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Interdigitating dendritic cell sarcoma: Clinicopathologic study of 8 cases with review of the literature

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ABSTRACT

To investigate the clinicopathologic features and differential diagnoses of interdigitating dendritic cell sarcoma (IDCS), the clinical, morphological and immunohistochemical features of eight cases of IDCS were collected and analyzed. Three patients were males and five were females, the mean age and the median age were 56.5 years and 57 years respectively. Clinically, the majority of cases involved lymph nodes. Microscopically, neoplastic cells were spindle or ovoid, forming fascicles or whorls. Every case had active mitosis figures. Immunohistochemically, these neoplastic cells were consistently positive for S100, but negative for CD21 and specific B-cell and T-cell associated antigens. Follow-up results were available in 7 cases, of which 5 cases of localized lesions survived, 2 cases died of organ involvement. Interdigitating dendritic cell sarcoma is an extremely rare neoplasm, with inferior prognosis and without standard treatment regimen. IDCS has similar but unique clinicopathologic features and the differential diagnoses include other histiocytic and dendritic cell neoplasms and malignant melanoma.

1. Introduction

Interdigitating dendritic cell sarcoma (IDCS) is an extremely rare neoplasm of dendritic cell origin and there are only more than 100 cases reported so far. In 1981, Feltkamp and coworkers reported the first case of IDCS in the world, the patient was found to have a mass in mediastinum [1]; Wei-Dun Xu et al. in 2002 recorded the first case of IDCS in China, the patient suffered from enlargement of the left axillary lymph node [2]. Based on previous studies, patients are predominantly middle-aged adults (> 40 years old), with a slight male predominance (male: female ratio 1.38: 1) [3]. Concerning the sites of involvement, lymph node is most commonly affected, showing an isolated mass. Extranodal lesions include liver, gastrointestinal tract [3], lung [4], spleen [5], skin [6], nasopharynx [7] and kidney [8]. The ratio of lymphadenopathy and extranodal lesions was about 1.96:1. The liver was the most common site among extranodal lesions, which accounted for 26.00% of extranodal IDCS. However, soft tissue, mesentery, and oral cavity were occasionally involved [3]. In terms of morphology, the neoplastic cells proliferated in fascicled and/or storiform patterns. Tumor cells appear spindled to ovoid with distinct nucleoli in vesicular nuclei. The neoplastic cells express S100 protein, vimentin, fascin, and weakly positive for CD68/KP1 and lysozyme [9]. It has been reported that CD45 could be expressed [10]. However, staining for markers of B cells, T cells, follicular dendritic cells (CD21, CD23), CD1α, HMB45, Desmin and SMA were all negative [11]. Due to its rarity, there were a few cases reported in China. We thus collected and retrospectively analyzed by far the largest series of IDCS occurred in Chinese people and had a review of the literature, in order to have a better understanding of the clinicopathological features, which is crucial for making an accurate diagnosis.

2. Material and methods

2.1. Case selection

Eight cases diagnosed with IDCS between January 2009 and December 2017, were selected from the files of Department of Pathology, Fudan University Shanghai Cancer Center (Shanghai, China). All cases were reviewed by three independent pathologists according to the WHO classification of tumors of the haematopoietic and lymphoid tissues [9] and the initial diagnoses were confirmed. Clinical information including physical signs, complications, treatment, and follow-up were obtained and analyzed.

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2.2. Histology and immunohistochemistry

Formalin-fixed, paraffin-embedded (FFPE) tissues were cut into 4 μm-thick sections and stained with haematoxylin and eosin (H&E) for histological examination. For immunohistochemical analysis, a panel of monoclonal and polyclonal antibodies against the following antigens were employed: S100 (DAKO; dilution 1:700), CD68/KP1 (Long Island; dilution 1:600), AE1/AE3 (DAKO; dilution 1:150), CD1α (DAKO; dilution 1:50), CD20 (DAKO; dilution 1:50), cytoplasmic CD3 (DAKO; dilution 1:80), CD21 (MXB Biotechnologies; dilution 1:100), CD23 (DAKO; dilution 1:150), HMB45 (MXB Biotechnologies; dilution 1:80), PNL2 (Abcam; 1:100), Langerin (Long Island; dilution 1:150), MPO (DAKO; dilution 1:300), LMP1 (MXB Biotechnologies; dilution 1:40) and Ki-67(VENTANA). All of these antibodies were applied on a Ventana Bench-Mark automated immunostainer (Ventana Medical System Inc., Roche Tucson, AZ, USA) according to the EnVision method. Proper positive and negative controls were performed for every antibody. Immunohistochemical results were evaluated by two qualified pathologists.

3. Results

3.1. Clinical features

Among the present series of clinical cases, there were three male and five female patients. The average and median age at diagnosis were 56.5 and 57 years, respectively (range, 38–73 years). Six cases presented as lymphadenopathy, of which four cases occurred in left cervical lymph nodes, one case presented as submandibular lymphadenopathy, the remaining one primarily occurred in the inguinal lymph node. Extranodal lesions were found in the other two cases and involved cheek and nasopharynx, respectively. Clinically, in addition to one patient showed nasopharyngeal hemorrhage, the rest of seven patients demonstrated with asymptomatic lumps. The case 4 showed swelling of multiple left submandibular lymph nodes. The case 6 initially was found to have lymphadenopathy affecting a single lymph node in the left cervical region and progressed to multiple lesions about one month later. Two cases manifested simultaneously with interstitial pneumonia and acute myelomonocytic leukemia (AML-M4) separately. The laboratory test results of the latter revealed a high count of white cell (24.2 × 10/L) and monocyte (5.5 × 10^9/L). Bone marrow biopsy showed cellularity of 60% myeloblasts, monoblasts and promonocytes, 25% of which were positive for non-specific esterase. In terms of treatment, excision of lesions was carried out in four cases, one of which followed by radiotherapy. Another case received chemotherapy with unknown regimen and the case occurred in nasopharynx only underwent local radiotherapy. The remaining one patient with AML-M4 failed to receive any intervention on account of poor health condition. The follow-up information was obtained in seven patients with a follow-up time averaged at 13.9 months (range, 6–28 months). Two patients died of treatment-related disease and five patients were alive at the last contact without relapse. Clinical information of 8 cases was summarized in Table 1.

3.2. Histopathological features

Histologically, the neoplastic tissue in lymph nodes was located in paracortical regions with residual follicles (Figs. 1A, 2A). The atypical cells were spindled to ovoid, some of which were polymorphic or epithelioid, arranged in fascicles and whorls. Abundant slightly eosinophilic cytoplasm with the indistinct border was observed. Part of nuclei appeared contorted, and the majority of nuclei were vesicular, with distinct eosinophilic nucleoli (Figs. 1B, 2B). In addition, there were lymphocytes, eosinophils, and a few plasma cells distributed among neoplastic cells. Multinucleate cells, like Reed-Sternberg (RS) cells, could be found occasionally (Fig. 1C). Moreover, one interesting finding

Table 1
Clinical information of eight patients.

Case	Sex/age (years)	Site (single or multifocal)	Size	Duration	ECOG performance status (PS)	Concomitant diseases	Medical history	Treatment	Survival/ months[a]
1	Female/73	Cheek (single)	2 cm	2 months	0	No	Varicosity of the right foot	Complete excision	Alive/28
2	Female/72	Nasopharynx (single)	Unknown	3 months	3	Interstitial pneumonia	Non-hodgkin's lymphoma	Radiotherapy	Dead/7
3	Male/61	Left cervical lymph node (single)	3 cm	2 months	0	No	No significant history	Complete excision	Alive/12
4	Male/53	Left submandibular lymph nodes (multifocal)	3 cm	4 months	0	No	No significant history	Complete excision	Alive/16
5	Female/65	Left cervical lymph node (single)	3 cm	4 months	3	Acute myelomonocytic leukemia	No significant history	No	Dead/6
6	Female/46	Left cervical lymph node (single)	4 cm	3 months	0	No	Multinodular goiter	Complete excision + radiotherapy	Alive/17
7	Male/38	Right inguinal lymph node (unknown)	Unknown	Unknown	0	Unknown	No significant history	Unknown	Unknown
8	Female/44	Left cervical lymph node (single)	2 cm	2 months	0	No	No significant history	Chemotherapy	Alive/11

ECOG = Eastern Cooperative Oncology Group.
[a] Time was measured from the date of diagnosis to the date of last follow-up or death.

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