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Case Report

Cervical Primary Ewing's Sarcoma in Intradural and Extramedullary Location and Skip Metastasis to Cauda Equina

İntradural Ekstramedüller Yerleşimli Servikal Primer Ewing Sarkomu ve Kauda Ekuina'ya Uzak Metastazı

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ABSTRACT

Ewing's Sarcoma (ES) is a rare malignant tumor that commonly arises from skeletal bone but rarely has an extraskeletal origin. Intradural ES is rare in childhood and adulthood. Intradural metastasis is very rarely encountered in clinical observations. There are only two reports of intradural ES skip metastasis in the literature to date. Here we present the case of a 39-year-old female who was admitted to our hospital with complaints of left upper limb pain and numbness for one year. Cervical magnetic resonance imaging showed a C4-C6 primary intradural and extramedullary Ewing's sarcoma. Skip metastasis to cauda equina was observed three years following the first surgery and chemoradiotherapy.

KEYWORDS: Intradural, Extramedullary, Ewing's sarcoma, Skip metastasis, Surgery, Chemoradiotherapy

ÖZ

Ewing sarkomu (ES) genellikle iskelet sistemindeki kemiklerden köken alan, ancak nadiren iskelet sistemi dışında da gelişen malign bir tümördür. İntradural ES çocukluk çağı ve erişkin dönemde nadirdir. İntradural metastaz klinik olarak çok nadir görülür. Halen literatürde intradural uzak metastaz olan sadece 2 yayın vardır. Makalede bir yıldır sol üst ekstremitede ağrı ve uyuşukluk şikayeti ile hastanemize başvuran 39 yaşında kadın hastayı sunduk. Servikal manyetik rezonans görüntüleme C4-C6 seviyesinde primer intradural-ekstramedüller Ewing sarkomunu ortaya koydu. Kauda ekuina'ya uzak metastaz ilk cerrahi ve kemoradyoterapiden 3 yıl sonra gözlendi.

ANAHTAR SÖZCÜKLER: İntradural, Ekstramedüller, Ewing sarkomu, Uzak metastaz, Cerrahi, Kemoradyoterapi

ABBREVIATIONS: CTX: cyclophosphamide, **THR:** pirarubicin, **VCR:** vincristine

INTRODUCTION

Ewing's Sarcoma (ES) is a malignant tumor that primarily affects children and young adults and is normally located in the long bones such as the femur (10). ES is mainly a bony tumor that comprises approximately 10% to 15% of all primary bone tumors (5). Specifically, the incidence of primary vertebral ES is 3.5% (13). Only a few cases of primary intradural ES (2, 3, 6-8, 10-12, 14) have been reported as yet. Only two cases of ES skip intradural metastasis have previously been reported (2, 3).

CASE REPORT

First Round of Surgical Treatment

A 39-year-old female was admitted to our hospital with complaints of left upper limb pain and numbness for one year. Physical examination showed a remarkable hypesthesia of the left upper limb. No other abnormalities of the nervous system were evident. Cervical enhanced magnetic resonance imaging (MRI) showed a uniform reinforcement mass extending from the level of C4 to C6; part of the mass was located in the intradural and extramedullary region and the other part extended to the extradural space through the intervertebral foramen (Figure 1A, B). After preoperative examinations, the patient was put in the prone position and general anesthesia was administered. A middle approach and left hemilaminectomy of C4-6 was performed to expose the dural layer. Next, the dura was incised in order to remove the intradural and extramedullary tumor. The soft nature of the tumor facilitated easy resection of the extradural tumor through the vertebral foramen and allowed for complete removal. No bone destruction was found during the procedure; this finding was certified by postoperative imaging examinations (Figure 2A, B). After surgery, the patient showed more pronounced weakness of the left upper limb (muscle strength: level 2). Unfortunately, pathological examinations

confirmed that the mass was Ewing's sarcoma (Figure 3A, B). The patient was then transferred to the department of oncology to receive chemotherapy and radiotherapy.

Chemoradiotherapy History

The patient underwent seven courses of chemotherapy (CTX+ THR +VCR) plus one course of local radiotherapy (a total dose of 38 Gy) within three years. Three years after surgery, MRI revealed no residual tumor mass (Figure 4A, B). Her symptoms had improved and the muscle strength of her left upper limb was at level 4. However, some new symptoms have started to occur, which led to further treatment.

Second Round of Surgical Treatment

The patient returned to our institution three years after the first operation with complaints of several weeks of bilateral pain in the buttocks and thighs. The patient said that the pain was serious (9 out of 10 on a visual pain scale) and that she was

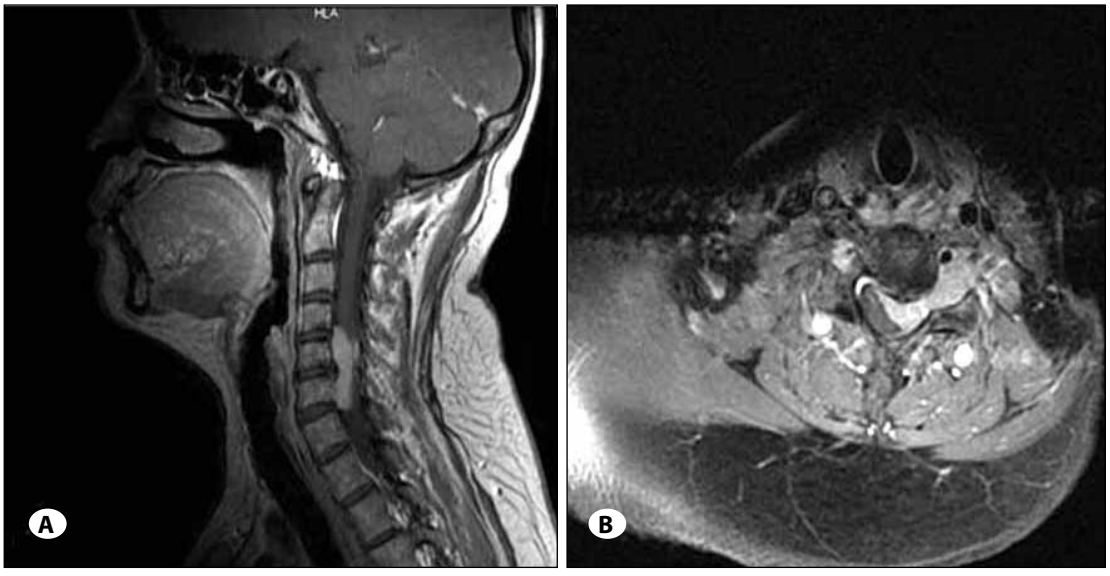


Figure 1: A mass extending from C4 level to C6 in enhanced T1-weighted sagittal scan **(A)** and part of the mass was located in the intradural and extramedullary region and the other part extended to the extradural space through the intervertebral foramen in axial scan **(B)**.

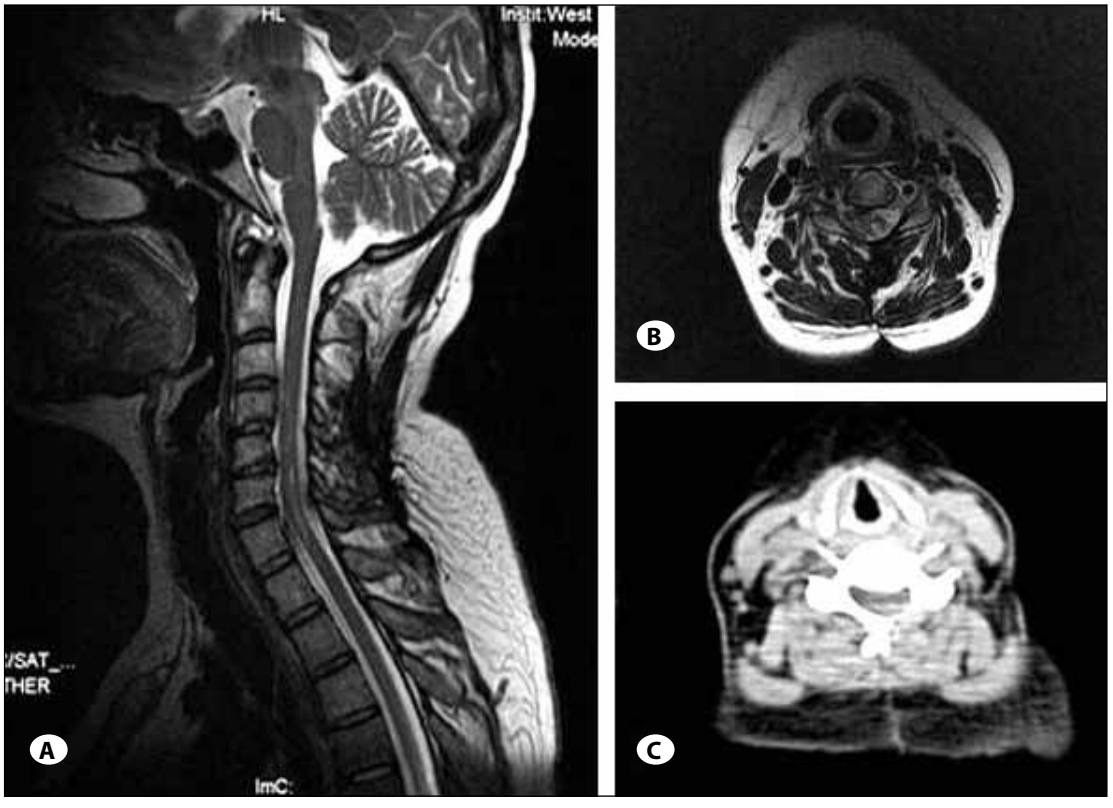


Figure 2: No bone destruction was found in the T2-weighted sagittal scan **(A)** and axial scan **(B)**. Left hemilaminectomy was detected in the cervical CT scan **(C)**.

unable to tolerate it without analgesics (Tramadol). A lumbar spinal enhanced MRI showed a lesion located in the intradural space extending from L4 to S1 (Figure 5A, B). A second surgery commenced with the patient placed in the prone position. A middle approach followed by L4-S1 laminectomy was performed to expose the mass. Then, the adhesion between the lesion and the nervous tissue was carefully sharp dissected under the microscope with assistance from neuro-electrophysiology. However, the tumor was subtotally resected because of strong adhesion to the cauda equina. Postoperatively, it was clear that serious neurological deficits had been avoided. After surgery, her pain level was greatly diminished (2 out of 10 on a visual pain scale). Interestingly, this mass was identified as "Ewing's Sarcoma". The patient was transferred to the Department of Oncology again to resume chemoradiotherapy.

DISCUSSION

The Ewing's sarcoma family of tumors represents a group of high-grade small round cell tumors, including ES of bone, extraskeletal ES, peripheral primitive neuroectodermal tumor (pPNET), and Askin tumor (4). Ewing's sarcoma shares histo-

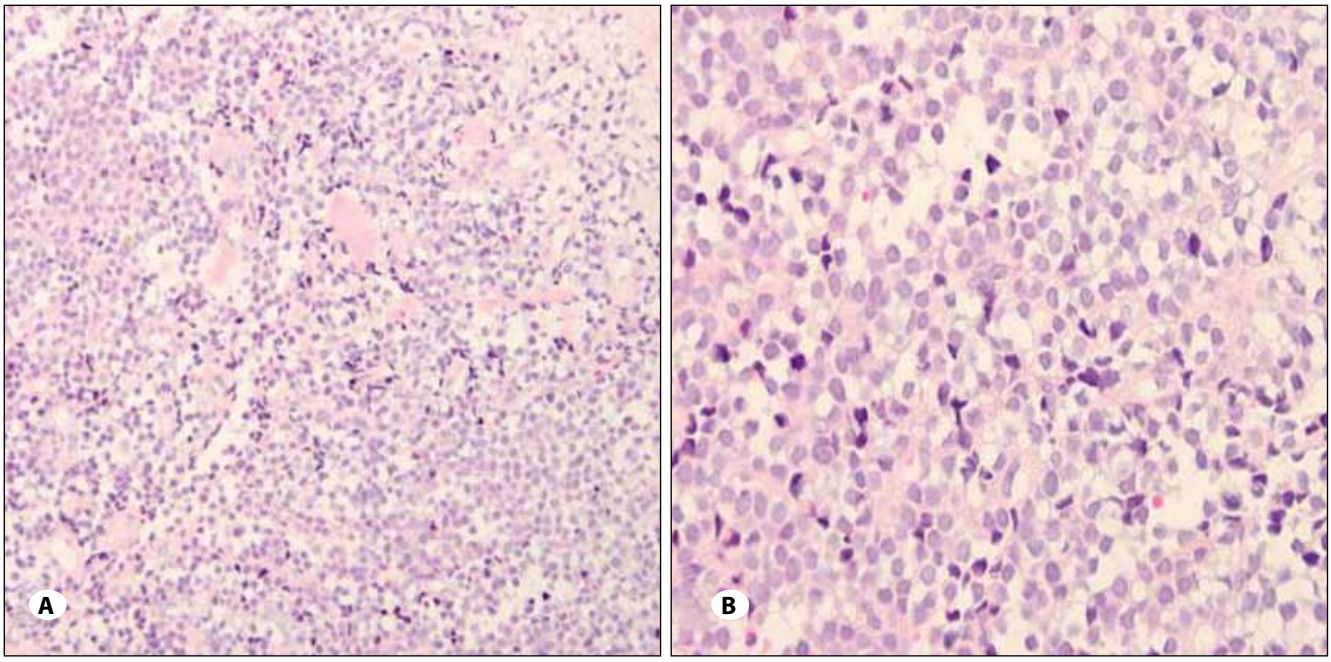


Figure 3: The tumor cells showing a small-blue-cell with strong membranous CD99 reactivity has been noted. Hematoxylin and Eosin staining (**A:** ×200 ; **B:** ×400).

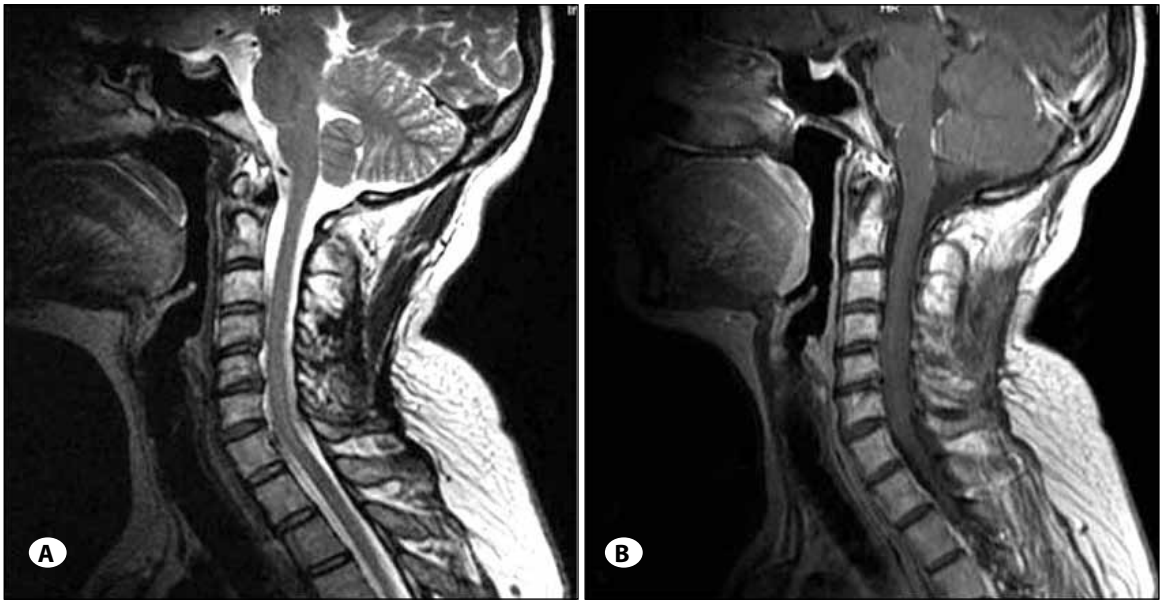
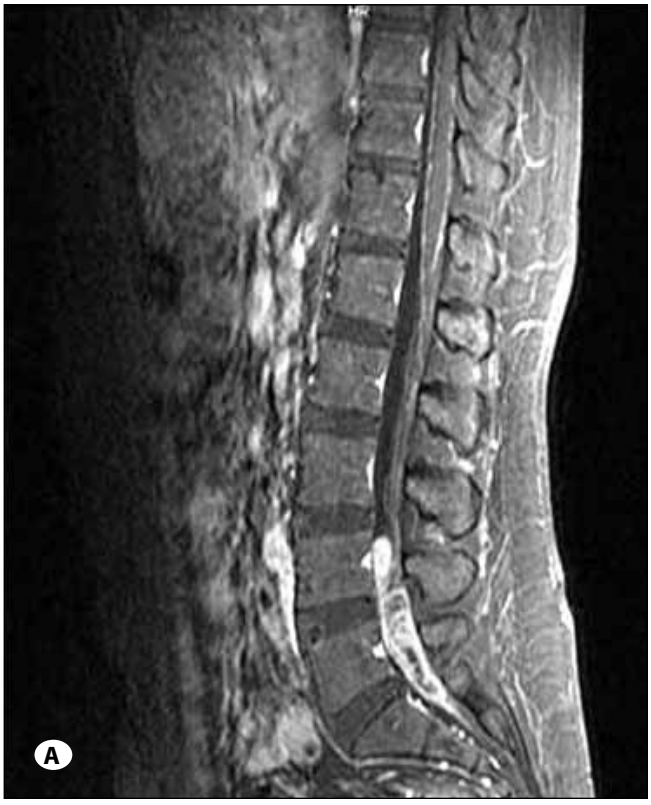


Figure 4: No tumor recurrence in T2-weighted sagittal scan **(A)** and enhanced T1-weighted sagittal scan **(B)**.



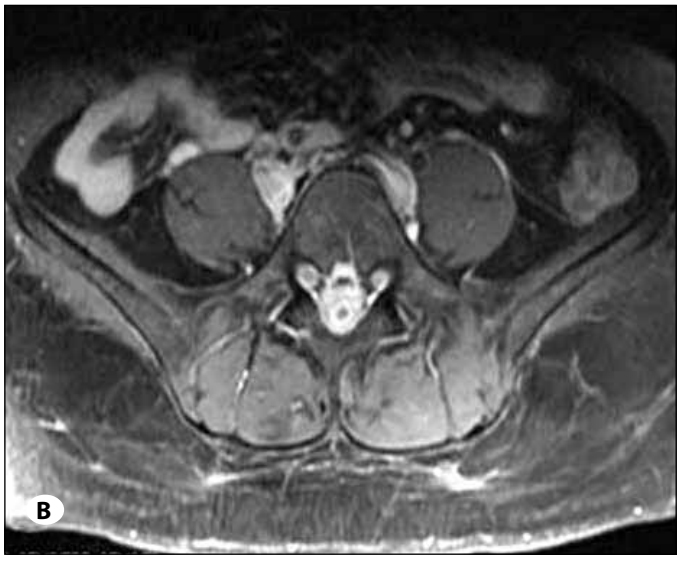


Figure 5: An obviously enrichment lesion extending from intradural L4 to S1 in enhanced T1-weighted sagittal scan **(A)** and mainly located in the ventral of cauda equina in axial T2-weighted scan **(B).**

pathological features with commonly encountered tumors such as lymphoma, malignant meningioma, and atypical teratoid tumor (9).

The diagnosis of ES relies on histopathology and immunohistochemistry. ES is correlated with strong expression of the glycoprotein p30/32 (CD99), which is encoded by the MIC2 gene. Histologically, a small blue-cell tumor with strong membranous CD99 reactivity has been noted. Molecular analysis has revealed translocation t (11; 22) (q24; q12) (1).

Surgery is currently the main treatment for ES (10, 15). Patients who do not receive adjuvant treatment show a poor prognosis (15), whereas a combination of radiation and chemotherapy leads to better results (6, 10, 12). Recurrence and metastasis are common. However, skip intradural metastasis is uncommon and only two cases (2, 3) have ever been reported in the literature.

Our case is similar to these two preceding reports. Our patient also underwent surgery and combination treatment with chemotherapy and radiotherapy. However, our case differs from the previously published case studies in several regards. First, we observed that much more time was required (36 months) for skip metastasis to develop after the first operation than the duration reported by Haresh et al. (3) (2 months) and Dorfmuller et al. (2) (12 months). Secondly there was no evidence of tumor recurrence in the original region. It seems that surgical intervention in combination with chemoradiotherapy improved prognosis, even though it is hard to prevent metastasis. The characteristics and prognoses of ES remain unclear. Surgery in combination with chemoradiotherapy should be regarded as routine therapeutics in every patient with intraspinal ES. When an ES patient exhibits new symptoms after the first operation, especially when symptoms are dissimilar to the original ones, a skip metastasis has likely occurred.

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