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Letter to the editor

Femoral nerve schwannoma misdiagnosed as an inguinal herniation: A case report and review of the literature

A 48-year-old man, with no previous medical history, had been admitted to our department for a 2 year progression of an upper inguinal mass that had been blocked in the inguinal area since 2 months. He described that his lump had increased in size during the past year and recently had become uncomfortable. Prior to his admission, he had been diagnosed with a possible progressive inguinal hernia incarcerated in the groin area, but the patient declined an eventual surgical intervention. At clinical examination he had a continuous left thigh pain that radiated from the internal aspect of the thigh to the knee which worsened during the night with intermittent swelling and superficial venous insufficiency. Physical examination found a palpable mass measuring 5 cm × 3 cm in the anterior inguinal region, mildly tender, fixed, ovular and irreducible with no cough impulse or pushing efforts associated with a small edema in the thigh. He had no sensitive or motor deficit in his thigh or in the leg during our neurological examination. Otherwise, he denied no serious abdominal symptom and the vascular examination only revealed a slight superficial venous turgescency. Biological data were normal.

Ultrasonography (US) of the left inguinal region and the leg revealed an hypoechogenic mass, well-limited, homogenous, vascularized on Doppler, eccentric, and adherent to the femoral nerve and seems to displace slightly the vascular trunk inside. This examination was completed by pelvic magnetic resonance imaging (MRI) centered on the inguinal area that showed a large inguinal tumor measuring 4.5 × 2 × 2 cm in diameter, well-defined, encapsulated; hypointense on T1, hyperintense but heterogenous on T2, slowly hyperintense to surrounding muscles with contrast-enhancement and located on the femoral nerve but eccentric. This description was compatible with a femoral nerve schwannoma (Fig. 1).

Under general anesthesia, the patient was placed in a supine position, the thigh in slight abduction. The preoperative ultrasonography was done to facilitate the tracking: a 5 cm incision was made approximately 3 cm down and parallel to the inguinal ligament and crossing down its medial point. After dissection from the subcutaneous fat to the fascia, the tumor was easily located, well visualized, well dissected from the main femoral nerve trunk and totally removed with no neural damage (Fig. 2).

Macroscopically, the tumor was characterized by an encapsulated nodule, bumped measuring about 3.5 cm in length with a firm whitish cut surface. Microscopically, the tumor was well delimitated with a fibrous capsule, composed of fusiform cells of variable sizes, elongated or rounded with fine chromatin, rarely nucleated without atypia, necrosis or mitosis activity and available in a palisade collagen stroma (Fig. 3). Several congestive vessels with a more or less thickened wall were also seen. These data were consistent with the diagnosis of a benign peripheral nerve schwannoma.

Postoperatively, the patient presented an excellent recovery and was discharged five days after surgery without inguinofemoral pain and swelling. He has been free of symptoms since twelve months.

Schwannomas or neurilemmomas are benign peripheral nerve tumors, first described by Verocay in 1908 [1–3]. They predominantly develop as solitary tumors ranging from 1.5 to 3 cm in diameter [4,5], although the presence of large tumors had previously been described in the literature [5,6]. Femoral nerve schwannoma is very rare and those located in the inguinal groin are very exceptional. The real cause of these schwannomas is still unknown.

The clinical presentations of schwannomas are atypical and vary according to their size and location. These benign tumors that develop as a slowly growing mass and are generally discovered as a palpable mass without any neurological symptoms. This is why the majority of schwannomas are diagnosed so late. A lump in the inguinal region usually defines the presence of a hernia, but other bulging masses like a cyst, ganglion, spermatic cord lipoma, hematoma, abscess, neurofibroma, varicocele, hydrocele, desmoid tumor, vasogenic tumor, neurogenic tumor, lymphoma, metastasis or sarcoma should be considered in the differential diagnosis [7,8]. However, the possible association of femoral schwannoma to these masses might be detected and considered before treatment. Therefore, there are no distinct criteria in differentiating schwannoma and neurofibroma clinically, all of them originate from schwann cells. Also, an increased incidence of neurofibromas has been observed in patients with von Recklinghausen disease (NF1) and also, neurofibromas tend to occur at 20–30 years of age and schwannomas at 30–60 years of age [9–11]. The Table 1 summarizes the main characteristics between schwannoma and neurofibroma. Ninos et al. were surprised to find a neurilemmoma in the inguinal canal masquerading an irreducible inguinal hernia in a 65 year-old man admitted with a 4-year history of a lump in the right inguinal region [7]. Schutle et al. and Peace et al. had each published a case of an inguinal mass where the diagnosis of schwannoma was only made after an histological examination, despite preoperative explorations [8,10]. In this area, the benign lesions generally seem to be grown very slowly than malignant lesions that progress rapidly. US must be the first exploration that can be performed during the first visit after discovering a persistent inguinal mass. Our patient was 48 years old, and suffered from this inguinal mass, with no pain and no electric discharge at the beginning and diagnosed as a hernia; and suddenly become painful with Tinel's sign when blocked in the inguinal area with intermittent thigh swelling. These symptoms encourage the medical team to carry out more investigations such as US and MRI. On US, schwannoma is usually hypoechogenic, heterogenous lobulated with posterior enhancement along the nerve fascicle, eccentric into it and mildly increased vascularity on color Doppler ultrasound [12,13]. On MRI, schwannomas exhibit intermediate signal intensity on T1-weighted images and hyperintensity on T2-weighted

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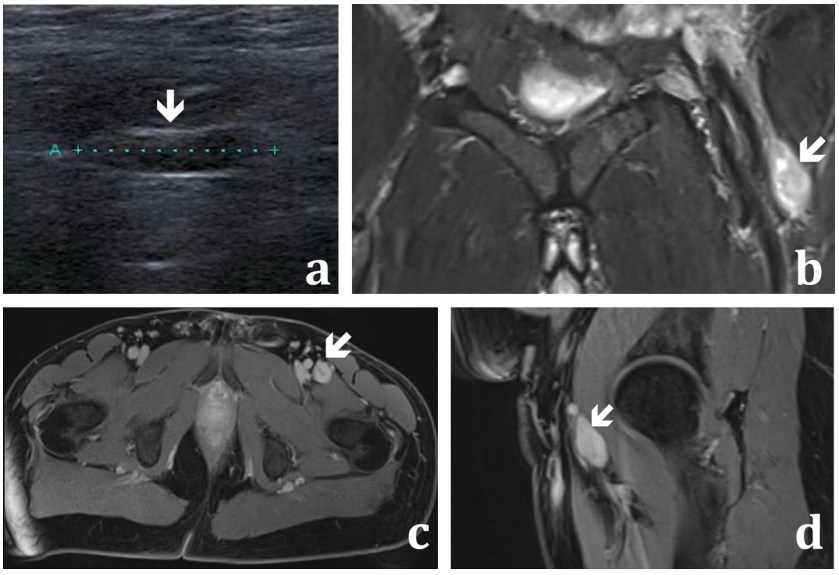

Fig. 1. a: ultrasonography view showing a hypoechogenic mass in the left inguinal area (↘); b, c and d: T2 W in coronal views and T1 W MRI in axial and sagittal views with gadolinium injection showing a well delimitated mass attached on the left femoral nerve (↘).

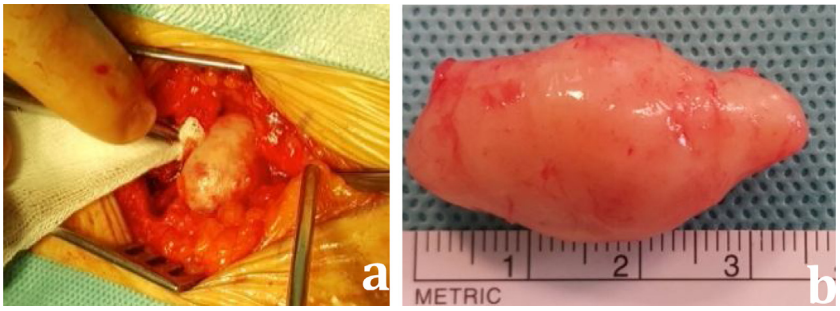

Fig. 2. a and b: operative view of the schwannoma from dissection to total excision.

images and the enhancement tends to be heterogeneous; adhere to the nerve fibers rather than infiltrate them, whereas in neurofibromas they grow within the nerve (fusiform aspect), leading to a dissociation of the nerve fibers [14,15]. These analyses permitted us to consider schwannoma as a potential diagnosis before surgery and formally dismissed the diagnosis of an incarcerated hernia. The utilities of these diagnostic tools are not only for diagnosis but for planning the surgical approach and were used in our patient. This attitude is supported by other colleagues [7,8] and we thought MRI might be the investigation of choice to confirm the presence of schwannoma. The treatment of the choice of schwannomas is an extracapsular or intracapsular removal by using a micro dissector, under magnification or under an operating microscope [16–18]. The total excision is the rule, without or with only slight neurological structural damage. However, in some asymptomatic cases, monitoring can be an option. In contrast, neurofibromas are associated with a greater chance of incomplete resection and neurological injury [19,20]. Histologically, schwannomas are more common, usually solitary, encapsulated, eccentrically located on proximal nerves or spinal nerve roots, whereas in neurofibromas tumors are multiple, with no capsule, originate and grow within the distal nerves and causing fusiform enlargement of distal nerve fibers [14,15,21] and have generally some characteristic features of von Recklinghausen disease [7,22,23]. Unlike schwannomas, neurofibromas had an increased number of mitoses. They are generally

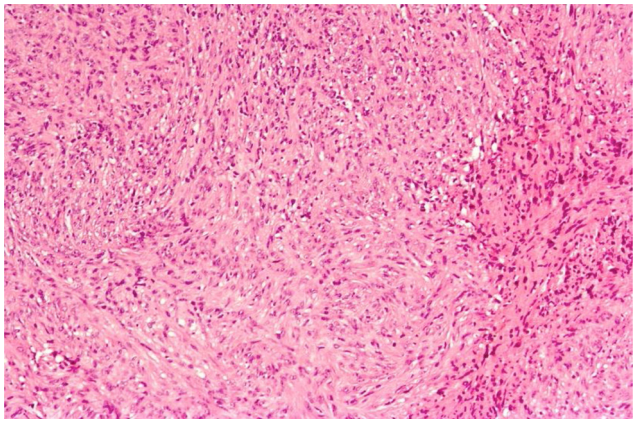

Fig. 3. Photomicrograh of the schwannoma showing predominantly Antoni A cells dispersed in a palissadic stroma collagen (Hemotoxylin and Eosin staining × 40).

infiltrating with locally invasive areas, and there is no Verocay body formation in histological sections. In the inguinal area, it is very important to perform careful investigation in order to avoid any surprising diagnoses during surgery.

Table 1
Characteristics between schwannoma and neurofibroma.

	Schwannomas	Neurofibromas
Age	30–60	20–30
Frequency	70–90%	10–30%
Palpation	+	+
Number	Solitary	Multiple
Motor deficit	-/+	±
Ultrasonography or MRI++	Eccentric/parent nerve	Fusiform/parent nerve
Surgery	Complete excision	Incomplete excision
Histology	Verocay body	No verocay body
Immunohistochemistry	PS 100 + diffuse	PS 100 + only 40–50%
	CD34 + in capsular area	CD34±

Disclosure of interest

The authors declare that they have no competing interest.

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