



Incidental diagnosis of bilateral common iliac artery aneurysms: a case report and comprehensive literature review

Shailendra katwal, MD^{a,*}, Srijana Katwal, MBBS^b, Sushmita Bhandari, MBBS^g, Pratiksha Paudel, MBBS^c, Devendra Bhandari, MBBS^d, Shristi Bhandari, MBBS^e, Santosh Maharjan, MD^f

Introduction and importance: Aneurysms are dilatations of arteries, with abdominal aortic ectasias (AAE) considered precursors to abdominal aortic aneurysms (AAA). Iliac artery aneurysms (IAAs), often accompanying AAA, present a serious risk, particularly due to rupture. Here, the authors present a case highlighting the importance of recognizing and managing isolated bilateral common iliac artery aneurysms (CIAAs).

Case presentation: A 66-year-old male presented following a road traffic accident (RTA) with ankle and leg pain. Examination revealed tenderness in the leg, mild right flank tenderness, and a history of mild pelvic pain. Biochemical studies showed deranged glucose and lipid levels. Imaging revealed large CIAAs, prompting surgical intervention. The patient's fracture was also managed accordingly.

Clinical discussion: CIAAs are rare but serious, typically occurring in elderly males with risk factors including advanced age, male sex, smoking, and hypertension, while diabetes and hyperlipidemia may exert protective effects. While often asymptomatic, they can lead to complications such as thrombosis or rupture. Diagnosis relies on imaging, and intervention is recommended for larger or symptomatic aneurysms.

Conclusion: It's crucial to consider CIAAs in high-risk individuals and recognize the significance of early detection and intervention to prevent potentially life-threatening complications. Prompt management, either through open surgical repair or endovascular options, is crucial for improving patient outcomes.

Keywords: common iliac artery, early diagnosis, hyperlipidemia, iliac aneurysm, risk factors

Introduction

Aneurysms are characterized by dilatations that are at least 150% larger than the unaffected proximal part of the artery. Abdominal aorta diameters between 25 and 29 mm are classified as abdominal aortic ectasias (AAE), which are considered precursor lesions to abdominal aortic aneurysm (AAA)^[1]. Iliac artery aneurysms (IAAs), although relatively uncommon, frequently co-

HIGHLIGHTS

- This study highlights the importance of early detection and management of isolated bilateral common iliac artery aneurysms (IAAs), particularly in high-risk individuals.
- Understanding the protective role of comorbidities like diabetes and hyperlipidemia can inform treatment decisions.
- Timely intervention is essential to prevent potentially life-threatening complications associated with IAAs.

^aDepartment of Radiology, Dadeldhura Subregional Hospital, Dadeldhura,

^bDepartment of Cardiology, National Academy of Medical Science, ^cDepartment of Radiology, All Nepal Hospital, ^dDepartment of Medicine, Manmohan Memorial Medical College and Teaching Hospital, ^eDepartment of Medicine, Sukraraj Tropical and Infectious Disease Hospital, ^fDepartment of Radiology, Tribhuvan University Teaching Hospital, Kathmandu and ^gShankar Nagar Health Post, Butwol, Nepal

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*Corresponding author. Address: Department of Radiology, Dadeldhura subregional Hospital, Dadeldhura, Tufandada, 10300. Tel.: +977 984 914 9630.

E-mail: shailendrakatwal@gmail.com (S. Katwal)

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occur with AAA. Risk factors for aneurysm development include advanced age, smoking, hypertension, hyperlipidemia, hyperglycemia, male gender, and trauma. Patients with aortoiliac aneurysms are often asymptomatic and may present with systemic cardiovascular disease and other comorbidities^[2]. Rupture is a common initial manifestation of IAA, often resulting in acute abdominal pain and hypovolemic shock^[2]. Early diagnosis and prompt intervention are crucial in managing this serious condition to prevent catastrophic complications. Abdominal ultrasound and duplex ultrasonography are first-line imaging tools for detection. Due to the asymptomatic nature and high mortality rates associated with ruptured aneurysms, a high index of suspicion and screening is recommended for high-risk individuals^[2].

This case has been reported in line with Surgical Case Reports (SCARE) 2023 guidelines^[3].

Table 1			
Biochemical parameters of the patient.			
Test	Result	Unit	Reference
WBC	12 900		/cumm
4000–10 000			
Differential count			
Neutrophil	79	%	40–70
Lymphocyte	20	%	20–45
Eosinophil	01	%	1–6
Monocyte	00	%	2–10
Basophil	00	%	0–1
Hemoglobin	15.7	g/dl	13–18
P.C. V	44	%	40–54
Platelets	244 000		/cumm
150 000–400 000			
Blood glucose	428	mg/dl	70–140
Blood urea	37	mg/dl	10–45
Creatinine	0.7	mg/dl	0.4–1.4
Sodium	143	meq/l	135–150
Potassium	4.2	meq/l	3.0–5.0
Thyroid function tests			
FT3	4.6	pmol/l	3.1–6.8
FT4	21.3	pmol/l	12–22
TSH	1.9	uIU/ml	0.27–4.2
Lipid profile			
Total cholesterol	312	Mg/dl	< 200
Triglyceride	154	Mg/dl	< 150
HDL cholesterol	26	Mg/dl	> 40
LDL cholesterol	115	Mg/dl	< 100
D Dimer	1.7	mg/dl	< 0.5

HDL, high-density lipoprotein; LDL, low-density lipoprotein; TSH, thyroid stimulating hormone; WBC, white blood cell.

Case details

A 66-year-old male presented to the emergency department following a road traffic accident (RTA) with complaints of pain in his ankle and leg. Upon arrival, his vital signs were recorded as follows: blood pressure 130/90 mmHg, pulse rate 102 beats per min, respiratory rate 18 breaths per min, temperature 98°F, and SpO₂ 98% on room air. Physical examination revealed tenderness in the leg and ankle region with limited range of motion. While the remainder of the systemic examination was unremarkable, mild tenderness was noted on the right flank upon palpation of the abdomen. Further inquiry revealed a history of mild right-sided pelvic pain over the past two years, which the patient had not sought medical attention for as the pain was not bothersome. There was no family history of similar complaints, and the patient had no history of any type of abdominal surgery. However, he has a positive history of hypertension, hyperlipidemia, and type 2 diabetes mellitus for which he is taking medications but is non-compliant.

The pain was not accompanied by dysuria, back pain, or dyspnea. The patient is a non-smoker and does not consume alcohol. His biochemical study showed increased glucose levels and a deranged lipid profile (Table 1).

The patient’s leg and calf pain were managed, followed by an e-FAST scan of the abdomen as part of the trauma protocol. The e-FAST scan revealed a cystic structure in the right pelvic cavity, prompting further investigation. Color Doppler imaging showed an outpouching from the common iliac artery with a swirling flow and reduced velocity (Fig. 1). Subsequently, a computed tomography (CT) angiography of the abdomen and pelvis was performed, revealing a large-sized (9.72 × 7.9 cm) atherosclerotic fusiform aneurysm in the right common iliac artery just distal to

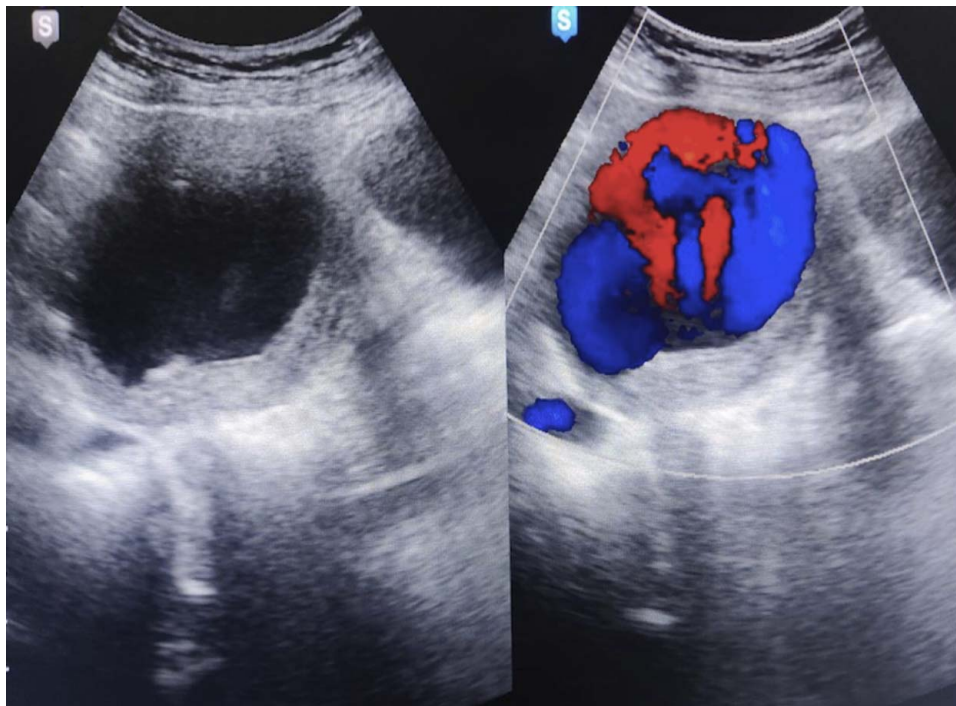


Figure 1. Gray scale and color doppler ultrasound image showing the cystic outpouching arising from common iliac artery showing Ying and Yang pattern in color doppler study.

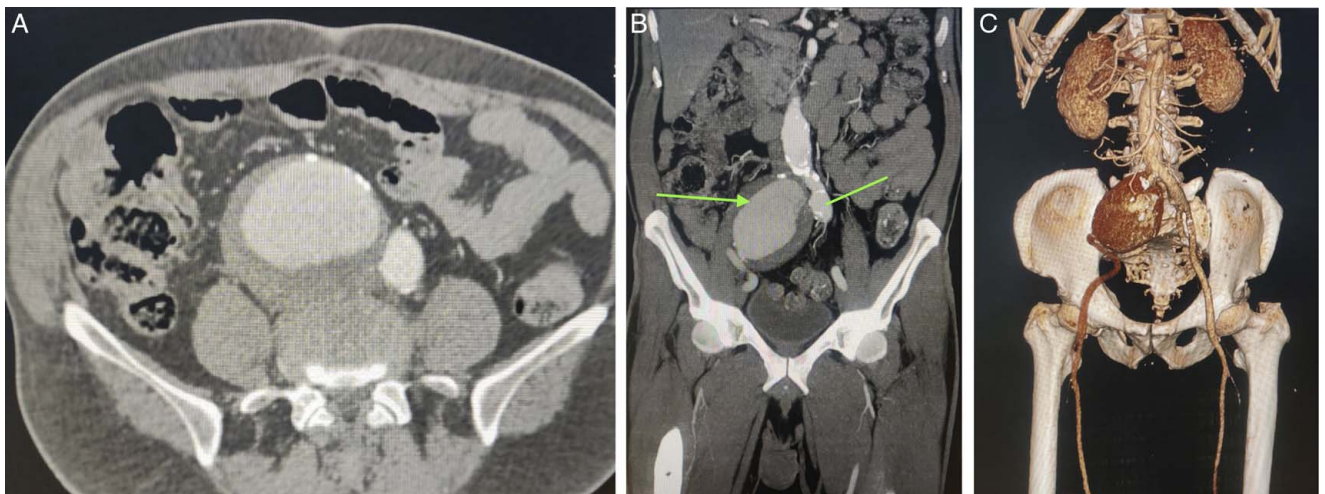


Figure 2. (A) Contrast enhanced computed tomography axial image showing contrast filled dilatation of right common iliac artery with peripherally displaced wall calcification. (B) Coronal reformatted contrast enhanced computed tomography image showing the bilateral common iliac artery aneurysm (right shown by green arrow, left shown by green line). (C) Three-dimensional volume rendered image showing the bilateral common iliac artery aneurysm.

the bifurcation, with eccentric wall thrombus and a small aneurysm in the middle aspect of the left common iliac artery. An aneurysm of the left common iliac artery (3 × 2.9 cm) with ectasia of the infra-renal part of the abdominal aorta (2.9 cm wide) was also noted (Fig. 2A, B, and C). There were no extensions of the aneurysm to the external or internal iliac artery. Additionally, atherosclerotic changes with wall calcifications were observed in the abdominal aorta and its branches.

Due to the large size of the aneurysm with eccentric thrombus and the patient's multiple risk factors, including hypertension, diabetes, and hyperlipidemia, there was concern for impending rupture of the aneurysm. Therefore, the vascular surgery and

interventional radiology teams were consulted, and the patient underwent open surgery (Fig. 3). There were no intraoperative or postoperative complications, and the patient was advised on

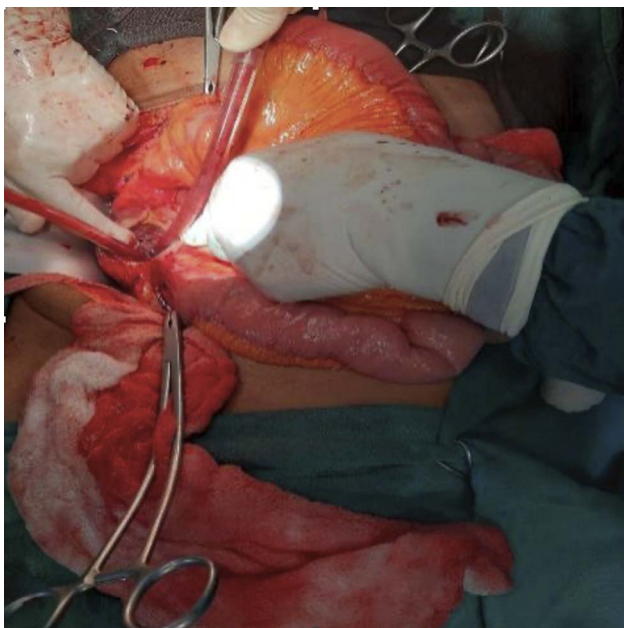


Figure 3. Intraoperative image showing the surgical repair of the common iliac artery aneurysm.



Figure 4. Xray Anteroposterior and lateral view showing the comminuted fracture of distal shaft of tibia and proximal shaft of fibula.

Table 2

Literature review of the case reports

Authors	Year	Age/sex	Presenting features	Risk factor	Comorbidities	Diagnostic modality	Size of aneurysm	Management
Hariri <i>et al.</i> ^[11]	2022	36 years/male	Unspecific left lower limb pain, numbness, paresthesia	Ex-smoker (3 pack year)	NA	Doppler US CTA	4 × 5 cm left common iliac artery	Open surgery with aorto-bi-femoral bypass (ABFB)
Asad <i>et al.</i> ^[18]	2020	82 years/female	coldness of the affected lower limb Abdominal pain Weight loss Appetite loss Incidental finding of a non-pulsatile, right iliac fossa mass on physical examination	Ehlers Danlos syndrome Ex-smoker (< 1 per day) Consumed little alcohol	Hypertension (HTN) Cerebrovascular Accident (CVA) osteopenia	CTA	8 cm isolated right common iliac artery	Hybrid approach: Right aorto-uni-iliac stent graft and right to left femoro-femoral crossover graft and right internal iliac artery embolization
Hu <i>et al.</i> ^[19]	2017	68 years/male	Chest pain Back pain	Smoker	HTN Penetrating aortic ulcer	3D CTA	3.6 cm right common iliac artery	Single stage endovascular repair
Willems <i>et al.</i> ^[20]	2021	79 years/male	Acute and progressive abdominal pain	NA	Brucellosis melitensis	CTA	3.1 cm right CIA 2.7 cm left CIA	Endovascular repair
Hwang <i>et al.</i> ^[21]	2023	58 years/male	Referral case following incidental detection of left CIAA	NA	Hepatitis B carrier Right inguinal hernia	CTA	7 × 4 cm left CIA	Endovascular repair with use of Iliac branch device
Centofanti <i>et al.</i> ^[22]	2021	75 years/male	Asymptomatic	NA	NA	CTA	3.2 cm left CIA	Endovascular repair with use of Iliac branch device
Ida and Taniguchi ^[23]	2016	49 years/male	Sudden left lower quadrant abdominal pain after defecation	HTN	HTN	CECT abdomen and pelvis	Left CIA aneurysm and dissection	Conservative treatment with antihypertensive medications
Zahdi and Lekehal ^[24]	2021	67 years/male	Abdominal pain	Smoking Hypertension	NA	CTA	4 cm right CIA	Open surgery
Selim <i>et al.</i> ^[13]	2020	80 years/male	Lower urinary tract symptoms Low back pain with numbness	NA	Asthma Diabetes Hypertension Chronic kidney disease Ischemic heart disease with PCI done	CT Abdomen and pelvis with contrast	4.2 × 3.6 × 5.9 cm left CIA	Endovascular approach under ultrasound with fluoroscopy guidance with elective stent angioplasty
Jiber <i>et al.</i> ^[5]	2019	75 years/male	Urinary retention large tender pulsatile mass in lower left abdominal quadrant	NA	NA	CTA	9 × 6 × 4 cm in left CIA	Open surgery
Our Study	2024	66 years/male	Mild tenderness in right lower abdominal region.	NA	Type II DM, Dyslipidemia	Ultrasound abdomen CTA	9.7 × 7.9 × 8 cm in left CIA	Open surgery

CECT, contrast enhanced computed tomography; CIA, common iliac artery; CTA, computed tomography angiography; NA, not available; US, ultrasound.

lifestyle modifications and measures to mitigate risk factors, with follow-up recommended. The case was also consulted for a comminuted fracture in the right tibial and fibular shaft (Fig. 4) and managed accordingly. Follow-up ultrasound evaluation for the abdominal aortic ectasia and left common iliac artery aneurysm showed no significant increase in size.

Discussion

This is a case of a 66-year-old man who was incidentally diagnosed as having a bilateral common iliac artery aneurysm. Isolated iliac artery aneurysm is a rare condition, with a prevalence of 0.03% in the general population, comprising 2–7% of all abdominal aneurysms^[4]. The most frequently encountered types of isolated iliac artery aneurysms involve the common iliac artery (found in 70–90% of cases), followed by the internal and external iliac arteries^[5–7]. Common iliac artery aneurysm (CIAA) typically occurs in elderly males, with a mean age ranging from 62 to 72 years, which aligns with our case^[8,9]. Similarly, Bolin *et al.*^[10] observed a median age of 69 years in a patient with an isolated iliac artery aneurysm. Charisis *et al.*^[11]'s systematic review identified a predominance of the disease among males, with an average age of 72 years.

Similar to abdominal aortic aneurysms, CIAA is associated with risk factors such as advanced age, male sex, white race, smoking, and hypertension^[7]. Less common risk factors include pregnancy, infection, connective tissue disorders, arteritis, trauma, and iatrogenic injuries^[10,12,13]. One of the main risk factors for atherosclerotic lesions is diabetes mellitus (DM). Conversely, individuals with diabetes exhibit a reduced rate of aneurysm development, a decreased rupture rate, delayed age of rupture (beyond 65 years), a lower mortality rate, and a shorter hospital stay for patients with abdominal aortic aneurysms^[14]. This protective effect is attributed to vascular remodeling induced by hyperglycemia and increased glycation end-products^[15].

Similarly, in patients aged 60 years and older, as well as in females, hyperlipidemia has been associated with a reduced risk of death in abdominal aortic aneurysm cases^[16]. This phenomenon may be attributed to the direct impact of hyperlipidemia on the vascular system, potentially slowing the progression of an aneurysm^[8]. Additionally, some research suggests that the protective effect of hyperlipidemia may be linked to statin therapy^[17]. Nevertheless, the precise mechanism behind this protective effect remains unclear and warrants further investigation. Our patient had a history of hypertension but did not smoke. He also had a background of diabetes and hyperlipidemia. Despite the significant size of the CIAA, the patient remained asymptomatic, possibly due to the described protective role of diabetes in disease progression. A review of CIAA case reports is outlined in Table 2^[5,12,13,18–24].

Due to their deep location within the pelvic cavity, IAAs typically remain asymptomatic and are often incidentally discovered due to the increased utilization of ultrasound (US) and CT scans^[5,13]. However, if symptoms do manifest, they may include lower abdominal and flank pain, the presence of an abdominal mass, or other nonspecific symptoms like nausea, constipation, urinary symptoms, paresthesia, chronic vague lower leg discomfort, sciatica, or syncope^[13,18]. In addition to these compressive symptoms, some individuals may present with thrombosis or rupture, leading to significant mortality

rates^[6,7,12,18]. Diagnosis is often delayed since these symptoms are not directly related to the vascular system. However, Krupski *et al.*^[25] found that a significant proportion (57%) of patients with isolated IAAs experienced symptoms such as abdominal pain (19%), neurological symptoms (9.5%), calf claudication (9.5%), urinary tract infection (9.5%), or hemodynamic instability (9.5%). Additionally, a pulsatile abdominal mass may sometimes be palpable, particularly during vaginal or rectal examinations, which provide better access to the pelvis. Despite this, physical examinations often yield inconclusive results^[10]. In our study, the aneurysm was detected incidentally while performing workup for trauma.

A CIAA is characterized by a permanent localized dilation measuring 2.0 cm or larger, as determined by various imaging modalities such as US, CT scans, magnetic resonance imaging (MRI), angiography, or surgical records^[8]. Doppler ultrasound is suitable for both screening and diagnosing aneurysms, while CT angiography (CTA) and MRI offer higher accuracy in diagnosis and provide detailed anatomical images of the affected arteries^[12]. Additionally, CTA plays a crucial role in planning pretreatment interventions^[5]. Although aneurysm was detected incidentally in ultrasound imaging of abdomen, detailed evaluation was done with CTA in our patient.

Patients with symptomatic IAAs and asymptomatic IAAs larger than 3.5 cm in diameter are recommended for intervention, whereas those with asymptomatic IAAs smaller than 3 cm should undergo regular imaging surveillance^[12]. In our case, we opted for surgical intervention due to the aneurysm's substantial size. While open surgical repair (OR) using prosthetic grafts has historically been the preferred treatment for CIAAs, endovascular repair has become increasingly common and is considered safe and effective, particularly for high-risk patients such as the elderly and those with multiple comorbidities^[2,5,8,18].

Conclusion

This study emphasizes the significance of early detection and management of isolated bilateral common IAAs, especially in high-risk individuals. Understanding the protective role of comorbidities like diabetes and hyperlipidemia can aid in decision-making. Timely intervention is crucial to prevent potentially life-threatening complications associated with IAAs.

Ethical approval

None.

Consent

Written informed consent was obtained from the patient's legal guardian for publication of this case report and the accompanying images. A copy of the written consent is available for review by the Editor-in-chief of this journal on request.

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None.

Author contribution

S.K.: conceptualization, as mentor and reviewer for this case report and for data interpretation. S.K.: contributed in conceptualization and reviewer. S.B.: contributed in performing literature review and editing. P.P.: contributed in performing literature review and editing. D.B.: contributed in writing the paper and reviewer for this case. S.B.: contributed in writing the paper. S.M.: contributed in writing the paper. All authors have read and approved the manuscript.

Conflicts of interest disclosure

All the authors declare that they have no competing interest.

Research registration unique identifying number (UIN)

None.

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Data availability statement

Data sharing is available upon reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

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