Atresia of the Proximal Left Common Iliac Artery Complicated by a Completely Thrombosed Saccular Aneurysm of the Terminal Abdominal Aorta in a Nigerian Female

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ABSTRACT

Congenital atresia of the common iliac artery is rare. A case of atresia of the left common iliac artery in a 40-year-old mother of three which was complicated by saccular aneurysm of the terminal abdominal aorta is reported. Radiological investigations revealed massive and complete thrombosis of the aneurysmal sac. Atresia of the proximal left common carotid was confirmed at surgery. Postoperative follow-up radiological investigations show return to normal caliber of the abdominal aorta.

Key words: Aneurysm; aorta; atresia; iliac; thrombosis

Introduction

Abdominal aortic aneurysms (AAA) occur most commonly in individuals in their sixth and seventh decades of life and is said to be present when the diameter of the abdominal aorta exceeds 3.0 cm or more than 50% larger than normal diameter.[1] They often are asymptomatic and found incidentally on physical or radiological examination of the abdomen. Risk factors include male gender, cigarette smoking, hypertension, and a positive family history.

Spontaneous complete thrombosis of AAA is seldom seen. Chronic thrombosed AAA are associated with occlusive iliac disease and present with intermittent claudication and diminished or absent femoral/distal pulses.[2] Occlusion of the common iliac arteries is mostly due to an acquired disease.[3] Congenital atresia of the common iliac artery is rare.[4]

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We report a case of congenital atresia of the left common iliac artery in a 40-year-old Nigerian female which was complicated by a completely thrombosed saccular aneurysm of the terminal aorta in whom radio-diagnostic imaging was vital in both pre- and post-operative management.

Case Report

A 40-year-old homemaker and mother of three presented at the Surgical Out-patient Department of a Teaching Hospital in Nigeria with a 2 year history of recurrent lower abdominal pain radiating to the groin and anal region and no known relieving or aggravating factors. The pain later became throbbing and colicky.

There was no history of cigarette smoking and no history of hypertension. She is neither a known diabetic nor a known

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sickle cell disease patient. She had neither history of previous penetrating nor blunt abdominal trauma. No history of weakness of the lower limbs or claudication was volunteered. Family history of pulsatile abdominal mass was negative. Her last confinement and birth was 10 years ago.

She had presented at a peripheral clinic 2 years previously with similar complaints for which she had myomectomy after a pelvic ultrasound investigation revealed the presence of uterine fibroids. However, the symptoms persisted postsurgery.

Clinical examination showed a young woman who was afebrile, anicteric, and not pale. The cardiovascular system revealed a blood pressure of 100/70 mmHg with a pulse rate of 80 bpm. The peripheral pulses were symmetrical.

A midline subumbilical abdominal surgical scar was noted. A pulsatile mass was palpated in the central lower abdomen with mild tenderness.

Per vagina examination revealed normal cervical feel with no adnexal tenderness. There was no significant finding per rectal examination.

An impression of aneurysm of the abdominal aorta was made with the differential of aortic dissection also entertained.

Requested ancillary laboratory investigations were all essentially within normal limits.

Radiological investigations which were ordered included abdominal ultrasound scan (USS), Doppler USS of the femoral arteries and computed tomographic (CT) angiography (CTA) of the abdomen and pelvis.

The abdominal USS showed normal upper abdominal structures. A dilated lower abdominal aorta (5.5 cm × 3.2 cm) was seen with luminal mixed echogenic areas more on the left measuring 7.8 cm × 8.3 cm [Figure 1]. A more homogeneous component of the mass extends more inferiorly compressing the urinary bladder and abruptly terminating with a rounded margin. The diameter of the aorta proximal to an aneurysm was 2.3 cm. Color Doppler interrogation of both the right and left superficial femoral arteries showed fairly symmetrical arterial waveforms with peak systolic velocities of 72.01 and 58.84 cm/s, respectively [Figure 2].

CTA of the abdomen and pelvis was done and the axial images reviewed alongside the native noncontrast scan [Figures 3-7]. Coronal reconstruction [Figure 8] and three-dimensional volume rendering/maximum intensity view of the aorta and its bifurcation [Figure 9] were also obtained which shows aneurysmal dilatation of the terminal aorta. The sac extends inferiorly beyond the branching off of both common iliac arteries. A shriveled proximal portion of the left common iliac artery is demonstrated. Anastomotic collateral channels are noted connecting more proximal aortic portions and a relatively larger right internal iliac artery to the distal continuation of the left common iliac artery.

She was worked up for surgery and taken to the theater thereafter for aneurysm repair (with graft bifurcation).

Findings at operation include the following:

1. Saccular aneurysm at the termination of the aorta descending into the pelvis, filled with an extensive blood clot. Wall of the aneurysmal sac was adherent to the sigmoid colon and left ureter
2. Patent right common iliac artery with dilated internal iliac branch
3. The left common iliac artery orifice was not visualized. An atretic (fibrotic) proximal portion of the left common iliac artery was present
4. Collateral vessels were seen connecting from the mid and lower abdominal aorta as well as a dilated right internal iliac artery to supply the postatretic continuation of the left common iliac artery

The aneurysm was repaired. A Y-graft was cut to size to fit over the distal 2 cm of the abdominal aorta with the right limb anastomosed accordingly. The left limb of the Y-graft was closed.

The patient was stable with no remarkable events and was discharged home 9 days postoperative.

She was seen at the out-patients clinic about a month after during which repeat radiological investigations including CT scan of the abdomen, abdominal USS, and Doppler scan of the lower limbs was requested for.

The scan results showed intact repaired aneurysm with abdominal aortic dimensions restored within normal limits [Figure 10]. There were no significant changes in the Doppler scan findings.

Discussion

AAA cause 1.3% of all deaths among men aged 65–85 years in the western countries.[5] Its prevalence in a population with symptomatic peripheral vascular disease is found to range between 4% and 10%.[2] They are usually asymptomatic and found incidentally on physical or imaging examination of the abdomen more so when of relatively small size. Increasing diameter could lead to pronouncement of symptoms including pain radiating to the groin or the back. Rupture of an aneurysm is often a catastrophe with a mortality rate exceeding 65%.[6]

Risk factors are male gender, cigarette smoking, hypertension, Caucasian descent, and a positive family history. Other

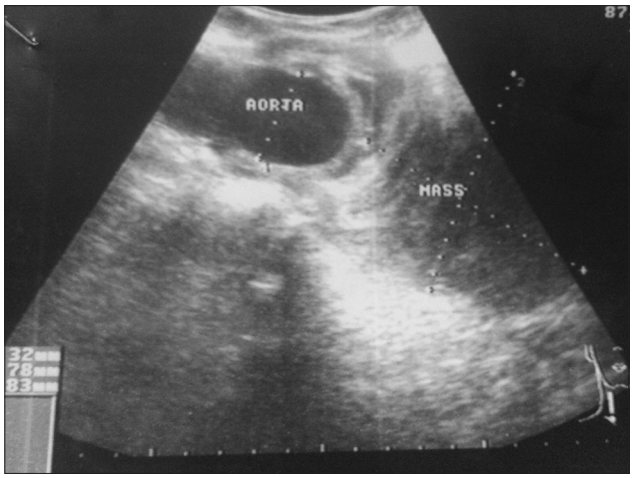

Figure 1: Transverse ultrasound scan of the lower abdomen showing dilated lower abdominal aorta and adjacent contiguous mixed and hypoechoic masses

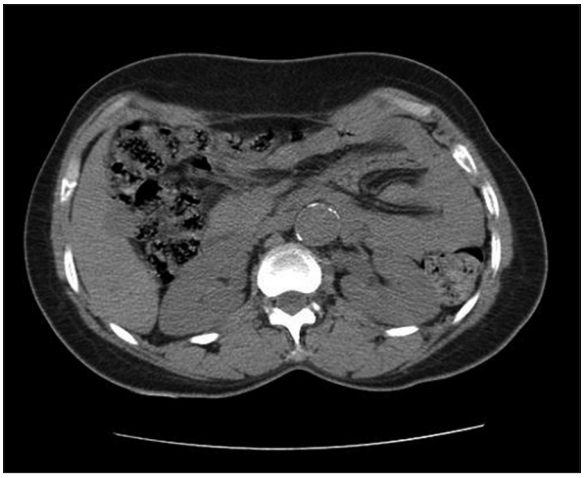

Figure 3: Distal suprarenal aorta with normal dimension and wall calcifications

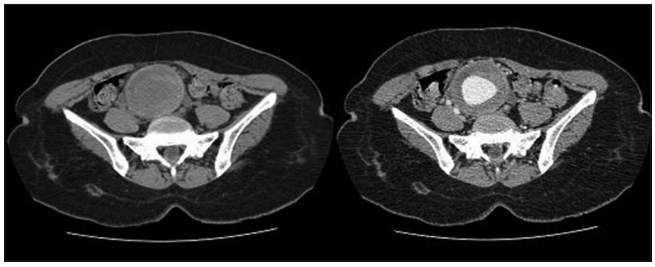

Figure 5: Native and post-contrast images at the level of the L4/L5 disc space. Note the peripheral circumferential filling defect caused by thrombus

associated factors include trauma, atherosclerosis, hypercoagulation, occlusive iliac disease, and connective tissue disorder.[5]

Spontaneous thrombosis of abdominal aortic aneurysm is uncommon.[2] Acute thrombosis may present with limb ischemia or neurological deficits. Chronic thrombosed AAA present with intermittent claudication and diminished or

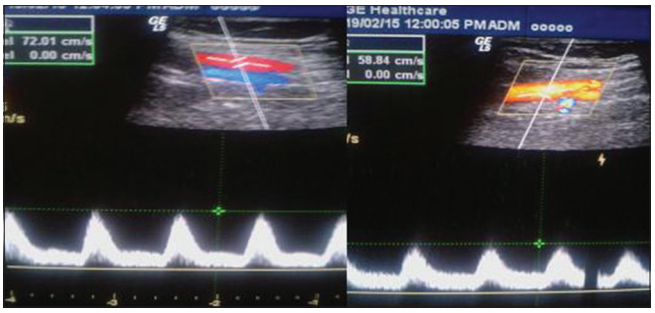

Figure 2: Doppler scan Image of the right and left femoral arteries showing fairly symmetrical arterial wave forms with velocities of 72.01 and 58.84 cm/s, respectively

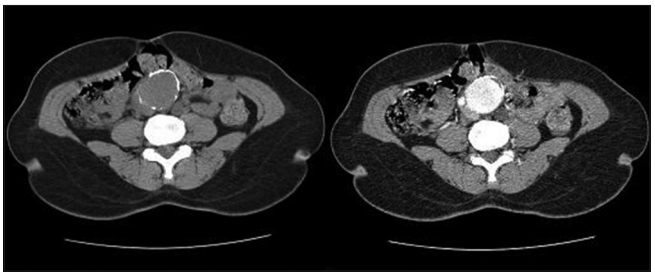

Figure 4: Native and post-contrast axial images at a level just below the aortic bifurcation. Only the right common iliac artery is demonstrated

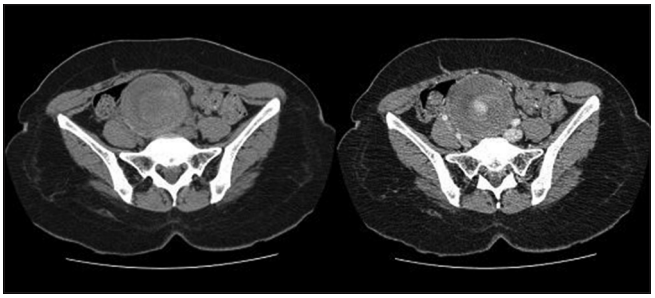

Figure 6: Native and post-contrast images at level of L5. The aneurysmal sac is almost filled with thrombus

absent femoral/distal pulses and are frequently associated with occlusive iliac disease.[2] The influence of intraluminal thrombus on an aneurysmal wall in predisposing it for rupture has been documented.[7]

Occlusion of the common iliac arteries is mostly due to an acquired disease often involving atheromatous plaque formation and thrombogenesis.[3] Congenital atresia of the common iliac artery is rare. A few cases of absence or hypoplasia of either of the common iliac arteries have been reported in literature.[4,8]

The index patient presented with recurrent lower abdominal pain without any history of weakness of the lower limbs or claudication.

She is female, in her fourth decade of life and was neither hypertensive nor a cigarette smoker. Hypertension and

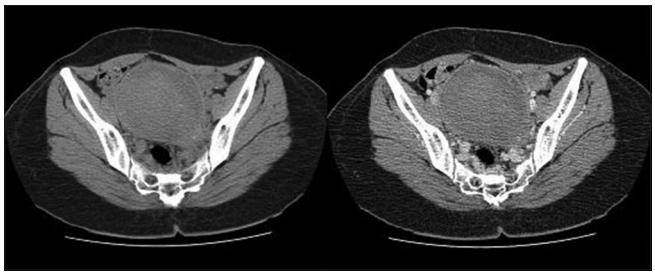

Figure 7: Native and post-contrast images at level of S1. The aneurysmal sac is completely filled with thrombus

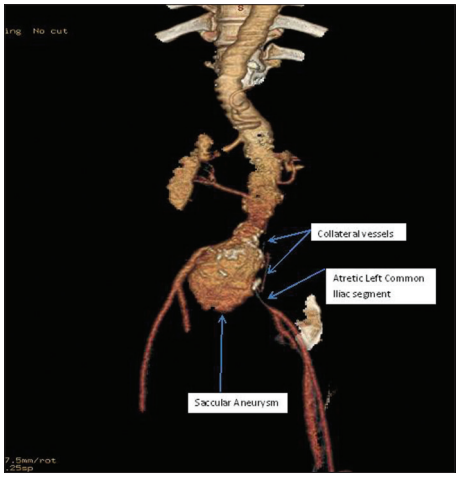

Figure 9: Three-dimensional volume rendering image of the aneurysm showing the atretic left common iliac segment and some collateral vessels

cigarette smoking are known to be associated with increased prevalence of AAA. Rapidity of growth rate and the chance of rupture are also enhanced in both hypertensives and cigarette smokers.[5]

Infrarenal aneurysms are the most common type.[6] The hemodynamic conditions in the infrarenal aorta due to the changes in its anatomical, histological, and mechanical characteristics compared to those of the thoracic aorta are thought to affect the development of aneurysm in this abdominal aortic region, which is invariably augmented by the presence of arterial hypertension or iliofemoral occlusion.[6,9]

The presence of atresia of the left common iliac artery which was confirmed at surgery had apparently predisposed the aneurysmal dilatation of the terminal abdominal aorta by progressive buildup of pressures as she grew into adulthood with the gradual accumulation of thrombus, the atresia itself constituting an obstructive point. The saccular aneurysm eventually became completely filled with massive thrombus material.

Extensive aortic wall calcifications seen in the preaneurysmal aorta and the proximal portions of the aneurysm could be an indication of atherosclerosis which is long considered

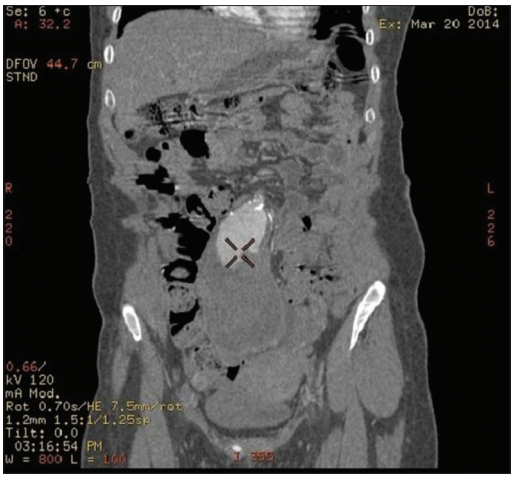

Figure 8: Coronal reconstructed Image through thrombus filled saccular aneurysm of the terminal abdominal aorta

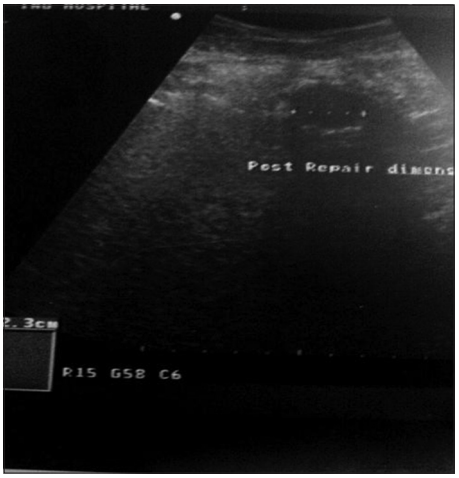

Figure 10: Postsurgery ultrasound scan showing dimension of the abdominal aorta returned to normal at the level of the repaired aneurysm

a precursor to the development of AAA. However, mechanical stresses associated with blood flow and pressures have conversely been linked to the pathogenesis of atherosclerosis.[10] It is known that many patients with advanced atherosclerosis do not develop AAA and some patients having no evidence of atherosclerosis do. Atherosclerosis may indeed represent a nonspecific secondary response to vessel wall injury induced by multiple factors and the observed association between atherosclerosis and AAA is probably not causative.[6]

Collateral bypass vessels from the mid aorta and a dilated right internal iliac artery had developed to connect to the post atretic portion of the left common iliac artery and ensure arterial supply to the left pelvis and perineum and the left lower limb. The absence of any history of claudication or weakness of a lower limb in a mother of 3 further gives credence to the above while discrediting acquired origin of the iliac occlusion. Furthermore, no evidence of inferior extension

of the aortic wall calcification into the common iliac branches was found to support atheromatous occlusion.

Ultrasonography (B-mode and duplex) should be the initial imaging modality for a pulsatile abdominal mass. Lower limb Doppler studies are necessary with symptoms such as intermittent claudication and for medicolegal reasons.

CTA is an important preoperative investigation but magnetic resonance angiography is an alternative in patients whose renal function does not permit the administration of iodinated contrast material.

The above two investigations have replaced the relatively invasive conventional angiography as a preoperative evaluation for AAA in some institutions.

Mainstay of treatment for large or symptomatic aneurysm is surgery aimed at prevention of rupture. This could be an open repair or endovascular repair. Both procedures usually involve the placement of a stent-graft. While open repair requires an abdominal or flank incision, endovascular repair involves the intraluminal introduction of a covered stent through the femoral and iliac arteries under fluoroscopic guidance; the stent functioning as a sleeve that passes through the aneurysmal sac, anchoring in the normal aorta above the aneurysm and the iliac arteries below the aneurysm.[3] Appropriate vascular anatomy proximal and distal to the aneurysm is, therefore, essential in a patient to be eligible for endovascular repair. Over the long term (8–10 years), endovascular repair has been shown not to confer any survival benefit when compared with open repair.[1]

Postsurgery follow-up imaging is necessary and could be serial.

An open aneurysmal repair and Y-graft placement were eventually carried out for the patient in this case and was well tolerated.

Symptoms were relieved, with the initial post-surgery imaging (4 weeks postoperative) showing no complications.

This case report is presented to highlight the role of imaging in establishing the diagnosis as well as in the pre- and post-surgical management of the sequelae from an uncommon congenital pathology.

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Conflicts of interest
There are no conflicts of interest.

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