

Critical Limb Ischemia and Cerebral Arterial Disease in A Young Patient; Two Sides of The Same Coin: A Case Report

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1. Abstract

Critical limb ischemia as first diagnosis can lead to amputation in a 20-25% of patients. In this case we present a 49-year-old male with a history of peripheral atherosclerotic arterial disease due to diabetes mellitus type 2 who underwent below the knee amputation and presented with cerebral infarcts due to bilateral occlusion of the internal carotids. The case illustrates the importance of evaluating for cerebrovascular disease when someone presents with stroke-like symptoms and highlights the critical importance of tailored management strategies and patient education in mitigating the impact of critical limb ischemia-related amputations.

2. Introduction

Peripheral vascular disease (PVD) affects an estimated 200 million individuals worldwide [1]. Stroke is a common neurological disease and accounts for the second leading cause of death in the world [2]. Peripheral artery disease (PAD) specifically referring to reduced arterial blood flow to the extremities is combined to reduced cerebral flow by bilateral occlusion of the internal carotids (ICA). The combination of PAD and diabetes presents additional challenges. In fact, individuals with diabetes face a 20-fold increased risk of lower limb amputation compared to the general population [3] as well as a higher incidence rates of internal carotid artery (ICA) occlusion. This case report presents a 49-year-old man who underwent a below the knee amputation of the left lower extremity due to critical limb ischemia, an amputation of the five toes of the right foot and suffered a stroke that demonstrated a bilateral ICA occlusion.

3. Case Report

Our patient is an approximately 49-year-old male living in Patras in Southwest Greece. Prior to and after his amputation he was employed in a big factory selling agricultural products. He lived in a small one-room building (without private bathroom) adjacent to his brother's house. He has a history of good controlled Type II Diabetes Mellitus (DM II), resulting in very rare hospitalizations due to hypoglycemic or hyperglycemic events. His Below Knee Amputation (BKA) was the result of a multi-year history of controlled DM II, smoking and elevated cholesterol. The patient was transferred to the home care-nursing program, a profit organization providing private primary and rehabilitative care to residents in Patras District, for assistance with diabetes supplies and management. He had a wheelchair for traveling between his room and the main house, or for leaving the family compound. He was tall and thin with limited muscle definition in his left lower but not limited in the bilateral upper extremities. He did not spend most time in bed due to assistive device, could not crawl and could independently rise to sit in a chair. Furthermore, he was educated in the importance of proper residual limb strengthening and positioning, including prone positioning, to avoid contractures. In the end he managed to use a below-knee prosthetic limb. After 5 years he returned with an ischemic ulcer on the right foot. The patient underwent a diagnostic angiography that showed a complete occlusion of the superficial femoral artery, the peroneal artery and 80% stenosis of the posterior and anterior tibial artery. As a result of these

findings, we proceed with stenting of the superficial femoral artery and angioplasty of the tibial arteries. Two days after we went to the operating theatre for a surgical debridement by amputating the five toes and leaving an extremely open ulcer. Two days after we started the Vac therapy and after four months the result was extremely good. Our patient experienced a non-traumatic lower limb amputation, an unfortunate and common consequence for people with Diabetes. He was at a greater risk of disability due to residing in an economically and socially disadvantaged region of Greece. Resources, both peer and material, were not limited in Greece, a country with rich medical or rehabilitation-professionals training programs. He received care by the medical and rehabilitation teams. He was thrilled to receive and be trained in the proper use of durable medical equipment. Moreover the patient before his discharge from the hospital underwent a stroke with no neurological deficit. His initial symptoms onset one day before his presentation, associated with hypoesthesia followed by hemiparesis of his right face, right upper extremity (UE), and right lower extremity (LE) lasting for 30 seconds. No dysphagia, dysarthria, or visual symptoms were reported. A non-contrast CT of the head showed no evidence of hemorrhage and ischemic changes while CT angiography of the head and neck showed complete occlusion of his bilateral intracranial internal carotid arteries (ICA).

4. Discussion

This pathological process of atherosclerosis initiates in the vessel walls, where lipid-laden macrophages contribute to the formation of fatty streaks [2]. Immune cells remain active in the formation of an atheroma which is surrounded by a smooth muscle cap. Furthermore, this cap tends to weaken, exposing the thrombotic plaque and leading to platelet aggregation, which can result in thrombus formation [4]. Patients with hypertension and diabetes face an increased risk of PAD as well as complications such as strokes and myocardial infarctions [4]. PAD restricts mobility. Diabetic patients often experience impaired wound healing due to hyperglycaemia. This oxidative stress can damage the blood supply and nerve structures [4]. B Nishan et al. [4] there is no significant difference between factors (gender and comorbidities) affecting contralateral limb [5].

4.1. Amputation In Patients Who Underwent Major Amputation

On the other hand, stroke is the main leading cause for adult disability and there are very few cases reported on bilateral internal carotid artery occlusion (BICAO). The history of our patient was notable for risk factors for atherosclerotic disease including diabetes mellitus (DM), smoking and hypertension (HTN) as well as elevated cholesterol. Cardioembolic sources were excluded in this case and large-vessel vasculitis was felt to be unlikely for this patient. No headache, jaw claudication and visual disturbances were demonstrated. A hypercoagulable condition could not be ruled out. Carotid duplex ultrasonography is considered among one of the highest sensitive and specific studies to diagnose total carotid occlusion and CT angiography (CTA) are considered as sensitive as

ultrasonography in diagnosing internal carotid artery occlusion. Due to the low reported incidence of this condition, definitive data on outcomes is necessarily limited.

5. Conclusion

The combination of atherosclerosis and diabetes can significantly exacerbate inflammation and endothelial dysfunction within vessel walls. In this case we present a 49 years old patient with a left BKA due to PAD and simultaneous bilateral ICA occlusion. This case underscores the unique challenges faced by patients with diabetes and atherosclerosis due to the complex interplay between these diseases.

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