CASE REPORT

Congenital Gingival Granular Cell Tumor

A Case Report

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Abstract

Congenital gingival granular cell tumor is a rare benign lesion of uncertain origin, which has been found only in newborn infants. This article describes one such case. Our immunohistochemical study employing antibodies against S-100 protein, epithelial membrane antigen, carcinoembryonic antigen, wide-spectrum keratin, desmin and vimentin yielded data supporting the theory of a mesenchymal cell origin for this lesion.

Introduction

Congenital gingival granular cell tumor (CGGT) of the newborn is a rare tumor showing female predominance which is usually located in the anterior alveolar ridge of the maxilla. In addition to the original description as congenital epulis^[1], various designations such as congenital granular cell epulis, congenital epulis of the newborn, and congenital granular cell myoblastoma^[2], have been used.

Because of its characteristic clinical features and histologic morphology, it is generally not difficult to diagnose. However, the tumor has been the subject of considerable controversy with respect to its histogenesis. Several ultrastructural and immunohistochemical studies have attempted to elucidate the cause or histogenesis of this lesion. Odontogenic epithelial^[3], fibroblastic^[4], neurogenic^[5], myoblastic^[6], perithelial^[7], and primitive mesenchymal cells^[2,4] have been suggested as progenitors of the characteristic granular cells. Granular cells are not specific for CGGT, and several other odontogenic and non-odontogenic lesions may harbor them^[8,9]. Although no clear consensus has yet been reached, a mesenchymal cell origin has been supported by most recent studies^[2,4,10,11].

The present report presents an example of CGGT in the mandible of a female infant, and discusses the histogenesis of CGGT in the light of immunohistochemical data.

Case Report

A white female infant, the product of a normal full-term pregnancy, was noticed at birth to have a pedunculated tumor measuring 2.5 cm in diameter on the alveolar ridge of the left mandible (Fig. 1). The overlying mucosa was normal. There were feeding difficulties due to the obstructive effect of the mass. The tumor was therefore excised surgically during the infant's second week of life. The postoperative course was uneventful.

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Histologic Procedure

The tissue specimen was fixed in 10% buffered formalin and embedded in paraffin. Four-micrometer-thick sections were cut and stained with hematoxylin and eosin, and periodic acid-Schiff (PAS) with and without diastase digestion.

Primary antibodies against the following were utilized for immunostaining: S-100 protein (Immunon, S-1010-prediluted, Detroit, USA), epithelial membrane antigen (EMA)(Immunon, E-1470-prediluted, Detroit, USA), carcinoembryonic antigen (CEA)(Dako, K-506-prediluted, Santa Barbara, CA, USA), keratin (wide spectrum)(Dako, K-528-prediluted), desmin (Dako, K-544-prediluted), vimentin (Dako, K-537-prediluted).

Immunostainings were carried out with the peroxidase-anti-peroxidase method. Diaminobenzidine (DAB) was used as the chromogen and Mayer's hematoxylin as the counterstain. Positive controls for the aforementioned antibodies consisted of peripheral nerves, breast tissue, colonic carcinoma, oral epithelium and skeletal muscle.

Microscopic Findings

Light microscopic examination showed that the tumor was composed of clusters of cells with granular cytoplasm (Fig. 2). The nuclei were small with evenly distributed chromatin and without mitotic figures. The overlying mucosa was non-hyperplastic squamous epithelium (Fig. 2). There were small nests of odontogenic epithelium among the granular cells (Fig. 3). Diastase-resistant PAS-positive cytoplasmic granules were present within the cytoplasm of many of the granular cells.

Keratin immunoreactivity was demonstrated only in the odontogenic epithelium (Fig. 3). Vimentin immunoreactivity was observed in the cytoplasm of the granular cells (Fig. 4). No

Fig. 1 Congenital gingival granular cell tumor on the alveolar ridge of the mandible

Fig. 2 Clusters of granular cells with several capillaries and non-hyperplastic overlying squamous epithelium (hematoxylin and eosin x70)

Fig. 3 Immunoperoxidase reaction for wide-spectrum keratin. Odontogenic epithelial cells are positive (arrows) (PAP x200).

Fig. 4 Immunoperoxidase reaction for vimentin. Granular cell cytoplasm is positive (PAP x200).

Table 1 Immunostaining results in congenital gingival granular cell tumor

Antibody	Source	Expected Immunoreactivity	Granular cells	Odontogenic epithelial cells
S-100 protein	Immunon	Nerve fibers, Melanocytes, Langerhans cells, Chondrocytes, Myoepithelial cells	—	—
EMA	Immunon	Normal and neoplastic epithelia	—	—
CEA	Dako	Fetal tissues, malignant tumors	—	—
Keratin (wide spectrum)	Dako	Epidermis, oral mucosal epithelium	—	+
Desmin	Dako	Skeletal, cardiac, smooth muscle cells	—	—
Vimentin	Dako	Mesenchymal cells	+	—

Abbreviations: EMA : Epithelial membrane antigen, CEA : Carcinoembryonic antigen

other antibody stained the neoplastic elements. Table 1 provides a summary of the staining results.

Discussion

Investigations of CGGT have focused mainly on two aspects: histogenesis and biologic nature. In their review of the literature up to 1972, FUHR and KROGH^[8] listed the suggested origins of CGGT as odontogenic, fibroblastic, histiocytic, myoblastic and neurogenic.

In the present case, immunostaining positivity for vimentin in the cytoplasm of granular cells was considered to favor a mesenchymal origin. On the other hand, lack of desmin and S-100 protein staining suggested, but did not prove, a non-muscular and non-neural origin. The ultrastructural and immunohistochemical studies of LACK et al.^[4] and LIFSHITZ et al.^[11] are in agreement with ours in supporting a mesenchymal origin for CGGT. Wide-spectrum keratin immunoreactivity has been shown only in odontogenic epithelial remnants as an expected finding^[12]. Absence of keratin and EMA reactivity in the granular cells tends to rule out the possibility of an epithelial origin. CEA has been suggested as a potential marker for aggressive odontogenic tumors^[13], and the lack of staining in CGGT is consistent with its benign behavior. In addition to the immunostaining results, the location of CGGT in the alveolar ridge anterior area and its close relation with unerupted tooth buds suggest an origin from odontogenic mesenchyma.

The reports on ameloblastic fibroma by WHITE et al.^[14] and UNAL et al.^[15] stress the similarity of this lesion to CGGT and indirectly support an origin from odontogenic mesenchyma. Since the gingival tissues are rich in odontogenic epithelial remnants^[16], the presence of odontogenic epithelial islands in CGGT may be incidental.

Some lesions of CGGT may reach 9 cm in diameter^[17], while others may show spontaneous regression^[18]. The behavior is always benign even if excision is incomplete^[4]. It has been suggested that the innocuous clinical behavior of the lesion is consistent with a reactive or degenerative nature^[4,7]. However, some hormone-dependent benign tumors such as uterine leiomyoma may regress with cessation of the endocrine stimulus. The line of demarcation between a benign neoplasm and a reactive hyperplasia is tenuous and speculative. The predominant occurrence in female newborns and the static or regressive behavior of CGGT give credence to the belief that these are developmental, questionably hormone-dependent, aberrations. Obviously, the management of the feeding and breathing difficulties caused by the lesion is much more important than the nature of the tumor, whether it be neoplastic or reactive.

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