Internal iliac artery aneurysm masquerading as a sciatic nerve schwannoma: illustrative case

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BACKGROUND Schwannomas are common peripheral nerve sheath tumors. Imaging techniques such as magnetic resonance imaging (MRI) and computed tomography (CT) can help to distinguish schwannomas from other types of lesions. However, there have been several reported cases describing the misdiagnosis of aneurysms as schwannomas.

OBSERVATIONS A 70-year-old male with ongoing pain despite spinal fusion surgery underwent MRI. A lesion was noted along the left sciatic nerve, which was believed to be a sciatic nerve schwannoma. During the surgery for planned neurolysis and tumor resection, the lesion was noted to be pulsatile. Electromyography mapping and intraoperative ultrasound confirmed vascular pulsations and turbulent flow within the aneurysm, so the surgery was aborted. A formal CT angiogram revealed the lesion to be an internal iliac artery (IIA) branch aneurysm. The patient underwent coil embolization with complete obliteration of the aneurysm.

LESSONS The authors report the first case of an IIA aneurysm misdiagnosed as a sciatic nerve schwannoma. Surgeons should be aware of this potential misdiagnosis and potentially use other imaging modalities to confirm the lesion before proceeding with surgery.

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KEYWORDS iliac artery aneurysm; schwannoma; sciatic nerve

Schwannomas are the most common benign peripheral nerve sheath tumor.1–3 They typically affect nerves in the head and neck region or the extremities and are commonly found as solitary or well-circumscribed tumors that respond well to excision.1 Schwannomas of the sciatic nerve are extremely rare and represent less than 1% of all schwannoma cases.4 Diagnosis of sciatic nerve schwannomas is difficult and often delayed because they can exhibit symptomatology similar to that of sciatica, leading to clinical consideration of more common conditions such as degenerative spine disease.2,4

The gold standard diagnostic technique for peripheral nerve sheath tumors is high-resolution magnetic resonance imaging (MRI).2 MRI can allow schwannomas to be differentiated from other pathologies, including other types of nerve sheath tumors. Benign schwannomas are distinguished on MRI by homogeneous enhancement and display a “split fat sign,” which is formed from a rim of fat surrounding the tumor, especially at the proximal and distal poles of the lesion.5,6 This is distinct from malignant lesions, which often have heterogenous enhancement on imaging and have irregular borders or infiltrate surrounding tissues.5

There have been several reports of aneurysms masquerading as schwannomas despite the use of MRI and other imaging studies for diagnosis. All but one of the previously reported cases have involved the intracranial vestibular nerve.7–11 There has been only one reported case involving the lower extremity, in which an aneurysm of the posterior tibial artery had a preoperative diagnosis of a tibial/saphenous nerve schwannoma.12 To the best of our knowledge, no case in the literature has reported an internal iliac artery (IIA) branch aneurysm being misdiagnosed as a sciatic nerve schwannoma.
Herein, we discuss a case of a lesion initially believed to be a sciatic nerve schwannoma. Intraoperatively, the lesion was discovered to be an IIA branch aneurysm, despite imaging and symptoms leading to a preoperative diagnosis of a sciatic nerve schwannoma.

Illustrative Case

A 70-year-old male, who had undergone L4–5 transforaminal lumbar interbody fusion (TLIF) by an outside orthopedic surgeon 1.5 weeks earlier, presented to the neurosurgical clinic with ongoing pain originating from the left buttock and radiating down his leg for more than 1 year. The pain improved with lying or standing, but any pressure on the buttocks or left hip aggravated the pain. The patient had undergone a previous spinal cord stimulator trial, epidural steroid injections, and medical management with gabapentin, with no relief of his symptoms prior to his presentation. He did endorse partial resolution with physical therapy; however, the pain returned after 4 months. The patient was diagnosed with degenerative spine disease and underwent a TLIF procedure. However, his pain persisted, prompting MRI of the abdomen and pelvis. An incidental lesion believed to be a schwannoma along the left sciatic nerve just posterior to the left acetabulum was found (Fig. 1). This lesion was thought to be the source of the patient’s pain; therefore, he consented to undergo neurolysis of the left sciatic nerve with tumor resection.

In the operating room, the patient was placed prone and was prepped and draped in the usual sterile fashion. A plastic surgeon performed the dissection through a transgluteal approach (Fig. 2A). Upon exposure, the lesion was clearly pulsatile and further dissection was paused. Triggered electromyography (EMG) mapping along the surface of the lesion was performed with no distal muscular responses. Intraoperative Doppler confirmed vascular pulsations, and turbulent flow was seen within the lesion (Fig. 2B). Therefore, the lesion was considered an IIA branch aneurysm. An intraoperative vascular surgery consultation was performed. The surgery was aborted, and the incision was closed with plans for the patient to return for further investigation by the vascular surgery team. Further history was obtained, and the patient denied any trauma, injection, or other procedures performed at the site of this aneurysm.

The patient then underwent formal computed tomography angiography (CTA), which confirmed the IIA branch aneurysm (Fig. 3). The aneurysm was revealed to be 6.4 cm in diameter and exhibited direct mass effect on the adjacent sciatic neurovascular bundle. Because the parent vessel originated from within the pelvis, proximal control was deemed inadequate. For this reason, endovascular embolization was completed. The postprocedure angiogram confirmed complete obliteration of the aneurysm. At the 3-week follow-up, the patient noted...
continued pain radiating down the back of his left leg, limiting his ambulation. Follow-up CTA confirmed a stable size and occlusion of the IIA aneurysm (Fig. 4), but new filling was noted in the terminal left inferior gluteal artery branches and internal pudendal artery, which appeared to originate from the aneurysm sac. The patient’s pain has improved and he is participating in physical therapy. He will follow-up with vascular surgery to evaluate the need for resection of the thrombosed aneurysm.

Discussion

A literature search for all cases of aneurysms masquerading as schwannomas was performed. PubMed, Science Direct, and Cochrane databases were queried using the search terms “peripheral nerve tumor” and “aneurysm.” The literature search yielded seven cases from six reported studies that matched our search criteria (Table 1). Six of the seven cases had a preoperative diagnosis of a vestibular schwannoma. Only one case involved a lower extremity peripheral nerve and had a diagnosis of a tibial/saphenous nerve schwannoma. To the best of our knowledge, the current case is the first to report an IIA aneurysm masquerading as a sciatic nerve schwannoma.

Observations

A significant challenge to diagnosing peripheral nerve schwannomas and IIA aneurysms is their low prevalence. Although schwannomas themselves are not uncommon, they are exceedingly rare in the lower extremity, with sciatic nerve schwannomas representing less than 1% of all schwannoma cases.1 Isolated IIA aneurysms account for less than 0.5% of all intra-abdominal aneurysms.13 The symptoms of these conditions also make rapid and accurate diagnosis difficult because both conditions are often asymptomatic.5,13 Schwannomas commonly present as painless, slow-growing masses and only begin presenting symptoms as they become significantly large.5 The presenting symptoms can often be vague and nonspecific, as in our case in which the patient had pain radiating down his leg. Similarly, patients with isolated IIA aneurysms are often asymptomatic, but patients can become symptomatic by the time of presentation.13 Vestibular schwannomas often present with more clear symptoms, with 90% of patients having sensorineural hearing loss.14 All the previous cases found in our literature search involving a preoperative diagnosis of vestibular schwannomas presented with hearing loss. These challenges can cause a delay in diagnosis. Our patient had pain radiating down his leg for over a year and ultimately underwent spinal fusion before the IIA aneurysm was discovered as the likely source of his pain. The one previous case report of a lower extremity aneurysm had a similar course, with the patient suffering for 1 year due to a slow-growing mass on his calf.12 The other cases all presented with hearing loss and acute symptoms from a range of days to weeks.

![FIG. 4. Follow-up abdomen and pelvis CTA, sagittal (A) and axial (B) views, showing successful embolization of the aneurysm sac.](image)

### TABLE 1 Cases of aneurysms masquerading as schwannomas

<table>
<thead>
<tr>
<th>Authors &amp; Year</th>
<th>Age (yrs), Sex</th>
<th>Imaging Technique</th>
<th>Preoperative Diagnosis</th>
<th>Postoperative Diagnosis</th>
<th>Final Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sakai et al., 200212</td>
<td>54, M</td>
<td>CT, MRI</td>
<td>Tibial/saphenous nerve schwannoma</td>
<td>Aneurysm of a branch of posterior tibial artery</td>
<td>Surgical excision</td>
</tr>
<tr>
<td>Pasler et al., 20117</td>
<td>22, M</td>
<td>CT, MRI</td>
<td>Vestibular schwannoma</td>
<td>AICA</td>
<td>Surgical excision</td>
</tr>
<tr>
<td>Diaz et al., 20138</td>
<td>72, F</td>
<td>MRI</td>
<td>Vestibular schwannoma, inflammatory process, or metastatic process</td>
<td>Labyrinthine artery aneurysm</td>
<td>Surgical excision</td>
</tr>
<tr>
<td>Marchini et al., 20149 (Case 1)</td>
<td>44, M</td>
<td>MRI</td>
<td>Vestibular schwannoma</td>
<td>AICA</td>
<td>Patient refused any treatment</td>
</tr>
<tr>
<td>Marchini et al., 20149 (Case 2)</td>
<td>61, F</td>
<td>MRI, CT</td>
<td>Vestibular schwannoma</td>
<td>AICA</td>
<td>Coil embolization</td>
</tr>
<tr>
<td>Liang et al., 202010</td>
<td>65, M</td>
<td>CT, MRI</td>
<td>Vestibular schwannoma</td>
<td>AICA</td>
<td>Clip ligation</td>
</tr>
<tr>
<td>Benjamin et al., 202211</td>
<td>27, F</td>
<td>CT, MRI</td>
<td>Vestibular schwannoma</td>
<td>AICA</td>
<td>Liquid embolic embolization</td>
</tr>
<tr>
<td>Current case</td>
<td>70, M</td>
<td>MRI</td>
<td>Sciatic nerve schwannoma</td>
<td>IIA branch aneurysm</td>
<td>Coil embolization</td>
</tr>
</tbody>
</table>

AICA = anterior inferior cerebellar artery.
All cases identified in the literature search used MRI for diagnosis. Although MRI can allow for an accurate diagnosis, with studies reporting up to 92.6% sensitivity for schwannomas, lesions of adjacent structures, which can cause compression of the neurovascular bundle and produce similar conditions, should be considered as a differential diagnosis.\(^3\)\(^15\) Utilizing contrast may assist in more effectively assessing the mass and help to differentiate schwannomas from aneurysms. In our case, contrast was not used in the preoperative MRI because the indication for MRI was to investigate the continued pain after the TLIF procedure. A potential option to ensure that the lesion is in fact a schwanna and not an aneurysm mimic is the use of CTA. However, this might not be practical to implement into practice, because the misdiagnosis of aneurysms as schwannomas is still rare with only a few cases being previously reported. Instead, surgeons should be aware of this potential misdiagnosis and exercise caution when planning to excise a peripheral nerve tumor. Using diagnostic modalities such as intraoperative Doppler ultrasound and EMG mapping can help to differentiate an aneurysm from peripheral nerve tumor.

**Lessons**

Overall, the misdiagnosis of aneurysms as schwannomas is infrequent with only seven cases having been reported previously. The current case is the first to occur in the sciatic nerve region with an IIA branch aneurysm being misdiagnosed as a sciatic nerve schwannoma. Surgeons should be aware of this potential misdiagnosis and should potentially use other imaging modalities to confirm the lesion before proceeding with surgery.

**References**


**Disclosures**

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

**Author Contributions**

Conception and design: Bhenderu, Taghlabi, Faraji. Acquisition of data: Bhenderu, Goldstein, Sharma, Le, Dinh, Faraji. Analysis and interpretation of data: Bhenderu, Hassan, Le, Faraji. Drafting the article: Bhenderu, Taghlabi, Hassan, Guererro, Cruz-Garza, Faraji. Critically revising the article: Bhenderu, Taghlabi, Hassan, Guererro, Cruz-Garza, Le, Dinh, Faraji. Reviewed submitted version of manuscript: Bhenderu, Taghlabi, Hassan, Guererro, Cruz-Garza, Goldstein, Le, Dinh, Faraji. Approved the final version of the manuscript on behalf of all authors: Bhenderu. Statistical analysis: Cruz-Garza. Administrative/technical/ material support: Faraji. Study supervision: Faraji.

**Abstract Presentations**

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