Serendipitous Discovery of a Benign Obturator Nerve Schwannoma

A Case Report with a Brief Clinical Review

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Abstract

Schwannomas are typically benign tumours of the peripheral nerves. However, they seldom arise from the obturator nerve. Here we report a case of an uncommon swelling (2.5 × 3.5cm) in a 65-year-old male cadaver which was found during the routine dissection for first MBBS students in the department of Anatomy, Kasturba Medical College, Manipal, India in the month of December 2019. It was seen originating from the left obturator nerve in the pelvis at the level of the sacral promontory. Histopathological investigation revealed a schwannoma. The hypocellular tumor was arranged in a sweeping fascicle pattern with patches of myxoid degeneration. Obturator schwannomas, though rarely seen, can exist in the cadaver, as seen in the present case. Hence, it should be considered as a differential diagnosis for clinical cases of pelvic masses and eliminated only after thorough radiological examination. Knowledge about the existence of such schwannomas is, therefore, a must.

Keywords: Schwannoma, Obturator nerves, neurilemmoma, nerve sheath neoplasms.
Introduction
The obturator nerve originates from the ventral rami of the second, third and fourth lumbar nerve. The nerve runs down into the pelvis along the medial border of the psoas major muscle. It enters the anterior compartment of the thigh through the obturator foramen to supply the muscles of the medial compartment of the thigh. Further, it gives articular branches to the hip, knee joints and sensory innervation to the medial side of the thigh.\(^1\)

A schwannoma is a benign, encapsulated, noninvasive tumor of Schwann cells, rarely undergoing malignant transformation. There is no gender predilection, with it presenting commonly between the ages of 20–50 years.\(^2\) They are rare tumors that can develop at any site in the body and are most commonly found in the head and neck region. They are rarely located in the lower extremities where they can mimic compression neuropathies.\(^3\) Presently in the literature retroperitoneal schwannoma are about 60 and among them only about 20 are in pelvis.\(^4\) Schwannomas are usually solitary tumours extending from 1–3 cm in diameter.\(^5\) Here, an accidental finding of an Obturator nerve schwannoma in a 65-year-old male cadaver during a routine undergraduate dissection and its histological findings are reported.

Case report
In the present case, during routine undergraduate dissection, a mass on the course of the obturator nerve was discovered in a 65-year-old male cadaver. The fusiform swelling was on the left obturator nerve located extraperitonealy in the pelvis, at the level of the sacral promontory. On examination, it was 2.5 cm in length, encapsulated, and hard in consistency. The breadth of the swelling at the midpoint of the mass was 3.5 cm. However, the obturator nerve breadth was measured as 1 cm below as well as above the swelling. On gross examination, the swelling was identified as a peripheral nerve sheath tumour [Figure 1]. On the contralateral side, the obturator nerve was observed to be typical with no visible abnormality.

The mass was excised, histologically processed and stained with Haematoxylin and Eosin. On the microscopic examination of the specimen, all three layers of the peripheral nerve (perineurium, epineurium and endoneurium) could be identified. A proliferation of spindle cells with a fascicular architectural configuration and areas of loosely cellular corresponding to Antoni B patterns of arrangement were observed. The hypocellular tumor was arranged in a sweeping
fascicle form with patches of myxoid degeneration. Tumour cells showed elongated buckled nucleus with no mitotic figures. The tumor was detected as schwannoma [Figure 2A]. The obturator nerve on the right side was also excised and histologically processed. It showed features of a typical nerve [Figure 2B].

**Discussion**

Schwannoma, synonymously known as neurilemmoma, is classified under the peripheral nerve sheath tumours (PNSTs) and arises from Schwann cells of the outer nerve sheath i.e. epineurium. They are rare tumours that can develop at any site in the body. Only 13% of PNST’s arise in the trunk; about 3% are retroperitoneal, and the incidence of retroperitoneal location of schwannoma is 0.5-5%. Schwannomas are benign, well-circumscribed lesion with 30-40 years being the peak age at diagnosis. The World Health Organization (WHO) classifies schwannomas as grade 1 tumours that are generally benign and their malignant transformation is extremely rare. They may be present with neurological manifestations such as pain in the limbs, paresthesia and motor weakness due to compression of the adjacent structures or maybe be found incidentally as asymptomatic masses. The low incidence is due to the fact that there are no specific signs and symptoms as it develops in the broad area of retroperitoneum. The clinical manifestations are produced only after the tumours have grown to a substantial size hence there is a long latency period. The tumours when large enough cause pressure symptoms through compression or displacement of adjacent structures. As the tumours are deep seated in the retroperitoneum, often on ultrasound the tumor is erroneously seen as a gynecological tumour only to be proven wrong during surgery. Therefore presurgical diagnosis is very challenging. It is hence confirmed in most of the clinical cases after surgery and definitive histopathological examination. The CT and MRI narrow the diagnosis but are not able to assess as imaging features are not specific to any type of tumour. Laparoscopic resection is the treatment of choice with favorable post-operative recovery.

Benign peripheral nerve sheath tumours are classified into two main groups: neurofibromas and schwannomas (neurilemmomas). The distinction of schwannomas from neurofibromas is of importance to surgeons as schwannomas can be easily enucleated using laparoscopic surgery while preserving nerve contiguity. However, neurofibromas are intraneural; hence, resection without nerve deficits is difficult. The characteristic of a peripheral nerve sheath tumour is the
identification of a nerve proximal and distal to the mass. However, this may be difficult to visualize as the nerve itself may be compressed or distorted by the tumor.\textsuperscript{16}

Histologically, schwannomas can be differentiated from other peripheral nerve tumors by the presence of capsule and fascicular growth pattern, increase in nuclear size, and large nuclear hyperchromasia.\textsuperscript{9} Areas of elongated cells that are densely packed arranged in fascicles showing Antoni type A pattern maybe seen, verocay bodies are formed when they are prominent. Cells are less compact and prone to cystic degeneration in Antoni type B pattern.\textsuperscript{4} Large schwannomas generally go through progressive degenerating alterations, comprising of cyst formation and hyalinization of vessels. Benign schwannomas have large expanses of eosinophilic atypical round cells whereas epithelioid appearance is seen when they undergo malignant transformation.\textsuperscript{17} In the current case, histopathology showed a distinct capsule with an Antoni B pattern of fascicular cells. Degenerative changes were not observed.\textsuperscript{18}

Most of the cases of Obturator schwannomas that have been reported in the literature as seen in [Table 1] were diagnosed postoperatively only after laparoscopic resection and pathological examination.\textsuperscript{10,13} Obturator nerve schwannomas should be considered as a differential diagnosis when dealing with cases of a pelvic mass. As the obturator nerve is in close proximity to the vital pelvic structures, the symptoms arising from these growing masses usually mimic gynecological or urological tumors.\textsuperscript{19,20} Literature cites schwannoma cases misdiagnosed as lymphnode metastasis and ovarian malignancies before surgery.\textsuperscript{21,22,23}

However, a case has been reported by Takahashi et. al which diagnosed the obturator nerve tumor preoperatively as CT and MRI showed clear continuity with the obturator nerve.\textsuperscript{23} Being in an anatomically complex and surgically inaccessible site with surrounding vital structures pelvic tumour enucleation necessitates familiarity and knowledge of pelvic retroperitoneal anatomy to evade damages to the adjacent vascular and urinary structures.\textsuperscript{24}

**Conclusion**

There is a varied range of benign and malignant tumours in the pelvic retroperitoneum. The patients commonly present with vague pain at a very late stage when the tumour is of large size. CT and MRI help significantly in diagnosis; however, the imaging features are non-specific and
diagnosis is confirmed only by postoperative histopathology. This case report concludes that obturator schwannomas, though very rarely seen, can occur as seen in this case in a cadaver. Hence it should be considered as a differential diagnosis for cases of pelvic masses, and needs to be ruled out only after careful investigation.

References


Figure 1: Showing Shwannoma (*) in the retroperitoneal area of the pelvis originating from the left Obturator nerve (ON). LST- Lumbosacral trunk, U- Ureter, PM- Psoas major, SP- Sacral promontory, IAA- Internal iliac artery, in a 65-year-old male cadaver in the department of Anatomy, Kasturba Medical College, Manipal, India in the month of December 2019.
**Figure 2A:** Histology of Schwannoma, (40X H&E stain) in a 65-year-old male cadaver in the department of Anatomy, Kasturba Medical College, Manipal, India in the month of December 2019. Arrow: flattened nerve fascicle in the periphery, The capsule with the three layers (epineurium, perineurium and endoneurium) enclosing the tumour are represented by a yellow dotted line. The fascicle pattern with patches of mixed degeneration is indicated by *. **2B:** Histology of normal obturator nerve of the right side (40X H&E stain). Arrows: bundles of nerve fascicles enclosed in perineurium.

**Table 1:** Cases of pelvic retroperitoneal schwannoma

<table>
<thead>
<tr>
<th>Study</th>
<th>Number of cases</th>
<th>Presenting complaint</th>
<th>Radio diagnosis</th>
<th>Laproscopic resection and postoperative pathological diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Di Furia M, et.al 2018</td>
<td>Case report</td>
<td>Dysuria and strangury</td>
<td>CT – well circumscribed mass</td>
<td>Pelvic schwannoma</td>
</tr>
<tr>
<td>Chopra S, et.al 2017</td>
<td>Case report</td>
<td>Left pelvic pain of unknown origin</td>
<td>CT- Multi loculated cystic mass on lateral pelvic wall</td>
<td>Obturator schwannoma</td>
</tr>
<tr>
<td>Gleason T, et.al 2017</td>
<td>Case report</td>
<td>Pelvic pain diagnosed as ovarian malignancy</td>
<td>MRI- 2.6 × 2.1 × 2.7 cm mass adjacent to the left pelvic sidewall</td>
<td>Benign obturator nerve schwannoma</td>
</tr>
<tr>
<td>Authors</td>
<td>Year</td>
<td>Type</td>
<td>Metastasis Description</td>
<td>Imaging Description</td>
</tr>
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<tr>
<td>Yamada M et al.</td>
<td>2015</td>
<td>Case report</td>
<td>Lymph node metastasis of rectal cancer</td>
<td>CT and MRI - 15-mm tumor</td>
</tr>
<tr>
<td>Coskun B et al.</td>
<td>2016</td>
<td>Case report</td>
<td>Initially diagnosed as pelvic metastasis of right kidney mass.</td>
<td>CT - a well demarcated left iliac mass of 30*29 cm</td>
</tr>
<tr>
<td>Takahashi H et al.</td>
<td>2016</td>
<td>Case report</td>
<td>Left lower abdominal pain</td>
<td>CT and MRI - a mass 30 mm yes</td>
</tr>
<tr>
<td>Okuyama T et al.</td>
<td>2014</td>
<td>Case report</td>
<td>Diagnosed as a mesenteric tumor</td>
<td>CT and MRI - heterogeneous tumor, 5 cm in diameter, in the pelvic cavity</td>
</tr>
<tr>
<td>Takaaki N et al.</td>
<td>2013</td>
<td>Case report</td>
<td>Anal pain</td>
<td>CT and MRI - prominent cystic degeneration and calcification.</td>
</tr>
<tr>
<td>Ningshu L et al.</td>
<td>2012</td>
<td>Case series</td>
<td>3 incidental, 3 vague pelvic pain</td>
<td>One case preoperatively diagnosed</td>
</tr>
<tr>
<td>Aubert J et al.</td>
<td>2000</td>
<td>Case report</td>
<td>Urological manifestations</td>
<td>CT - mass in paravesical position</td>
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<td>Scotto V et al.</td>
<td>1998</td>
<td>Case report</td>
<td>Not specified</td>
<td>No</td>
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<tr>
<td>Hunter VP et al.</td>
<td>1988</td>
<td>2 Cases</td>
<td>Asymptomatic</td>
<td>No</td>
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</tbody>
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