Short Communication

Columnar Cell Carcinoma of the Thyroid: MIB-1 Immunoreactivity as a Prognostic Factor

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Abstract

We report a case of columnar cell carcinoma of the thyroid. A 47-year-old Japanese man had a nonencapsulated thyroid mass that infiltrated the surrounding tissues extensively. Seventeen months after thyroidectomy he died of respiratory failure resulting from tracheal invasion. An autopsy showed distant metastases to the liver, lung, esophagus, and pancreas. Histologically, the thyroid mass consisted of tall columnar atypical cells with marked nuclear stratification. About one-fifth of tumor cells were immunopositive for MIB-1. The MIB-1-positive index of our case was extremely high, compared with that of ordinary papillary carcinoma. This case indicates that biological growth activity in columnar cell carcinoma may be similar to that of undifferentiated carcinoma of the thyroid, since the MIB-1-positive index is close to each other.

Key Words: Thyroid; columnar cell carcinoma; papillary carcinoma; poorly differentiated carcinoma; MIB-1.

Introduction

Columnar cell carcinoma of the thyroid was first described by Evans in 1986 as an aggressive variant of thyroid papillary carcinoma [1]. This tumor is extremely rare and is seen in 0.47% of papillary carcinoma [2] or 0.17% of thyroid carcinoma [3]. Mizukami et al. [3] reviewed the literature of columnar cell carcinoma and emphasized the lethal biological nature of this variant. However, Evans [4] recently described four cases of encapsulated columnar cell neoplasms of the thyroid with a favorable prognosis. Herein, we report a case of columnar cell carcinoma of the thyroid and discuss its prognostic value of immunoreactivity for MIB-1.

Case Report

A 47-year-old Japanese man presented with enlargement of the thyroid and was subsequently referred to our hospital. The roentgenogram and bronchoscopic examination revealed a thyroid tumor invaded to the trachea. Total thyroidectomy with modified neck dissection was performed. Although at the time of the surgery a part of the tumor mass remained at the peritracheal area, any distant metastases were not detected. Histological diagnosis was papillary carcinoma of the thyroid and metastatic carcinoma of the lymph nodes. He was treated with radioactive iodine, but it was not effective. Seventeen months after the surgery he died of respiratory failure. An autopsy was performed and revealed a direct invasion of the carcinoma to the trachea and parathyroid. Distant metastases to the liver, lung, esophagus and pancreas were also observed.

Pathology

The resected thyroid tissue and autopsy specimen were fixed in 20% buffered for-

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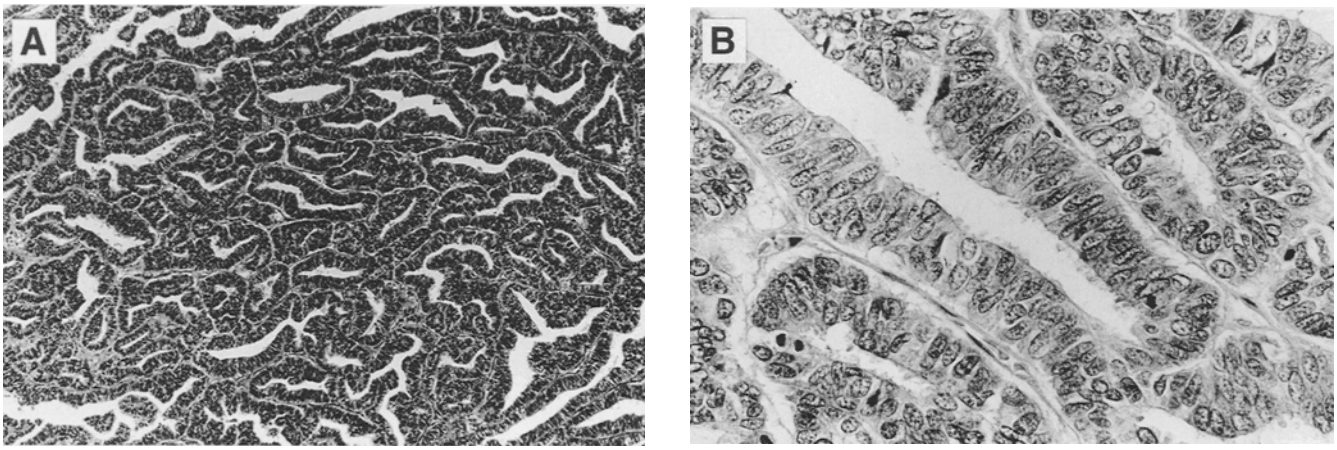

Fig. 1. (A) Tall columnar atypical cells show glandular architecture (H&E stain, original magnification ×100). **(B)** The tumor cells show marked nuclear stratification (H&E stain, original magnification ×400).

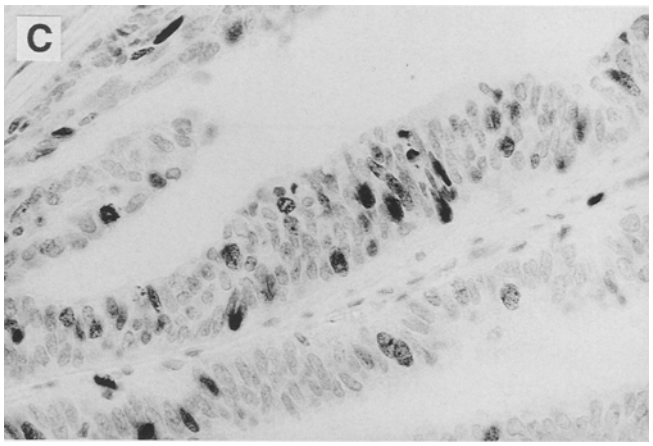

Fig. 2. About one-third of tumor cells are immunopositive for MIB-1 (immunostain for MIB-1, original magnification ×400).

malin, embedded in paraffin, and sectioned for staining with hematoxylin and eosin. Grossly, the resected thyroid was almost replaced by gray to white nodular mass, measuring 6 × 4 × 3.5 cm. It was not encapsulated and extensively infiltrated the surrounding tissues. Microscopically, the thyroid tumor was composed of tall columnar atypical cells, predominantly arranged in tubular and papillary structures (Fig. 1A). There were also foci of solid or cribriform growth. The nuclei were slender and hyperchromatic with stippled chromatin and showed marked stratification (Fig. 1B). Mitotic figures and necrotic foci were easily found. Stroma was fibrovascular or hyalinized but was scant. Foci of conventional papillary carcinoma, such as ground glass chromatin, round-shaped nuclei, intranuclear cytoplasmic inclusions, and psammoma bodies, were observed. Mucicarmine stain did not demonstrate any mucin within the tumor cells or in the lumen of the glands. Immunohistochemical studies were performed by the avidin–biotin–peroxidase method. About half of the tumor cells were immunopositive for thyroglobulin (Dako, High Wycombe, UK, monoclonal, 1:50). Epithelial membrane antigen (EMA; Dako, monoclonal, 1:100), cytokeratin AE1/AE3 and CAM5.2 (Becton Dickinson, Franklin Lakes, NJ, monoclonal, 1:200) were intensively positive in most tumor cells. The tumor cells partially reacted with LeuM-1 (Becton Dickinson, 1:10). As we counted more than 1000 tumor cells in most active area, about one-fifth of the tumor cells were immunopositive for MIB-1 (Immunotech, S.A., Marseilles, France, monoclonal, 1:50) (Fig. 2). They were negative for carcinoembryonic antigen (CEA; Dako, polyclonal, 1:50), S-100 protein (Dako, polyclonal, 1:200) and vimentin (Dako,

monoclonal, 1:10). Histologic appearance of the tumor cells in autopsy specimens was identical to that of the surgical specimen. There were no areas of anaplastic carcinoma.

Discussion

The histologic feature of columnar cell carcinoma of the thyroid is quite unique and shows papillary growth of tall columnar cells with a marked nuclear stratification [1–6]. The papillary architecture is usually associated with a thin fibrovascular core. The nuclei of columnar cell carcinoma are elongated and have stippled chromatin. This appearance may be reminiscent of colonic or endometrial adenocarcinoma. Columnar cell carcinoma and tall cell variant of papillary carcinoma may be confused because both of them are composed of tall columnar tumor cells, but the nuclei of the tall cell variant are basally located and otherwise show nuclear features of conventional papillary carcinoma [7–9].

In 1994, Mizukami et al. [3] reported a case of columnar-cell carcinoma of the thyroid and reviewed seven reported cases in the English literature. According to their review, five of the seven patients died of columnar cell carcinoma itself, emphasizing the lethal biological nature of this variant. They also concluded that columnar cell variant may be the most aggressive thyroid carcinoma except for anaplastic thyroid carcinoma. Microscopic findings as well as clinical course in our case fits into clinicopathological findings of the aforementioned columnar cell carcinoma.

Recently, Evans [4] reported four cases of encapsulated columnar cell neoplasms of the thyroid. Follow-up on the four patients was 112, 51, 112, and 29 mo, respectively, and none of their cases showed any evidence of recurrence or metastasis. He suggested that encapsulated columnar cell thyroid tumors have much more favorable prognosis than those that are unencapsulated and invasive into adjacent thyroid or extrathyroid tissue. However, MIB-1 immunoreactivity was not examined in his study.

Antibody MIB-1 reacts with an antigen present within the nuclei of all proliferating cells but is absent in the nuclei of quiescent cells. MIB-1-positive cell rate of thyroid carcinoma is generally low, compared with that of adenocarcinomas arising in other organs, such as breast, lung, stomach, and colon [10]. Katoh et al. [10] reported that MIB-1-positive rates of papillary carcinoma, follicular carcinoma, medullary carcinoma, undifferentiated carcinoma, and adenocarcinomas of other organs were 1.83, 3.18, 1.17, 32.67, and 28.33–57.63%, respectively. MIB-1-positive rate of our case (approx 20%) was extremely high, compared with that of ordinary papillary carcinoma, and was close to that of undifferentiated carcinoma of the thyroid. Although further investigation is necessary, MIB-1 may be a helpful prognostic factor in evaluation of columnar cell carcinoma.

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