Observations on the fine structure of interdigitating cell sarcoma

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Summary. In this histo-pathological follow-up study of a case of interdigitating cell sarcoma, intracytoplasmic membrane complexes were seen by electron microscopy within the neoplastic cells. These complexes might correspond to the eosinophilic inclusions seen in the tumour cells by light microscopy; they were not identified in the initial lymph node lesion. Recently, these structures have been found to be a variation of microtubuloreticular complexes. To our knowledge, they have not been previously described in interdigitating cell sarcoma. Their significance remains obscure.

Key words: Interdigitating cell sarcoma – Eosinophilic inclusion – Electron microscopy – Membrane complex

Introduction

Tumours arising from interdigitating cells (dendritic cells located in T-cell domains) are rare lesions first described as interdigitating cell sarcoma by Feltkamp et al. (1981).

We have previously reported the subcellular characteristics of this rare tumour (Nakamura et al. 1988). During histopathological follow-up study of that case, a number of specific structures were found in the cytoplasm of the neoplastic cells in the recurrent lesion. These specific structures had not been detected in the initial lesion despite intensive study and, to our knowledge, have not been reported previously in interdigitating cell sarcoma.

The present communication reports the follow-up study of the fine-structural aspect of interdigitating cell sarcoma and the characteristics of the specific structures in the cytoplasm of the neoplastic cells.

Materials and methods

A 58-year-old male was diagnosed as having interdigitating cell sarcoma by lymph node biopsy (Nakamura et al. 1988). In spite of chemotherapy, the tumour recurred twice in the jejunum. The recurrent lesions were excised in March and November 1986. The patient was discharged, followed with chemotherapy and was still alive in October 1988 without the metastasis.

Tissue blocks for both light and electron microscopy were obtained from the recurrent jejunal tumour. For light microscopy, specimens were fixed in phosphate-buffered 10% formalin. Specimens for electron microscopy were initially fixed in cacodylate-buffered 2.5 % glutaraldehyde for 2 h and then postfixed in 2% osmium tetroxide. After ethanol dehydration, the tissues were embedded in Epon 812. Thin sections were stained with uranyl acetate and lead citrate, and observed with a JEOL 1200EX.

Immuno-histological and enzyme-histochemical studies were done on fresh tissue obtained from the jejunal tumour by the same methods as previously described (Nakamura et al. 1988). Tumour cells possessed intracytoplasmic S100 protein, Leu3a (T4) and HLA-DR antigens. The neoplastic cells also showed membranous ATPase activity. LeuM1, T6, Leu1, Leu2a, B1, lysozyme and immunoglobulin were not detected. Alphal-antitrypsin and antichymotrypsin were present in the cytoplasm of a minority of tumour cells.

Results

The histological features of this interdigitating cell sarcoma have been reported previously (Nakamura et al. 1988). In brief, histological examination of lymph node biopsy revealed infiltration of pleomorphic cells in the paracortical area. Neoplastic cells exhibited pleomorphic nuclei with abundant cytoplasm. The tumour cells of the jejunal tumours and mesenteric lymph nodes had the same morphological characteristics as those in the cervical lymph node. A number of unusual eosinophilic inclusions were found in the cytoplasm of about 10–20% of the tumour cells at these sites.
Fig. 1. Jejunal tumour. Interdigitating cell sarcoma. Note the eosinophilic inclusions in the cytoplasm of the neoplastic cells. Haematoxylin and eosin. (×1000)

(Fig. 1). They were round or spindle-shaped and located in the center of the cell or near the nucleus. On electron microscopy the fine structure of the tumour cells from the cervical lymph node and jejunal tumour resembled each other in their main features (Figs. 2, 3). The cells had markedly elongated and complex cell processes, and invagination and bladelike indentation of the plasma membrane (Figs. 2–5). The cytoplasm of most cells was electron transparent. The nuclei were located centrally and occupied a relatively large part of the cell. Their contours were pleomorphic with deep invagination of the nuclear envelope and enlarged nucleoli. Some cells appeared to be multinucleated (Fig. 7). The finely dispersed chromatin was condensed in a thin rim against the nuclear envelope. The cytoplasm contained variable amounts of cell organelles, such as rough and smooth endoplasmic reticulum, mitochondria, Golgi apparatus, and ribosomes. These were dispersed around the nuclei. A few endoplasmic reticulum profiles were present as a variable forms of concentric membranous bodies or confronting cisternae, and were identified in the neoplastic cells from the jejunal tumour but not the cervical lymph node (Figs. 11, 12). They were associated with intracytoplasmic inclusions, which are referred to as membrane complexes in this paper and described in detail later (see Ghadially 1982). Some cells showed a moderate number of granules and lysosomes. One unusual cell had an annulate lamella-like structure in the cytoplasm (Fig. 13). Intracytoplasmic microtubules, associated with centrioles, and a few intermediate filaments were occasionally irregularly arrayed and undulated around cell organelles (Fig. 14). A small number of phagosomes were recognized in a few cells. Junctional complexes, Birbeck granules, basal lamina or thickening of cytoplasmic membranes were not identified.

Lymphocytes were intermixed in close contact with neoplastic cells through their branched cytoplasmic projections (Figs. 2, 3).

In about one fourth of the tumour cells in one section of specimen embedded for electron microscopy, membrane complexes were observed in the cytoplasm (Fig. 3). They were located near the nuclei apart from the Golgi apparatus, sometimes surrounded by rough endoplasmic reticulum and found in the neighborhood of confronting cisternae (Figs. 3, 8, 10, 11). They measured from 2.2 to 6.4 μm in length. The membrane complexes were intermixed with slightly-distended rough endoplasmic reticulum and appeared to be composed of undulating paired membranes showing an irregular pattern of loops or circles, or a combination of these configurations (Figs. 6, 7, 9). There were a very small number of circular profiles acceptable as sections through fine tubular structure (Fig. 9). The paired membranes of the complex measured 25 nm in thickness and maintained a uniform separation throughout their three-dimensional configuration. At the periphery and interior of the complex, the membranes were in direct communication with and appeared to be derived from rough endoplasmic reticulum (Figs. 6, 7, 9, 10). At the point of transition, two apposing membranes of the endoplasmic reticulum abruptly converged to form membrane complexes (Fig. 7). The paired mem-

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