

**Case
Report**

Endovascular Repair of an Abdominal Aortic Aneurysm with Iliac Vein Compression Syndrome

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An 84-year-old man with chronic obstructive pulmonary disease (COPD) was referred to our institution for further treatment of severe swelling of the left lower extremity. The left iliac vein was compressed by the abdominal aortic aneurysm and a right common iliac arterial aneurysm measuring 62 mm and 45 mm in diameter and was partially thrombosed. Multiple pulmonary artery embolisms were also noted. Endovascular repair of the abdominal aortic aneurysm and the right common iliac arterial aneurysm was performed because of his respiratory dysfunction. The left leg edema gradually resolved after endovascular treatment. Six months after the treatment, computed tomography (CT) demonstrated resolution of the venous thrombus of the left lower extremity. Although open surgery is reliable treatment for iliac compression syndrome, endovascular treatment might be a feasible and an adequate therapeutic option for patients who have severe comorbidities, complications, or high frailties.

Keywords: endovascular aneurysmal repair, abdominal aortic aneurysm, iliac vein compression syndrome

Introduction

Iliac vein compression syndrome is a result of left common iliac vein compression between the right common iliac artery and the overlaying spine. Although this syndrome is typically characterized by normal iliac artery compression without aneurysmal formation, an abdominal aortic or iliac arterial aneurysm can also lead to the

same result. We herein describe a patient with iliac vein compression syndrome successfully treated by endovascular therapy of the abdominal aortic aneurysm. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Case Report

An 84-year-old man was referred to our institution for further treatment of severe swelling of the left lower extremity. He had been previously treated for chronic obstructive pulmonary disease (COPD). Computed tomography (CT) showed an infra-renal abdominal aortic aneurysm and a right common iliac arterial aneurysm, measuring 62 mm and 45 mm in diameter, respectively (**Fig. 1a**). The left iliac vein was compressed by the abdominal aortic aneurysm and was partially thrombosed (**Fig. 1b**). Multiple pulmonary artery thrombus was also noted (**Fig. 1c**). Anticoagulation

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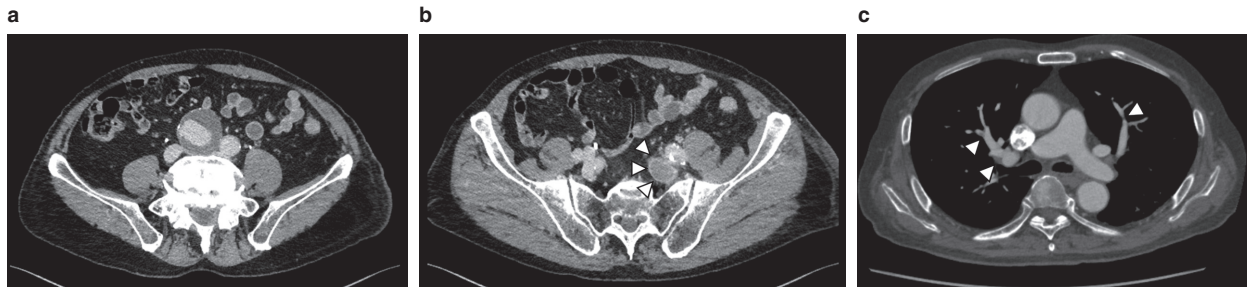


Fig. 1 (a) Computed tomography demonstrated left iliac vein compressed by right common iliac aneurysm measuring 45 mm in diameter. (b) Thrombosis from left femoral vein to left iliac were detected (arrowheads). (c) Pulmonary thrombus was also detected (arrowheads).

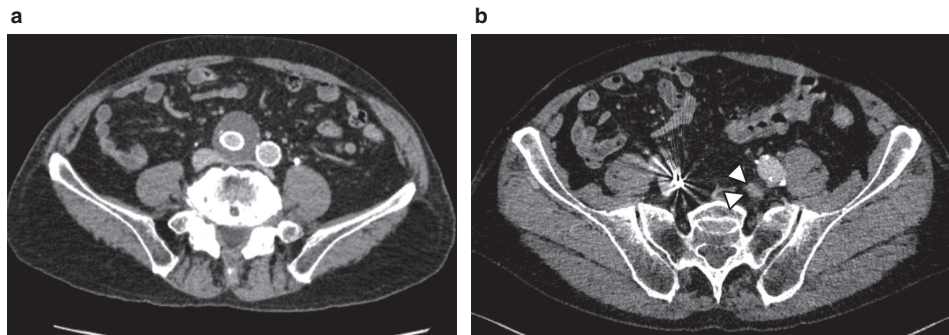


Fig. 2 (a) CT performed 1 after treatment demonstrated decompression of left iliac vein. Common iliac aneurysmal diameter was unchanged compared with preoperative CT findings. (b) The venous thrombus of the left lower extremity was resolved. CT: computed tomography

therapy consisting of heparin and apixaban was started soon after admission. Prosthetic graft replacement of the aneurysm via a laparotomy was considered ideal to directly decompress the thrombosed iliac vein. However, endovascular repair of the aneurysms was planned because of his respiratory dysfunction (forced expiratory volume [FEV]1.0 1.14 L/sec FEV1.0% 42.9%). Therefore, endovascular repair (Gore Excluder, W.L. Gore & Associates, Inc, Flagstaff, Arizona, USA) of the abdominal aortic aneurysm and the right common iliac arterial aneurysm was performed electively. Endovascular aneurysm repair (EVAR) was expected to treat not only the aneurysms, but also the iliac vein compression syndrome. Coil embolization of the right internal iliac artery was performed simultaneously. The patient was well during the postoperative period and no significant complication was noted. The left leg edema gradually resolved after endovascular treatment. One year after the treatment, CT demonstrated resolution of the venous thrombus of the left lower extremity (**Fig. 2**). Furthermore, no pulmonary artery thrombus was detected. The patient is currently doing well 14 months after the operation.

Discussion

Iliac vein compression syndrome is characterized by the compression of the left common iliac vein between the right common iliac artery and the overlying spine, with subsequent development of deep venous thrombosis (DVT) in the left lower extremity.¹⁾ This phenomenon is also known as the May–Thurner syndrome.^{2,3)} The combination of chronic mechanical compression and pulsatile vibratory pressure from the artery causes chronic repetitive microtrauma. This leads to endothelial injury of the vein that may predispose one to DVT due to specific morphologic changes.⁴⁾

Several treatment options for iliac vein compression syndrome have been described in the literature. These include anticoagulation therapy, open surgery, and endovascular therapy. Recently, with the advance of the endovascular technique, an endovascular venous stent placement in combination with anticoagulation therapy is considered first-line. Butros et al.⁴⁾ reported that there have been some cases successfully treated by a self-expanding venous stent following thrombolysis. The cumulative patency of venous stents

with catheter-directed thrombolysis was reported to be 74%.⁵⁾ Open surgery was indicated in unsuccessful cases.⁶⁾

However, these treatment strategies are indicated in patients with a “normal” iliac artery and abdominal aorta. A different therapeutic option is thus necessary for patients with iliac vein compression syndrome complicated with “arterial aneurysms.” In our case, direct decompression by aneurysmal resection was considered ideal to relieve the symptoms resulting from the iliac compression. There have been some reports describing the efficacy of open surgical repair of the aneurysm associated with iliac vein compression syndrome.^{7,8)}

Endovascular aneurysmal repair is also considered in high-risk patients, such as in our case. Due to severe respiratory dysfunction, our patient underwent endovascular repair of the abdominal aortic aneurysm and right common iliac artery aneurysm. There have only been two reports of EVAR for iliac vein compression syndrome.^{9,10)} In these reports, it was reported that after EVAR, the mass effect on the surrounding structures persisted although the pulsatile force reduced soon after the procedure. Therefore, the relief of venous compression was slower than that of an open surgery. The leg edema also improved after the operation, but it gradually resolved in both patients. A CT scan 3 months after the endovascular treatment for one patient showed no remarkable changes in aneurysm size and venous compression persisted, but the lower limb edema resolved clinically.¹⁰⁾ Aneurysmal aorta and iliac artery repair with an endograft results in transfer of aortic pulsatile flow and associated shear forces from the aneurysm walls to the lumen of an endograft, thereby reducing aneurysm vessel wall stress and ultimately size.⁹⁾ Combe et al.⁷⁾ reported two patients who underwent an exclusion of the aneurysm in combination with an axial bi-femoral bypass. Considering these findings, aneurysmal decompression effect by the endovascular procedure was considered adequate for the relief of the iliac vein compression syndrome.

Conclusion

Iliac compression syndrome caused by abdominal aortic aneurysm is a very rare clinical entity. Although open surgery is reliable treatment, EVAR might be a feasible and an adequate therapeutic option for patients who have severe comorbidities, complications, or high frailties.

Disclosure Statement

All authors have no conflicts of interest.

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