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Testicular pain as an unusual presenting symptom of aortic coarctation: a case report and review of the literature

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Abstract

Background Coarctation of the aorta is a congenital narrowing of the aortic arch. Clinical presentation includes hypertension and its complications, but genitourinary manifestations such as testicular pain are rare. Early recognition and management are crucial to prevent long-term morbidity. Despite advances in diagnosis and treatment, some cases remain undetected until adulthood, sometimes presenting with atypical symptoms. This underscores the importance of clinicians' awareness.

Case presentation We present the case of a 27-year-old Ethiopian male who presented with testicular pain and intermittent headaches. Physical examination revealed severe hypertension. Imaging studies confirmed coarctation of the aorta with a bicuspid aortic valve. The patient underwent successful endovascular stenting of the coarctation, except for a small distal arch dissection postoperatively. Currently, he is on regular follow-up, and his blood pressure is controlled with antihypertensive therapy.

Conclusions This case illustrates the importance of recognizing unusual presentations of coarctation of the aorta with testicular pain in young hypertensive adults. Early diagnosis and intervention with endovascular stenting can prevent long-term complications and improve patient outcomes. Clinicians should maintain a broad differential when evaluating resistant hypertension, considering vascular causes even in the absence of classical features.

Keywords Testicular pain, Hypertension, Aortic coarctation, Bicuspid aortic valve, Case report

Background

Coarctation of the aorta (CoA) is one of the most common congenital cardiac anomalies, causing a narrowing of the proximal descending aorta [1]. It accounts for 4%-6% of all congenital heart defects, with an incidence of 3–4 cases per 10,000 live births [2]. Traditionally, CoA is classified based on its relationship with the ductus arteriosus, though the degree of narrowing and arch vessel anomalies is now considered more clinically relevant [3]. While often diagnosed in infancy, presentation in adults is relatively rare, with approximately 10.3% of cases identified after the age of 40 [4].

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Classic clinical evaluation relies on blood pressure measurements in all four extremities and characteristic physical findings, such as delayed femoral pulses and systolic hypertension in the upper extremities. Diagnosis is confirmed through multimodal imaging—including chest x-ray, echocardiography, Computed Tomographic Angiography (CTA), and Cardiac Magnetic Resonance (CMR)—which delineate the pressure gradient, the "Figure 3" sign, and associated anomalies such as bicuspid aortic valve [5, 6].

While these classical features are well-established, atypical symptoms can pose significant diagnostic challenges. Recent literature connecting aortic and systemic vascular pathology to testicular pain supports the plausibility of unusual presentations in adult CoA. Pathology involving the retroperitoneal aorta can present as referred pain; for instance, acute aortic dissection has been reported to manifest initially as acute bilateral testicular pain, attributed to the irritation or stretching of perivascular sympathetic nerves [7]. Similarly, the expansion of a symptomatic abdominal aortic aneurysm (AAA) has been documented to cause acute isolated testicular pain, serving as a critical warning sign of retroperitoneal irritation [8].

These observations strongly suggest a mechanism of referred pain via shared visceral sensory pathways (T10-T12), which innervate both the periaortic tissues and the testes. In severe CoA, the body develops extensive collateral circulation to bypass the aortic obstruction. These large, tortuous spinal collaterals can alter flow dynamics and exert mass effects, occasionally mimicking spinal arteriovenous malformations or causing neurological deficits [9, 10]. Consequently, aortic irritation or chronic vascular strain from severe hypertension may be misdirected via these shared pathways, presenting clinically as scrotal pain.

This report describes a rare case of a patient presenting with testicular pain who was subsequently diagnosed with coarctation of the aorta. By highlighting the physiological link between aortic pathology and testicular pain—specifically through ischemia, collateral circulation, and shared sensory pathways—this case emphasizes the importance of considering CoA in young adults with resistant hypertension and atypical symptoms.

Case presentation

We report the case of a 27-year-old Ethiopian male with no known comorbidities who presented to an outpatient clinic with right-sided testicular pain lasting three weeks. He denied fever, penile discharge, burning micturition, trauma, or previous headache episodes, although he experienced intermittent headaches currently. Physical examination of the testes and testicular ultrasound were normal. No murmurs were detected, and he had not been previously evaluated for hypertension.

During routine examination, a hypertensive crisis was identified, with blood pressure readings of 210/99 mmHg in the right upper limb, 200/100 mmHg in the left upper limb, 140/85 mmHg in the right lower limb, and 138/80 mmHg in the left lower limb. Despite initiating antihypertensive therapy, his blood pressure remained uncontrolled, prompting an abdominal ultrasound to evaluate for possible renal causes of hypertension. The ultrasound revealed post-stenotic flow in the aorta and renal vessels, suggestive of proximal aortic stenosis consistent with coarctation of the aorta (CoA).

Further assessment with transthoracic echocardiography demonstrated a bicuspid aortic valve with trace regurgitation, severe coarctation, and dilatation of the aortic root. An ECG showed a normal sinus rhythm with signs of left ventricular hypertrophy (Fig. 1). Chest radiography exhibited bilateral posterior rib notching and the 'Figure 3' sign, supporting the diagnosis (Fig. 2). Additional imaging with aortography and pulmonary CT angiography confirmed descending thoracic aortic narrowing, a dilated ascending aorta, and multiple intercostal collateral vessels (Fig. 3).

The patient was referred for surgical intervention. Under general anesthesia, a stent was successfully placed across the coarctation site, confirmed by angiography (Fig. 4).

Procedural details

- A 4 F multipurpose catheter was initially introduced via the right radial approach over a 0.035 × 260 Terumo wire, but crossing the segment was unsuccessful.
- Using the left radial approach over a Run-through wire, crossing the coarctation was achieved.
- Snaring with a JR 6 F catheter through the right femoral sheath facilitated device placement.
- A 6 F pigtail catheter was positioned in the aortic arch, and the arterial sheath was exchanged for a 12Fr Mullins sheath.
- An Optimus 48 XL covered stent mounted on a VACS III 16 × 4 balloon was precisely deployed across the coarctation, with subsequent dilation using an 18 × 4 balloon for optimal placement.

Findings

- The coarctation segment measured approximately 36 mm in length.
- The transverse aortic arch diameter was 17 mm.
- The flow across the segment was nearly interrupted, with a peak-to-peak pressure gradient of 8 mmHg.



Fig. 1 Electrocardiogram showed Sinus rhythm with signs of Left Ventricular Hypertrophy

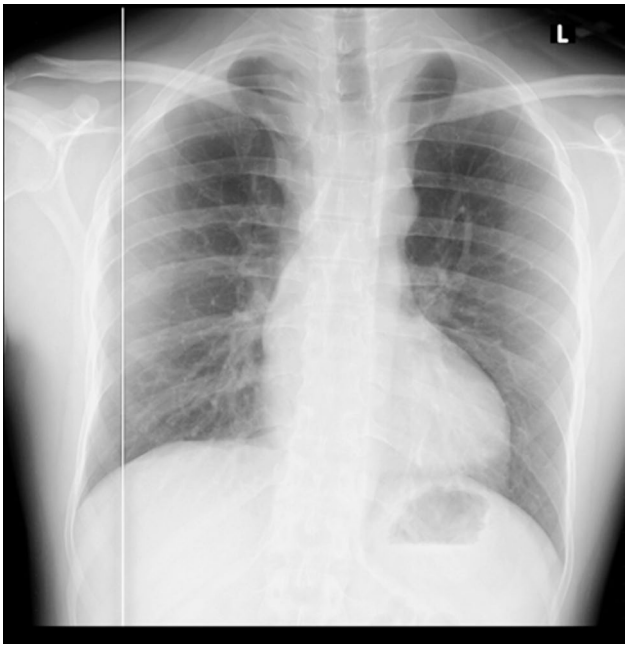


Fig. 2 Chest radiography showed rib notching and the figure of 3 sign

- Post-procedure angiography showed significant improvement, with resolution of the coarctation waist, and a total dye volume of 200 mL was used.

Outcome and postoperative course

Post-procedure blood pressures improved to 134/78 mmHg in the right upper limb, 130/76 mmHg in the left upper limb, 122/76 mmHg in the right lower limb, and 120/74 mmHg in the left lower limb. The patient's testicular pain resolved. A small dissection was noted at the distal arch, but it remained clinically stable. His recovery was otherwise uncomplicated; he was discharged in good condition after 14 days.

Follow-up echocardiography revealed mild concentric left ventricular hypertrophy. Currently, his blood pressure remains well-controlled on amlodipine 10 mg daily. He continues regular follow-up with clinical assessments and imaging to monitor for re-coarctation, aneurysm formation, or other vascular complications.

Future management

Monitoring includes scheduled evaluations at 3, 6, and 12 months post-procedure, with annual assessments. In case of re-stenosis, expansion of the dissection, or other issues, further interventions such as repeat angioplasty, stent revision, or surgical repair may be considered.

Discussion

This case highlights the importance of considering coarctation of the aorta (CoA) in young adults with resistant hypertension, even when presenting symptoms, such as testicular pain, seem unrelated. Although typically diagnosed in childhood, adult cases may be overlooked, underscoring the need for thorough cardiovascular assessment.

Classically, CoA presents with blood pressure discrepancies between the upper and lower limbs, delayed

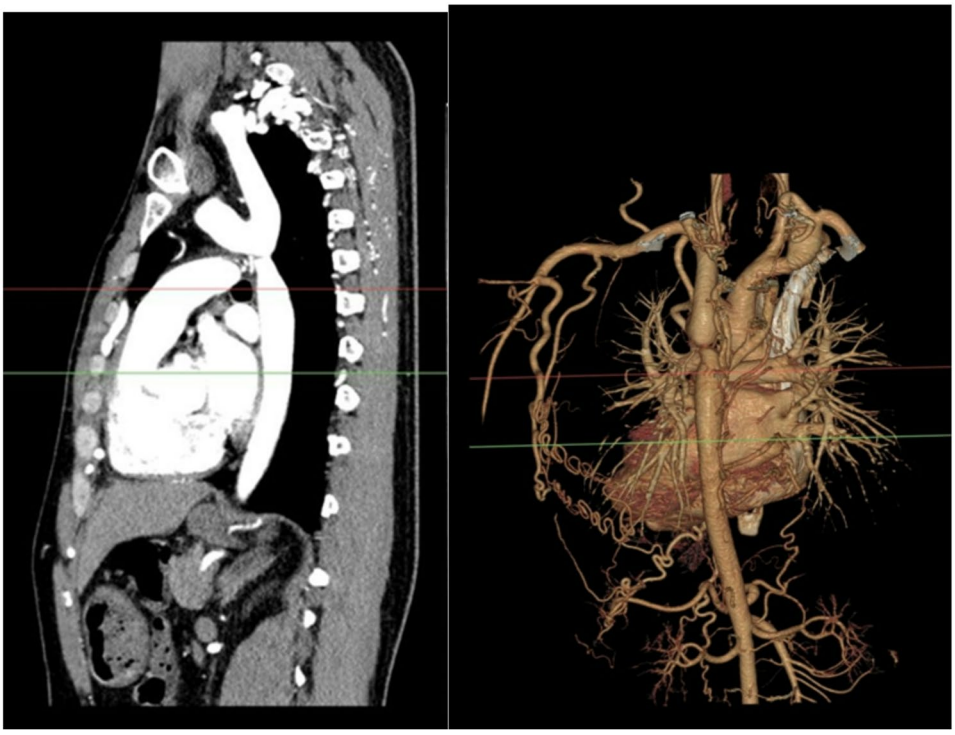


Fig. 3 CT angiography of the chest, a sagittal reformat, and 3D reconstruction, respectively, showed coarctation of the aorta with multiple intercostal arterial collaterals



Fig. 4 Post-stent angiography showed a properly deployed stent at the prior location of the severe aortic coarctation, with sufficient restoration of the aortic lumen diameter

femoral pulses, and systolic hypertension [11]. While catheterization remains the gold standard for assessing pressure gradients [12], non-invasive diagnostic tools like chest x-ray, echocardiography, and CTA, reveal characteristic signs such as the "Figure 3" sign and rib notching, often alongside associated bicuspid aortic valve, seen in up to 75% of cases [13].

This is a rare reported case of CoA presenting primarily with testicular pain. While previous adult cases have documented atypical presentations like calf atrophy, lower limb paralysis, or backache pain [14–16], the localization to the scrotum offers unique pathophysiological insights.

Rarely, CoA manifests with atypical symptoms like testicular pain. Potential mechanisms include:

- Referred pain via shared T10-T12 sympathetic pathways supplying both the aorta and testes, with irritation or dissection causing pain [7, 8].
- Collateral circulation and ischemia, where extensive collateral vessels may alter retroperitoneal hemodynamics or impinge on genitofemoral nerves, leading to discomfort [9, 10, 17].

Endovascular stenting offers a minimally invasive, effective treatment, as seen in this case, with significant symptomatic relief. However, procedural risks include aortic wall injury, exemplified by the postoperative small distal arch dissection—highlighting the necessity for careful monitoring [18]. Distal arch dissection after Thoracic Endovascular Aortic Repair (TEVAR) occurs in approximately 1.3% to 6.8% of cases [19].

In conclusion, clinicians should maintain a high index of suspicion for CoA in young hypertensive patients with atypical presentations. Early diagnosis and intervention can prevent long-term complications and improve patient outcomes.

Conclusions

This case illustrates the importance of recognizing unusual presentations of coarctation of the aorta with testicular pain in young hypertensive adults. Early diagnosis and intervention with endovascular stenting can prevent long-term complications and improve patient outcomes. Clinicians should maintain a broad differential when evaluating resistant hypertension, considering vascular causes even in the absence of classical features.

Abbreviations

AAA	Abdominal aortic aneurysm
CMR	Cardiac Magnetic Resonance
CoA	Coarctation of the aorta
CTA	Computed Tomographic Angiography
TEVAR	Thoracic Endovascular Aortic Repair

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Author contributions

Dr. Ephrem Basazinew: Participates in all activities of the case report. Dr. Temesgen Alemayehu: Participates in conceptualization. Dr. Azeb Werede: Participates in writing the original draft. Dr. Maranata Teferi: Participates in writing review and editing. Dr. Bereket Alemayehu: Participates in collecting the investigations. Dr. Getahun Derso: Participates in Final approval. Dr. Merahi Kefyalew: Participates in Conception and design.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate

Consent is available.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests

The authors declare no competing interests.

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