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Campos Moraes Amato, Alexandre; Melissano, Germano; Liu, Xiaobing; Civilini, Efrem; Chiesa,
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Endovascular approach for isolated common iliac aneurysm and severe kyphoscoliosis

Tratamento endovascular de aneurisma isolado de artéria iliaca comum e cifoescoliose grave

Alexandre Campos Moraes Amato, Germano Melissano, Xiaobing Liu, Efrem Civilini, Roberto Chiesa*

Abstract

We report the case of a 72-year-old patient presenting with an isolated common iliac aneurysm with occlusion of contralateral common iliac artery and severe kyphoscoliosis. Because of high risk for open surgery due to chronic obstructive pulmonary disease, this patient was treated with an endovascular approach using an aortomonoiliac stent graft, followed by a femoro-femoral crossover bypass. This report illustrates the usefulness of a minimally invasive approach, and feasibility even for patients with difficult anatomy.

Keywords: Aneurysm; aortic and iliac surgery; endovascular treatment, adult; therapeutic; iliac aneurysm; stents; tomography, treatment outcome; vascular patency.

Introduction

Isolated iliac artery aneurysms are rare.¹ They are found in only about 0.03%² of the general population and represent 2% of all abdominal aneurysms.³⁻⁵ Moreover, its association with severe kyphoscoliosis, to our best knowledge, was not previously reported.

Although open surgical repair with prosthetic graft is the gold standard treatment for iliac artery aneurysms,^{3,4,6} an increasing number of reports show that endovascular repair is possible, with several advantages.^{4,7-11}

The purpose of this study is to report a case of a patient with an isolated left common iliac aneurysm with occlusion of the right common iliac artery and severe kyphoscoliosis and gibbosity causing extreme vessel tortuosity. He was successfully treated with a carefully planned endovascular approach.

Resumo

Relatamos o caso de um paciente de 72 anos com aneurisma isolado de iliaca, oclusão contralateral de artéria iliaca comum e cifoescoliose grave. Devido ao alto risco para cirurgia convencional em razão de doença pulmonar obstrutiva crônica, o paciente foi tratado com abordagem endovascular, utilizando uma endoprótese aortomonoiliaca, seguida de uma derivação fêmoro-femoral cruzada. Este relato ilustra a utilidade de uma abordagem minimamente invasiva e demonstra que, mesmo para pacientes com anatomia difícil, é factível.

Palavras-chave: Aneurisma; cirurgia aorto-iliaca; tratamento endovascular, adulto; terapêutico; aneurisma de iliaca; stents; tomografia, desfecho de tratamento; patência vascular.

Case report

A 72-year-old man was admitted at our service with a 5.6 cm isolated left common iliac aneurysm with occlusion of right common iliac artery discovered during ultrasound screening.

The patient was a former heavy smoker who also had hypertension. He had no previous history of aneurysms. However, 2 years before, he had a trauma with lumbar vertebrae fracture (L2 and L3) and secondary spinal canal stenosis. His physical examination revealed severe kyphoscoliosis, gibbosity in lumbar region, significant thoracic asymmetry and obesity.

A preoperative CT scan was performed (Figure 1) showing the isolated left common iliac aneurysm and an important tortuosity of the abdominal aorta subsequent to the tortuosity of the spine (video available online at

* Chair of Vascular Surgery, Vita-Salute University, Scientific Institute H. San Raffaele, Milan, Italy.

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www.scielo.br/jvb). In the radiological examination, left convex dorsal and right convex lumbar scoliosis were stated, denoting an 81-degree lumbar scoliosis in frontal plane (Figure 1A) and a 65-degree kyphotic curvature in the sagittal plane (Figure 1B).

During surgical risk stratification, electrocardiography stated left bundle branch block, echocardiography revealed moderate left ventricular hypertrophy and a rest ejection fraction of 55%, suggesting a previous mild asymptomatic myocardial infarction. He also had a severe respiratory insufficiency due not only to chronic obstructive pulmonary disease, but also to restrictive disorder, which turned him into a night bi-level positive airway pressure dependent.

Due to the obvious risks of open surgery and despite the anatomical difficulties, endovascular approach was preferred over open surgery. The procedure was performed in the operating room and a portable digital C-arm image intensifier was used. Under local anesthesia, left femoral artery was surgically exposed. At this time, 5000 IU of unfractionated heparin were administered intravenously. A standard 8F sheath was inserted over guidewire.

Angiography showed a large left common iliac aneurysm. Selective catheterization using a Simmons-2 catheter and left hypogastric artery embolization with five coils (0.035 inch in diameter and 5 cm in length; MReye stainless-steel coils; William Cook Europe) were performed. A Lunderquist extra-stiff guidewire was inserted through the catheter, over which a stent graft (24-12 mm in diameter and 131 mm in length; Zenith® Aortomonoiliac Graft ZCMD-24-12-131-SR-UNI-E-ENDO; William Cook Europe Aps) was infrarenally deployed, excluding the common iliac aneurysm and covering collateral circulation. Completion angiography revealed correct placement of the endograft, with complete exclusion of the aneurysm and hypogastric artery without evidence of endoleaks and good renal flow. Following the endovascular procedure, right femoral artery was surgically exposed, and a femoro-femoral crossover bypass procedure (InterGard® 6 mm ringed, InterVascular) was performed.

The postoperative period was uneventful. The patient was discharged home 3 days after the procedure. He is alive and asymptomatic at 1-year follow-up.

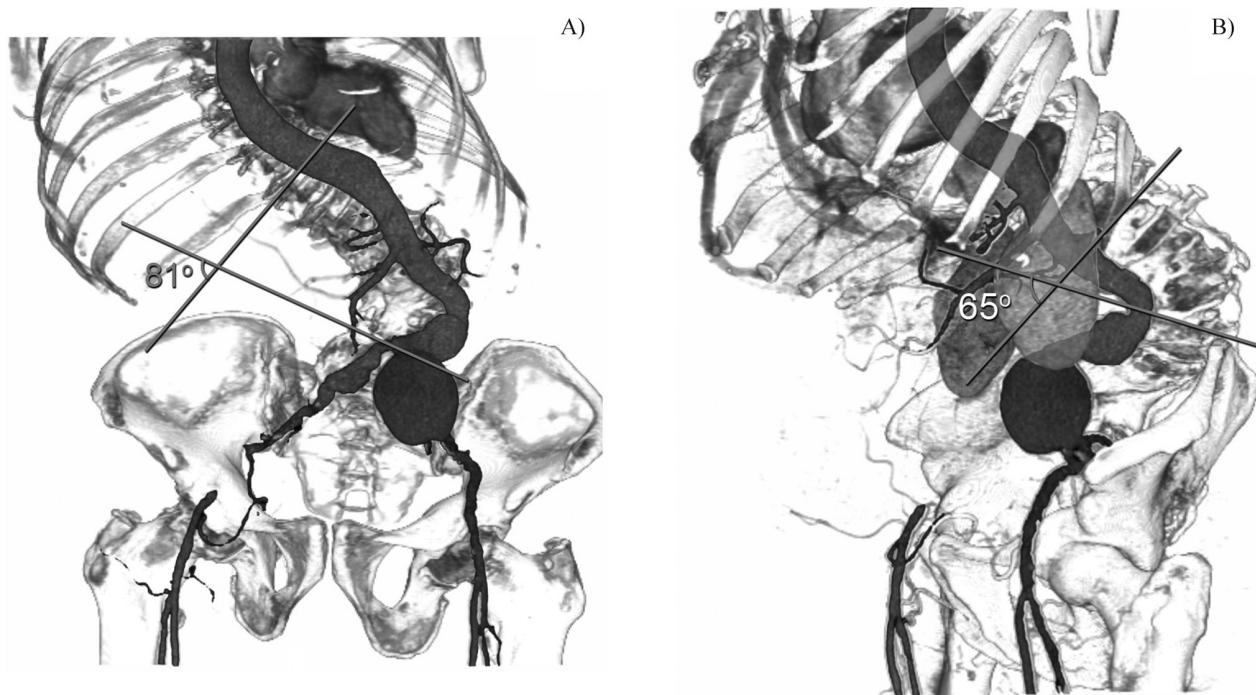


Figure 1 - Three-dimensional reconstruction of preoperative CT scan with OsiriX software¹² showing the left common iliac aneurysm, occlusion of the right common iliac artery and vicarious collateral circulation. A) Anteroposterior view shows extreme lumbar scoliosis; B) left sagittal view shows a severe kyphotic curvature

A CT scan performed 12 months after the surgery demonstrated endograft and femoro-femoral graft patency, complete exclusion of left common iliac aneurysms without evidence of endoleak (Figure 2 and video available online at www.scielo.br/jvb) and shrinkage of the aneurysmal sac from 98.24 cm³ measured in preoperative CT scan to 35.3 cm³ (Figure 3).

Discussion

Aorta and major vessels may change their normal path due to scoliosis^{13,14} and irregular aortic blood flow may lead to aneurysm formation.^{14,15} Vessel tortuosity can make endovascular repair technically challenging.^{16,17} In the presented case, moreover, severe respiratory insufficiency and thoracic deformity were also contraindications to open surgery. Thus, the best treatment for this case was dubious.

Open repair of common iliac aneurysms is the current gold standard. However, endovascular technique carries a number of potential advantages, as it avoids general anesthesia and aortic clamping, reduces operative blood loss and transfusion requirements, shortens hospital stays and limits the overall physiological stress associated with conventional open surgery^{1,4,8-10,18} Pitoulias et al.⁹ stated that endovascular repair is safe and effective in cases without anatomical challenges, with better intraoperative and early postoperative outcomes, as well as durable mid-term re-

sults, concluding that endovascular procedure should be offered as first-line therapy.

Literature shows that coil embolization of the internal iliac artery is performed in 37-78% of the cases,^{1,9} and it



Figure 2 - Three-dimensional reconstruction of postoperative CT scan with OsiriX software showing left endograft and femoro-femoral bypass graft patency, right iliac occlusion and complete exclusion of common iliac aneurysm. The arrow points to the coils used in the procedure to prevent backflow from the hypogastric branches

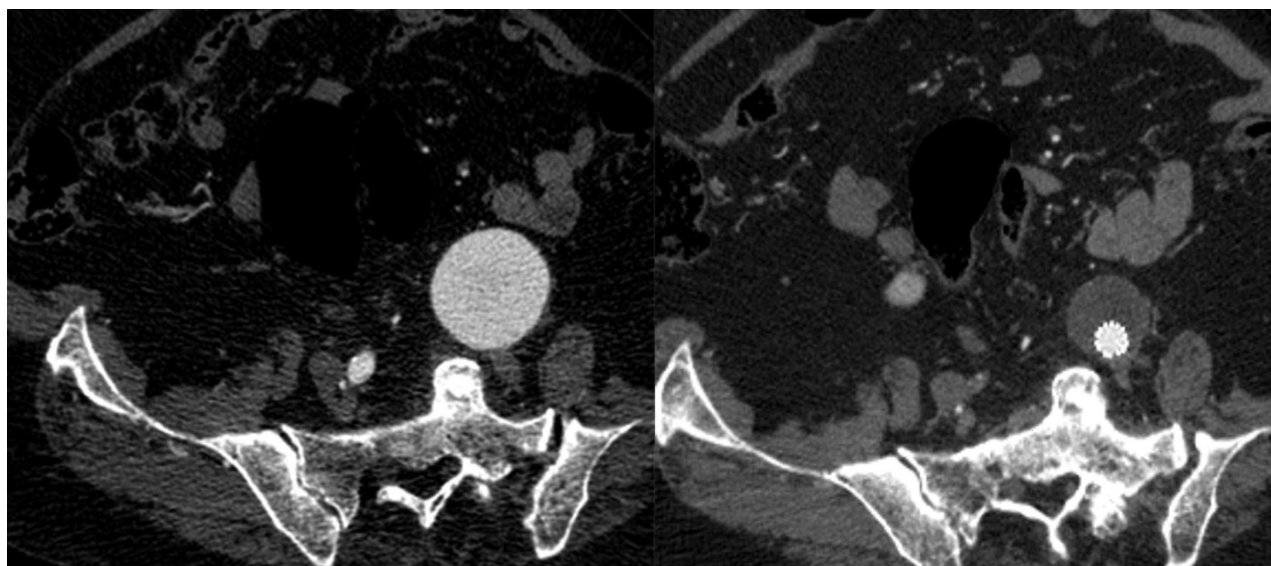


Figure 3 - Preoperative and postoperative CT scan of axial view of common iliac aneurysm showing absence of endoleak and shrinkage of the aneurysmal sac

was also performed in the case reported here to prevent backflow into the aneurysm.

Post-processing preoperative CT scan with OsiriX software¹² allowed accurate measurement and planning of the endovascular procedure. The aortomonoiliac endograft used to expressly adapt to the patient's particular anatomy, with a short proximal large segment, designed to fit the aorta, followed by a long narrow iliac segment, designed to fit the iliac artery, allowed it to be deployed even in this tortuous artery.

Complete exclusion of the iliac aneurysm resulted in significant shrinkage of the aneurysmal sac after only 1 year, proving the efficacy of the method. Our encouraging result demonstrates acceptable mid-term graft patency.

In conclusion, this report confirms the feasibility of endovascular repair of isolated common iliac aneurysms in complex vessel anatomy worsened by severe kyphoscoliosis. New generation devices are more adaptable to difficult anatomy, broadening endovascular approach and allowing us to make a personalized choice for each patient.

Supplementary online information: Video available at www.scielo.br/jvb - Three-dimensional reconstruction movie of preoperative and postoperative CT scan with OsiriX software.

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Correspondence:

Dr. Germano Melissano, MD

IRCCS H. San Raffaele, Department of Vascular Surgery
Via Olgettina, 60

20132 – Milan, Italy

Tel.: +39 02.2643.7146

Fax: +39 02.2643.7148

E-mail: melissano.germano@hsr.it