CASE REPORT

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Malignant Ectomesenchymoma of Pelvis in an Infant

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ABSTRACT Malignant ectomesenchymoma is a rare pediatric soft tissue tumor that contains both neuroectodermal and mesenchymal components. It is frequently found in the pelvis, paratesticular soft tissue, external genitalia and the head-neck region. We present a 12-month-old boy with a recurrent pelvic tumor excised 5 months ago and diagnosed as neuroblastoma. Histological consultation of the initial tumor tissue revealed a biphasic pattern with rhabdomyosarcomatous and neural components. The mesenchymal component was embryonal rhabdomyosarcoma showing desmin, myogenin, and Myo-D1 positivity. The neuroectodermal component was mainly Schwannian stroma stained with S100 antibody and scattered synaptophysin and chromogranin positive ganglion cells were also present. The patient was diagnosed with malignant ectomesenchymoma. A chemotherapy regime was started and surgical approach to the recurrent tumor was planned. We present here a pediatric case of malignant ectomesenchymoma because of its rarity and it is important that this entity should be considered in the differential diagnosis for appropriate clinical management.

Keywords: Ectomesenchymoma; neural crest; rhabdomyosarcoma

Malignant ectomesenchymoma is a rare soft tissue tumor which was first described in 1946.[1] Approximately 68 cases were reported so far and some of which were described in the recent years. The tumor is thought to originate from pluripotent migratory neural crest cells.[2]

The tumor contains both neuroectodermal and mesenchymal components. These cells can transform into different neuroectodermal and mesenchymal components. Neuroectodermal component may include ganglioneuroma, ganglioneuroblastoma, and neuroblastoma with a cellular composition ranging from clustered ganglion cells to immature primitive neural elements. The mesenchymal component often consists of rhabdomyosarcoma (RMS).[2,3] The cases in which the mesenchymal component consists of chondrosarcoma, liposarcoma and undifferentiated sarcoma have been also reported.[2,4]

Malignant ectomesenchymoma is frequently found in the pelvis, paratesticular soft tissue, external genitalia and head-neck localizations and more common in children younger than 10 years old.[5-7] The clinical, pathological, radiological, treatment and survival data of this tumor are still very limited. We report here a pediatric case of malignant ectomesenchymoma because of its rarity and stress that this entity should be taken into account in the differential diagnosis for appropriate clinical management.

CASE REPORT

A 12-month-old boy referred to our emergency department with a complaint of difficulty to urinate and constipation. His medical history revealed that he underwent a surgery at the age of 7 months due to excision of a regularly contoured, heterogeneous, solid mass at retrovesical-presacral region with a size of

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62×49×42 mm and histological diagnosis was neuroblastoma.

On this admission, the physical examination revealed suprapubic tenderness and bladder distention. In the laboratory examinations, there were no significant findings other than mild neutrophilia. Magnetic resonance imaging examination showed a lesion in the pelvis with a size of 55×45×50 mm and adjacent to the prostate gland and the posterior wall of the bladder. Also, the mass appeared with a suspicious invasion the posterior medial wall of the rectum. Thoracic computed tomography (CT) and positron emission tomography CT imaging did not show any metastasis.

Histopathological consultation of the initial surgical operation tumor tissue revealed a biphasic pattern consisting of rhabdomyosarcomatous and neural morphology (Figure 1). Schwannian stroma was predominant in the neural component with scattered ganglion cells (Figure 2). In the rhabdomyosarcomatous area, groups of embryonal appearing small round and primitive spindle cells in the myxoid stroma were observed (Figure 3). Immunohistochemical staining showed S100 positive Schwannian stroma (Figure 4A), desmin and MyoD1 positivity (Figure 4B and Figure 4C) in the rhabdomyosarcomatous component and scattered synaptophysin positive ganglion cells (Figure 4D). Based on typical morphological and immunohistochemical findings, the patient was diagnosed as malignant ectomesenchymoma. Ifosfamide, carboplatin, and etoposide chemotherapy was initiated, and the surgical excision of the recurrent tumor was planned. Consent was obtained from the patient's family for the study.

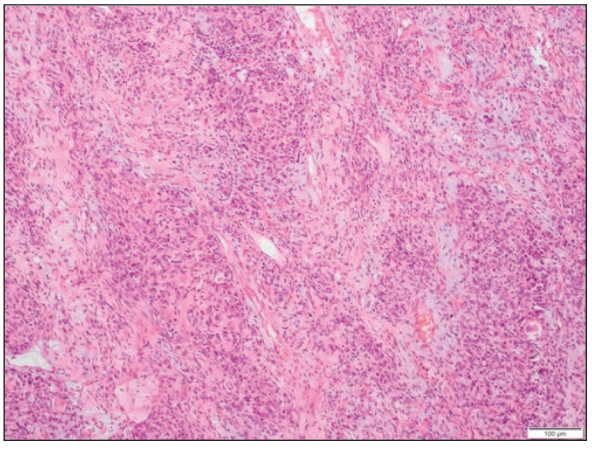

FIGURE 1: Biphasic tumor with rhabdomyosarcomatous and neural components (H&E, x10 magnification).

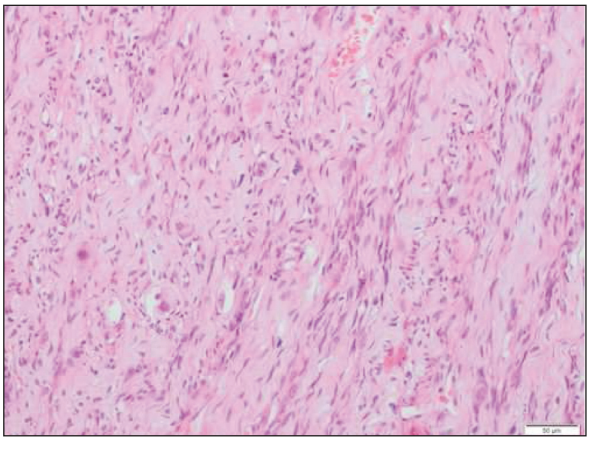

FIGURE 2: Schwannian stroma with scattered ganglion cells (H&E, x20 magnification).

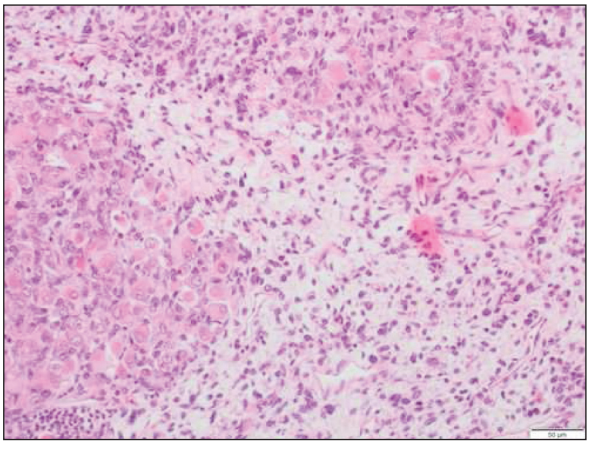

FIGURE 3: Rhabdomyosarcomatous area consisting of groups of rhabdomyoblasts and scattered ganglion cells, and primitive spindle cells in the myxoid stroma (H&E, x20 magnification).

DISCUSSION

Malignant ectomesenchymoma is a rare tumor that contains both neuroectodermal and mesenchymal elements. The most accepted hypothesis for the etiopathogenesis is that it originates from a pluripotent migratory neuronal crest cell.[2] The areas where these cells are present in the body are widespread. So, there are several locations that can be involved by ectomesenchymoma. More common locations are pelvic and the retroperitoneal region, scrotal area, ex-

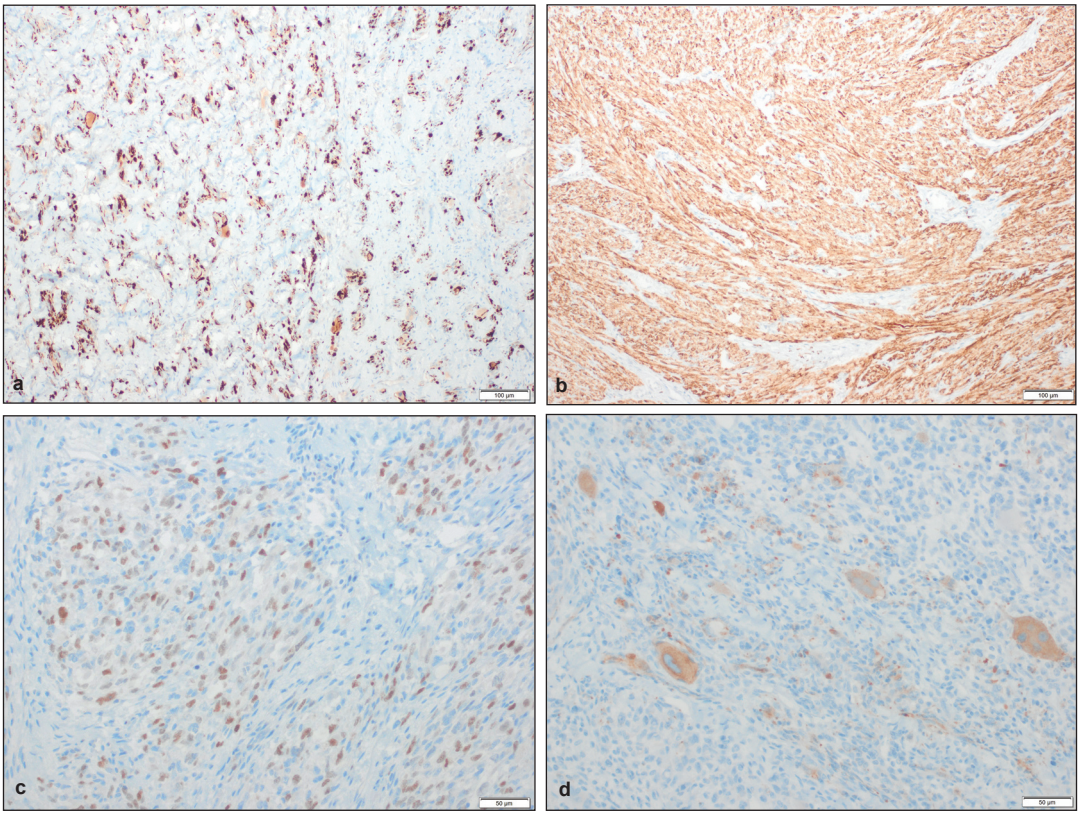

FIGURE 4: Immunohistochemical findings of the tumor. A: S100 staining, B: Desmin staining, C: MyoD1 staining, D: Synaptophysin staining.

tremities, head and neck, and intra-abdominal sites.[2,5-7] It is more common in males and the first decade of life, especially in the neonatal period.[2]

The mesenchymal component of malignant ectomesenchymoma is generally RMS with predominantly embryonal subtype but other sarcomas such as pleomorphic sarcoma, undifferentiated sarcoma, chondrosarcoma and liposarcoma have been reported.[2-4,6,8-10] The neuroectodermal component can be ranged from clustered mature ganglion cells to immature primitive neural elements. The predominant component of the tumor is usually RMS, and this is important for biological behavior and therefore clinical management.[6] Immunohistochemical studies reveal that muscle markers such as desmin and myogenin are usually positive in the mesenchymal component whereas neural markers such as S100, CD56, synaptophysin and protein gene product 9.5 in the neuroectodermal component.[4,6,11,12] Although these immunohistochemical markers are useful for identifying biphasic components, they may not always be reliable since some aberrant results have been reported.[10]

Due to the low frequency of the tumor, genetic and molecular changes have been identified in a small number of studies. Trisomy on the 2nd, 11th, and 20th chromosomes and various mutations on the 6th chromosome were observed in the karyotype analysis.[7,12] Some of these cytogenetic changes have also been described in embryonal RMS (ERMS). In addition, it was shown that some cases had similar HRAS mutation identified in ERMS cases as well. Therefore, it is thought that there is a genetic similarity between these 2 entities.[5,12] In addition, FOXO1 gene rearrangement was demonstrated in three cases with alveolar RMS morphology in a series analysis of 6 cases, whereas EWSR1 gene rearrangement (t: 11,22) and deletion in the 22nd chromosome was also shown.[10,13,14]

Since malignant ectomesenchymoma is a tumor showing various differentiation features and consisting of different number of components, its differen-

tial diagnosis includes almost all sarcomas mainly RMS, as well as many tumors such as ganglioneuroma, neuroblastoma, teratoma, benign/malignant triton tumor and malignant peripheral nerve sheath tumor.[2,6,13,15]

The data on treatment and prognosis are limited due to the rarity of this tumor. The treatment options include surgery, chemotherapy, and radiotherapy. It is recommended in the non-disseminated disease that chemotherapy option should be selected according to the dominant and aggressive component in the tumor after complete surgical resection of the tumor.[2,15] Radiotherapy is recommended for local control of the tumor if the tumor cannot be grossly resected or the patient is followed up without surgery.[8,9] According to the review study of 40 cases, the best survival rate was observed in patients who underwent complete surgical resection and received appropriate chemotherapy earlier.[2] Because the predominant component is RMS in most cases, the patients are usually treated according to the protocol of the RMS study group.[2,6,15] Although prognostic data are limited, the patients have a clinical course and prognosis similar to RMS patients.[6]

Since ectomesenchymoma is a malignant disease with poor prognosis, it should be considered within the differential diagnosis in the pediatric age group, especially when a tumor with biphasic morphology is seen.[12,15] Adding immunohistochemical panel and molecular techniques to the diagnostic process is important to provide an option to the clinician for the appropriate therapy. With the advancements in molecular and immunohistochemical diagnostic methods and the increase in number of cases, the clinical, pathogenetic, treatment and prognosis data of this tumor will become more comprehensible.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Erdener Özer, Sumru Çağaptay;* ***Design:*** *Erdener Özer, Sumru Çağaptay;* ***Control/Supervision:*** *Erdener Özer, Sumru Çağaptay;* ***Data Collection and/or Processing:*** *Erdener Özer, Sumru Çağaptay, Nur Olgun;* ***Analysis and/or Interpretation:*** *Erdener Özer, Sumru Çağaptay, Nur Olgun;* ***Literature Review:*** *Erdener Özer, Sumru Çağaptay;* ***Writing the Article:*** *Erdener Özer, Sumru Çağaptay;* ***Critical Review:*** *Erdener Özer;* ***References and Fundings:*** *Erdener Özer, Sumru Çağaptay;* ***Materials:*** *Erdener Özer, Sumru Çağaptay.*

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