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A Case of Undifferentiated Pleomorphic Sarcoma of the Right Lower Extremity

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Abstract

Objective: To strengthen the understanding of the disease and treatment of undifferentiated pleomorphic sarcoma (UPS). ***Methods:*** The clinical data of an elderly male patient with UPS admitted to Hebei Provincial People's Hospital in September 2020 were retrospectively analyzed, and relevant literatures were reviewed. ***Results:*** The patient was an elderly male, 74 years old. The color Doppler ultrasonography of the body surface mass showed a solid mass of subcutaneous soft tissue on the lateral side of the right thigh. Undirected arrangement, multinucleated tumor giant cells with strange shapes are seen, and mitotic figures are more common. Immunohistochemical staining: CKpan (-), Vimentin (+), Desmin (-), SMA (partial+), EMA (-), S100 (-), CD34 (vascular+), MyoD1 (-), Myogenin (-), Myoglobin (-), CD68 (-), Caldesmon (-), Ki-67 (about 40% active area). After six months of follow-up, no tumor recurrence was found. ***Conclusion:*** UPS is a rare malignant tumor in clinic. It has no specific clinical manifestations, imaging manifestations, histopathology and immunohistochemical staining. It is an exclusive diagnosis. Complete tumor resection is required, and pathological examination is the gold standard for diagnosis. Its long-term prognosis is relatively poor.

Keywords: male, sarcoma, pleomorphism, undifferentiated

1. Data and Analysis

The patient, a 74-year-old male patient, was admitted to the hospital in September 2020 due to the lateral body surface mass of the right thigh for more than one year. Physical examination: a single raised mass about 3cm×3cm in size was seen in the upper 1/3 of the right thigh, without skin redness and swelling, no ulceration and pus, no obvious tenderness, firm in texture, smooth in surface, and moderate in activity. The boundary was clear, and no obvious abnormality was found in the symmetrical parts of the limbs.

Examination results: The color Doppler ultrasound of the body surface mass showed a solid mass of subcutaneous soft tissue layer on the lateral thigh of the right thigh, which was lobulated (puncture or excision is recommended). There was no obvious abnormality in the preoperative examination, and the tumor on the right thigh was excised under local anesthesia. Postoperative pathological report: (right thigh tumor) a tumor with a size of 3cm×2cm×1.5cm, gray-white gray-red on the cut surface, and medium quality. Attached to the skin tissue, the area is 3.5cm×1cm. Immunohistochemical staining: CKpan (-), Vimentin (+), Desmin (-), SMA (partial +), EMA (-), S100 (-), CD34 (vascular +), MyoD1 (-), Myogenin (-), Myoglobin (-), CD68 (-), Caldesmon (-), Ki-67 (about 40% active area). Pathological diagnosis: (right thigh mass) immunohistochemical staining consistent with undifferentiated pleomorphic sarcoma. Tumors were seen at the margins. According to the postoperative

pathological report of the patient, further surgical treatment was required, and then extended excision of skin cancer on the right thigh was performed under local anesthesia. Postoperative pathological report: a piece of frozen (upper incision margin) soft tissue with a diameter of 3cm. (Lower incision edge) A piece of soft tissue, size 4cmx1cmx0.8cm. (Internal cutting edge) A piece of soft tissue, 2cm in diameter. (External cutting edge) A piece of soft tissue, 2cm in diameter. (basal incision edge) a piece of sheet-like soft tissue with an area of 3.5cmx2cm and a wall thickness of 0.1cm. Pathological diagnosis (see Figure 3 and Figure 4 for details: upper, lower, inner and outer resection margins of the mass on the lateral side of the right thigh) no tumor was found, and no tumor cell infiltration was found in the striated muscle. Considering that the disease is prone to metastases, the systemic examination was completed on the 6th postoperative day. CT of the chest and abdomen showed multiple tiny nodules in the lungs, mild emphysema in both lungs, and small calcifications in the dorsal segment of the right lower lobe; the aorta and Coronary artery calcification; multiple hepatic cysts possible. The rest of the head and abdomen CT showed no obvious abnormality. Whole body bone scintigraphy showed no signs of distant metastasis.

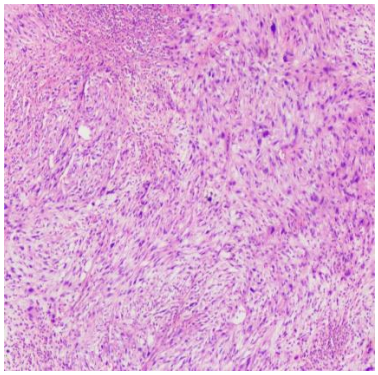

Figure 1.

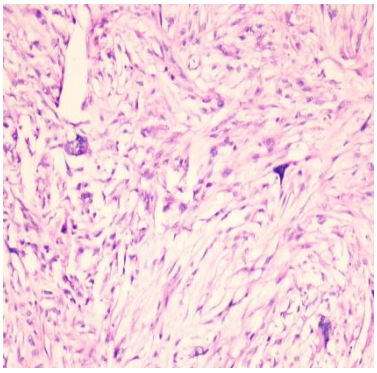

Figure 2.

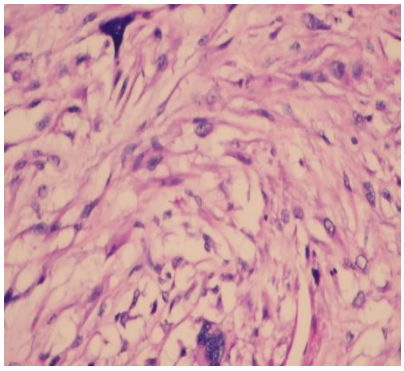

Figure 3.

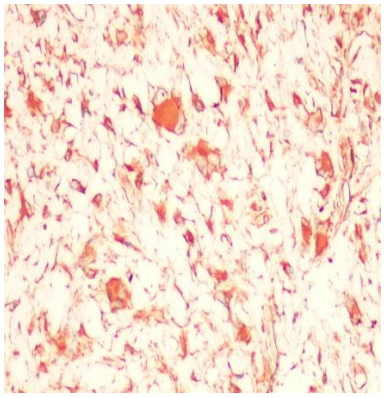

Figure 4.

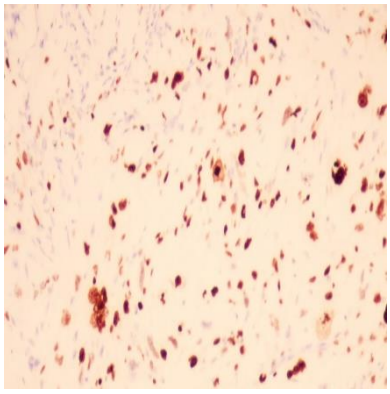

Figure 5.

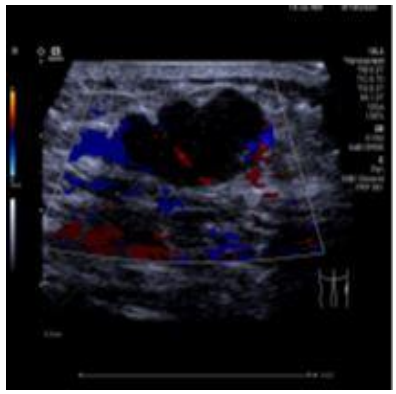

Figure 6.

Figure 1: HE×40 showed pleomorphic and spindle tumor cells with unoriented arrangement; **Figure 2**: HE×100; **Figure 3** :HE×200 showed multinucleated tumor giant cells,more mitotic images are shown in; **Figure 4:** IHC×100 Vimentin (+); **Figure 5:** IHC×100 Ki-67 (about 40% active area); **Figure 6:** Color ultrasound of body surface mass.

2. Discussion

Undifferentiated pleomorphic sarcoma (UPS), also known as malignant fibrous histiocytoma (MFH), accounts for less than 5% of adult soft tissue sarcomas. In 2002, the World Health Organization classified MFH into three categories: pleomorphic MFH, giant cell MFH and inflammatory MFH (FLETCHER C D., 2006). With the advent of contemporary histological techniques, the World Health Organization abolished the concept of MFH in 2013 and changed it to undifferentiated/unclassified sarcomas (FLETCHER C D., 2014). UPS has a high degree of malignancy and is prone to local recurrence and distant metastasis. The 5-year survival rate is 30-50% (ZHENG B, QU Y. & WANG J, et al., 2019). The most common metastatic sites are the lung (90%), bone (8%) and liver (1%), while skin metastases are rare, ranging from 0.6% to 1.5% (JEONG D S, PARK D H. & KIM C Y., 2015). Primary is the most common type of UPS disease, and a few can be secondary to abnormal soft tissue

hyperplasia caused by radiation, chemotherapy, biopsy, or surgical trauma. The disease is more common in male patients. The age at diagnosis of UPS mostly shows a bimodal distribution, and the prevalent age is mostly under 16 years old and over 60 years old (WAPSHOTT T, SCHAMMEL C M G & SCHAMMEL D P, et al., 2018).

UPS has no clear genetic profile (FUJIWARA T, STEVENSON J. & PARRY M, et al., 2020). Usually TP53, ATRX and RB1 are identified as highly mutated genes, and Hippo, RAS/MAPK and PI3K/mTOR pathways are activated in UPS (ZHENG B, QU Y. & WANG J, et al., 2019). UPS is mostly composed of atypical spindle-shaped and pleomorphic cells under the microscope, and mitotic figures are common. Immunohistochemical staining suggests mesenchymal origin, but lacks characteristic markers. Most of them express vimentin, Ki-67, and some also express S-100 protein, CK, SMA, CD10, CD68, actin, Desmin, cytokeratin, antitrypsin and antichymotrypsin (Yang XQ. &Tan S., 2015). UPS represents a heterogeneous group of malignant soft-tissue tumors with relatively diverse locations, including some retroperitoneal tumors, and thus lacks sufficient specificity to distinguish skin-derived or skin-based tumors. It is similar to atypical fibroxanthoma (AFX) in all other respects except that it exhibits more aggressive clinical and histological features. Therefore, when diagnosing the UPS, AFX needs to be excluded to make a diagnosis. AFX has the following characteristics: (1) It usually occurs on the skin of sunburned elderly people, and it is more common in male patients. It usually presents as rapidly growing papules or nodules, which may be accompanied by ulcers and bleeding. (2) The typical histological features are: large cell density, pleomorphism and irregularly arranged spindle cells. Tumor cells are often hyperchromatic, with irregular nuclei, neutral eosinophilic cytoplasm, and bizarre multinucleated giant cells are common. The covering epidermis is usually thinned or ulcerated. (3) Reliable and relatively specific antigen markers CD10 and/or procollagen-1 (PC1) in AFX. (4) The depth of UPS invasion can reach subcutaneous adipose tissue, skeletal muscle, fascia or tympanic membrane, and histologically, the invasion is deeper than that of AFX (SOLEYMANI T. & TYLER HOLLMIG S., 2017).

Wide resection is the main method for the treatment of UPS, but its recurrence and metastasis rates are extremely high, so complete resection is very important. When the resection margin is $\geqslant$10 mm, the local recurrence rate is significantly reduced (FUJIWARA T, STEVENSON J. & PARRY M, et al., 2020). For some patients with unresectable, recurrent or metastatic disease, adjuvant therapy such as radiotherapy or chemotherapy is required. Traditional chemotherapy is not effective in the treatment of such metastatic disease, and radiotherapy may bring more clinical benefits, and the optimal dose, type and frequency of radiotherapy and other relevant treatment details are determined according to the patient's own situation (SOLEYMANI T, AASI S Z. & NOVOA R, et al., 2019). The study by GURAM et al (GURAM K, NUNEZ M. & EINCK J, et al., 2018). showed that radiotherapy combined with checkpoint blockade immunotherapy achieved satisfactory results in the treatment of UPS, but the overall objective response rate was less than 20%.

In conclusion, UPS is relatively rare in adult soft tissue sarcomas, sometimes they appear as nodules on the skin of the body, or even as primary masses in the digestive tract. It is not easy to make a clear diagnosis based on tests and imaging examinations, and it is necessary to confirm the diagnosis based on pathology. Due to the high rate of local recurrence and distant metastasis of UPS, once the diagnosis is made, it is necessary to improve the systemic examination. According to the postoperative pathological diagnosis and related examinations, the patient in this case showed no obvious signs of metastasis, and no recurrence or distant metastasis was found in the follow-up for half a year. With the advancement of technology, UPS molecular biology research may provide a certain basis for molecular targeted therapy and immunotherapy, thereby improving the prognosis of UPS patients to a certain extent.

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