

Cellular Neurothekeoma with Atypical Features in a Child

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ABSTRACT

Cellular neurothekeoma (CNT) is an uncommon benign skin neoplasm and a variant of neurothekeoma (NT). Histopathological examination of cellular neurothekeoma often reveals mild cellular atypia and occasional mitoses. CNTs with atypical features (including large size, deep penetration, marked cytologic pleomorphism, high mitotic rate, diffusely infiltrative borders, vascular invasion) are very rare. The rare presence of atypical features may sometimes make CNT difficult to distinguish from soft tissue sarcoma. We describe a case of a 9-year-old girl with a progressively enlarging left thigh tumor (1.5 × 1.3 × 1 cm) over 6 months. After total resection of the tumor, examination revealed histological findings consistent with cellular neurothekeoma but with prominent atypical features, including deep penetration into the subcutaneous adipose tissue, marked cytological pleomorphism, high mitotic rate (5/10HPF), and diffusely infiltrative border. Immunohistochemically, these cells were positive for α -smooth muscle actin, but negative for cytokeratin and S-100. Her clinical course was uneventful without recurrence after one and a half years of follow-up. (*Tzu Chi Med J* 2005; **17**:43-45)

Key words: cellular neurothekeoma, atypical features, leg tumor

INTRODUCTION

Cellular neurothekeoma (CNT) is an uncommon benign skin neoplasm and a variant of neurothekeoma (NT) [1-5]. This tumor usually occurs in the skin of the upper trunk, head, or neck of children and young adults. It typically consists of a lobulated dermal tumor composed of spindle and epithelioid cells arranged in fascicles and nests and lacks immunoreactivity against the S-100 protein [1-3,5]. Cellular atypia and occasional mitosis are not uncommon in CNT, but atypical features (large size, deep penetration, marked cytologic pleomorphism, high mitotic rate, diffusely infiltrative borders, vascular invasion) are very rare in this tumor [2]. We describe a case of cellular neurothekeoma with atypical features on the left thigh [IS1] of a 9-year-old girl.

CASE REPORT

A 9-year-old girl presented with a six-month history of a nodular lesion on her left thigh. The nodule initially manifested as an erythematous papule and subsequently displayed progressive enlargement. On physical examination, the nodule was red-brown, smooth, nontender, elastic, and mobile, and measured 1.5 × 1.3 × 1 cm. No other abnormal physical or laboratory findings were present. The patient had no history of trauma or family history of neoplasm.

The patient underwent surgery under general anesthesia. The tumor was well-demarcated, unencapsulated, elastic, and extended into the subcutaneous fat. The tumor and adjacent adipose tissue were excised. The patient tolerated the procedure well, and the postoperative course was uneventful.

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Histologically, the tumor was close to the deep margin of the skin, and there was a subepithelial Grenz zone (1-2 mm) between the tumor and the stratified squamous epithelium, with tumor infiltration into the adjacent adipose tissue (Fig. 1A). The tumor was composed of fascicles of myxoid spindle cells with focal epithelioid components. These cells showed pleomorphism, a high nucleus/cytoplasm ratio, hyperchromatism, and frequent mitotic figures (5/10 high power fields (HPF)) (Fig. 1B). There were also multinucleated giant cells and foci of lymphoid aggregates adjacent to the tumor. Immunohistochemically, these cells were positive for α -smooth muscle actin but negative for cytokeratin and S-100.

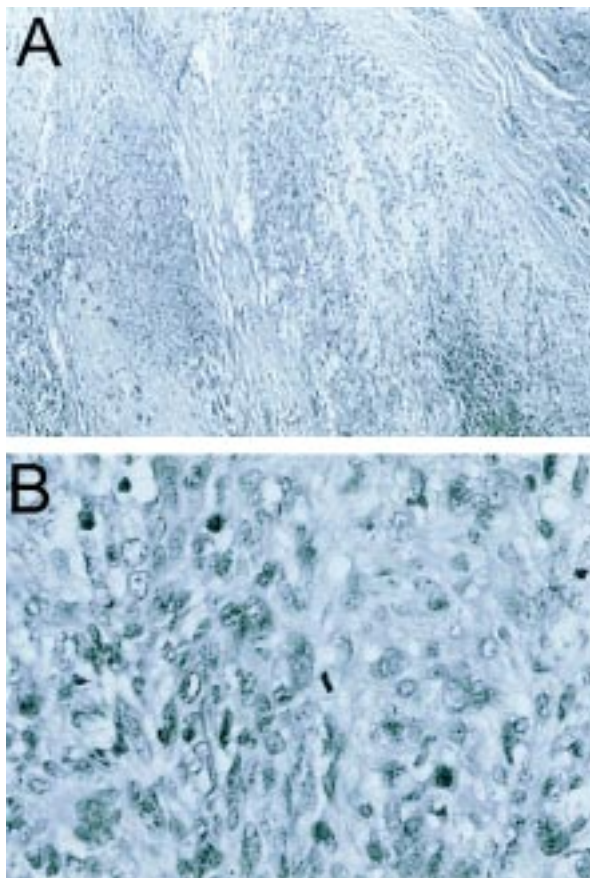


Fig. 1. Histopathology of the tumor. (A) The tumor is composed of fascicles of spindle cells with a focal epithelioid component and is close to the deep margin of the skin. There is a subepithelial Grenz zone (1-2 mm) between the tumor and the stratified squamous epithelium, with tumor infiltration into the adjacent adipose tissue (Hematoxylin & eosin staining, $\times 40$). (B) These cells shows pleomorphism, a high nucleus/cytoplasm ratio, hyperchromatism, and frequent mitotic figures (5/10 high power fields (HPF)). There are also occasional multinucleated giant cells and foci of lymphoid aggregates adjacent to the tumor (Hematoxylin & eosin staining, $\times 200$).

These histopathological features suggested a diagnosis of cellular neurothekeoma with atypical histological features. After one and a half years of follow-up, this patient was well and free of tumor recurrence.

DISCUSSION

Neurothekeomas are benign, predominantly cutaneous neoplasms that are divided histologically into myxoid, intermediate, and cellular types [2,6]. Among these three types of NTs, cellular neurothekeoma occurs mainly in children and young adults, with a slight female predominance [1,6,7]. Most CNTs present as asymptomatic papules or nodules, light pink to pink-reddish, with variable consistency, and a mean diameter of 1 cm, but with progressive growth [7]. Histologically, CNT is characterized by high cell density, large and occasionally epithelioid cells that contain plump vesicular nuclei, occasional atypia, and an absent or sparse mucinous matrix [2].

The origin of CNT is uncertain because it consists of a mixture of undifferentiated cells with immature features of Schwann cells, fibroblasts, myofibroblasts, perineural cells, smooth muscle cells and histiocytes [8]. Further, CNT is difficult to diagnose because of the morphologic similarity to other dermal tumors, such as dermatofibroma, malignant melanoma, spindle and epithelioid cell (Spitz) nevus, cellular blue nevus, fibrohistiocytic proliferations and dermal smooth muscle tumors [1,2,7].

CNT often shows mild cellular atypia and mitoses, but it is still considered a benign tumor [9-11]. However, CNT can rarely evince prominent atypical features associated with malignancy, leading to an erroneous diagnosis of soft tissue sarcoma [2,3,10]. Busam et al reported ten cases of CNTs with atypical features and described six atypical features including large size (larger than 1 cm in diameter), deep penetration (extending into skeletal muscle or subcutaneous fat, or both), diffusely infiltrative borders, vascular invasion, high mitotic figures (3-15 per 10 HPF), and marked cytologic pleomorphism [2]. No single case possessed all six atypical features; five tumors were larger than 1 cm, five had mitotic figures $\geq 5/10$ HPF, four had deep penetration into subcutaneous fat or muscle, and one had vascular invasion [2]. Two cases displayed 5 of 6 atypical components; while three cases had four components, three other cases had three components, and two cases had two components [2]. The CNT presented in this case had five of the six atypical components, including tumor size larger than 1 cm in diameter, deep penetration

into the subcutaneous adipose tissue, marked cytologic pleomorphism, high mitotic rate (5/10 HPF), and diffusely infiltrative border, but did not show vascular invasion. Thus, the tumor displayed a relatively high degree of cellular atypia, and an initial diagnosis of sarcoma was entertained. The atypical components of CNTs are not described in detail in the available literature [1, 3,4,6,10,12]. Therefore, a comparison between the present case and those of Busam et al [2] could not be performed.

In addition to histological examination, immunohistochemical studies are often performed to establish a diagnosis and to determine the origin of the tumor. The lack of S-100 immunoreactivity of cellular neurothekeoma help to differentiate them from typical neurothekeoma and to exclude melanocytic lesions [2,3,13-15]. The present case was negative for S-100 and cytokeratin and positive for α -smooth muscle actin, which is consistent with most CNTs described in the literature [2,3, 13-15].

The presence of atypical features raises concern about the clinical behavior of these lesions, with speculation that they might reflect an aggressive variant of CNT. However, the absence of metastases and lack of post-surgical tumor recurrence indicate that these atypical features are not prognostically significant [2,8]. However, we speculate that these tumors may invade adjacent tissues if not excised early, complicating resection and perhaps, worsening prognosis. Thus, cellular neurothekeoma with atypical features may be more appropriately referred to as atypical cellular neurothekeoma and be regarded as a low-grade malignancy. Long-term follow-up of patients to observe for tumor recurrence may aid in confirming this supposition. Further, observation of the natural course of the tumor in patients who defer surgical resection is important.

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