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Case Report

Alveolar soft part sarcoma of the pararectal space in the pelvic cavity: a case report and review of the literature

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Abstract: Alveolar soft part sarcoma is an extremely rare type of soft tissue malignancy, manifests in a variety of locations. We report a case of a 28-year-old Chinese woman presented with alveolar soft part sarcoma. To the best of our knowledge, this study is the first to report a case of alveolar soft part sarcoma with primary location in the pararectal space of the pelvic cavity. Histopathologically, the tumor presented as relatively uniform, organoid, with an alveolar or nest-like growth pattern that varied in size and shape. Immunohistochemical examination revealed expression of TFE3 (transcription factor E3), S-100, and Vimentin. The case exhibited typical histological and immunohistochemical features are suggestive of alveolar soft part sarcoma. After surgical resection, no evidence of local recurrence or distant metastasis was observed after complete resection in this patient in the five months of follow-up.

Keywords: Alveolar soft part sarcoma, pararectal space, immunohistochemistry

Introduction

Alveolar soft part sarcoma (ASPS) is a rare malignant soft tissue neoplasm that was first described by Christopherson et al. in 1952 [1]. ASPS is a very rare, unknown histogenetic type of sarcoma that constitutes less than 1% of all soft tissue sarcomas [2]. This malignancy affects mainly adolescents and young adults, with a peak age of 15 to 35 years old and a slight female predilection [3]. The tumor usually occurs in the head and neck in children, whereas adults primarily are affected in the limbs and trunk. Unusual locations have been reported, including in the retroperitoneal area, tongue, cheek, stomach, bladder, breast, larynx, endometrium, heart, bone, sinus, and kidney (**Table 1**) [4-15]. The clinical features of ASPS present as a painless deep soft tissue mass that is characterized by slow growth and easy relapse [16]. This type of tumor is not easy to discover during the early period, is difficult to prevent and cure, and has low survival rate. Image examinations do not provide distinct characteristics for the malignancy. Therefore, pathological confirmation with a biopsy is crucial in forming an accurate diagnosis. ASPS of the pararectal space is an extremely rare malignancy, with only the first case having ever been reported in the literature. In this study, we report a case of ASPS arising from the pararectal space, along with macroscopical, morphological, and immunohistochemical features, and the detection of transcription factor E3 (TFE3) nuclear immunoreactivity.

Case report

On November 22, 2015, a mixed type mass measuring 9.4 cm in greatest dimension was found in the pelvic cavity during the physical examination of a 28-year-old female patient. The patient was hospitalized for further workup. Computed tomography (CT) examination reve-

Table 1. Summary of clinical data in reported cases of alveolar soft part sarcoma with rare location

Author	Age (year)/Sex	Primary site	Maximum dimension of tumour (cm)	Treatment	Recurrent	Metastasis
Yamamoto J [4]	27/F	Retroperitoneal	Not available	Radical excision	Yes	Bilateral lung
Noussios G [5]	3/M	Tongue	3.3	Radical excision	No	No
Wang HW [6]	36/F	Cheek	6.0	Radical excision	No	No
Yaziji H [7]	54/F	Stomach	6.0	Radical excision	No	No
Amin MB [8]	25/F	Urinary bladder	Not available	Radical excision	Urethral	No
Van Buren R [9]	13/F	Breast	2.5	Radical excision	Not available	Not available
Altug T [10]	33/F	Larynx	Not available	Radical excision	No	No
Kasashima S [11]	50/F	Endometrium	1.9	Radical excision	No	No
Luo J [12]	11/F	Cardiac	7.5	Incomplete resection	No	No
Zhu FP [13]	23/M	Vertebra	6.0	Incomplete resection	Not available	Right scapula
Singh G [14]	25/M	Pparanasal sinuses	Giant	Incomplete resection	Maxillary and sphenoid sinus	No
Meng L	28/F	Pararectal space in the pelvic cavity	9.0	Radical excision	No	No
Kim JM [15]	16/M	Kidney	21	Chemotherapy	Not available	Multiple pulmonary lymph nodes andbone

Note: F: Female, M: Male.

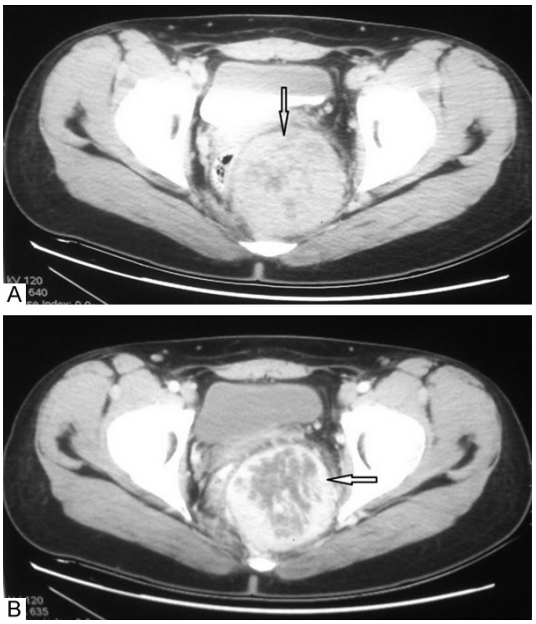

Figure 1. A. Computed tomography (CT) examination revealed a mass lesion, 8.1 cm in diameter, located in the left posterior wall of the pelvic cavity (arrow). B. On contrast-enhanced CT, the lesion had significant heterogeneous density during the arterial phase (arrow).

aled a mass lesion, 8.1 cm in diameter, located in the left posterior wall of the pelvic cavity. On contrast-enhanced CT, the lesion had significantly heterogeneous density during the arterial phase (**Figure 1A**, **1B**), and no evidence of distant metastasis, hence, the mass was considered to possibly be a sarcoma or stromal tumor. One of the tumor markers, CA72-4, was 35.07 U/mL (normal range, 0-6.9 U/mL). A complete resection through an incision below the umbilicus was chosen as treatment for this patient. Intraoperatively, the tumor was very close to the rectum, well differentiated from the surrounding tissues, and presacral hemorrhaged; hence, 1800 mL erythrocyte suspension and 1590 mL plasma were given. An incision in the space between the anus and the left ischial tuberosity was necessary for proper dissection of the lower part of the distal tumor after the patient's blood pressure became stable. The mass was removed for pathologic examination.

Macroscopically, the dimensions of the cystic mass were 9.0 cm×7.0 cm×4.0 cm. The mass is cystic and contains papillary-like excrescences; it was gray-yellow, gray-red in color, with areas of necrosis.

Microscopically, the tumor presented as relatively uniform, organoid, with an alveolar or nest-like growth pattern that varied in size and shape. The tumor was composed of uniform round, polygonal neoplastic cells separated by fibrous septa with distinct cell borders (**Figure 2A**). The cytoplasm was abundant and eosinophilic; the cells' nuclei were large and vesicular, but the nucleoli were small (**Figure 2B**). No vascular invasion was present. Periodic acid-Schiff (PAS) stain yielded intracellular diastase-resistant granules with few needle-shaped crystals (**Figure 2C**).

Immunohistochemical results indicate that the tumor was stained extensively nuclear positive for TFE3 (**Figure 2D**), positive for S-100 (**Figure 2E**), and interstitial positive for Vimentin (**Figure 2F**). The Ki-67 proliferating index was 1%. In addition, ASPS was negative for myogenic markers (Desmin, Myogenin, and MyoD1), epithelial marker (AE1/3), and neuroendocrine marker (Chromogranin A). The final pathological diagnosis was ASPS of the pararectal space in the pelvic cavity.

Discussion

ASPS is an extremely rare type of soft tissue malignancy, the true origins of which have yet to be determined [17]. This type of malignancy is named after its typical pseudoalveolar pattern, but not the origin of the tissue. Typical cases have been given a variety of names, including malignant granular cell myoblastoma, hemangioendothelioma, and even liposarcoma before Christopherson et al. initially described it in 1952. Patients with ASPS usually have a relative lack of clinical symptoms, because the malignancy presents as a painless and slow-growing mass, is easily neglected, and usually presents as large (mean diameter, 6.5 cm, range, 1.2-24 cm) [18]. Metastasis to the brain or lung is often the first presenting feature of this disease. A noteworthy aspect is that metastasis may occur much later, even 33 years after resection of the primary tumor [19]. The prognostic factors include patient age at initial presentation, size of the tumor, and the existence of metastases at the time of diagnosis.

ASPS manifests in a variety of locations and involve the retroperitoneal area, tongue, cheek, stomach, bladder, breast, larynx, endometrium, heart, bone, sinus, and kidney [4-15]. In the

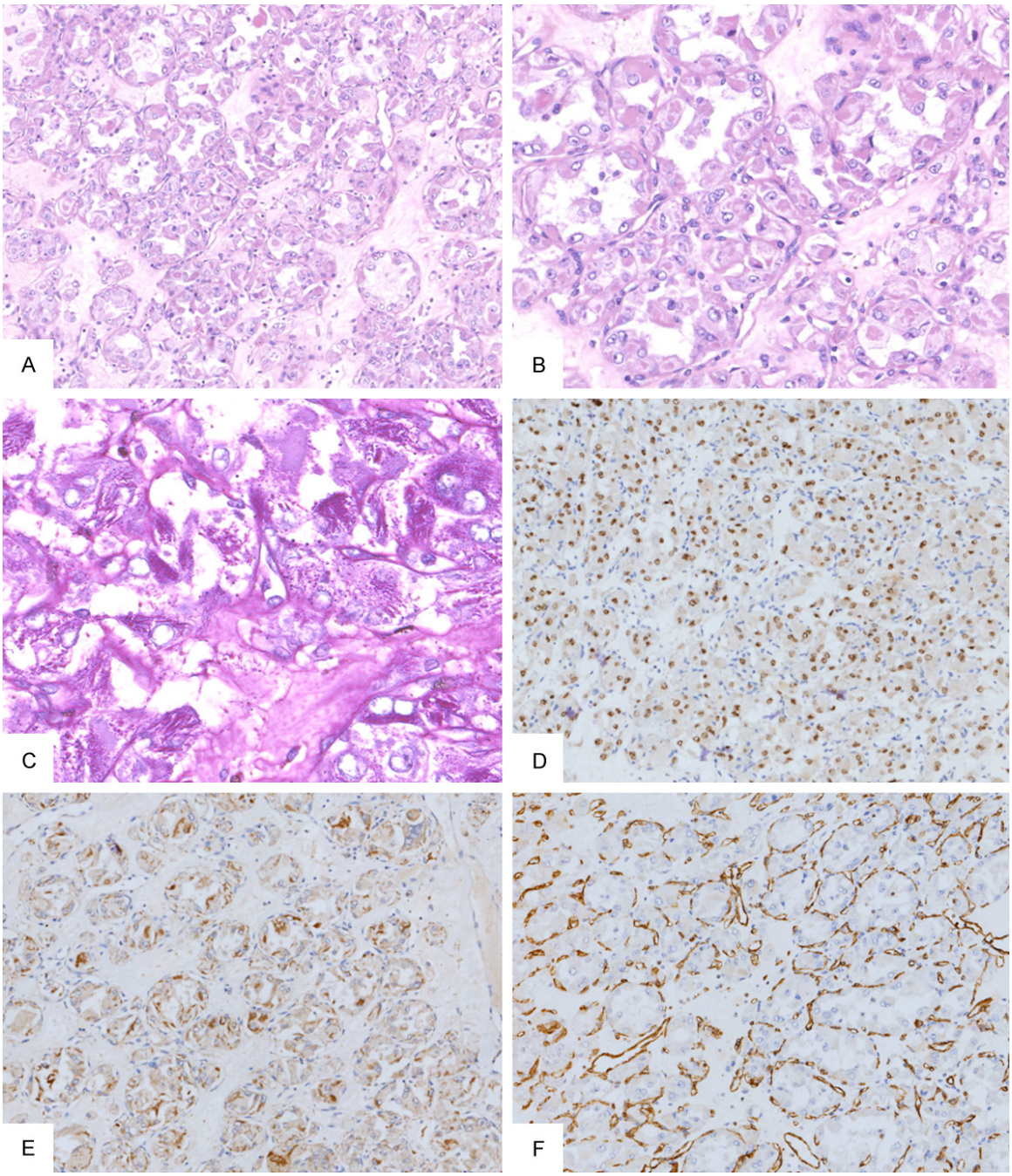

Figure 2. Histology and Immunohistochemical photograph of the pararectal space lesion. The tumor cells were relatively uniform in appearance and exhibited a typical pseudoalveolar pattern (A. H&E×100). The round to oval vesicular nuclei contained a single prominent nucleoli (B. H&E×200). Periodic acid-Schiff exhibited few needle-shaped crystals (C. PAS×400), the tumor cells exhibited positive immunostaining for TFE-3 (D), S-100 (E), and Vimentin (F). (D-F) ×200.

present case, a 28-year-old woman was diagnosed with ASPS with primary location in the pararectal space of the pelvic cavity. The reported tumor has a large mass (9.0 cm×7.0 cm×4.0 cm). Primary pararectal space ASPS is extraordinarily rare; to the best of our knowledge, our case represents only the first one reported in the literature. The local recurrence rate of ASPS reportedly ranges from 20% to 30% after removal of the mass and an adjunctive radiation treatment could be beneficial to preventing a relapse [20]. No evidence of local

recurrence or distant metastasis was observed in this patient in the five months of follow-up.

ASPS may often be highly vascular upon imaging analysis. Angiography and CT showed that ASPS is rich in blood vessels, resulting in the enhancement of the tumor and tortuous and dilated draining vein. The tumor commonly displays high signal intensity on T1-T2-weighted images on MRI, which are highly indicative of ASPS [21]. The imaging characteristics of primary pararectal space ASPS have not been well described. In our case, on contrast-enhanced CT, the lesion had a significantly heterogeneous density during the arterial phase.

Immunohistochemical and specific stains had remarkable supporting roles in diagnosing ASPS. The specificity for ASPS diagnosis of PAS stain and D-PAS stain indicated that needle-like or red rod-like crystal was observed in the cytoplasm. Nuclear positive for TFE3 was regarded as a very powerful marker for ASPS diagnosis. ASPS was negative for epithelial markers (AE1/3, cytokeratin), negative for neuroendocrine markers (chromogranin A, synaptophysin), and negative for specific melanocytic markers (HMB45, Melan A). However, ASPS was at times positive for non-specific markers, such as Vimentin, neuron-specific enolase (NSE), and about 1/4 cases are positive for S-100 protein. Some inconsistencies in the immunoreactivity response to these antibodies have been reported.

ASPS characterized by an unbalanced tumor specific t(X;17)(p11.2;q25) translocation. This translocation results from the fusion of the TFE3 transcription factor gene (from Xp11) with alveolar soft part sarcoma locus (ASPL) at 17q25, thereby producing the fusion gene ASPL-TFE3 [22]. In a study performed by Ann Williams [23], they showed that TFE3 immunohistochemical staining and reverse transcriptase-polymerase chain reaction detected for ASPL-TFE3 fusion transcripts are powerful tools in the diagnosis of ASPS, particularly in cases with unusual clinical setting or morphologic features. In a similar light, the oncogenicity of the fusion genes result from chromosomal translocations in myxoidliposarcoma (FUS-CHOP), alveolar rhabdomysarcoma (PAX3-FKHR), synovial sarcoma (SS18-SSX2), and clear cell sarcoma (EWSR1-ATF1). Matthew L. et al. have shown that the APSL-TFE3 fusion gene is sufficient for completely penetrated sarcomagenesis in mouse.

No standardized treatment guidelines exist because of the rarity of the malignancy, and an unclear original. Most series reported suggest that chemosensitivity of ASPS is very low. Hence, systemic chemotherapy has not yielded any benefit in the adjuvant/neoadjuvant setting as in the metastatic one. Radical resection with no microscopic residual tumor is the first option in treating a local tumor, and R0 resection is critical for good outcome in localized ASPS. ASPS seldom recurs locally after complete resection, however because of the lack of understanding of the diagnosis, surgical resections are not always complete. A SEER analysis shows that the five-year overall survival (OS) for locoregional disease was 82% and metastatic disease was 27%. For locoregional disease patients, surgery plus radiotherapy compared to surgery alone resulted in better OS, whereas for metastatic disease patients, primary site surgery remarkably improved survival [24]. In recent years, new targeted therapy utilizing antiangiogenic agents, for instance, sunitinib, cediranib, bevacizumab, and ARQ197 (Met receptor tyrosin-kinase inhibitors), have displayed promising results [25]. However, further molecular targets should be explored in addition to these therapeutic approaches.

We have presented a rare case of ASPS originating in the pararectal space. To the best of our knowledge, our case is only the first case of ASPS in the pararectal space reported to date. For this malignancy, the best long-term control can be provided by En bloc resection. Lifelong clinical follow-up is necessary because of the potential for late recurrence.

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Disclosure of conflict of interest

None.

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