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Ischemic Stroke Unveiling Takayasu Arteritis Complicated by Coronary Arteritis: A Case Study

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Authors' contributions

This work was carried out in collaboration among all authors. Author BA designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors EFI and SO managed the analyses of the study. Author SO managed the literature searches. All authors read and approved the final manuscript.

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Case Report

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ABSTRACT

Context: We present the case of a 38-year-old woman admitted for ischemic stroke. Etiological evaluation revealed halo signs on transesophageal echocardiography (TEE), suggestive of Takayasu arteritis.
Case Presentation: During hospitalization, the patient developed chest pain, elevated troponin levels (300 ng/L), left ventricular hypokinesia on echocardiography, and T-wave inversions on electrocardiogram (ECG), indicating coronary arteritis. High-dose corticosteroid therapy led to rapid improvement in inflammatory markers. The diagnosis of Takayasu arteritis was confirmed based on

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the American College of Rheumatology (ACR) criteria. This case highlights the variable clinical presentation of Takayasu arteritis, including coronary involvement, and underscores the effectiveness of corticosteroid therapy in controlling inflammation.
Conclusion: Takayasu arteritis, though rare, can manifest with ischemic stroke and coronary arteritis. Prompt recognition and corticosteroid treatment are essential in managing this potentially life-threatening condition.

Keywords: Takayasu arteritis; ischemic stroke; coronary arteritis; corticosteroid therapy; in-situ thrombosis; acute coronary syndrome.

1. INTRODUCTION

Takayasu arteritis is a chronic large-vessel vasculitis that predominantly affects the aorta and its major branches. It primarily impacts young women and can lead to severe complications, including ischemic strokes and coronary involvement. Coronary arteritis is a rare but serious complication, often leading to acute coronary syndromes. Here, we present a case of Takayasu arteritis revealed by ischemic stroke and complicated by coronary arteritis.

2. CASE PRESENTATION

A 38-year-old woman with a medical history that was initially considered unremarkable but later revealed nonspecific symptoms possibly related to vasculitis was admitted for sudden onset of right-sided hemiparesis and aphasia, suggestive of ischemic stroke. At the time of presentation, her NIHSS score was 8, and she reported symptom onset 2 hours prior to admission. On admission, her vital signs were stable, with a blood pressure of 140/90 mmHg and a heart rate of 90 beats per minute. However, further investigations revealed elevated inflammatory markers, supporting the suspicion of an underlying vasculitis. Neurological examination revealed central facial paralysis on the right side and weakness in the right upper and lower limbs. Diagnostic imaging with CT angiography and Doppler ultrasound was performed but showed no evidence of cardiac emboli, increasing the likelihood of large-vessel vasculitis, including Takayasu arteritis.

A brain CT scan confirmed an ischemic infarct in the left middle cerebral artery (MCA) territory (Fig. 1).

Further vascular imaging, including cerebral angiography, revealed the following:

- Occlusive and stenotic thickening involving the subclavian arteries, common carotid arteries, right internal carotid artery, and left vertebral artery, with in-situ thrombosis of the right common carotid artery. These findings were highly suggestive of Takayasu arteritis.
- Ischemic infarction of both the superficial and deep regions of the right MCA territory, with no hemorrhagic transformation.

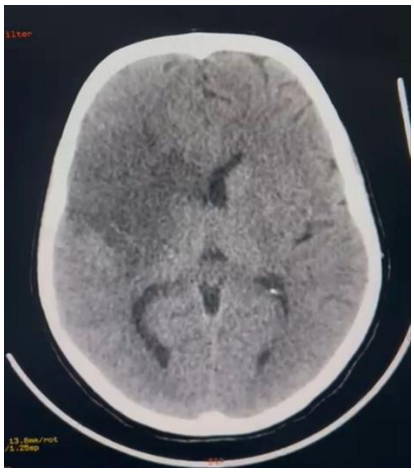

Fig. 1. A brain CT scan confirmed an ischemic infarct in the left middle cerebral artery (MCA) territory

Transesophageal echocardiography (TEE) showed thickening of the aortic wall with a halo sign, characteristic of vasculitis, supporting the diagnosis of Takayasu arteritis. Laboratory tests revealed elevated inflammatory markers, including C-reactive protein (CRP) at 80 mg/L and erythrocyte sedimentation rate (ESR) at 70 mm/h. During hospitalization, the patient developed acute chest pain. Laboratory findings revealed an elevated troponin level (300 ng/L), suggesting myocardial involvement. Transthoracic echocardiography (TTE) demonstrated segmental wall motion abnormalities of the left ventricle, and the ECG showed T-wave inversions in the anterior leads, consistent with acute ischemia.

These findings were indicative of coronary arteritis, a rare but serious complication of Takayasu arteritis. The patient was promptly treated with high-dose corticosteroid therapy (prednisone 1 mg/kg/day), leading to rapid clinical improvement. Inflammatory markers significantly decreased, with CRP levels dropping to 20 mg/L and ESR to 30 mm/h.

3. DISCUSSION

Takayasu arteritis is a chronic granulomatous vasculitis affecting large arteries, most commonly the aorta and its primary branches. While it primarily affects young women, its clinical manifestations can be highly variable, ranging from systemic inflammatory symptoms to severe organ ischemia due to arterial stenosis or occlusion [1]. In the early stages, non-specific symptoms such as fatigue, fever, or weight loss may mask the diagnosis, complicating timely management [2]. In our case, the initial presentation with ischemic stroke led to the discovery of extensive vascular involvement, including stenosis of the common carotid and subclavian arteries.

Coronary arteritis, though rare, is a significant complication of Takayasu arteritis that can lead to acute coronary syndromes, as observed in our patient [3]. The inflammation of the coronary arteries results from the same pathophysiological mechanisms seen in other large vessels affected by the disease, including arterial wall thickening, fibrosis, and, eventually, stenosis or occlusion [4]. Recent studies suggest that immune-mediated injury plays a critical role in the early development of coronary involvement, with increased expression of interleukin-6 and other inflammatory markers [5]. Coronary involvement is reported in 10% to 30% of Takayasu arteritis cases, with the ostium of the coronary arteries being the most frequently affected site [6].

In our case, the patient developed acute chest pain during hospitalization, with elevated troponin levels and echocardiographic evidence of segmental left ventricular dysfunction, indicating myocardial ischemia. This was further supported by ECG findings of T-wave inversions. These signs were consistent with coronary arteritis, a life-threatening complication that requires prompt recognition and treatment.

The diagnosis of Takayasu arteritis is based on a combination of clinical, laboratory, and imaging findings. Notably, inflammatory markers such as ESR and CRP are often elevated during acute phases of the disease, as observed in our patient [7]. In this case, transesophageal echocardiography (TEE) revealed thickening of the aortic wall with a characteristic halo sign, a key feature of vasculitis [8]. This was further supported by cerebral angiography, which demonstrated stenosis and occlusion in multiple large vessels, including the carotid and subclavian arteries, alongside in-situ thrombosis of the right common carotid artery. These findings are consistent with the diagnostic criteria established by the American College of Rheumatology [9].

Imaging plays a critical role in diagnosing and monitoring Takayasu arteritis. Angiography, CT angiography, and magnetic resonance angiography (MRA) are valuable tools for visualizing vessel wall changes and identifying areas of stenosis or occlusion [10]. The hallmark of the disease is concentric arterial wall thickening and stenosis, which can lead to ischemic events, as in our patient's ischemic stroke and myocardial ischemia.

Corticosteroids remain the first-line treatment for controlling systemic inflammation in Takayasu arteritis. High-dose corticosteroids (prednisone 1 mg/kg/day) were initiated in our patient, resulting in a rapid clinical and biological improvement, with a significant decrease in inflammatory markers (CRP and ESR). Early initiation of corticosteroid therapy is crucial to prevent disease progression and manage acute complications such as ischemic stroke and coronary arteritis [11]. Nonetheless, up to 50% of patients experience relapses despite initial corticosteroid responsiveness, necessitating the addition of immunosuppressive agents [12].

For patients who are refractory to corticosteroid therapy, or who experience relapses, additional immunosuppressive agents such as methotrexate, azathioprine, or cyclophosphamide may be required [13]. In patients with critical coronary stenosis or other severe vascular complications, surgical interventions such as coronary revascularization or vascular bypass surgery may be necessary [14].

Takayasu arteritis is a chronic disease with a relapsing-remitting course. Long-term follow-up is essential for monitoring disease activity and preventing recurrences. Regular imaging and clinical evaluations are recommended to assess disease progression and the response to

therapy. In our case, after the initiation of corticosteroids, the patient demonstrated a significant reduction in symptoms and inflammatory markers, but close follow-up will be necessary to ensure continued disease control and to prevent further ischemic events. A multidisciplinary approach involving rheumatologists, cardiologists, and neurologists is essential for optimal management, given the disease's complex systemic impact [15].

4. CONCLUSION

This case highlights the complex and varied presentation of Takayasu arteritis, with simultaneous cerebral and coronary involvement. Coronary arteritis, though rare, can result in acute coronary syndromes that require immediate attention and treatment. Corticosteroid therapy remains the cornerstone of treatment, but a multidisciplinary approach and long-term follow-up are critical to managing the disease and its complications.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

ETHICAL APPROVAL

As per international standards or university standards written ethical approval has been collected and preserved by the author(s).

CONSENT

As per international standards or university standards, patient(s) written consent has been collected and preserved by the author(s).

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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