Refractory Renovascular Hypertension as the Presenting Manifestation of Takayasu Arteritis: A Case Report

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Abstract

Takayasu arteritis is a chronic large-vessel vasculitis that may lead to renovascular hypertension and progressive chronic kidney disease. We report the case of a 32-year-old woman presenting with refractory arterial hypertension, declining renal function, and constitutional symptoms. Physical examination revealed marked inter-arm blood pressure asymmetry and reduced left radial pulse. Laboratory investigations showed severe renal impairment, normocytic anemia, and elevated inflammatory markers.

Computed tomography angiography demonstrated diffuse aortic wall thickening, bilateral renal artery stenosis and occlusion of the left subclavian artery. Positron emission tomography confirmed active vascular inflammation, and renal scintigraphy showed severe hypoperfusion of the right kidney. Treatment was initiated with high-dose corticosteroids and methotrexate and later escalated to tocilizumab due to disease relapse. Right renal artery angioplasty was performed for persistent hypertension and renal deterioration.

During long-term follow-up, the patient achieved sustained clinical remission under biologic therapy, stabilisation of chronic kidney disease, and blood pressure control with intensive antihypertensive treatment, including cautious renin–angiotensin system blockade.

This case highlights the importance of early recognition of Takayasu arteritis in young patients with refractory hypertension and supports an individualised multidisciplinary approach combining immunosuppression, selective revascularisation and optimized cardiovascular risk management.

Keywords: Hypertension, Renovascular; Renal Artery Obstruction; Takayasu Arteritis

What's already known about this topic?

Takayasu arteritis is a rare large-vessel vasculitis that may cause renovascular hypertension and chronic kidney disease. Immunosuppressive therapy is the cornerstone of management, with biologic agents recommended for refractory or relapsing disease. The benefit of renal revascularisation remains controversial and must be individualised.

What does this study add?

This report describes severe bilateral renal artery stenosis as the main driver of refractory hypertension in Takayasu arteritis. It demonstrates long-term remission with tocilizumab and selective renal angioplasty. It supports cautious renin–angiotensin system blockade in bilateral renal artery stenosis under close renal monitoring.

INTRODUCTION

Takayasu arteritis (TA) is a rare form of large-vessel vasculitis that predominantly affects the aorta and its primary branches.[1] One of the most significant and potentially debilitating complications of this condition is the involvement of the renal arteries, which can lead to renovascular hypertension and chronic kidney disease.[1] The management of TA is multifaceted, with immunosuppressive therapy serving as the foundational cornerstone of clinical care.[1]

Renovascular hypertension in the context of TA presents a complex therapeutic dilemma.[1] This study aims to

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describe a specific case of severe bilateral renal artery stenosis as the main driver of refractory hypertension in a patient with Takayasu arteritis.

CASE REPORT

A 32-year-old woman with no relevant past medical history was referred for evaluation of refractory arterial hypertension despite quadruple antihypertensive therapy. She complained of dyspnea, chest pain, paraesthesia in the left upper limb, and intermittent colicky abdominal pain.

Physical examination revealed a systolic murmur, reduced left radial pulse, marked inter-arm blood pressure asymmetry (183/59 mmHg in the right arm vs 84/62 mmHg in the left arm), and an abdominal bruit. Laboratory investigations showed severe renal impairment (serum creatinine 3.44 mg/dL, estimated glomerular filtration rate 16.7 mL/min/1.73 m²), mild normocytic normochromic anemia, and elevated ferritin and C-reactive protein. Electrocardiography demonstrated left ventricular hypertrophy, and transthoracic echocardiography revealed septal hypertrophy with preserved systolic function.

Computed tomography angiography demonstrated diffuse aortic wall thickening (Fig. 1), severe bilateral renal artery stenosis, estimated at approximately 80%–90% in the right renal artery and 60%–70% in the left renal artery, involvement of multiple abdominal branches, and occlusion of the left subclavian artery, consistent with Takayasu arteritis. Positron emission tomography showed intense vascular inflammatory activity, and renal scintigraphy confirmed asymmetric renal perfusion with markedly reduced tracer uptake in the right kidney compared with the left (Fig. 2).

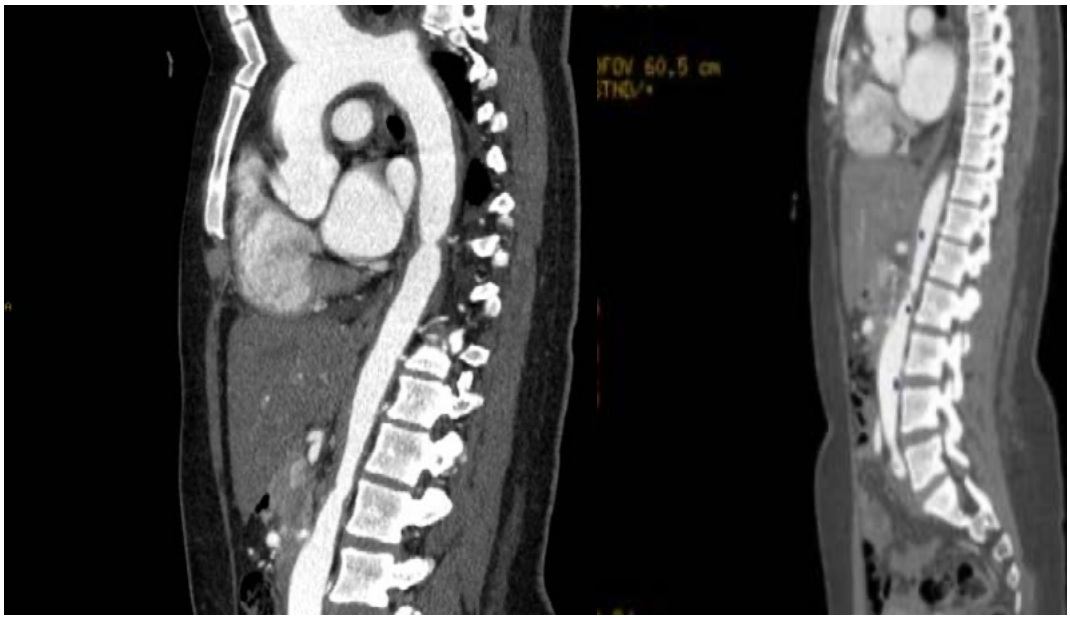


Figure 1. Sagittal contrast-enhanced CT angiography images showing large-vessel involvement of the thoracoabdominal aorta, consistent with inflammatory changes in Takayasu arteritis.

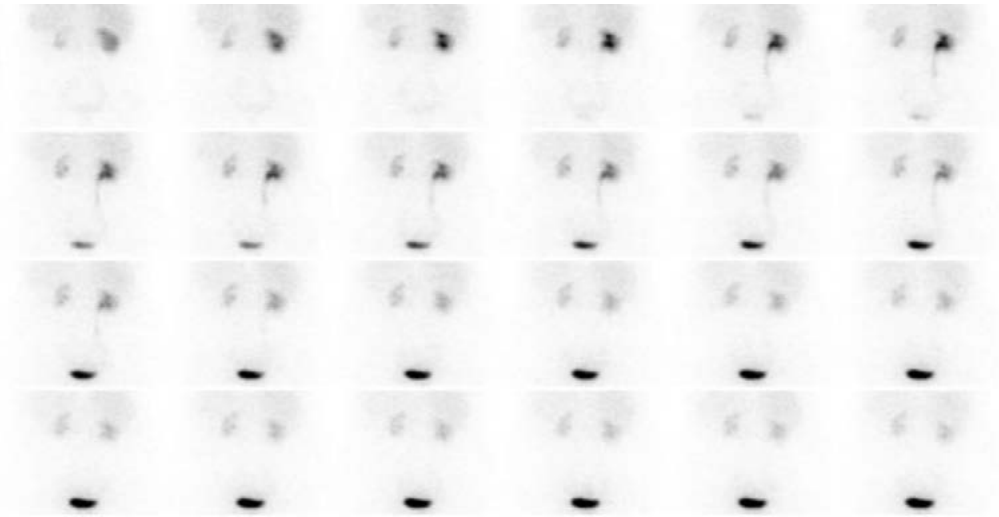


Figure 2. Isotopic renogram demonstrating asymmetric renal perfusion, with reduced blood flow to the right kidney, consistent with renovascular involvement.

High-dose corticosteroids and methotrexate were initiated, resulting in clinical remission of constitutional symptoms together with a reduction in inflammatory biomarkers. After initiation of immunosuppressive therapy and partial control of systemic inflammation, right renal artery angioplasty was performed due to persistent hypertension and renal dysfunction, resulting in transient improvement in renal function. At the time of the intervention, there was no clear evidence of ongoing systemic inflammatory activity, and revascularisation was therefore considered appropriate. The patient subsequently experienced a disease relapse with intestinal involvement, which responded to corticosteroid pulses and tocilizumab. She achieved sustained clinical remission for four years.

At the last follow-up, the patient had stable advanced chronic kidney disease (estimated glomerular filtration rate approximately 13.8 mL/min/1.73 m²), and serum creatinine levels over time are shown in Fig 3. Blood pressure was controlled with seven antihypertensive agents. A mineralocorticoid receptor antagonist was considered; however, its use was avoided due to advanced chronic kidney disease and the associated risk of hyperkalemia. Low-dose enalapril was cautiously introduced with close monitoring, without deterioration of renal function.

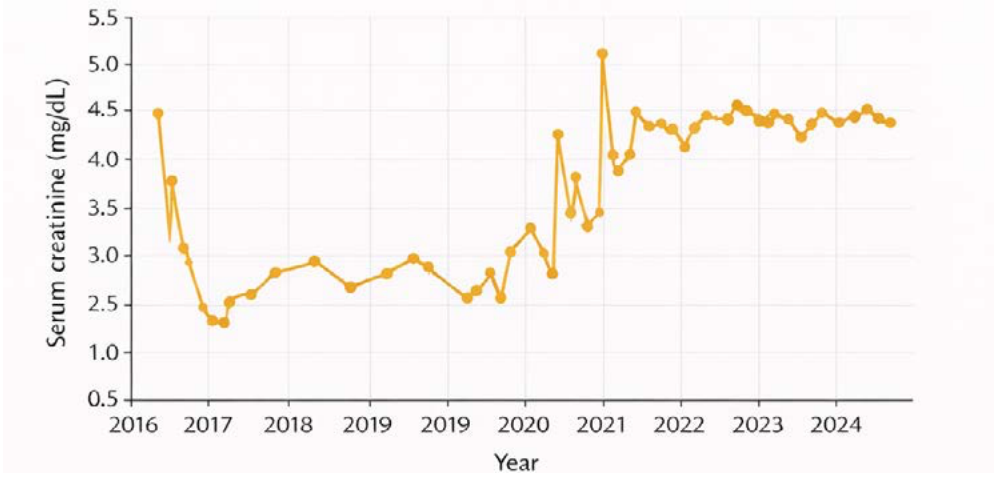


Figure 3. Serial serum creatinine levels from 2016 to 2024, showing initial improvement after treatment followed by progressive deterioration consistent with advanced chronic kidney disease.

DISCUSSION

Renovascular disease is a recognised cause of secondary hypertension and may account for up to 40% of cases of refractory hypertension. When associated with chronic kidney disease, as in this patient, it worsens prognosis and complicates antihypertensive management.[1] Takayasu arteritis is characterised by chronic granulomatous inflammation of large vessels mediated by T lymphocytes, macrophages, and pro-inflammatory cytokines such as interleukin-6, tumour necrosis factor-α, and interferon-γ.[2]

Progressive fibrosis and vascular stenosis lead to ischemic complications, including renovascular hypertension and renal dysfunction.

Current management strategies recommend high-dose corticosteroids for induction therapy, followed by steroid-sparing immunosuppressants such as methotrexate, azathioprine, or mycophenolate mofetil. In refractory or relapsing disease, biologic agents such as tocilizumab have demonstrated efficacy for induction and maintenance of remission.[3] In this case, tocilizumab resulted in sustained remission without further disease flares. Imaging plays a central role in diagnosis and monitoring. Computed tomography angiography provides structural assessment of vessel stenosis and collateral circulation, whereas positron emission tomography can detect active vascular inflammation even in the absence of elevated inflammatory markers.[4] In patients with advanced chronic kidney disease, non-contrast magnetic resonance angiography may be considered.[5]

Renal revascularisation remains controversial. Randomised trials such as ASTRAL failed to show a general benefit of revascularisation in atherosclerotic renal artery stenosis; however, selected patients with refractory hypertension or progressive renal dysfunction may benefit from angioplasty, particularly in inflammatory vasculopathies. In Takayasu arteritis, endovascular interventions are generally recommended after at least partial control of inflammatory disease activity with immunosuppressive therapy, as procedures performed during active inflammation are associated with higher rates of restenosis.[6] The decision to revascularise the right renal artery was supported by scintigraphic evidence of marked hypoperfusion with preserved residual function, suggesting potentially reversible renal ischemia. In this case, right renal artery angioplasty contributed to the stabilisation of renal function and improved blood pressure control.[7]

Traditionally, renin–angiotensin system blockade has been contraindicated in bilateral renal artery stenosis due to the risk of acute kidney injury.[8] Recent observational studies and meta-analyses suggest that many patients can tolerate cautious initiation of these agents with close monitoring.[8] In this case, low-dose enalapril was successfully introduced, contributing to blood pressure control without deterioration of renal function. This case underscores the importance of a multidisciplinary and individualised approach combining immunosuppressive therapy, selective revascularisation, and optimised antihypertensive treatment to improve cardiovascular and renal outcomes in Takayasu arteritis.

Table 1. Summary of key clinical events, imaging findings, therapeutic interventions, and antihypertensive management throughout follow-up.

Date	Event
April 2016	Diagnosis of Takayasu arteritis by CT angiography
May 2016	First hospital admission and initiation of prednisone and methotrexate
May 2016	PET-CT showing increased metabolic activity
June 2016	Balloon angioplasty of the right renal artery
March 2020	PET-CT showing reduced metabolic activity
April 2021	Second hospital admission due to Takayasu arteritis flare (intestinal ischemia) Initiation of tocilizumab
January 2023	PET-CT showing no metabolic activity; referral to advanced chronic kidney disease clinic
February 2024	Control of hypertension with nitroglycerin 15 mg patch, doxazosin 8 mg every 8 hours, hydralazine 25 mg every 6 hours, torasemide 10 mg every 12 hours, manidipine 20 mg every 12 hours, atenolol 50 mg every 12 hours, and enalapril 5 mg every 24 hours.

TAKE HOME MESSAGES

Takayasu arteritis should be suspected in young patients presenting with refractory hypertension and inter-arm blood pressure differences.

Renal artery involvement may result in severe renovascular hypertension and progressive chronic kidney disease.

Early immunosuppressive therapy, including biologic agents, is essential to control vascular inflammation and prevent complications.

Selective renal revascularisation may stabilise renal function and improve blood pressure control in selected cases.

Renin–angiotensin system blockers can be cautiously used in bilateral renal artery stenosis with close renal monitoring.

Multidisciplinary management is crucial for optimal long-term outcomes.

Ethical Disclosures

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Contributorship Statement

AJH: Conceptualization, Methodology, Data curation, Formal analysis, Writing – original draft, Supervision.
APM: Methodology, Investigation, Data curation, Writing – review & editing.
EDSM: Investigation, Resources, Validation, Writing – review & editing.
MJEH: Supervision, Project administration, Writing – review & editing.

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