OBSERVATION ON A CASE OF ACINIC CELL TUMOR
BY SEM AND TEM

TAMAKA OKINA, TADAMITSU KAMEYAMA, TAKAKI KIMURA,
KOTARO NAKASHIMA, KEN YAEGAKI, NOBUHIKO NAKAYOSHI,
YOSHIHISA INOUE, TOSHIHIKO YAMANAKA
AND MASAO YAMAMOTO

Department of Oral Surgery1, Second Department of Anatomy2,
Kurume University School of Medicine, Kurume, 830, First
Department of Oral Surgery, Fukuoka Dental College,
Fukuoka3, 814 and Self Defense Faculty, Central
Hospital Dental Clinic, Tokyo4, 154, Japan

Received for publication July 30, 1980

The acinic cell tumor developed in the right lower lip region of a 62
year-old woman was studied by scanning and transmission electron micro-
scopes.

(1) The tumor was about 0.7 × 0.7 × 0.6 cm in size, and almost spherically
shaped, and its surface was covered with a thin membrane.

(2) Histological observations showed that the tumor consisted of relatively
large cells which contained acidophilic granules and vacuoles. The nucleus
of the tumor cell was rich with chromatin.

(3) Scanning electron microscopically, the tumor cell was either spherical
or oval, its nucleus was situated off-centrally, and numbers of granules
with varying sizes formed a beads-like, beehive-like and reticular structures
in the cytoplasm.

(4) Transmission electron microscopically, the cell organelle was found
to be poor, and vacuole-like structures with various sizes and myelin struc-
tures were observed.

(5) The patient is in good prognostic condition at the stage of 2 years
after surgery, and no abnormalities such as metastasis are presently
observed.

INTRODUCTION

Acinic cell tumor is originated from
the salivary gland, and its site of gen-
eration is located relatively often at
major salivary glands, particularly at
the parotid glands, and extremely rare-
ly at minor salivary glands.

We have recently had an experience
of examining a case in which acinic
cell tumor developed in right lower
lip region. The results of scanning
and transmission electron microscopes
observations will be presented.

CASE REPORT

Date of the first examination:
Chief complaint: A small tumor on
the lingual mucosa of right lower lip.
No notable remarks in the family his-
tory and the patient's clinical history.

Previous history of present disease: The presence of a small tumor at the lower lip had been pointed out by a dentist in early July, 1978, when the patient had visited the dentist for the treatment of a caries. Then the patient visited our clinic for further examinations.

Present condition: Systemic findings; no abnormality was noted. Local findings; the small tumor, which was covered with healthy mucosa, as large as a soy bean, spherical, with a smooth surface and had a clear boundary, was observed in the lingual region of the right lower lip mucosa.

The tumor was partly adhered with the mucosa, but the connection to the lower layer tissue was mobile. It was soft in elasticity without compression pain (Fig. 1).

Clinical diagnosis: Surgical operation was made with a suspicion of mucous cyst.

Findings on the resected tissue: The size of the tumor was about $0.7 \times 0.7 \times 0.6$ cm; it was soft; the surface was covered with a thin membrane with a little infiltration by surrounding tissues (Fig. 2), and the cut surface of the tumor showed a packed structure with a grey colour (Fig. 3).

Pathohistological findings: According to the H. E. staining and toluidine blue staining, the tumor was found to be separated from normal minor salivary glands by the presence of thin fibrous connective tissue, and consisted of acidophilic granular substances and relatively large cells having vacuoles. The nucleus rich of small chromatins was situated at the center of these large cells. The extracellular presence of the pooling of basophilic substances was also noted although only partially. This substance positively reacted to PAS and Alcian blue. On the basis of these clinical and pathohistological findings, the tumor was diagnosed as the acinic cell tumor (Figs. 4 and 5).

METHODS

For scanning electron microscopic examination, a specimen was rinsed with physiological saline, prefixed in 2.5% glutaraldehyde buffer solution, and postfixed in 1% osmic acid buffer solution. After dehydrated by the alcohol series, the specimen was soaked in an acetic acid-isooamyl alcohol medium, dried by means of the critical point drying method using liquid carbon dioxide, and sputtered with gold ions. For the purpose of obseving the inner morphology of the tumor cell, the frozen resin fracture was also carried out and observations were made using the Hitachi HFS-2 type.

For observation using the transmission electron microscope, the remaining specimen was fixed in 2.5% glutaraldehyde and in 1% osmic acid buffer solution, rinsed with the buffer, dehydrated, embeded, polymerized and sectioned according to conventional procedures. Then the Hitachi Hu-12AS type was used for observation.

OBSERVATIONS

Scanning electron microscopic findings: As shown in Fig. 6, the transverse section of the tumor showed that the tumor was covered with the epithelium and connected to the thin fibrous connective tissue situated right under the epithelium, and that the surface of the tumor was uneven and irregular. In the parenchyma and stroma, which appeared to be granular and finely porous, there were small numbers of capillary blood vessels which dilated to cystic shapes.

Tumor cells had various shapes such
as oval, dice, polygonal, etc, and piled up on each other. On the surface of these cells, small spherical granular structure, appeared to be the projected secretory, was found to be distributed partly densely and partly coarsely. In the densely distributed region, the spherical structures of varied sizes connected and adhered with each other to show the appearance such as pomegranate seeds or a bunch of grapes (Fig. 8). The fractured surface of the specimen showed that the size of the nucleus of tumor cells was small and that the cells had vacuole-like structures with various sizes in the cytoplasm. The inner surface of the vacuole was densely covered with small spherical granules, and these cavities, as a whole, showed various patterns such as a honeycomb and a reticular formation. These patterns might be the structure remained after the overflow of secreting granules, but no regularities were observed in the size and the arrangement of these granules. Moreover, the tumor cells were bounded by thin fibrous connective tissue, and the capillary which were observed in the vicinity of tumor cells were found to be partly dilated to form cystic shape.

Transmission electron microscopic findings: The tumor cells showed varied shapes such as spherical, oval, cubic etc., and in general, their width and lengths were as large as about 10μm. Adjacent tumor cells were isolated from each other, and no formation of the tubular lumen was observed. The nucleus was generally small, spherical or oval in shape and rarely in a lobular form, and it was situated at the center on the off-center of the cell.

Similarly to the finding under the scanning electron microscope, the cytoplasm of tumor cells was filled with varying sized granular structures with varied electron densities, with the elements, appeared to be overflowed secreting granules, which were covered with a limiting membrane, and the inside of which was amorphous and had vacuolar structure, myeline-like structure or the structure appeared to be resulted in the mutual adhesion of cell membranes. The development of intracellular organelle was generally poor. As mentioned above, each tumor cell was isolated, and the amorphous substances, the connective fibers and the capillary blood vessels were also recognized in the intercellular area. These findings, however, seemed not to suggest the direct relation to the genesis of the acinic cell tumor.

DISCUSSION

Acinic cell tumor belongs to the salivary gland tumor, and is not that of dental origin. It is generally said that this tumor preferably develops in the parotid gland and only sporadically in other salivary glands.

This tumor shows similar clinical features to those of tumors developed in other salivary glands, but its pathohistological finding resembles that of serous acinic cells. Therefore, this tumor is called as acinic cell tumor (Abrams and Melrose, 1978). However, the genetic origin of this tumor is still unclear and no unanimous concept has yet been established as to the difference from acinic cell carcinoma. Therefore, the need of clinical treatment which is as careful as that for malignant tumors has been suggested even when no malignancy was indicated by clinical and pathohistological examinations.

According to Masuda et al. (1971) and Inoue et al. (1978) who have carried out transmission electron microscopic observations on this tumor, the tumor composing cell was found to correspond
to the acinic cell and the clear cell in the classification by Adams et al. (1965). Masuda et al. (1971) have postulated that the tumor is generated from the differentiation process to mature acinic cells, while Inoue et al. (1978) have supported the inter-calated duct cell hypothesis. Esaki et al. (1974) thought that the cell which is similar to the inter-calated duct cells grows and differentiates to acinic cell-like cells, namely from vacuolar cells to clear cells. They in fact have observed the appearance of clear cell adenoma. Kato et al. (1973) have emphasized the pluripotential duct cell as the origin. Although Yokoo et al. (1977) have obtained the findings which are capable of supporting the generation of the tumor from epithelial-like cells. The present scanning and transmission electron microscopic examination on the present case did not indicate the existence of mature acinic cells, inter-calated duct cells and epithelial-like cells. The nucleus was off-centrally situated, and the cytoplasm showed various sized vacuolar structures, indicating the findings of regressive degeneration as a whole. Thus, it was unclear as to whether this tumor was originated from epithelium or from minor salivary glands. The tumor was well coated either at optical microscopic level, or at electron microscopic level, and neither a dysplasia nor nuclear divisions were observed in the present study. However, in view of the lack of the established concept as to the origin of this tumor, the classification, the treatment and the prognosis, we have been continuing the observation on the present patient.

Although neither the sign of recurrence nor abnormal findings have yet been noted at the postoperative stage of 2 years, we will continue to perform complete follow-up for the patient.

(Presented before the 24th Annual Session of the Japanese Society of Oral Surgeons, Nagoya, October 5, 1979)

ACKNOWLEDGEMENTS

Grateful acknowledgements are made to Professors C. Sujaku, M. Murakami and T. Tomioka for their constant source of interest and guidance.

This study was supported in part by the Grants-in-Aid for Scientific Research from the Ministry of Education. Science and Culture of Japan.

REFERENCES


Fig. 1. Clinical appearance of the patient. (locus of the tumor →).

Fig. 2. Resected tumor.

Fig. 3. Cut section of the tumor mass.
Fig. 4. Tumor tissue. H.E. ×50

Fig. 5. Tumor tissue. H.E. ×200
Fig. 6. Scanning electron micrograph: Outline of the tumor tissue. The tumor mass is covered with an epithelium and connective tissue. ×100

Fig. 7. Scanning electron micrograph: Showing the free surface of the tumor cell. Small spherical granular substances are observed on the surface of individual tumor cells. ×6,600
Fig. 8. Showing the enlarged structure of the tumor cell and the bead-like arrangement of granules. $\times 27,000$

Fig. 9. Showing the fracture section of the tumor cell. Vacuoles with various sizes from reticular structure. $\times 14,000$
Fig. 10. Transmission electron micrograph: Showing the presence of a spherical nucleus at the center of the tumor cell. The nucleus (Nu) is surrounded by the vacuolar structure with various sizes. Cell organelles are localized along the margin of the cell. ×10,000

Fig. 11. Showing the presence of small nuclei and of many large, small vacuolar and lysosome-like structure in the cytoplasm. ×17,000. Nu: Nucleus.