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CASE REPORT

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Atypical Radiological Presentation of Takayasu Arteritis: A Case Series

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Abstract

Takayasu arteritis (TA) is a chronic large-vessel vasculitis predominantly affecting the aorta and its primary branches. We report three patients with atypical imaging findings diagnosed using computed tomography angiography (CTA). Case 1 (a twenty-five-year-old woman) had diffuse aortic wall thickening with an infrarenal abdominal aortic aneurysm. Case 2 (a thirty-five-year-old woman) showed bilateral renal artery stenosis with left renal arteriovenous fistula. Case 3 (a thirty-eight-year-old woman) demonstrated extensive arterial calcifications, left carotid artery occlusion, and an infrarenal saccular aneurysm. CTA was invaluable in detecting wall thickening, stenosis, aneurysm formation, and calcification. These cases illustrate that atypical vascular involvement may occur in TA and emphasize the role of CTA in comprehensive disease evaluation and management. Early recognition of such atypical radiological features can guide timely management and prevent complications.

Keywords: Takayasu arteritis, Large-vessel vasculitis, Computed tomography angiography, Aortic aneurysm, Vascular stenosis, Arteriovenous fistula

1 Introduction

Takayasu arteritis is a chronic granulomatous vasculitis predominantly involving the aorta and its major branches. It classically affects young adults (often females) and leads to arterial wall thickening, stenosis, occlusion, or aneurysm formation[1, 2]. The disease incidence is low (approximately 2–3 per million annually) but varies geographically, being more common in Asia.[1] Presenting features (e.g., limb claudication, hypertension, bruits) are nonspecific and depend on the vessels involved. Diagnostic criteria (e.g., ACR 1990) incorporate age <40, blood pressure discrepancies, bruits, and angiographic abnormalities[1, 3].

Because early TA is often subclinical, vascular imaging is essential for diagnosis. Historically, catheter angiography was the gold standard, but today noninvasive modalities predominate[1]. Computed tomography angiography (CTA) remains valuable for delineating the vessel lumen and wall, as well as identifying calcifications or complex lesions. CTA has high sensitivity for detecting the characteristic findings of TA — namely concentric mural thickening with enhancement — and can reveal complications such as aneurysms or fistulae[2, 4].

In this case series, we describe three cases of TA with atypical CTA imaging features, including renal artery stenosis, arteriovenous fistula, abdominal aortic aneurysm, and extensive arterial calcification, emphasizing their radiological appearance, diagnostic approach, and clinical relevance.

2 Cases

Case 1:

A 25-year-old woman with a six-month history of fatigue and hypertension underwent contrast-enhanced CTA. Images showed diffuse concentric thickening of the thoracic and abdominal aortic walls from the root to the bifurcation. Infrarenally, there was a 3.8 cm fusiform aneurysm (Fig. 1**b, c, d**). Both renal arteries originated from this aneurysm; the right renal artery had a short proximal stenosis with reduced right renal size (Fig. 1**d**). No other major branch was aneurysmal or occluded. These CTA findings suggested chronic inflammatory vasculopathy. The patient's ESR and CRP were mildly elevated, supporting active arteritis. She was treated with high-dose glucocorticoids and immunosuppressive agents. This case illustrates a combination of diffuse aortic arteritis and aneurysm formation. In this patient, the infrarenal aneurysm likely represents a late, fibrotic complication of long-standing vasculitis.

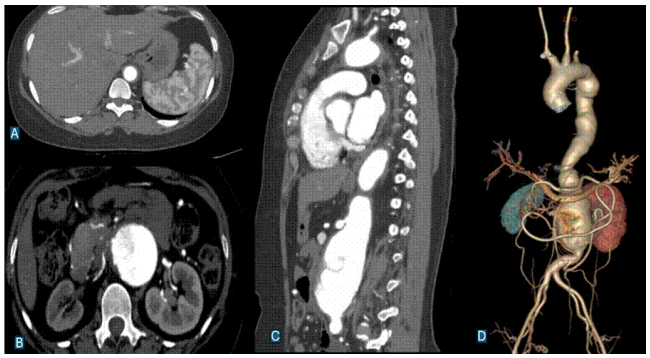

Fig. 1: a – Normal-sized thickened abdominal aorta; b, c & d – CTA image showing diffuse circumferential thickening of the aortic wall and infrarenal aneurysm with small right kidney

Case 2:

A 35-year-old woman presented with severe headache, uncontrolled hypertension, and bilateral lower-limb claudication. She had a prior diagnosis of TA but was off treatment. Laboratory tests showed mildly elevated ESR and CRP. CTA showed reduced luminal caliber of the thoracic and abdominal aorta, with severe proximal stenosis of both renal arteries (Fig. 2**a & b**). Surprisingly, arterial-phase images showed the left renal artery directly communicating with a dilated left renal vein near the hilum, consistent with a renal arteriovenous fistula (Fig. 2**a, b & c**). There was no previous history of trauma or renal intervention. These findings explained her refractory hypertension. The patient underwent arteriovenous fistula embolisation with bilateral renal artery angioplasty. The fistula likely resulted from severe perivascular inflammation eroding into the adjacent vein. This case highlights the importance of contrast-enhanced CTA, which can uncover uncommon vascular complications in TA. Incidental discovery of a spontaneous renal artery–vein fistula is exceptionally rare; only one other case in TA has been reported[4].

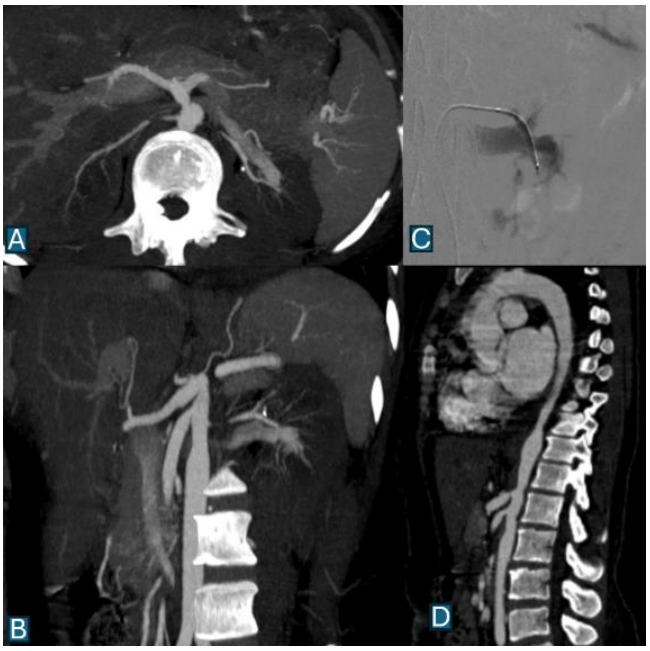

Fig. 2: A & B- Severe proximal stenosis of both renal arteries with left renal arteriovenous fistula near the hilum. C – Digital subtraction angiography shows early venous drainage before the parenchymal phase, consistent with an arteriovenous fistula. D – Reduced luminal caliber of thoracic and abdominal aorta

Case 3:

A 38-year-old woman presented with left arm claudication and dizziness. Examination revealed absent left carotid and brachial pulses, and a blood pressure difference >20 mmHg between arms. Inflammatory markers were moderately raised. CTA demonstrated advanced disease: the left common carotid artery was completely occluded, the left subclavian artery was narrowed at its origin, and the right subclavian artery had mild stenosis. The ascending and descending aorta were irregularly narrowed. An infrarenal saccular aneurysm (3.3 cm) with mural calcification was noted Fig. 3**c & d**). These findings indicated chronic TA with long-standing arterial inflammation and healing. The patient was started on steroids and planned for left carotid–subclavian bypass. This case illustrates a chronic-stage presentation of TA, featuring extensive vascular calcification, luminal narrowing, occlusion,

and saccular aneurysm evident on CTA — a pattern seen in long-standing disease[2].

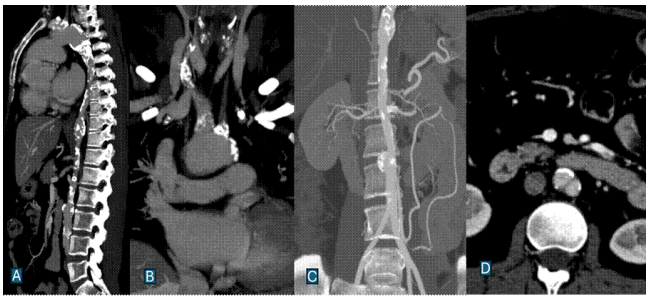

Fig. 3: a, c & d – Extensive vessel calcification with luminal narrowing and saccular aneurysm. b – Occluded left common carotid artery and severely narrowed ostio-proximal segment of right subclavian artery

3 Discussion

These cases illustrate the protean vascular manifestations of Takayasu arteritis (TA) and underscore the pivotal role of cross-sectional imaging in diagnosis and management. In the early inflammatory phase, CTA typically demonstrates concentric wall thickening with mural enhancement, whereas the chronic phase is characterized by stenoses, occlusions, aneurysmal dilatation, and vascular calcifications[5, 6]. MRI and FDG-PET provide complementary information, with mural enhancement and FDG uptake reflecting disease activity, while CTA and MRA delineate the extent of luminal lesions. By EULAR consensus, MRI/MRA is preferred for diagnosis and follow-up due to its lack of radiation and better wall characterization, whereas CTA offers superior spatial resolution and widespread availability, making it invaluable for assessing the full aortic tree, subtle luminal irregularities, and complex aneurysm anatomy for surgical planning[6, 7].

Our three cases illustrate atypical radiological features of TA. Case 1 demonstrated pan-aortic involvement with a large infrarenal aneurysm. Case 2 was remarkable for bilateral renal artery stenoses complicated by a renal arteriovenous fistula — a rare but clinically significant manifestation. Case 3 highlighted extensive vascular calcification, carotid occlusion, and infrarenal aneurysm, reflecting advanced chronic disease.

TA is primarily managed with glucocorticoids, often combined with steroid-sparing immunosuppressants such as methotrexate or azathioprine. In refractory cases, biologic agents such as the IL-6 receptor blocker tocilizumab have shown efficacy in recent trials[8]. Vascular interventions — including angioplasty, stenting, bypass surgery, or endovascular aneurysm repair — are considered after controlling active inflammation. Imaging plays a central role in this decision-making: active mural enhancement on MRI/CTA or FDG-PET suggests ongoing vasculitis, while structural lesions on CTA/MRA guide revascularization strategies[6, 7].

4 Conclusion

While TA often conforms to known angiographic patterns, atypical features — such as saccular aneurysms and spontaneous renal arteriovenous fistulae — can occur and must be recognized. Awareness of such unusual manifestations is crucial for radiologists and clinicians, as early detection directly influences management and improves outcomes.

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