Strumal Carcinoid of the Ovary

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Summary: A strumal carcinoid arising in a benign cystic teratoma of the left ovary was reported in a 41 year-old woman. The solid tumor was histologically a trabecular carcinoid tumor associated intimately with thyroid follicle-like structures. By Grimelius staining, argyrophil granules were found in the cytoplasm of the tumor cells. The final diagnosis of strumal carcinoid, however, was established by the confirmation of thyroid tissue.

Key words: ovary—carcinoid—struma ovarii—teratoma—case report

Introduction

The term, strumal carcinoid tumor, was first applied to primary ovarian neoplasms in which trabecular carcinoid was intimately associated with thyroid tissue of teratomatous origin (Scully, 1970). Since then, several reports have been published on the strumal carcinoid tumor of the ovary, leading to some disagreements on the characteristics of the tumor (Arhelger and Kelly, 1974; Serratoni and Robboy, 1975; Ranchod et al. 1976). From the electron microscopic findings, Ranchod et al. (1976) raised a question whether any strumal carcinoid tumor contained thyroid tissue. This report describes a case involving a strumal carcinoid tumor.

Case Report

A 41 year-old gravida 3, para 2 housewife visited the Kurume University School of Medicine Out-Patient Clinic on November 11, 1989 because of a slight abdominal pain. The previous history was unremarkable. The blood pressure was 128/80 mmHg. No clinical evidence suggestive of hyperthyroidism or carcinoid syndrome was observed. The urinary levels of 5-HIAA were not determined. The calcium was 4.8 mg/dl serum. Other physical and laboratory examinations were within normal ranges. A laparotomy was performed on January 9, 1990. The left ovary was replaced by a cystic tumor 3×4 cm in size, which grossly appeared to be a dermoid. No pathology was found in the right ovary, uterus, and other abdominal organs. The tumor of the left ovary was removed with the uterus. The patient has been well for 2 years after the surgery. The tumor tissues were fixed in 10% formalin and embedded in paraffin. The sections were stained routinely with hematoxylin and eosin. Periodic acid-Schiff (PAS), Alcian blue, argentaffin (Fontana-Masson), Argyrophil (Grimelius), and Congo red stains were used to prepare sections from the solid part of the
tumor.

Gross examination revealed a tumor arising in the left ovary that was $3 \times 4$ cm and mainly cystic with a smooth surface (Fig. 1). The cystic tumor contained a greasy substance and long hairs. A $2 \times 1$ cm solid mass which was brown-yellowish in color was found in part of the wall. With light microscopy, the cystic part of the tumor appeared to be composed of skin and its appendages, with a histology typical of a dermoid cyst. The solid mass, however, was predominantly a carcinoid tumor, but thyroid follicle-like structures and a mucinous cystadenoma were also observed (Figs 2 and 3). The carcinoid tumor was intimately associated with the thyroid follicle-like structures. The tumor cells were relatively uniform with eosinophilic cytoplasm and round to oval nuclei. The cells were mostly trabecular in arrangement, but sometimes were small acinar structures with eosinophilic materials resembling thyroid colloid (Fig. 4). Colloid-like substances stained strongly with PAS and faintly with Alcian blue stain. The Congo red stain for amyloid was negative. Most of the tumor cells were demonstrated to contain argyrophil granules by the Grimelius method (Fig. 5).

Fig. 1. Gross findings showing the left ovary with a smooth surface.

Fig. 2. Thyroid follicle-like structures and eosinophilic materials were occasionally admixed. Hematoxylin-eosin. $\times 40$.

Fig. 3. Carcinoid tumor cells were usually arranged as trabeculae. Hematoxylin-eosin. $\times 40$.

Fig. 4. Various sized acinar structures with eosinophilic materials were occasionally admixed. Hematoxylin-eosin. $\times 40$. 
**Discussion**

Most of the present tumor was apparently a dermoid cyst, but the small solid part seemed morphologically consistent with a strumal carcinoid, first described by Scully (1970). Arhelger and Kelly (1974) found dense core secretory granules and amyloid fibrils within stroma in a strumal carcinoid and suggested that strumal carcinoids were analogous to medullary carcinomas of the thyroid. The ultrastructural similarities between the two tumors had also been reported by Gonzalez-Licea et al. (1968). This idea was supported by the detection of calcitonin in carcinoid tumors (Robboy et al. 1977). However, the absence of carcinoembryonic antigen in the present tumor (Yamasaki et al. 1977) contradicts this idea, because carcinoembryonic antigen was reported to be characteristic of medullary carcinomas of the thyroid (Ishikawa and Hamada, 1976). Recently, Ranchod et al. (1976) described a strumal carcinoid, in which all tumor cells of the trabeculae as well as the thyroid follicle-like structures contained dense core secretory granules, they questioned whether any strumal carcinoid contained thyroid tissue. They also noted an absence of conclusive histochemical or chemical evidence to distinguish strumal carcinoid from other tumors arising from APUD (Amine and Precursor Uptake and Decarboxylation) cells, as proposed by Pearse and co-workers (Pearse, 1974; Pearse and Polak, 1974). APUD cells are considered to have a common ancestor, the neural crest cells, and they characteristically secrete polypeptide hormones and share several cytochemical and morphological properties.

The morphology of the secretory granules has been considered to be characteristic of carcinoind tumors (Serratoni and Robboy, 1975; Robboy et al. 1977). Dense core secretory granules are found not only in trabecular carcinoids but also in some strumal carcinoid tumors (Arhelger and Kelly, 1974; Robboy et al. 1977), as shown with the present tumor. However, a strumal carcinoid has been described which contained spherical secretory granules without clear space between the granular matrix and the limiting membrane (Serratoni and Robboy, 1975). Therefore, the morphology of the secretory granules is not necessarily pathognomonic of strumal carcinoid. As already described, the term strumal carcinoid was originally applied to the trabecular carcinoid associated intimately with thyroid tissue of teratomatous origin (Scully, 1970; Robboy et al. 1977; Ueda et al. 1978; Ulbright et al. 1981). Since the carcinoid nature of the present tumor was demonstrated by routine histology, the final diagnosis of strumal carcinoid was established by observing the thyroid tissue.

**References**


