

## Surgical approach to internal iliac arteries in repair for bilateral iliac aneurysms

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### ABSTRACT

Bilateral iliac artery aneurysms are rare pathologies. Although patients are often asymptomatic, they are associated with high morbidity and mortality rates due to the risk of rupture in symptomatic patients. Currently, the treatment of iliac artery aneurysms is feasible using endovascular and open surgical techniques. When aneurysm involves the ostium of internal iliac artery, anastomosis of this artery to the interposed graft is recommended. Nevertheless, in some surgical conditions, anastomosis to the interpositioned graft may be impossible. Herein, we present a 76-year-old male case who underwent open surgery for bilateral iliac aneurysmectomy and graft interposition. In this case, surgical ligation of bilateral internal iliac arteries was performed due to the weakness and fragility of the vessel wall.

**Keywords:** Aneurysm; bilateral internal iliac artery; surgical repair; ligation.

Aneurysmatic dilatation of the iliac artery is more common in patients with advanced age.<sup>[1]</sup> It usually involves only one side with bilateral lesions being extremely uncommon and difficult to diagnose.<sup>[1]</sup> Patients presenting with rupture as the first sign of clinically asymptomatic iliac artery aneurysm comprise 33 to 38% of the cases,<sup>[1,2]</sup> thereby, indicating the high mortality and morbidity associated with this condition. Early detection of asymptomatic iliac artery aneurysms with advanced imaging modalities bears a clinical significance.<sup>[1-3]</sup> Potential therapeutic strategies include endovascular interventions or open surgery.<sup>[1-3]</sup> In patients with bilateral iliac artery aneurysms, internal iliac artery should be preserved or re-implanted.<sup>[1-3]</sup> Bilateral interruption of the blood flow in the iliac arteries has been reported to result in pelvic ischemia, impotence, or pelvic claudication.<sup>[1-3]</sup> Also, injury to collateral circulation may represent another potential cause of increased morbidity. On the other hand, failure to establish blood flow in both internal iliac arteries may lead to pelvic ischemia. Despite this fact, in the presence of thin-walled or lacerated vessels precluding anastomosis, surgical ligation may be considered.

Herein, we present a 76-year-old male case who underwent open surgery for bilateral iliac aneurysmectomy and graft interposition. In this case, surgical ligation of bilateral internal iliac arteries was performed due to the weakness and fragility of the vessel wall.

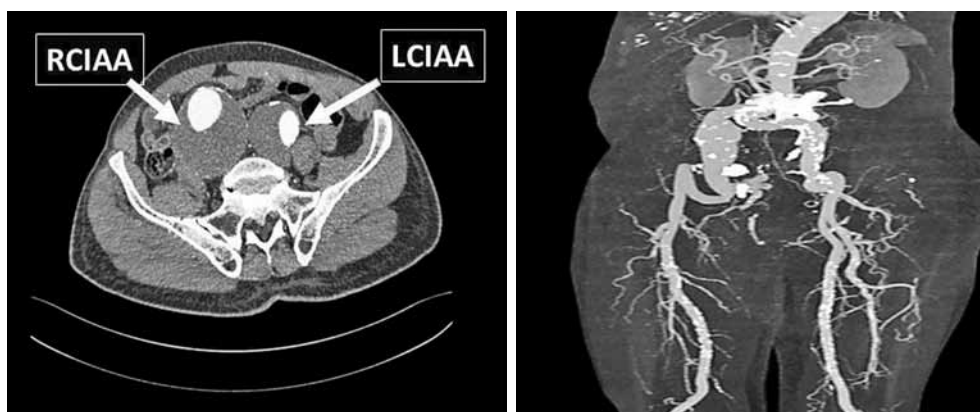
### CASE REPORT

A 76-year-old male patient presented to our outpatient unit with complaints of abdominal pain emerging after 50 meters of walking for the past three months. The pain was limited to the left lower quadrant and the patient had no family history of a diagnosis of aneurysms or sudden death in family members. At the time of presentation, his heart rate was 68 bpm, blood pressure was 140/74 mmHg, and body temperature was 36.4 °C with nonspecific biochemistry results. On chest X-ray, the cardiothoracic index was below 2.5. Electrocardiogram showed sinus rhythm with no findings suggestive of cardiac ischemia or other pathology. Physical examination showed that femoral and distal peripheral pulses were bilaterally palpable. Abdominal ultrasound showed bilateral dilatation in the iliac arteries in the abdominal ultrasound. Computed tomography was used to evaluate the intra-abdominal pathology. Contrast-enhanced abdominal tomography showed bilateral aneurysmal dilatation of the common iliac arteries. The diameters of the abdominal aorta, right common iliac artery, and the left common iliac artery were 2.1x2.0, 6.2x5.9, and 4.3x3.8 cm, respectively (Figure 1). No endovascular

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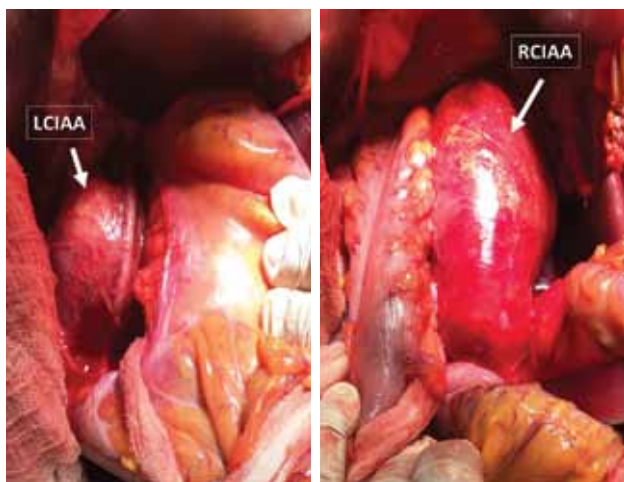


**Figure 1.** Bilateral iliac artery aneurysms as shown by the contrast enhanced tomographic images. Note the extensive collateral circulation on the right side. RCIAA: Right common iliac artery aneurysm; LCIAA: Left common iliac artery aneurysm.

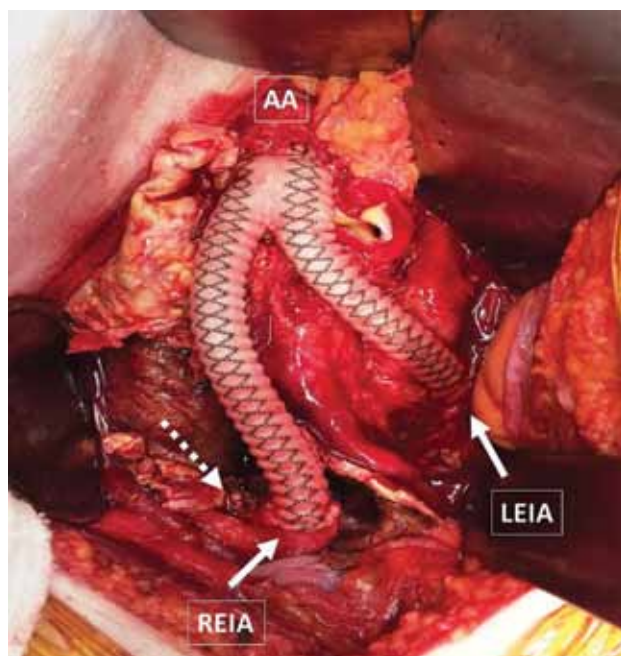
procedures were performed due to the aneurysmatic involvement of the internal iliac arteries. The patient was asked to provide a written informed consent for surgery, after information was provided to him on the risk of mortality and free rupture into the abdominal cavity. A written informed consent was obtained from the patient.

Under general anesthesia, the abdominal cavity was accessed through a median laparotomy and the distal abdominal aorta as well as the iliac arteries were explored (Figure 2). Aneurysmatic dilatation was also observed macroscopically and, then, bilateral iliac artery aneurysmectomy was performed by placing clamps on the aorta and distal external iliac arteries. At this stage, the vessel wall in the proximal

segments of both internal iliac arteries was observed to be tiny and fragile. Also, adequate retrograde blood flow was present in the internal iliac arteries. No re-implantation was performed in the internal iliac arteries, which were too fragile and lacerated. An end-to-end anastomosis with a 16:8 Dacron Y graft between the proximal graft and the distal abdominal aorta was accomplished, while the distal anastomoses



**Figure 2.** Macroscopic appearance of the bilateral iliac artery aneurysms in the surgical field. RCIAA: Right common iliac artery aneurysm; LCIAA: Left common iliac artery aneurysm.



**Figure 3.** The tube graft placed between the distal abdominal aorta and both external iliac arteries. The arrow with the white interrupted line shows the site of ligation on the right internal iliac artery. REIA: Right external iliac artery aneurysm; LEIA: Left external iliac artery aneurysm.

were performed with end-to-end anastomoses in both distal external iliac arteries (Figure 3). Both internal iliac arteries were ligated. Following hemostasis, the abdominal layers were closed in accordance with the normal anatomy. After a one-day stay in the intensive care unit postoperatively, he was transferred to the patient ward.

Postoperatively no pelvic, visceral, or distal ischemia occurred, and the patient was discharged with complete cure in the sixth postoperative day with hypertensive treatment.

## DISCUSSION

As seen in our case with abdominal aortic aneurysms, the aneurysms of iliac arteries frequently develop on the background of existing atherosclerosis.<sup>[1-3]</sup> Other etiological factors include infections, injuries, arteritis, connective tissue disorders such as Marfan's syndrome, and pregnancy.<sup>[1-3]</sup> Although mostly asymptomatic, aneurysms of the iliac arteries may lead to neurological, urological, or gastrointestinal symptoms due to the compression effect on the adjacent organs.<sup>[1-3]</sup> Also, hematuria due to uretero-iliac aneurysmal fistula, or hydronephrosis secondary to ureter compression may develop in the urinary system.<sup>[1-3]</sup> Other symptoms due to a compression effect on the gastrointestinal system include constipation, abdominal distension, ileus, or melena.<sup>[1]</sup> Neurological manifestations may include lumbosacral plexus entrapment and consequent back pain, pain projecting anteriorly in the thigh, and pain and paresthesia in the legs.<sup>[1]</sup>

The primary goal of treatment in bilateral iliac artery aneurysms be it surgical or endovascular, is to eliminate the risk of rupture.<sup>[1]</sup> Surgical approach involves accomplishment of graft interposition through aneurysmectomy, as well as the use of graft material. Particular attention should be paid to avoid injury to the internal iliac arteries during this procedure. The absence of reimplantation of the internal iliac arteries in open surgical techniques and the use of coil embolization in endovascular approaches may result in decreased penile and gluteal blood flow, which have been reported to be associated with pelvic ischemia, impotence, or pelvic claudication.<sup>[4]</sup>

Current management strategies for iliac artery aneurysms include open surgery or endovascular interventions. Conventional surgery remains the gold standard approach in the management of aneurysms involving the common iliac artery.<sup>[1-5]</sup> On the other

hand, endovascular interventions may be preferred in appropriately selected patients, as they are associated with a less invasive course of management.<sup>[4-7]</sup> For instance, endovascular procedures may be preferred in aneurysms located in poorly accessible anatomical sites, or in patients with a history of previous abdominal surgery or concomitant conditions. Also, successful results have been reported for endovascular grafting and coil embolization in the distal branches of the internal iliac arteries as alternative management modalities.<sup>[4-7]</sup> However, whether endovascular interventions would eventually replace open surgery still remains unclear, due to the lack of data on long-term outcomes with this management strategy.<sup>[6-8]</sup>

Review of literature revealed no large patient series undergoing bilateral internal artery ligation. In the light of common practice, a recommendation is made to perform an end-to-end anastomosis between the internal iliac arteries and the graft placed in the position of the common iliac artery.<sup>[1]</sup> However, in cases with fragile and tiny vessel walls or in those with traumatic lacerations of the arteries precluding a surgical anastomosis, ligation may be undertaken. In such cases, the adequacy of the collateral branches and retrograde blood flow should be ascertained. Also, in the presence of visceral ischemia, possible revascularization should always be considered. In our patient, no re-implantation of the internal iliac artery was performed due to degenerative changes in the walls of the internal iliac artery potentially complicating surgery and also on the basis of the presence of adequate retrograde blood flow. Implantation may be opted out, when mesenteric arterial blood flow is normal and pelvic collateral blood flow is adequate, or when the patient has strong retrograde blood flow in the internal iliac artery. However, in such cases, a particular emphasis should be placed on the close monitoring of the patient with regard to potential pelvic ischemia. Our case had no such morbidity during the follow-up.

In conclusion, the recommended approach involves the re-implantation of the internal iliac arteries. Preservation of the pelvic collateral blood flow should be a priority in all patients. When the superior and inferior mesenteric blood flow is normal or retrograde blood flow is strong, a decision to not to perform reimplantation of the internal iliac artery may be justified, when surgery seems infeasible. However, it should be kept in mind that the latter approach requires close patient monitoring.

### Declaration of conflicting interests

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