Leiomyosarcoma in Peripheral Nerve : The First Case Report

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Abstract

A neoplasm of the peripheral nerves can be obscured, especially during the early phase. The authors report a patient with sciatic nerve leiomyosarcoma. The patient's presentation and initial management are unique. A 51-year-old man with clinical manifestations of von Recklinghausen's disease reported numbness and weakness of the left leg for one and a half years. The symptoms gradually progressed. The symptoms were consistent with peripheral neuritis. The patient developed foot drop one month before coming to our service. Two episodes of biopsy confirmed leiomyosarcoma. A long, large sciatic nerve leiomyosarcoma was found intra-operatively, positioned from the upper thigh to the point where the tibial nerve passes beneath the upper margin of the soleus muscle. Surgical resection was done and confirmed the diagnosis. Decreased sensation was still intact after resection.

Key word : Leiomyosarcoma, Nerve Tumor, Sciatic Nerve Tumor, Nerve Resection, von Recklinghausen's Disease

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Von Recklinghausen's disease is the most common cause of a nerve sheath tumor. The clinical forms may be peripheral or central neurofibromatosis, which include café-au-lait spots, cutaneous nodules, verrucus hyperplasia and skeletal manifestations. The tumor itself rarely presents with neurodeficit except in cases of mass effect. It seldom associated with a soft tissue sarcoma but most of them are gastrointes-

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tinal in origin[1-8]. Leiomyosarcoma is a tumor of the soft tissue originating from the smooth muscle cell but has been reported from other uncommon sites[9-11]. According to our knowledge, there has never been a report of leiomyosarcoma presenting as a peripheral nerve tumor. The authors present a case of von Recklinghausen's disease with leiomyosarcoma embedded in the sciatic nerve.

CASE REPORT

A 51-year-old Thai male presented with left footdrop for one and a half months before admission. He developed slight numbness of the left leg and left foot one and a half years previously. The diagnoses from several physicians was peripheral neuropathy. There was no improvement after medication. One and a half months before admission, he was unable to control his ankle at all, both in flexion and extension direction.

Physical examination revealed generalized café-au-lait spots with some small neurofibromas. At the posterior aspect of the left leg, there was a palpable mass along the sciatic nerve and a tibial nerve diameter of 2 cm, approximately. Knee extensor and knee flexor power were grade V/V but the dorsiflexor and plantar flexor power of the left ankle was 0/V. Touch sensation and pin-prick sensation were decreased on the left leg and left foot.

Magnetic resonance imaging (MRI) of the lumbar spine demonstrated enlargement of the spinal canal at lumbar level, but no mass was seen. Computerized axial tomographic scan (CAT scan) of the upper and lower gastrointestinal tract revealed no positive findings. Electromyographic study (EMG) confirmed peripheral nerve lesion.

In the operative field, the sciatic nerve was enlarged and bulging from the upper thigh to the entry point of the tibial nerve which just passed beneath the upper border of the soleus muscle. The common peroneal nerve and cutaneous branch were also enlarged (Fig. 1).

The first biopsy showed a fasciculated spindle cell tumor with moderate to marked mitotic nucleopleomorphism (Fig. 2). The mitotic figure was generous. There were also discrete small areas of tumor necrosis. Immunohistochemical staining revealed tumor cells which showed diffuse positive reaction to smooth muscle actin stain (SMA) (Fig. 3) and Calponin stain (Fig. 4). They were negative for Clustered designation 117 (CD 117), S-100 protein (Solubility in 100% ammnonium sulphate), CD 68 and cytokeratin.

The pathological diagnosis was high-grade leiomyosarcoma. Because of suspicion in the diagnosis, a second biopsy was done for ultrastructural study. The histomorphology was similar to the first biopsy specimen. The ultrastructural morphology disclosed distinct filaments with dense bodies in the cytoplasm of many tumor cells (Fig. 5). The findings were compatible with smooth muscle differentiation, which confirmed the diagnosis of leiomyosarcoma.

Definite treatment was wide resection of the tumor mass from the upper thigh to the entry point

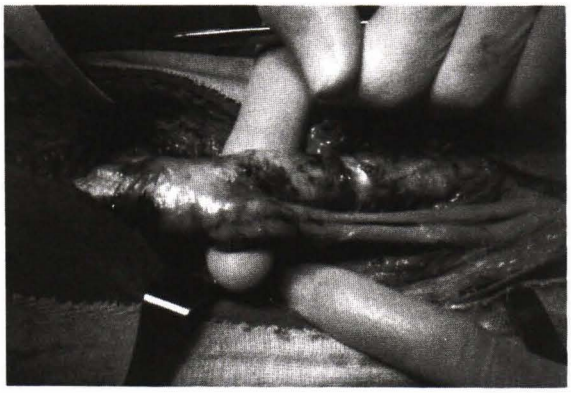

Fig. 1. Sciatic nerve at common peroneal bifurcation is seen.

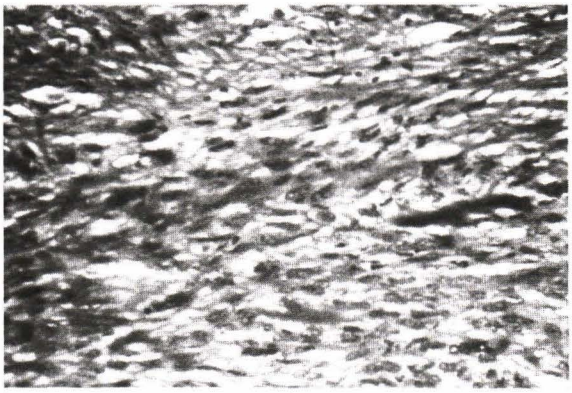

Fig. 2. Eosinophilic cytoplasm and blunt-ended nuclei are demonstrated.

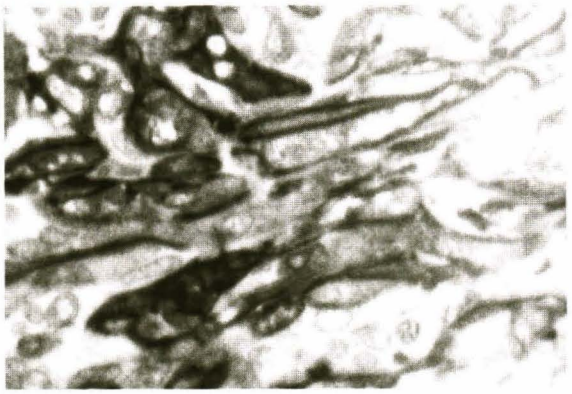

Fig. 3. **Smooth muscle actin stain shows blunt-ended nuclei with perinuclear vacuoles.**

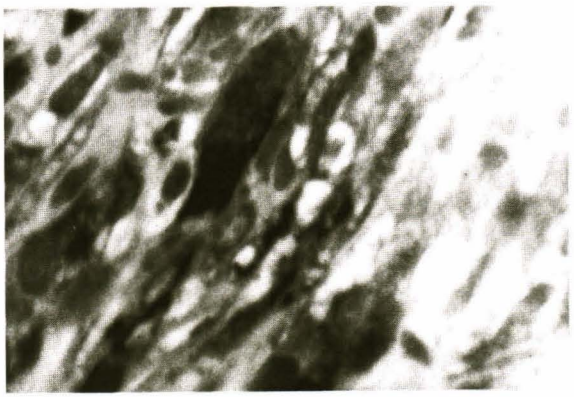

Fig. 4. **Calponin stain shows high-light cytoplasm of the tumor cell.**

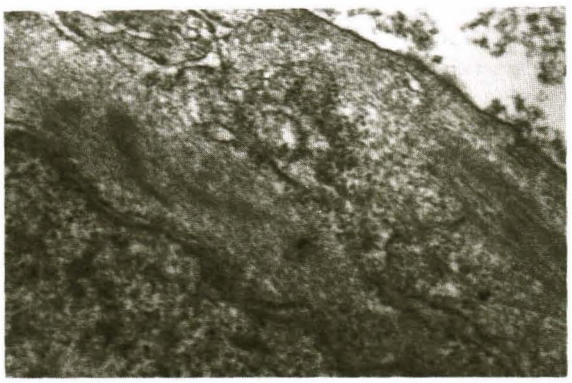

Fig. 5. **Electron microscope shows thin filaments with dense bodies in the cytoplasm.**

at the upper border of the soleus muscle. The gross morphology showed markedly enlarged nerve trunk. Cross sections revealed firm grey-white tumor encompassing nerve bundles (Fig. 6). Histomorphology of the tumor cells was similar to the biopsy specimens. The tumor invaded the epineureum, perineureum and endoneureum of the nerve trunk.

Radiotherapy was later given after the wound had healed sufficiently.

Post-operatively, there was no further neurodeficit - the patient still had feeling in the left leg and left foot as it was pre-operatively. Histopathological, immunohistochemical and ultrastructural studies of the tumor mass definitely confirmed high grade leiomyosarcoma.

DISCUSSION

Leiomyosarcomas account for 5-10 per cent of soft tissue sarcomas[12-14]. They are more common in the uterine and gastrointestinal tract because of numerous existences of smooth muscles in the uterus and GI wall. In general, this retroperitoneal group is more common in women than in men and rarely happens in children[15,16]. Some evidence has suggested that this tumor might arise from the small vesssels. The other common groups are cutaneous leiomyosarcoma and vascular leiomyosarcoma that happen in medium-size to large veins such as the inferior vena cava or pulmonary artery.

Because of the uncommon location of the tumor, the authors carried out several studies. Initially, it was thought to be a peripheral nerve sheath tumor, so S-100 protein stain was done, which is positive in melanoma[17], peripheral nerve sheath tumors[18], cartilaginous tumors[19], and normal adipose tissue, but the result was negative. From the low-power appearance, which showed spindle cells, the differential diagnosis comprised leiomyosarcoma and other sarcomas composed of fascicles of moderately differentiated spindle cells, such as fibrosarcoma and gastrointestinal stromal tumor. CD 117, which is specific for gastrointestinal stromal tumors, was done but the result was also negative. The tumor showed positive

Fig. 6. Gross appearance demonstrates tumor embedded in the nerve trunk.

stain for smooth muscle actin (SMA) stain (a special stain for smooth muscle, myofibroblastic tumors and pseudotumors) and for Calponin (for a myoepithelial tumor). The results preferred leiomyosarcomas. However, the authors also studied CD 68 and cytokeratins, but the results were negative.

The tissue was studied for ultrastructural details and showed cleft in the nucleus and dense bodies in cytoplasm, suggestive of leiomyosarcoma [20]. To find out the possible primary source, a CAT scan of the abdomen and upper gastrointestinal tract was done but it showed no evidence of a tumor.

The pathological diagnosis was leiomyosarcoma. A leiomyosarcoma embedded in the peripheral nerve has never been reported in the medical literature. There is only one report[21], in which the patient presented with sciatica because the tumor mass was located in the soft tissue of the buttock and irritated a sciatic nerve but was not embedded in the nerve tissue as in the presented case.

In the normal anatomic structure of the peripheral nerve, the smooth muscle exists in the wall of the small vessel located outside the perineureum. If this is true, it was expected that the tumor behavior would be the same as the retroperitoneal group.

The perineureum is a natural barrier to tumor spreading. This is also the first case of leiomyosarcoma with gross and microscopic transdural spread inner to the perineureum that caused absolute neurodeficit, which rarely happens.

Von Recklinghausen's disease is a generalized abnormality of the peripheral nerve. There are a few reports of association between von Recklinghausen's disease and a tumor of the peripheral nerve [22-27]. For leiomyosarcoma, 11 cases have been associated with von Recklinghausen's disease[1-8]. All of these cases appeared in the GI tract. So, in the case of von Recklinghausen's disease with neurodeficit and palpable peripheral nerve, an associated tumor surrounding the nerve should be considered until it has been proved before claiming that it is a neurofibromatic mass, because the line of management is definitely different.

Definite treatment for leiomyosarcoma is surgical removal. Advanced or recurrent leiomyosarcomas have traditionally been resistant to most chemotherapeutic regimens[28]. Though there are reports[29-31] claiming good results but a study with adequate sampling is still needed. Radiotherapy has an advantageous role especially if the tumor can not be radically removed[32,33]. Resection of the main nerve trunk is usually followed by major complications. But in case with no motor function, like the presented case, total resection is not harmful to motor function. They are many reports on resection of the sciatic nerve without sensory function consequence [34-37]. Eventhough the common peroneal nerve and tibial nerve are the only two main trunks to supply the distal leg and foot, there may be anastomosis from other cutaneous nerves that could compensate for this functional loss[38,39]. In the presented case, the patient had the same sensory function at the distal leg and left foot post-operatively as before surgery.

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มะเร็งกล้ามเนื้อเรียบในเส้นประสาทส่วนปลาย : รายงานผู้ป่วยรายแรก

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เนื้องอกของเส้นประสาทส่วนปลายเป็นโรคที่พบได้ไม่บ่อยและวินิจฉัยโรคได้ยาก โดยเฉพาะอย่างยิ่งเนื้องอกประเภท leimyosarcoma ซึ่งยังไม่เคยมีการรายงานในวารสารทางการแพทย์ คณะผู้รายงานได้รายงานผู้ป่วยหนึ่งราย อายุ 51 ปี มีอาการชาและขาค่อย ๆ อ่อนแรงหนึ่งปีครึ่งก่อนมาโรงพยาบาล ผู้ป่วยได้รับการวินิจฉัยว่าเป็นเส้นประสาทส่วนปลายอักเสบและได้รับการรักษา แต่อาการเลวลง หนึ่งเดือนครึ่งก่อนมาโรงพยาบาลผู้ป่วยมีอาการข้อเท้าตกและไม่สามารถเหยียดข้อเท้าให้ตรงได้ ตรวจร่างกายพบผิวหนังมีลักษณะทางคลีนิกเป็น von Recklinghausen's disease คลำพบก้อนตามแนวยาวทางด้านหลังของต้นขาซ้ายยาวประมาณ 20 ซม ได้ทำการผ่าตัด พบเนื้องอกของเส้นประสาท sciatic จากส่วนกลางของต้นขาซ้ายถึงเหนือต่อขอบบนของกล้ามเนื้อ soleus ผลตรวจชิ้นเนื้อทั้งสองครั้งทางพยาธิวิทยายืนยันว่าเป็น Leiomyosarcoma ได้ทำการผ่าตัดรักษาโดยการตัดเส้นประสาท sciatic nerve ในส่วนที่เป็นเนื้องอกออก หลังการผ่าตัดแล้วความรู้สึกสัมผัสของขามิได้ลดลง

คำสำคัญ : มะเร็งกล้ามเนื้อเรียบ, เนื้องอกเส้นประสาทส่วนปลาย, เนื้องอกเส้นประสาทไซอาติค (sciatic nerve), การตัดเส้นประสาท, ท้าวแสนปม

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