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Refractory Syncope with Head Rotation Leading to the Diagnosis of Bowhunter's Syndrome Requiring Intensive Rehabilitation: A Case Report

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ABSTRACT

This is a case report regarding the presentation of Bowhunter's syndrome, also known as vertebral artery rotational occlusion, leading to surgical intervention and intensive rehabilitation [1]. A 74-year-old man presented with syncope and vertigo with symptom onset after head rotation and CT angiogram showing cervical spondylosis and lateral mass hypertrophy causing significant compression of the right vertebral artery at C4-C5. A diagnostic cerebral angiogram then showed vertebral artery compression in the C4-C5 transverse foramen by lateral mass hypertrophy with lateral rotation of the head to the right. There was resolution of stenosis with the head in neutral or rotated to the left. The patient underwent a right C4-5 facetectomy with C3-6 fusion for Bowhunter's Syndrome. After neurosurgical intervention, the patient had significant reduction in his symptoms, but with significant functional deficits. Bowhunter's Syndrome is a rare cause of syncope that must be evaluated due to risk of ischemia to the posterior circulation. Intensive rehabilitation should be considered for patients that present with significant deficits due to prolonged ischemia leading to impaired activities of daily living and mobility after neurosurgical decompression.

Introduction

Rotational vertebral artery compression, or Bow Hunter's syndrome, is due to the occlusion of the vertebral artery with head movements leading to vertebrobasilar insufficiency. This occlusion typically occurs due to ligamentous bands, cervical instability, osteophytes, and anatomic vessel variations [1]. Vertebrobasilar insufficiency can present with a multitude of symptoms including dizziness, vertigo, syncope, visual disturbance, ataxia, Wallenberg syndrome, Horner syndrome, etc. Depending on the severity, patients may become pre-syncopal, lose consciousness, and/or have an ischemic event. Diagnosis is usually made by digital subtraction angiography, a fluoroscopic technique that emphasizes the vasculature while digitally removing the bones [2,9]. Treatment options range from conservative management with minimal head movements, surgical intervention with decompression, and endovascular stent placement [1].

Patient History

A 74-year-old man with history of hypertension, diabetes and holosystolic murmur presented with head trauma due to syncope in the setting of diarrhea and alcohol use. Initially, the etiology for his syncopal event was thought to be orthostatic due to hypovolemia in the setting of diarrhea, chronic alcohol use, as well as anemia requiring blood transfusions. A cardiac work-up including transthoracic echo, ECG, and troponins was negative for any other significant abnormalities. Patient further complained of vertigo and dizziness with lateral neck rotation. CT angiogram was performed showing cervical spondylosis and lateral mass hypertrophy and arthropathy specifically affecting the transverse foramen on the right at C4-C5 causing significant compression of the right vertebral artery. Patient was evaluated by neurosurgery with recommendations to get a diagnostic cerebral angiogram. The diagnostic cerebral angiogram revealed rotational vertebrobasilar insufficiency secondary to significant stenosis of the right V2 foraminal segment of the vertebral artery at C4-C5 level measuring 65% with patient's head rotated to the right and extended with resolution of stenosis in neutral position with the head rotated to the left. His findings were consistent with Bow Hunter's syndrome. Patient was then taken for C4-C5 right facetectomy and C3-C6 fusion.

Results

Postoperatively, the patient's complaints of syncope, dizziness and vertigo resolved. On repeat CT angiogram, there were no vascular abnormalities. Patient initially presented to the hospital independent with ambulation and activities of daily living. After surgical decompression, patient had significant functional decline and was a good candidate for acute inpatient rehabilitation. He was requiring moderate assistance in therapy with upper body and lower body dressing, moderate assistance with transfers and minimal assistance for ambulation with rolling walker. After completion of his intensive inpatient rehabilitation, he was able to ambulate independently and was independent with activities of daily living at 2 months follow-up.

Discussion

Bow Hunter's syndrome is a rare source of posterior circulation ischemia resulting from vertebral artery obstruction. It is usually the result of a hypertrophic osteophyte or thickening of a fibrous band resulting in insufficiency of the dominant vertebral artery [3,4]. Anatomically, the left vertebral artery is larger than the right and is responsible for a greater extent of posterior circulation blood flow [5]. There have been numerous causes identified as the initial event such as surgical intervention with fixation, subluxation secondary to autoimmune diseases like rheumatoid arthritis, chiropractic manipulation, and cervical spondylosis [6]. Bowhunter's syndrome clinically can result in Wallenberg Syndrome, but the more common presentation is transient ischemic episodes [5].

The preferred diagnostic imaging for Bow Hunter's syndrome is dynamic arteriography with provocative maneuvers [2,9]. This imaging modality allows detection of blood flow impairments during head movements [3]. Oftentimes, surgical intervention consisting of decompression is

necessary due to difficulties with conservative measures of immobilizing head rotation [7,8].

An important consideration after surgical correction is the residual functional status of the patient. In the setting of refractory syncope, it is imperative to get a thorough history as shown in this presentation. Given the multitude of more common etiologies for this patient's symptoms, history and supportive imaging were crucial in confirming the diagnosis. Due to the nature of the syndrome, it is important to perform a full neurological evaluation to assess deficits from posterior circulation ischemia. Inpatient rehabilitation may be necessary to improve symptoms secondary to the ischemia along with functional deficits secondary to surgical correction. This is a presentation of Bow Hunter's syndrome; a rare cause of syncope, vertigo and dizziness leading to surgical intervention and requiring intensive inpatient rehabilitation.

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