. In our case, since complete surgical resection was not possible due to the communication of the tumor with the large blood vessels of the neck, based on the decision of the medical council, radiotherapy was proposed as the safest option. The prognosis of these patients is generally poor because the development of carotid sinus syndrome is ,itself, a sign of advanced malignant disease.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was conducted in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national) and the Helsinki Declaration of 1975, as revised in 2013. Informed consent was obtained from the patient.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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None.

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