Case Report

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Carotidynia in high-altitude travelers

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Abstract

Background: Carotidynia is characterized by focal pain and tenderness of the carotid artery without associated hemodynamic or structural abnormalities. Carotid artery pathology has also been known to occur in high altitude due to aberrant baroreceptor response in the carotid bulb.

Case Presentation: We herein report two cases of high altitude-related idiopathic carotidynia. The first patient was a geologist who performed oil reserve survey in the Alaska Mountain, while the second patient was hiking in a mountain trail in Peru. Both patients developed acute onset of neck pain while traveling in high-altitude mountainous ranges. Carotid imaging showed transmural inflammation surrounding the carotid artery without intraluminal stenosis. Treatment with low-dose aspirin and nonsteroidal anti-inflammatory drug were initiated, which resulted in complete resolution of their symptom. Follow-up carotid ultrasound showed complete resolution of carotid inflammatory tissue density.

Discussion: This represents the first report linking carotidynia to high-altitude traveling.

Keywords

Carotidynia, high-altitude traveling, neck pain

Since the first report was published by Dr. Temple Fay in 1927 who described a patient with atypical throbbing neck pain, the term carotidynia has been used to characterize focal neuralgia arising from the carotid artery.[1] In the ensuing decades, clinical reports of idiopathic carotidynia continued to emerge in the literature describing patients with idiopathic carotidynia with a distinctive inflammatory tissue reaction surrounding the affected carotid artery without attributable anatomical or pathological etiologies to account for these patients' neuralgic symptoms.[2,3] We herein describe two patients who developed sudden onset of neck pain while living in a high-altitude mountainous range, and this represents the first study linking idiopathic carotidynia to high-altitude travelers. Informed consents were obtained for the publication of this report.

Case 1

A 55-year-old male geologist was tasked on a natural gas reserve survey assignment in the mountain range of Alaska where the elevation was above 12,000 feet. Two weeks after his job assignment in the Alaska Mountain, he devolved a sudden onset of right-sided neck pain. After the neck pain persisted for one week, he returned home for further evaluation. His physical examination showed extreme tenderness to palpation over the right carotid artery, while all the remaining neurological and vascular examinations were unremarkable. His carotid duplex ultrasound showed bilateral patent carotid artery without hemodynamically significant stenosis. However, a thickened inflammatory density surrounding the carotid wall in the proximal right internal carotid artery was identified. The contralateral carotid and bilateral vertebral arteries were normal. A T1-weighted magnetic resonance imaging scan of the head and neck was performed which showed symmetric soft tissue density surrounding the right carotid bulb without other associated pathologies (Figure 1). The patient was treated with aspirin 81 mg daily and non-steroidal anti-inflammatory drug with naproxen 500 mg every 8 h

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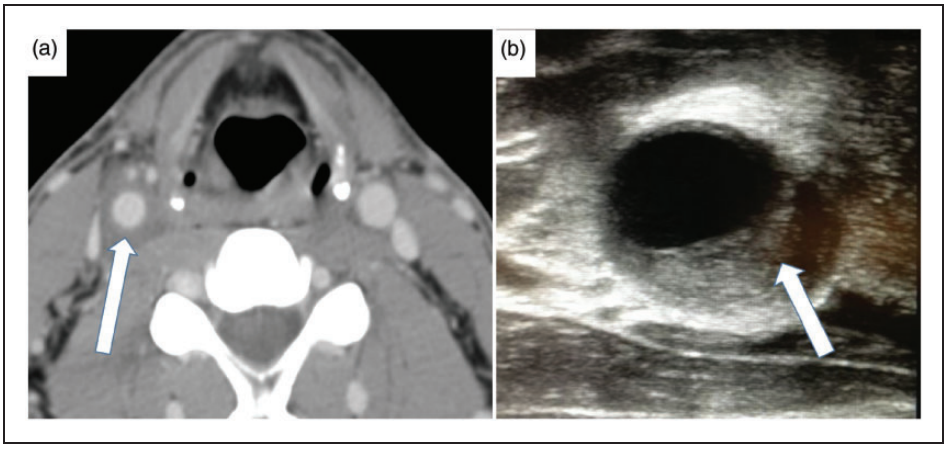

Figure 1. (a) T-1 magnetic resonance image showing a symmetrical inflammatory tissue density (arrow) surrounding the right common carotid artery; (b) Duplex ultrasound of the carotid artery showing perivascular inflammatory tissue density (arrow) surrounding the internal carotid artery.

as needed. The patient experienced resolution of neck pain five days after the commencement of the treatment. A follow-up carotid duplex ultrasound one month later showed complete resolution of the carotid wall inflammatory density. In his subsequent follow-up visits with surveillance carotid duplex ultrasound at one year and 18 months, his carotid artery was normal and he remains free of neck pain.

Case 2

A 56-year-old woman traveled to Peru for a medical missionary work where she also embarked on a local mountain hike at an elevation of 9000 feet. While on her hiking trail, she woke up one morning with severe neck pain over the region of her left carotid artery. She took acetaminophen 650 mg which provided partial pain relief. A carotid duplex ultrasound was performed approximately eight days following the onset of her neck pain, which revealed an asymmetric inflammatory tissue density surrounding her left carotid artery (Figure 2), while no hemodynamically significant stenosis was detected in either carotid or vertebral arteries. She was treated with aspirin 81 mg daily and naproxen 500 mg every 8 h as needed, and her neck pain subsided completely three days later. A follow-up carotid duplex ultrasound at three months showed complete resolution of her carotid artery inflammatory tissue density. At one-year follow-up, she remained free of neck pain symptoms and her carotid duplex ultrasound was unremarkable.

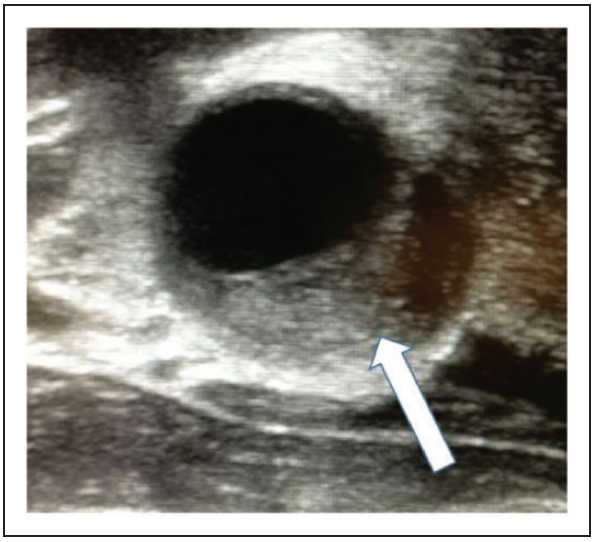

Figure 2. Duplex ultrasound of the carotid artery showing perivascular inflammatory tissue density (arrow) surrounding the internal carotid artery.

Discussion

Despite the controversy regarding the precise diagnostic criteria of carotidynia, many researchers have described carotidynia as an idiopathic inflammatory process confined to the distal common carotid artery.[2,4] The presentations of both patients in our report were similar which included exposure to a high-altitude environment with a resultant acute onset of neck pain overlying the carotid artery. Both of their symptoms resolved within two weeks after leaving the high-altitude environment. Our report is notable because it represents the first reported cases associating carotidynia and high-altitude environment.

Previous clinical studies have attributed high-altitude environment to carotid abnormality, such as carotid body tumor, which is in part caused by aberrant response of carotid baroreceptors in the setting of

altitude-related hypoxia.[5] However, evidence suggested that the onset of carotid body tumor is insidious in nature which typically occurs in residents who live in the mountainous region as chronic hypoxia triggered the development of carotid body tumor. A recent report described two mountain climbers who developed acute onset of neck pain with symptoms similar to our patients, and their subsequent workup revealed spontaneous carotid artery dissection.[6] Although high altitude or mountain travel is not a known risk for carotid artery dissection, studies have identified altered cerebral blood flow dynamics at high altitude and endothelial dysfunction in response to hypoxia.[7] We postulate that the altered cerebral blood flow triggered by the high altitude with resultant endothelial dysfunction may have played a role in the development of carotidynia in our patients.

Researchers have utilized various imaging modalities to substantiate the diagnosis of idiopathic carotidynia in patients who developed spontaneous neck pain without identifiable anatomical or pathological etiologies.[8] These imaging evaluations have revealed a patent carotid artery flow without intraluminal obstruction, while a distinct perivascular inflammatory process of carotid origin was observed.[8] Radiological studies using imaging modalities including CTA, MRI, and PET-CT scan have supported the concept that carotidynia represents a distinctive pathological process involving an inflammatory response of the carotid artery.[9,10] Specifically, the inflammatory vessel wall reaction in the carotid artery has been linked to an increased metabolism of glucose by PET-CT scan, with subsequent resolution of the imaging abnormality in the follow-up scanning evaluation as the glucose update returned to its baseline level.[9,10] The evaluation of our patients similarly demonstrated perivascular inflammation in the carotid artery without intraluminal pathology. Consistent with the natural history of carotidynia as reported in the literature, our patient had complete resolution of their carotidynia symptoms following treatment with aspirin and pain analgesic with non-steroidal anti-inflammatory drug.

In conclusion, our patients developed idiopathic carotidynia following a brief exposure to a high-altitude environment. Our patients experienced full recovery with supportive pharmacological treatment which underscored the self-limiting natural history of this condition.

Declaration of conflicting interests

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