A Patient With Two Episodes of Thoracic Spinal Cord Compression Caused by Primary Lymphoma and Metastatic Carcinoma of the Prostate, 11 Years Apart

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We report a 75-year-old man with two spinal tumors, primary epidural lymphoma and metastatic carcinoma of the prostate, which caused thoracic spinal cord compression, with a long symptom-free interval between episodes. The patient presented with back pain and progressive weakness and numbness in his lower limbs for 3 months. Eleven years earlier, he had a symptomatic T8–10 primary spinal epidural lymphoma that was treated successfully with surgery and he made a full recovery. Magnetic resonance imaging of the thoracic and lumbar spines revealed multiple thoracic and lumbar vertebral osteolytic lesions. Extrasosseous extension of a lesion at T1–4 resulted in severe spinal cord compression. In consideration of recurrent lymphoma, emergent cord decompression was achieved via posterior T1–4 decompressive laminectomy, and the patient’s neurological status improved rapidly after surgery. Pathological examination confirmed metastatic carcinoma of the prostate. After several courses of chemotherapy, the patient improved neurologically and could walk independently. Three years after surgery, magnetic resonance imaging showed complete resolution of cord edema at T1–4 and T8–9, and the high signal intensity at unoperated levels largely regressed. This report emphasizes that other newly developed lesions should be included in the differentiation of recurrent primary spinal epidural lymphoma, especially in patients who have long-term, disease-free intervals between episodes.

Key Words: lymphoma, metastasis prostate carcinoma, spinal cord compression, spinal tumors

Malignant lymphoma can be formed in a variety of organs, but the primary spinal epidural lymphoma (PSEL) is uncommon [1,2]. PSEL mainly occurs in the epidural space without other previously detected lymphomatous foci. This disease entity represents 0.9–6.5% of non-Hodgkin’s lymphomas, 10% of epidural spinal tumors, and 0.1–3.3% of all lymphomas [1,2]. In most cases, malignant cells are only found within and around the meninges, with no invasion to parenchymal tissues. Patients with PSEL, therefore, usually have no symptoms until severe pain or neurological deficits develop. However, the incidence of paralysis, sensory disturbance or walking difficulty as a consequence of spinal cord compression caused by lymphoma is not high (approximately 7% of all cases reported). PSEL patients have a better outcome if diagnosis and treatment are prompt. Emergency surgery for decompression of the spinal canal is carried out on PSEL patients who develop neurological deficits.
Malignant lymphoma is markedly responsive to chemotherapy with or without radiation, and the recovery of neurological function is far better in patients with PSEL than other tumors, such as metastatic carcinoma. Here, we describe a rare case of PSEL in the thoracic spinal level, with an indolent nature after aggressive surgery and chemotherapy. Eleven years after initial diagnosis, the patient suffered from an episode of spinal cord compression because of metastatic carcinoma of the prostate, which developed in the contiguous levels close to the previous PSEL. Clinical manifestations, characteristic imaging findings, and treatment course and results are discussed in this report.

**Case Presentation**

A 75-year-old man presented to our hospital with back pain and progressive weakness and numbness in his lower limbs for 3 months. His legs had gradually weakened to the point of having a problem in walking. Eleven years ago, the patient was admitted to our hospital with the same clinical picture of paraplegia with grade 0 muscle power. The muscle weakness and numbness of the bilateral lower extremities rapidly progressed within a few days. A review of hospital records revealed that he had been operated on for a T8–10 PSEL because of a rapidly developed episode of paraplegia (Figure 1A). The lesion was highly intensified after gadolinium injections (Figure 1B). Laminectomy was performed for spinal cord decompression and tumoral excision. One year later, the tumor showed complete remission after surgical removal and adjuvant radio- and chemotherapy (Figure 1C).

Histopathological analysis of the resected specimens showed diffusely proliferating lymphoblastic cells. Immunohistochemical characterization of the
tissue specimens showed that the cell membrane was stained with hematoxylin and eosin (Figure 1D). The tumor was diagnosed as malignant lymphoma of diffuse large B cell type. Superficial lymph node swelling was not recognized and histocytological examination of specimens obtained from bone marrow aspiration, chest and abdominal computed tomography and gallium scintigraphy showed no abnormality, therefore, the tumor was diagnosed as malignant PSEL. The muscle strength of the lower extremities improved to the 4/5 level immediately after surgery. Subsequently, the patient received adjuvant radiotherapy, including a total irradiation dose of 40 Gy given in 20 fractions (5 fractions per week), and four courses of chemotherapy, which involved high-dose intravenous methotrexate combined with cyclophosphamide, hydroxy-daunomycin/doxorubicin, vincristine, and prednisone (CHOP regimen), and made a full neurological recovery 1 week after surgery. The patient was symptom free for 11 years and received further surgery for benign prostate hyperplasia at another clinic 2 years before the present admission.

Physical examination revealed signs of myelopathy, grade 3/5 muscle weakness in both lower limbs, and sensory loss above the T8–9 level. The deep tendon reflexes were hyperactive, with bilateral extensor plantar responses and clonus at the ankles. Rectal examination showed diminished tone and loss of sensory innervation of the perineum and anus. Plain radiography of the thoracolumbar spine showed previous laminectomy and multiple osteoblastic changes. Magnetic resonance imaging (MRI) of the thoracic and lumbar spine in axial and sagittal planes was performed immediately. These images revealed multiple thoracic (T1–4), lumbar (L2, 3 and 5) and sacral vertebral lesions. A tumor in the T1–4 vertebral body was observed, which extended into the spinal canal and caused marked cord compression (Figure 2A). The cord at the T1–4 level exhibited high signal intensity, which indicated edema. The patient was screened for primary malignancy and metastasis using chest X-ray and serum–urine protein electrophoresis, and no such lesions were found. A presumptive diagnosis was made of recurrent lymphoma with multiple vertebral involvements and T1–4 extraosseous extension. The patient was referred to an oncologist and was treated with chemotherapy, including the CHOP regimen. However, after treatment, his muscle weakness deteriorated to a level of near total paralysis. The patient was operated with T1–4 posterior laminectomy for spinal cord decompression, and tumoral excision. There was minimal bleeding during the procedure, and no transfusions were needed intra- or postoperatively. Histopathological analyses of the resected specimens obtained during laminectomy and from the epidural space showed diffuse metastatic tumor from prostate carcinoma, which confirmed the diagnosis of metastatic carcinoma of the prostate (Figure 2B). The patient was mobilized in the early postoperative period with a thoraco-lumbo-sacral orthosis for 6 months. The patient’s neurological signs and symptoms improved rapidly. Adjuvant chemotherapy was prescribed because the metastatic lesion was only partially resected, and for the purpose of preventing cord compression by the remaining metastatic vertebrae. As the chemotherapy was completed, a clinical check showed that the patient was neurologically improved and was able to walk independently without pain. Two years later, MRI revealed complete resolution of the signal previously observed in the spinal cord at T1–4 and T8–9, and showed that the high signal intensity detected at unoperated tumorous vertebrae had regressed, which indicated diminished vascularity and reduced tumor aggression (Figure 2C).

**DISCUSSION**

The incidence of malignant lymphoma in the general population is reported to be 0.005% [1,2]. As a result of the limited number of PSEL patients and long timespan, parameters of this disease, such as natural history, prognostic factors, treatment techniques and survival, are difficult to establish [3,4]. MRI shows that meningeal involvement is useful for diagnosis. Nevertheless, definite diagnosis can be made when abnormal cerebrospinal fluid lymphocytes are recognized by immunocytochemistry or morphological analysis of meningeal biopsy. Lymphocytes are usually of B-cell origin, but T-cell and histiocytic PSEL have been described [3–5]. In most cases, symptoms such as pain and paralysis can be improved by surgery. Surgical excision plus adjuvant chemotherapy are usually sufficient to ameliorate disease progression, whereas radiotherapy is recommended for inoperable patients.

Despite a relatively high incidence of prostate carcinoma in the spinal column [6], patients with a previous history of PSEL at the contiguous levels are rare.
A purely coincidental event is likely to account for this association. Surgical procedures to remove metastatic tumors in the spinal compartment are usually limited because the diagnosis tends to be made late in the disease course, particularly for prostate carcinoma. Therefore, adjuvant chemotherapy is required to reduce tumoral dissemination and control disease progression after surgical decompression.

Cortical destruction is more commonly seen in metastasis than in hematopoietic malignancies [6,7]. In such cases, a mismatch between putative diagnosis (recurrent PSEL) and radiological findings (multi-level osteolytic lesions) usually occurs, and therefore, a survey for other subtle or newly developed lesions should be undertaken. This suspicion should also be kept in mind when dealing with patients with PSEL who have unexpected clinical deterioration after a long symptom-free interval. The presence of spinal malignancy, such as malignant lymphoma, tends to mislead clinical practitioners to overlook other coexisting spinal lesions. When there is recurrent PSEL, with or without metastases, the local tissues and metastases should be biopsied to confirm the diagnosis.

An interesting aspect of diagnosing the present patient was to determine whether the second episode of cord compression was caused by recurrence of PSEL. It is still controversial whether surgical resection and chemotherapy should be applied to patients with multiple spinal lesions and verified malignant lymphoma. It is also difficult to determine whether chemotherapy should be performed before surgical intervention. The clinical worsening that was seen in this patient after initial chemotherapy for recurrent malignant lymphoma, however, confirmed that surgical decompression and pathological confirmation are crucial in treating spinal canal compression and in differentiating between occurrence of other metastatic lesions and recurrence of malignant lymphoma.

In summary, we reported a rare case of prostate carcinoma that metastasized to several levels of the spinal vertebrae and epidural space, with a previous history of PSEL of the thoracic spine. This pattern of linkage is most likely to have been a random event. We emphasize that rapid decompression and pathological confirmation are needed to relieve spinal cord compression and to ensure appropriate diagnosis and treatment in such patients.

REFERENCES

間隔 11 年因兩次不同的脊髓腫瘤
造成之胸椎脊髓壓迫

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我們報告一位 75 歲男性病人，因兩次不同的腫瘤，一次是原發性的硬腦膜上淋巴瘤，一次是轉移性的攝護腺癌造成胸椎脊髓壓迫的病例報告。病人一開始的臨床表現症狀為 3 個多月的上背痛及雙下肢麻木與無力。在 11 年前，病人曾因第八到第十胸椎原癇性的硬腦膜上淋巴瘤造成胸椎脊髓壓迫，而接受外科手術，術後恢復情況良好。當時的磁振造影發現在胸椎及腰椎有多處的侵蝕骨質的病灶。第一至第四胸椎病灶嚴重地壓迫脊髓，當時認為是復發性的淋巴瘤的診斷下，病人接受了緊急的後位第一至第四胸椎椎板切除減壓手術。該病人術後神經學症狀有迅速恢復。術後的病理報告證實是一轉移性的攝護腺癌。病人接受了後續的化學治療，並恢復到可自行走路的狀態。三年後追蹤的磁振造影檢查不再發現有任何的病灶。我們強調在淋巴瘤病人，特別是長期追蹤沒有再復發的病人，如有新的脊椎病灶，除了復發性淋巴瘤之外，任何腫瘤的可能性都必須考慮。

關鍵詞：淋巴瘤，轉移性的攝護腺癌，脊髓壓迫，脊髓腫瘤
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