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Electron Microscope Observation of Eosinophilic Globules in Kaposi’s Sarcoma

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Abstract: The authors previously presented two cases of eosinophilic globules in the cutaneous type of Kaposi’s sarcoma by light microscope. The globules were stained with periodic acid Schiff (PAS), with periodic acid Schiff (PAS) reagent after diastase digestion, and with phosphotungstic acid hematoxylin (PTAH). Their shapes were very similar to glycoprotein globules of yolk sac tumor (endodermal sinus tumor) in the tissues of the ovary and testicule. Further, we developed observation of the globules by electron microscope. The cause of the glycoprotein globule accumulation is not clear. It seems unlikely that they play an important role in the pathogenesis of the Kaposi’s sarcoma.

Key words: Kaposi’s sarcoma, Eosinophilic globules, Glycoprotein globules, Diastase-resistant, Acquired immunodeficiency syndrome (AIDS).

Kaposi’s sarcoma (initially called a multiple idiopathic pigmented sarcoma of the skin, later called a multiple idiopathic hemorrhagic sarcoma) was first described by the Hungarian M. Kaposi (1872). The early (patch) stage of Kaposi’s sarcoma (KS) is recognized by the presence of increased numbers of vascular spaces that are irregular in shape, and are surrounded by a sparse mononuclear cell infiltrate. The later (plaque) stage is characterized by increasing numbers of abnormally shaped vessels, and the presence of atypical spindle cells within the dermis in close association with reticular dermal collagen. The nodular stage is essentially a spindle cell neoplasm in which irregular vessels with jagged outlines are no longer prominent (Ackerman, 1979; Blumenfeld et al., 1985).

Recently the KS is well known worldwide, for the acquired immunodeficiency syndrome (AIDS) is known to occur among homosexual men, often in association with opportunistic infections, is now well established (Durack, 1981; Fauci, 1982). Black Africans from Central Africa might be another high-risk group (Clumeck et al., 1984;
Downing et al., 1984; Perre et al., 1984). To evaluate AIDS in Equatorial Africa a prospective study was done in Rwanda (Perre et al., 1984), Zaire (Clumeck et al., 1984) and Zambia (Downing et al., 1984), where KS is endemic. The pathogens of AIDS patients infected opportunistically are as follows: candidiasis, cryptococcosis, cryptosporidiosis, Pneumocystis carinii pneumonia, toxoplasmosis, helpes simplex virus (HSV), cytomegalovirus (CMV), Epstein-Barr virus (EBV), hepatitis B virus (HBV), and human T-cell leukemia virus (HTLV). African KS is associated with immunodeficiency (Taylor and Ziegler 1974), and they decreased T helper/T suppressor and 2 of those were also lymphopenia (Downing et al., 1984).

The authors previously reported two cases of eosinophilic globules in the cutaneous type of Kaposi's sarcoma (Senba et al., 1984) and its materials investigated by light microscopic technique. Further, we have developed observation of the these globules by electron microscopic technique.

Two cases of eosinophilic globule specimens were used for electron microscopic observation. These materials were obtained from resected human subjects at Rift Valley Provincial General Hospital in Kenya. Tissue blocks from the Kaposi’s sarcoma including eosinophilic globules were fixed in 10% formalin, and post-fixed in phosphate-buffered 1% osmium tetroxide, serial dehydrated in ethanol, embedded in Poly/Bed-812 (Polyscience, Lot. 00431) and sectioned with glass knives on a LKB 2088 (Bromma) ultramicrotome. Thick sections for light microscopy were stained with alkaline toluidine blue (Toluidine blue: Merck, Art. 1273, Lot. 4101994) and used for histological examination of eosinophilic globule lesions. Ultrathin sections were stained with uranyl acetate and lead citrate and examined with a Nihondenshi 100 CX electron microscope.

Periodic acid Schiff (PAS) positive, periodic acid Schiff(PAS) reagent after diastase digestion positive and phosphotungstic acid hematoxylin (PTAH) positive globules in Kaposi,s sarcoma were investigated by electron microscope. Blackish globules of different size were observed (Fig. 1).

The glycoprotein globules of yolk sac tumor (endodermal sinus tumor) in the ovary and testicule (Kurman and Norris, 1976 a, b; Shirai et al., 1976; Wold et al., 1984) were very similar to such globules in the tissue of Kaposi’s sarcoma. The globules of "marker chemicals" are easily identified in PAS stained sections. However, not all of these globules were stained positively by immunohistochemical techincs for alpha-fetoprotein (AFP), human alubumin, beta-subunit of human chorionic gonadotropin, or alpha-l-antitrypsin (Kurman and Norris, 1976a; Shirai et al., 1976; Wold et al., 1984). Another possible explanation for their lack of staining is that the immunologically active sites are masked as a results of "packaging" in the glycoprotein globules (Wold et al., 1984).

Similar globules in the liver have been extensively described in previous reports (Anderson et al., 1961; Aterman, 1958; Bull et al., 1958; Eger et al., 1958; Fisher and Fisher, 1954; Gurd and Vars, 1949; Kettler, 1948; Nairn et al., 1958; Popper et al., 1960; Trowell, 1946; Weld et al., 1941). Evidence that the globules might originate from
imbibitation of serum proteins has been presented (Nairn et al., 1958; Pfeifer and Bannasch, 1968). Condensation of serum proteins in the globules and lysosomal activity of hepatocytes, may determine the intensity of PAS positive and also of eosinophilia (Pfeifer and Bannasch, 1968).

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