



Cervical Epidural Ewing's Sarcoma Presenting with Rapid Progression: A Case Report

Servikal Epidural Ewing Sarkomun Hızlı Rekürrensi: Bir Olgu Sunumu

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ABSTRACT

Primary extraskeletal Ewing's sarcoma is a highly malignant and extremely rare tumor arising from the soft tissues. There is a peak incidence in the second decade of life. A 24-year-old female presented with rapid loss of weight within 1 month, palpable mass lesion in cervical region, right upper limb pain, weakness in all extremities especially in the right upper limb, difficulty in walking, and urinary incontinence. In her neurological examination, her right upper extremity was paretic (3/5). Spinal magnetic resonance imaging (MRI) revealed an epidural mass lesion located at C7-T1 vertebral level, with prominent spinal cord compression. In T1- and T2-weighted images, the tumor was isointense and heterogeneous contrast-enhancement was prominent. An emergency surgery was undertaken because of rapid deterioration of neurological status. A gross total excision was achieved. Early post-operative neurological examination was normal. The pathology report was Ewing's sarcoma. In her post-operative 1st month, when planning to start oncological treatment, she was referred with right upper extremity paresis and recurrent lesion located at C6-T2 level with spinal cord compression. Urgent surgical intervention was performed due to rapid neurological deterioration. Gross total excision was achieved. Her recurrent pathology was also consistent with Ewing's sarcoma. Oncological treatment was planned with radiotherapy and chemotherapy (Vincristine, actinomycin D, and cyclophosphamide). A repeat MRI was performed at the completion of her treatment which showed no residual tumor at 6th month after surgery. This case highlights the possibility of rapid progression in extraskeletal Ewing's sarcoma and the importance of early diagnosis and intervention.

Keywords: Epidural; Ewing's sarcoma; Recurrence.

ÖZET

Primer ekstraskeletal Ewing sarkomu, yumuşak dokulardan kaynaklanan oldukça nadir bulunan malign bir tümördür. Yirmili yaşlarda daha sık görülür. Yirmi dört yaşında kadın hasta, bir ay içinde gelişen hızlı kilo kaybı, posterior servikal bölgede palpasyon ile ele gelen şişlik, sağ üst ekstremitte ağrısı, özellikle sağ üst ekstremitte olmak üzere tüm ekstremitelerde kuvvetsizlik, yürüme zorluğu, idrar kaçırma şikayetleri ile kliniğimize başvurdu. Nörolojik muayenesinde sağ üst ekstremitte paretikti (3/5). Spinal manyetik rezonans görüntüleme (MRG) belirgin omurilik basısı ile birlikte, C7-T1 seviyesinde epidural kitlesel lezyon saptandı. T1 ve T2 ağırlıklı görüntülerde izointens ve heterojen kontrast tutulumu belirgindi. Nörolojik durumunun hızlı bozulması nedeniyle hasta acil şartlarda opere edildi. Posterior yaklaşım ile kitlesel lezyon gross total olarak eksize edilerek, omurilik dekompresyonu sağlandı. Takiplerinde nörolojik muayenesi normal olarak taburcu edilen hastanın patoloji sonucu Ewing sarkomu ile uyumluydu. Postoperatif birinci ayda, onkolojik tedavinin planlanma esnasında sağ üst ekstremitede tekrar kuvvetsizlik gelişmesi üzerine yapılan MRG'de, C6-T2 seviyesinde omurilik basısına neden olan nüks kitle saptandı. Hasta yeniden ameliyat edilerek nüks kitle rezeksiyonu ve omurilik dekompresyonu yapıldı. Yara iyileşmesini takiben, onkolojik tedavisi başlanarak radyoterapi ve kemoterapi (vinkristin, aktinomisin D, siklofosfamid) ile tedaviye devam edildi. Tedavisinin tamamlanmasının ardından altıncı ay kontrolünde rezidü tümör saptanmadı. Bu olgu, ekstraskeletal Ewing sarkomunda hızlı progresyon ihtimali olabileceğini, erken tanı ve girişimin önemini vurgulamaktadır.

Anahtar sözcükler: Epidural; Ewing sarkomu; Rekürrens.

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Ewing's sarcoma and primitive neuroectodermal tumor (PNET) are both members of the tumor family known as Ewing's Sarcoma Family Tumors.^[1] Primary extraskelatal Ewing's sarcoma (EES) is extremely rare and highly deadly tumor develops in the soft tissue. With a male preponderance, the incidence peaks in the second decade of life.^[2] Acute to subacute localized pain and muscular weakening corresponding to the tumor location are the most frequent presenting symptoms of EES.^[1,3] These quickly growing tumors commonly appear with localized neurological signs of radiculopathy or myelopathy.^[3] Ewing's sarcoma typically develops in the skeleton (chest wall, arms, legs, and pelvis), head, neck, and retroperitoneal area, with the potential to extend to the lungs or other bony structures.^[3,4] Rarely do these tumors develop in the spine.^[3,4] Below 50 cases (mainly involving adolescents) with primary EES of the spine have been documented.^[2] The most frequent site, followed by the thoracic area (25%), was the lumbosacral region (50%). Seldomly, it localized in the cervical spine (including the cervicothoracic junction).^[1,4] Examples of the primary spinal EES have appeared both intradural and extradural localization.^[3] Just, 33 occurrences of EES in the cervical epidural area were reported in a recent literature study.^[1] Even though it has been described, cervical spine involvement in a primary EES is infrequent.^[3]

Case Report

A 24-year-old female presented with rapid loss of weight within 1 month, bulging in cervical region, right upper limb pain, weakness in all extremities especially in the right upper limb, difficulty in walking, and urinary incontinence. In her neurological examination, her right upper extremity was paretic (3/5). Spinal magnetic resonance imaging (MRI) revealed an epidural mass lesion located at C7-T1 vertebral level, with prominent spinal cord compression. In T1- and T2-weighted images (WI), the tumor was isointense and heterogeneous contrast-enhancement was prominent (Fig. 1). An emergency surgery was undertaken because of rapid deterioration of neurological status. Paravertebral muscles and spinous processes were invaded with tumor. C7 and T1 total laminectomy was performed, gross total excision of gray colored, hemorrhagic mass lesion was achieved. Post-operative neurological examination was fully recovered and she was discharged on 3rd post-operative day.

In histopathological examination, there were tumoral cells with narrow cytoplasm, round nuclei, thin or thick chro-

matin, high mitosis and apoptosis, and atypic cells with necrosis (Fig. 2). In immunohistochemical evaluation, there was rare pancytokeratin and epithelial membrane antigen positivity. Vimentin and neuron-specific enolase was positive. Synaptophysin was rarely stained and general membranous CD-99 positivity was observed. CD-45, CD-20, HMB-45, S-100, desmin, neurofilament, and glial fibrillary acidic protein were negative. Ki-67 proliferation index was 35%. Pathological diagnosis was confirmed as Ewing's sarcoma and patient was referred to oncology department. In immediate postoperative MRI there was no visible residual tumor (Fig. 3). In her post-operative 1st month, she was referred with recurrent lesion located at C6-T2 level with spinal cord compression (Fig. 4). In the last week, she experienced progressive right upper limb weakness with proximal 3/5, distal 2/5 motor strength. Her neurological examination was otherwise intact. Urgent surgical intervention was performed due to rapid neurological deterioration. T2 total laminectomy was added to decompression and the mass lesion was excised totally and spinal cord decompression was achieved. Her post-operative motor strength was 3/5 in the right upper extremity. Her recurrent pathology was also consistent with Ewing's sarcoma. Oncological treatment was planned with radiotherapy and chemotherapy (Vincristine, actinomycin D, and cyclophosphamide). A repeat MRI was performed at the completion of her treatment which showed no residual tumor on 6th month (Fig. 5).

Discussion

Cervical epidural EES is uncommon^[1] and there is a paucity of research for individuals who have extra and intradural involvement and very rapid cervical region progression.^[4] In computed tomography (CT), MRI, positron emission tomography (PET) scans, the spinal tumor is seen as an unspecific one.^[2,3] It can conceal other highly vascular pathology on imaging. It is challenging to distinguish intraspinal PNETs from other cancers developing from the spinal cord based solely on signal intensity.^[1] The paraspinal musculature or neural foramina is often invaded by the intradural extramedullary type, which can potentially result in the formation of a paraspinal mass.^[1] On CT, there seems to be a lump that expands heterogeneously.^[3] The mass may show up as hypo-, iso-, or hyperintense on T1 and hypo- or hyperintense on T2 MRI. In our case, heterogeneous contrast-enhancement was significant and T1- and T2-WI were isointense. The differential diagnosis of nonspecific spinal canal lesions should therefore include PNET.



Figure 1. Spinal magnetic resonance imaging revealed an epidural mass lesion located at C7-T1 vertebral level, with prominent spinal cord compression. In sagittal T1 (a) and T2 (b) weighted images, it was isointense and heterogeneous contrast-enhancement (c) was prominent. STIR sequence was also shown (d).

Ewing's sarcoma is typically chemo and radiosensitive. As a result, these modalities are crucial for multimodal therapy. Strong evidence supports the notion that early and aggressive therapy produces the best results when it comes to medical care.^[3] Adjunctive chemotherapy and radiotherapy are typically administered after surgery,^[2] yet, as no defined therapeutic recommendations exist, the choice of treatment is individual. While choosing the best treatment option, the

clinical history, the extent of the tumor, the likelihood of a complete tumor resection, and the patient's age should all be taken into account.^[2] In patients with worsening neurological impairments and when the tumor is susceptible to whole or near total excision, particularly in young individuals, surgical decompression and tumor resection are first required. Therefore, a more cautious approach with biopsy, adjuvant chemotherapy, and radiotherapy is advised in

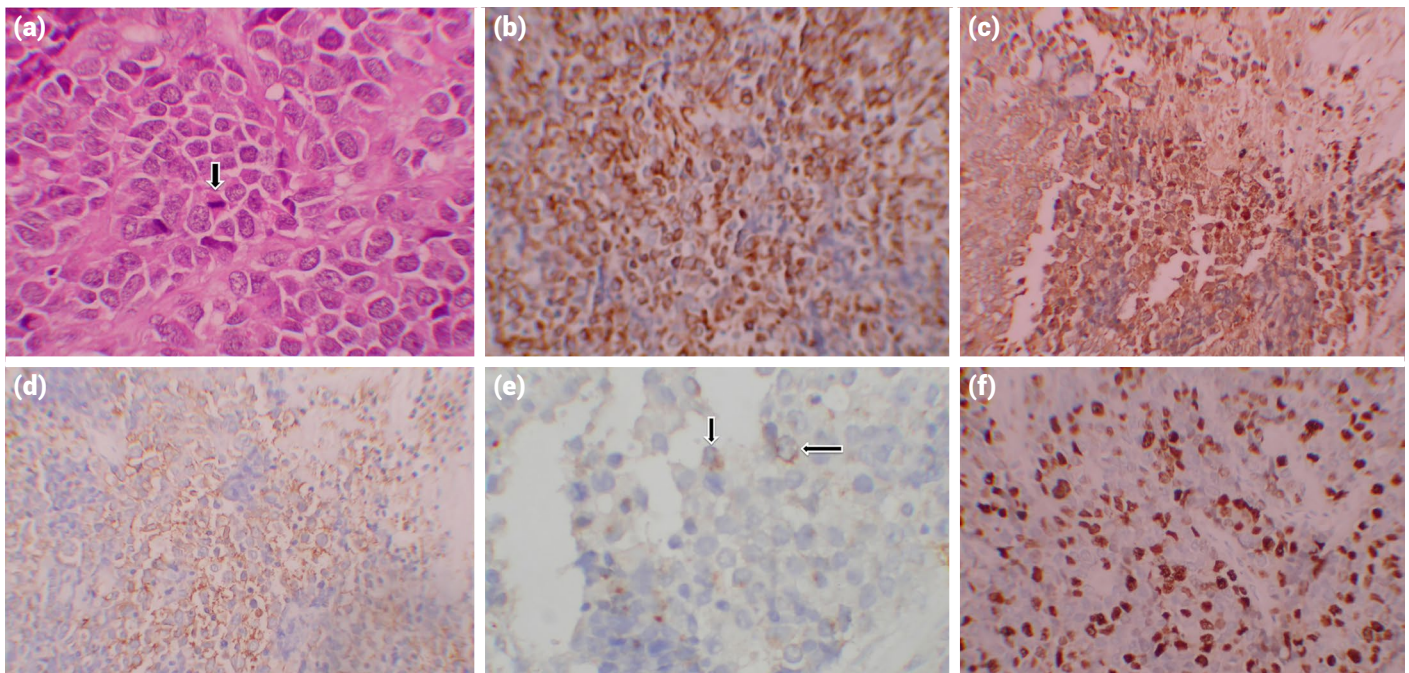


Figure 2. In histopathological examination, there were tumoral cells with narrow cytoplasm, round nuclei, thin or thick chromatin, high mitosis and apoptosis, and atypic cells with necrosis (a). In immunohistochemical evaluation, vimentin (b) and neuron-specific enolase (c) were positive. General membranous CD-99 (d) positivity was observed. Pancytokeratin, epithelial membrane antigen (e), and synaptophysin were rarely stained. High Ki-67 proliferation index was observed (f).

older individuals with big tumors. Due to important features like major veins, the esophagus, and the neural structures, Ewing's sarcoma in the spinal epidural space or the spinal column cannot be removed with wide margins, unlike in the extremities.^[4] Decompressive surgery, even numerous operations, may be able to maintain neurological function and hence life quality, even though it might not increase overall survival. Strong evidence of a fast-growing tumor and a rapidly progressing neurologic impairment existed in our patient. This made it necessary for the suggested laminectomy to have the decompression of the spinal cord as its primary surgical goal. In other situations, if the mass was not causing quickly progressing neurologic change, it would be justified to do a needle biopsy first, followed by radiation therapy to reduce the tumor and raise the likelihood of a successful gross total resection.

The likelihood of a favorable outcome is increased, however, by an intensive multimodal treatment strategy that includes surgery, chemotherapy, and local radiation therapy.^[3] The cornerstone of EES management is radiotherapy. After entire or partial resection of the lesion, patients who received chemoradiation therapy fared better than those who did not.^[1] It is difficult to treat the EES in the cervical spine because the required dose (55–60 Gy) is much higher than the spinal cord's tolerance level (55 Gy). Proton therapy is one of



Figure 3. Post-operative image on sagittal T1 (a), T2 (b) weighted images, and contrast enhancement (c).

the newer treatment approaches that has been similarly effective and has less acute and long-term toxicity.^[1] Adjuvant therapies using peripheral blood stem cell therapy may also enhance the prognosis of EES.^[1]

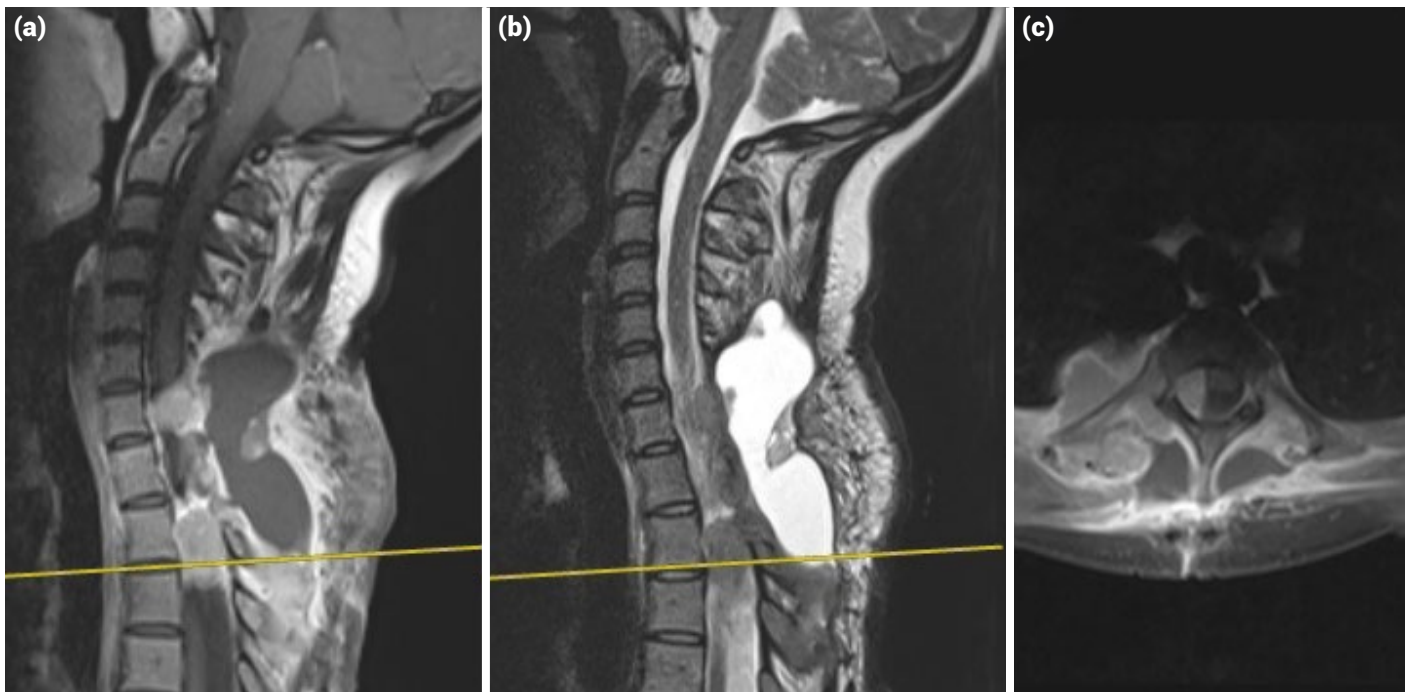


Figure 4. Recurrent lesion located at C6-T2 level with spinal cord compression on sagittal T1 (a), T2 (b) weighted images, and contrast-enhancement (c).

At present, following treatment, the 5-year survival rate is between 41 and 45%.^[4] Since the 1980s, Ewing's sarcoma of the spine survival has grown dramatically (almost 2-fold) as a result of medical advances. Yet, if distant metastasis occurs, the outcome is still dismal (3- to 4-fold shorter survival).^[4] Localized disease at presentation, a local treatment period of <4 months, primary bone origin, and an objective chemotherapeutic response are all good indicators of survival.^[2]

Histopathological investigation is used to make the final diagnosis, with specific attention paid to differentiating EES from lymphoma.^[2,3] Under light microscopy, the findings include homogenous tiny round blue cells with sparse, probably slightly eosinophilic cytoplasm. Pathologists typically use CD-99, which is expressed in Ewing's sarcoma and lymphoma, and CD-45, which is only expressed in lymphoblastic lymphoma, as two cellular markers.^[3] The pathologist typically does multiple immunohistochemical stains, as was done in our instance, to rule out numerous additional differential diagnoses before confirming an Ewing sarcoma diagnosis. Metastatic neuroblastoma, metastatic embryonal rhabdomyosarcoma, and malignant lymphoma were the differential diagnoses taken into consideration.^[5]

In this report, we describe a 24-year-old female who underwent surgery for rapidly progressing cervical epidural EES.

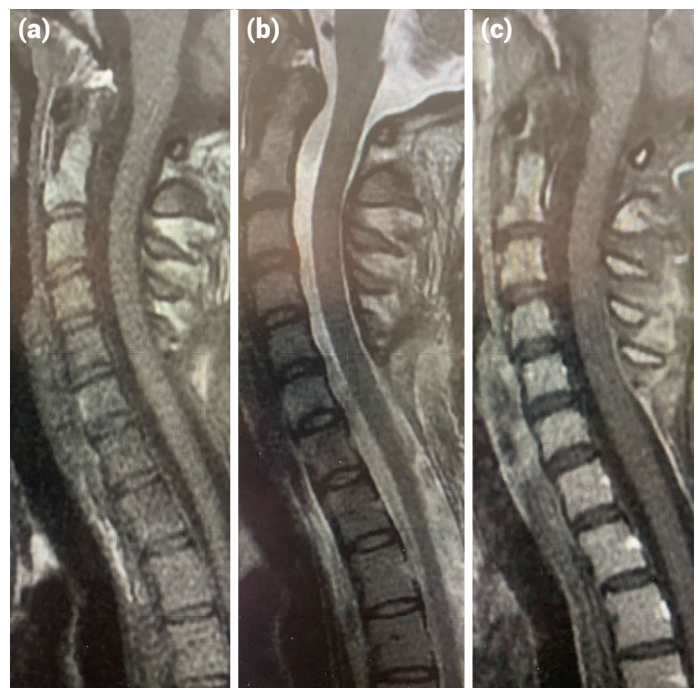


Figure 5. Post-operative image on sagittal T1 (a), T2 (b) weighted images, and contrast-enhancement (c) in 6-month follow-up.

This example serves to highlight that despite substantial therapeutic efforts, the progression-free survival in case of primary EES may be relatively short. A multimodal approach seems sufficient to preserve neurological function and excellent quality of life for as long as possible.

Disclosures

Informed consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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