CASE REPORT

DOI: 10.5336/caserep.2025-108315

Internal Iliac Artery Aneurysms: Distinct Treatment Paths for Two Separate Cases

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ABSTRACT Internal iliac artery aneurysms (IIAA), predominantly occurring in the common iliac artery, are rare but can lead to significant morbidity and mortality. Effective management is crucial to prevent complications such as rupture, which can result in life-threatening hemorrhage. These aneurysms may occur in isolation or in conjunction with aortic aneurysms. We present 2 cases of internal iliac artery aneurysms, each managed with distinct therapeutic strategies. The 1st case involved an isolated IIAA treated successfully with surgical repair, and 2nd one treated with endovascular approach. These cases highlight the importance of tailored management approaches for IIAAs. Close monitoring and timely treatment remain essential in managing these complex vascular conditions.

Keywords: Endovascular procedures; hydronephrosis; iliac aneurysm; ligation

In healthy adults, the internal iliac artery typically has a diameter of approximately 0.54±0.15 cm, although this can vary depending on factors such as age, gender, and overall health. An aneurysm is typically defined when the diameter of the common iliac artery exceeds 1.85 cm in males and 1.5 cm in females.[1] Iliac artery aneurysms are often associated with abdominal aortic aneurysms, occurring in about 10% of cases, while isolated iliac artery aneurysms are less common, with an incidence of around 2%.[2] Most iliac artery aneurysms occur in the common iliac artery (89%), followed by the internal iliac artery (10%), and are least common in the external iliac artery (1%). This article aims to explore the clinical characteristics, diagnostic approaches, and current treatment options for managing internal iliac artery aneurysms (IIAA).

CASE REPORT

CASE 1

The patient has granted informed consent. A 57-year-old male presented to the emergency department with severe left flank pain and restlessness. A 57-year-old male presented to the emergency department with severe left flank pain and restlessness. On examination, his pulse rate was 120 beats per minute, and his blood pressure was 160/90 mmHg. Given his clinical presentation, vascular pathology was suspected. A thoracoabdominal computed tomography (CT) scan revealed a significant aneurysm in the internal iliac artery, measuring approximately 90 mm in length and 65 mm in maximum diameter. In addition, the patient's left renal collecting system was dilated, with

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Peer review under responsibility of Turkiye Klinikleri Journal of Case Reports.

Received: 08 Jan 2025 ***Accepted:*** 24 Apr 2025 ***Available online:*** 11 Jul 2025

the renal pelvis measuring 21 mm in the anterior-posterior direction (Figure 1a). Given the severity of the findings, the patient was immediately scheduled for emergency surgery. The decision for surgery was based on the potential risks posed by the aneurysm, including rupture or continued compression of the renal structures. Hydronephrosis, resulting from the external compression of the renal pelvis by the aneurysm, could lead to impaired renal function if left untreated. Furthermore, the patient exhibited signs of systemic distress, including a high pulse rate and elevated blood pressure, raising concerns for potential complications such as aneurysm rupture or ischemia. During the operation, the aneurysm sac was opened, decompressed, and ligated both proximally and distally. Postoperatively, the patient was hemodynamically stable and transferred to the cardiovascular surgery intensive care unit. A rapid decompression and proximal and distal ligation were performed, which is a standard approach for dealing with urgent complications from an aneurysm causing significant pressure on nearby structures, such as the renal collecting system. The patient was discharged without complications on the 5th postoperative day and remained in good health at the 36-month follow-up (Figure 1b). Postoperatively, the patient remained stable with no signs of complications related to the aneurysm or renal function. The early recovery, along with the resolution of clinical symptoms, suggests that the surgical intervention was successful in both addressing the vascular pathology and alleviating the hydronephrosis caused by the aneurysm compression.

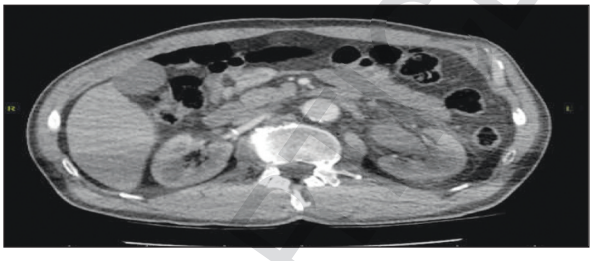

FIGURE 1a: Preoperative CT showing left kidney hydronephrosis

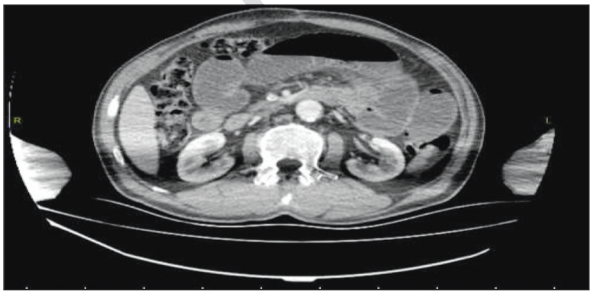

FIGURE 1b: Postoperative CT showing a normal left kidney

CASE 2

The patient has granted informed consent an 81-year-old male with a history of aortobifemoral bypass surgery performed 15 years ago. An 81-year-old male with a history of aortobifemoral bypass surgery performed 15 years ago for an abdominal aortic aneurysm presented to our emergency department with complaints of diffuse abdominal and groin pain lasting for 1 week. The patient also had a history of prostate cancer with lung metastasis. His general condition was stable upon presentation. A thoracoabdominal CT scan revealed significant vascular findings: the right common iliac artery measured 57 mm in diameter, the left 62 mm, with the left internal iliac artery measuring 95 mm and the right 20 mm. A significant thrombus, measuring 35 mm, was observed within the lumen of the left internal iliac artery highlighting a complex vascular issue requiring immediate assessment and intervention (Figure 2a).

The patient was admitted to the Intensive Care Unit (ICU) for pain and blood pressure control. Peripheral angiography was performed, revealing the intactness of the previously placed aortobifemoral bypass graft and retrograde filling of the bilateral iliac aneurysms. The procedure was initially paused to allow for comprehensive planning and coordination of the intervention strategy. One week later, under local anesthesia and fluoroscopic guidance, selective catheterization of the iliac aneurysms was performed via femoral artery access. For the left iliac aneurysm, 2 14-gauge vascular plugs (Lifetech Cera) were strategically placed proximal to the retrograde feeding artery to prevent further blood flow into the aneurysm. This was followed by the deployment of 4 multibeam plugs (Multibeam Invamed) between the initial plugs to ensure complete occlusion and stabilization of the aneurysm sac. Similarly, the right iliac aneurysm was addressed by placing 2 12-gauge vas-

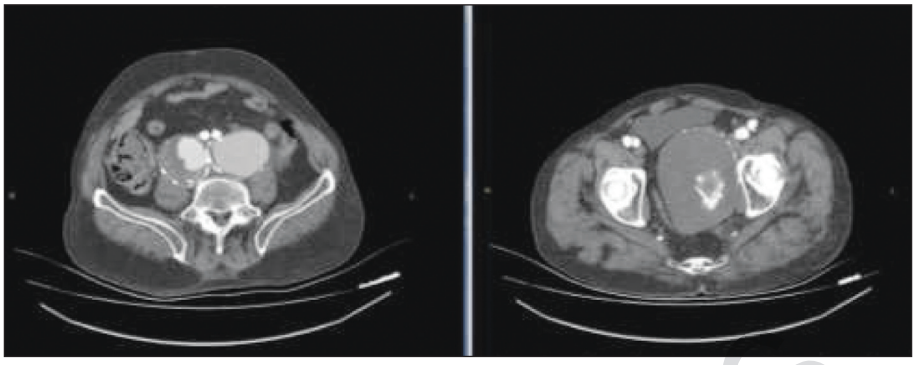

FIGURE 2a: Preoperative CT showing bilateral iliac artery aneurysms, with the left internal iliac artery aneurysm

cular plugs (Lifetech Cera) at critical points to block the inflow, followed by the insertion of 3 multibeam plugs (Multibeam Invamed) to reinforce the occlusion and prevent any potential endoleak. Bilateral aneurysms were successfully closed (Figure 2b). One day after the procedure, the patient was discharged with reduced symptoms. The meticulous placement of the plugs ensured effective closure of the aneurysms, minimizing the risk of rupture. The day after the procedure, the patient's symptoms significantly improved, and he was discharged in stable condition. Follow-up assessments showed complete closure of both aneurysms, and the patient was advised to return for regular monitoring to ensure long-term success and detect any potential complications early. The decision to perform selective catheterization and deploy vascular plugs via femoral access under local anesthesia was made to minimize operative risk and recovery time. The placement of multibeam plugs and vascular plugs successfully occluded the aneurysms and alleviated symptoms without causing significant complications.

DISCUSSION

Iliac artery aneurysms are most commonly caused by atherosclerosis (arterial hardening), genetic factors, and connective tissue disorders, all of which contribute to the weakening of the arterial wall. Atherosclerosis accelerates the degeneration of the arterial wall, while genetic and connective tissue factors predispose individuals to structural weaknesses, increasing the risk of aneurysm formation. IIAA are often asymptomatic and may be discovered incidentally during routine imaging tests. When symptomatic, these aneurysms can result from compression or impingement on adjacent structures, such as the ureters, intestines, or pelvic organs.

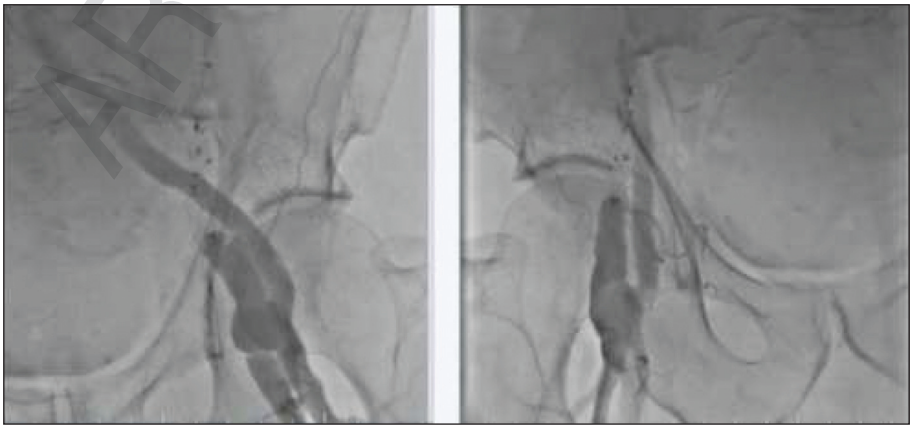

FIGURE 2b: Postoperative CT showing successful closure of the bilateral aneurysms

Symptoms can vary depending on the aneurysm's size, location, and the degree of compression on nearby organs. Common symptoms include pelvic pain, discomfort (often unilateral), pain during sexual intercourse, numbness or pain in the buttocks, thighs, or legs, urinary frequency or urgency, bowel dysfunction (e.g., constipation or diarrhea), and back pain.[3]

The majority of patients (95%) are elderly men (median age 71 years), but our 1[s] patient was relatively young. A review by Dix et al. reported abdominal pain in 31.7%, urinary symptoms or renal failure in 28.3%, lumbo-sacral pain in 18.3%, groin pain in 11.7%, hip or buttock pain in 8.3%, and rectal bleeding or constipation in 8.3% of cases.[4] Urological symptoms, such as ureteral colic, hydronephrosis, pyelonephritis, and renal failure, may develop secondary to ureteral obstruction.[5]

Early intervention is crucial, as conservative measures cannot prevent aneurysm growth, and elective surgery has a significantly lower mortality rate compared to emergency rupture repair (7% vs. 45%).[4] Elective repair is typically indicated for isolated iliac artery aneurysms when the diameter reaches 3.5 cm or more.[6] In our 2[nd] patient, the diameters of the right and left iliac arteries were 57 mm and 62 mm, respectively. Despite these large diameters, recent studies suggest that there is no direct correlation between aneurysm size and rupture risk.[3]

Treatment options for iliac artery aneurysms include open surgical repair and endovascular repair techniques. The choice of approach depends on factors such as the patient's overall health, anatomy, aneurysm location, and comorbidities. Traditional surgical methods, such as ligation, excision, endoaneurysmorrhaphy, and proximal and distal ligation, remain valid options but carry higher risks of bleeding and longer recovery timesi.[4] Endovascular techniques, including stenting and embolization, offer advantages such as reduced invasiveness, shorter hospital stays, and lower complication rates compared to open surgery. However, they may not fully address pressure-related symptoms. Stenting and coiling are considered equivalent to proximal and distal ligation.[7] These techniques offer advantages such as avoiding general anesthesia, less blood loss, and shorter hospital stays. However, they do not alleviate pressure-related symptoms. Proximal ligation alone reduces the risk of bleeding with limited dissection of the pelvis, but the aneurysm may rupture due to late retrograde flow, and compression symptoms are not relieved. Proximal and distal ligation, along with ligation of lateral branches, if present, is a less effective treatment, although the risk of bleeding is greater. Unilateral ligation is well tolerated if there is no disease in the contralateral artery. Compared with surgical repair, endovascular repair of iliac aneurysms results in shorter hospital stays, local anesthesia, no need for ICU admission, lower transfusion requirements, fewer complications (bleeding, infection), and similar mid-term outcomes.[8] In a study of 26 patients treated with endovascular repair, the technique achieved a 100% primary technical success rate and a low reintervention rate (7.7%).[9]

For our 1[st] patient, emergency surgery was necessary due to instability and the need to decompress the aneurysm to protect renal function. In the 2[nd] case, considering the patient's medical history and prior abdominal surgery, we opted for endovascular treatment to minimize surgical risks while effectively managing the aneurysms.

CONCLUSION

IIAA are rare but serious conditions that require prompt attention from vascular surgeons. Treatment should focus not only on rupture prevention but also on addressing compression-related symptoms. Early intervention is crucial to reduce the associated morbidity and mortality. Advances in endovascular techniques, including new stent designs and embolization materials, hold promise for improving treatment outcomes. Future research should focus on identifying biomarkers for aneurysm progression and developing personalized treatment plans based on genetic profiling, which could transform the management of iliac artery aneurysms.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct con-

nection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Eda Gödekmerdan Katırcıoğlu;* ***Design:*** *Eda Gödekmerdan Katırcıoğlu, Mihriban Yalçın;* ***Control/Supervision:*** *Eda Gödekmerdan Katırcıoğlu;* ***Data Collection and/or Processing:*** *Eda Gödekmerdan Katırcıoğlu, Ayşe Çiçek;* ***Analysis and/or Interpretation:*** *Eda Gödekmerdan Katırcıoğlu;* ***Writing the Article:*** *Eda Gödekmerdan Katırcıoğlu, Mihriban Yalçın;* ***Critical Review:*** *Eda Gödekmerdan Katırcıoğlu, Mihriban Yalçın;* ***References and Fundings:*** *Eda Gödekmerdan Katırcıoğlu, Ayşe Çiçek;* ***Materials:*** *Eda Gödekmerdan Katırcıoğlu, Ayşe Çiçek.*

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