Primary External Iliac Venous Aneurysm: A Case Report

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Primary iliac venous aneurysm is an exceedingly rare abnormality that can be complicated by pulmonary embolism, thrombosis, and rupture. Here we report the case of an otherwise healthy 40-year-old man with a unilateral external iliac vein aneurysm without any evidence of an arteriovenous fistula, proximal stenosis, or obstruction, as reported on computed tomography. Pulmonary embolism was diagnosed using 99mTc-macroaggregated albumin scintigraphy. To prevent life-threatening complications, we treated the patient with anticoagulant therapy and performed aneurysmectomy with reconstruction using a saphenous vein graft patch. Although postoperative venography showed obstruction of the external iliac vein, the patient remained asymptomatic.

Keywords: primary venous aneurysm, iliac vein, treatment

Introduction

Iliac venous aneurysm is an uncommon abnormality. Primary venous aneurysm, which is defined as a condition without an arteriovenous fistula, proximal stenosis, or obstruction, is particularly rare.1 The aneurysm may be associated with life-threatening complications, such as pulmonary thromboembolism, thrombosis, and rupture, followed by shock or cardiopulmonary arrest. Prior reports have shown several treatments, including anticoagulants, resection with venorrhaphy or patch plasty, and percutaneous coil embolization, were required for patients with primary venous aneurysm. In this report, we describe the case of a patient with a primary venous aneurysm of the right external vein; he was treated with tangential aneurysmectomy and reconstruction using a saphenous vein graft patch.

Case Report

A 40-year-old male who complained of pain in the right inguinal region underwent abdominal ultrasonography, which revealed a 6-cm sacciform tumor in the right lower abdomen. The patient had no medical history including surgery, trauma, or inflammatory disease, and he was referred to our hospital for further evaluation. Enhanced computed tomography (CT) showed continuity between the cystic tumor, which measured 66 mm × 72 mm, and the right external iliac vein (EIV) (Fig. 1A). Further, vascular ultrasonography indicated that the mass was a section of the ectatic vein. The mass was diagnosed as a right EIV aneurysm without stenosis or obstruction of the proximal flow. Although the patient did not present with any symptoms, 99mTc-macroaggregated albumin scintigraphy revealed a pulmonary thromboembolism in the inferior lobe of the right lung. Venography revealed a large sacular aneurysm of the EIV with flow stagnation (Fig. 1B), whereas arteriography of the common iliac artery did not indicate any sign of an arteriovenous fistula. Preoperative anticoagulant treatment with warfarin was initiated, and aneurysmectomy was recommended to prevent disastrous complications, such as massive pulmonary embolism and rupture.

One month after the aneurysm was diagnosed the patient underwent resection to treat the right EIV aneurysm. With the patient under general anesthesia, the aneurysm was exposed via a retroperitoneal incision in the right lower quadrant (Fig. 2A). The aneurysm did not adhere to the surrounding tissue and did not have feeding ves-
sels. The border between the normal venous wall and the aneurysm was easily detectable. An abnormal venous wall occupied more than one-third of the circumference of the vein; therefore, compared to venorrhaphy, patch plasty was considered suitable to preserve the lumen. Following the intravenous administration of heparin (7,000 U), the proximal and distal portions of the aneurysmal sac were clamped, and longitudinal venotomy was performed. The excess vein wall was resected and did not show an adherent mural thrombus. The vessel wall was reconstructed using a saphenous vein graft patch that was taken from the opposite side. The patch was wrapped in the remaining wall of the aneurysmal vein. (Fig. 2B). On histopathological examination, the three layers of resected venous wall

Fig. 1 Preoperative imaging in a 40-year-old male with a unilateral EIV aneurysm. (A) A 3D-reconstructed computed tomography angiogram shows an aneurysm of the right EIV, with a maximal diameter of 66 mm × 72 mm. (B) An ascending venogram reveals a large saccular aneurysm of the right EIV. EIV: external iliac vein

Fig. 2 Intraoperative findings of the external iliac venous aneurysm. (A) The venous aneurysm (white arrow), which was exposed through a retroperitoneal incision in the right lower quadrant, did not have feeding vessels. (B) After the excess vein wall was resected, the vessel wall was reconstructed using a saphenous vein graft patch that was taken from the opposite side. The patch was wrapped in the remaining wall of the aneurysmal vein.
were preserved and did not display signs of inflammation or fibrosis.

After the 8-h surgery, anticoagulation was started with intravenous heparin: 15,000 U/day, with activated partial thromboplastin time (APTT) of 36.2 s. However, on postoperative day (POD) 1, bleeding from the retroperitoneal drain was aggravated, and anticoagulation therapy was stopped. After a 2-day intermission period, on POD 3, heparin was re-started along with warfarin. Ascending venography, which was performed on POD 6, revealed that the right EIV was completely occluded and there was good collateral flow into the common iliac vein without thrombosis in the vein below the inguinal ligament. On POD 13, venous ultrasonography revealed a hyperechoic thrombus of the EIV alone, which indicated organization and a lower risk of thromboembolism. The patient remained asymptomatic and was discharged on POD 14. Throughout the hospitalization period, the patient did not use either elastic compression stockings or an intermittent pneumatic compression device because we were apprehensive about promoting bleeding due to increased venous pressure.

At the 1-month follow-up interval, the patient appeared to be in good condition, ultrasonography did not show the development of a thrombosis, and there was no change regarding thrombotic obstruction in the right EIV. The patient performed manual labor and requested that the anticoagulant therapy be discontinued due to apprehension about trauma. Subsequently, anticoagulant therapy with warfarin was stopped because the risk of thromboembolism was considered to be low.

### Discussion

To the best of our knowledge, only 16 cases of primary venous aneurysms of the iliac vein have been reported2–17 (Table 1). In these previously described patients, aneurysms did not seem to be prevalent in one particular sex, and the age of these patients ranged from 14 to 70 years (average age: 38 years). This demographic suggests that compared to other vascular diseases, primary venous aneurysm tends to manifest in younger patients. Aneurysms

### Table 1 Published cases of primary aneurysms of the iliac vein

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Age</th>
<th>Sex</th>
<th>Symptom</th>
<th>Location</th>
<th>Size (mm)</th>
<th>Thromboembolic complication</th>
<th>Operative procedure</th>
<th>Anticoagulant therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postma2)</td>
<td>1989</td>
<td>33</td>
<td>M</td>
<td>Exercise intolerance, episodic hemoptysis</td>
<td>Lt. IIV</td>
<td>30×120</td>
<td>PTE</td>
<td>Ligation</td>
<td>+</td>
</tr>
<tr>
<td>Alatri4)</td>
<td>1997</td>
<td>39</td>
<td>F</td>
<td>None</td>
<td>Bilateral CIVs</td>
<td>39×42×60</td>
<td>43×55×73</td>
<td>—</td>
<td>No described</td>
</tr>
<tr>
<td>Petrunić2)</td>
<td>1997</td>
<td>19</td>
<td>M</td>
<td>Abdominal pain</td>
<td>Lt. CIV</td>
<td>89×45</td>
<td>Thrombosed aneurysm</td>
<td>Resection with lateral venorrhaphy</td>
<td></td>
</tr>
<tr>
<td>Fournearu5)</td>
<td>1998</td>
<td>21</td>
<td>F</td>
<td>None</td>
<td>Lt. EIV</td>
<td>50×100</td>
<td>—</td>
<td>Resection with reconstruction with the SFV of the opposite side</td>
<td>+</td>
</tr>
<tr>
<td>Alonso-Pérez6)</td>
<td>2002</td>
<td>67</td>
<td>M</td>
<td>Limb swelling and pain</td>
<td>Bilateral CIVs</td>
<td>50</td>
<td>DVT</td>
<td>Resection below the renal veins and ligation of the CIVs</td>
<td>+</td>
</tr>
<tr>
<td>Banno7)</td>
<td>2004</td>
<td>20</td>
<td>F</td>
<td>None</td>
<td>Lt. EIV</td>
<td>80×60</td>
<td>—</td>
<td>Resection with lateral venorrhaphy</td>
<td>+</td>
</tr>
<tr>
<td>Cañibano-Domínguez8)</td>
<td>2007</td>
<td>70</td>
<td>M</td>
<td>Limb swelling</td>
<td>Lt. CIV-EIV</td>
<td>42</td>
<td>DVT</td>
<td>No surgery</td>
<td>+</td>
</tr>
<tr>
<td>Kotsis9)</td>
<td>2009</td>
<td>31</td>
<td>F</td>
<td>None</td>
<td>Rt. EIV</td>
<td>36</td>
<td>—</td>
<td>Tangential aneurysmaectomy with lateral venorrhaphy</td>
<td>+</td>
</tr>
<tr>
<td>Ysa10)</td>
<td>2010</td>
<td>30</td>
<td>M</td>
<td>Limb swelling</td>
<td>Rt. IIV</td>
<td>45</td>
<td>DVT</td>
<td>No surgery</td>
<td>+</td>
</tr>
<tr>
<td>Humphries12)</td>
<td>2010</td>
<td>32</td>
<td>F</td>
<td>Left-sided abdominal pain</td>
<td>Bilateral EIV</td>
<td>21×20</td>
<td>38×41</td>
<td>No surgery</td>
<td>—</td>
</tr>
<tr>
<td>Zou11)</td>
<td>2011</td>
<td>14</td>
<td>F</td>
<td>Dyspnea, syncope</td>
<td>Lt. EIV</td>
<td>Thrombosed aneurysm PTE</td>
<td>No surgery, IVC filter, mechanical fragmentation</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Ghidirim13)</td>
<td>2011</td>
<td>59</td>
<td>M</td>
<td>Abdominal pain, limb edema</td>
<td>Rt. CIV</td>
<td>Thrombosed aneurysm PTE</td>
<td>Resection with lateral venorrhaphy</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Hosaka14)</td>
<td>2014</td>
<td>22</td>
<td>F</td>
<td>Dyspnea</td>
<td>Lt. EIV</td>
<td>Thrombosed aneurysm PTE</td>
<td>Resection with reconstruction with the SFV</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Lucas15)</td>
<td>2015</td>
<td>25</td>
<td>M</td>
<td>Limb swelling and pain</td>
<td>Lt. EIV</td>
<td>38</td>
<td>—</td>
<td>Resection with lateral venorrhaphy</td>
<td>+</td>
</tr>
<tr>
<td>Park16)</td>
<td>2016</td>
<td>63</td>
<td>F</td>
<td>Right-sided abdominal pain, syncope, dyspnea</td>
<td>Rt. EIV</td>
<td>40×50</td>
<td>Rupture</td>
<td>Tangential aneurysmaectomy with lateral venorrhaphy</td>
<td>+</td>
</tr>
<tr>
<td>Audu17)</td>
<td>2017</td>
<td>63</td>
<td>M</td>
<td>Left testicular and inguinal pain</td>
<td>Lt. IIV</td>
<td>31×22</td>
<td>—</td>
<td>Percutaneous embolization</td>
<td></td>
</tr>
<tr>
<td>Taki (current case)</td>
<td>2017</td>
<td>40</td>
<td>M</td>
<td>Right-sided abdominal pain</td>
<td>Rt. EIV</td>
<td>66×72</td>
<td>PTE</td>
<td>Resection with reconstruction with the GSV of the opposite side</td>
<td>+</td>
</tr>
</tbody>
</table>

IV: internal iliac vein; CIV: common iliac vein; EIV: external iliac vein; PTE: pulmonary thromboembolism; DVT: deep venous thrombosis; SFV: superficial femoral vein; IVC: inferior vena cava; GSV: great saphenous vein

of the EIV occurred in 56% (9/16) of patients, whereas
aneurysms of the common iliac vein and internal iliac vein
were rare, occurring in 31% (5/16) and 13% (2/16) of
patients, respectively.

Venous aneurysm is best described as a solitary area
of venous dilatation that communicates with the main
venous structure by a single channel, and which is not
associated with arteriovenous communication or a
pseudoaneurysm. Abbott et al. clearly defined a primary
venous aneurysm as a fusiform or saccular lesion with
no associated abnormality that increases blood flow or
elevates venous pressure. The authors mentioned trauma,
obstruction, and adjacent neoplasms as the causes of
secondary venous aneurysms.18) Ysa et al. reported that
arteriovenous fistulas, which commonly occur due to
prior trauma, were the most common cause (41%) of iliac
venous aneurysms; primary venous aneurysm being less
frequent than other types (33%).1)

The most frequent clinical presentation of an iliac
venous aneurysm is venous thrombosis (41%) followed
by chronic venous insufficiency (32%).1) Our review of
available literature revealed that most patients presented
with abdominal pain or limb swelling, whereas only four
patients had a diagnosis without exhibiting any symp-
toms. Seven patients (44%) developed thromboembolic
complications such as deep venous thrombosis and pul-
monary thromboembolism, and at least 10 patients (63%)
were treated with anticoagulants. Rupture of the primary
iliac venous aneurysm was reported in only one patient
who was successfully treated with an operation. Among
the 16 cases that were described in the literature, surgery
was performed in ten cases (63%), resection with venor-
rhaphy or patch plasty was performed in nine, and lig-
tion was performed in only two. Audu et al. demonstrated
the efficacy of percutaneous coil embolization for primary
venous aneurysms.17)

As few cases have been reported in the literature, no
standard therapy or guideline for the management of
pelvic primary venous aneurysms has been established.
The therapeutic procedure should be decided in consid-
eration of key aspects such as the aneurysm size, presence
of thromboembolic complications, and the possibility of
using anticoagulant therapy. In our case, 99mTc-macro-
aggregated albumin scintigraphy revealed a pulmonary
thromboembolism, and ultrasonography revealed blood
flow stagnation inside the aneurysm. Because these exami-
nations indicated an imminent, life-threatening thrombo-
embolic complication, it was essential to start anticoagu-
lant therapy and perform aneurysmectomy.

Our review of the literature showed that the most popu-
lar treatment for a primary venous aneurysm was surgery;
however, two reports demonstrated the efficacy of endo-
vascular treatment of secondary venous aneurysms.17,19)

Endovascular treatment includes coil embolization, in-
serting a bare metal stent into proximal venous stenosis,
and deployment of a covered stent in the aneurysm.20) In
our case, a stent grafting procedure may have been more
effective and safer than conventional surgery in terms of
bleeding and thrombotic events.

Postoperative thrombotic occlusion is believed to have
occurred in our patient because of the interruption of hepa-
arin therapy. Ideally, postoperative anticoagulant therapy
should be resumed as soon as possible to avoid postopera-
tive thrombus formation. Elastic compression stockings
or an intermittent pneumatic compression device should
be used, especially in patients in whom anticoagulant
therapy is suspended. In the current case, the EIV obstruc-
tion that occurred postoperatively may have been due to
our decision not to use elastic compression stockings or an
intermittent pneumatic compression device. Elastic com-
pression stockings should have been used in the current
case, even if there was a risk of bleeding.

Conclusion
To our knowledge, few cases of primary iliac venous aneu-
yrsms have been reported. We describe a case of primary
venous aneurysm in the EIV that was treated with aneu-
ysmal resection followed by reconstructive patch plasty.
To prevent thromboembolic complications or rupture, an-
ticoagulant treatment and surgical or percutaneous ther-
apy should be considered in patients with primary iliac
venous aneurysms, even if the patient is asymptomatic.

Disclosure Statement
The authors declare no conflict of interest.

Author Contributions
Writing: MT, TM
Critical review and revision: TM, TK, TK, TM, MH, YM, FY
Final approval of the article: all authors
Accountability for all aspects of the work: TM

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