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Original article

Malignant tumors associated with ovarian mature teratoma: A single institution experience

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ABSTRACT

Objective: The aims of this study are to present demographical features of cases diagnosed with malignant tumor associated with ovarian mature teratoma and to analyze histopathological features and clinical follow up of these tumors.
Study design: Single-institution retrospective charts were reviewed to identify all cases of ovarian mature teratoma diagnosed from 1998 to 2015. Clinicopathological parameters that were analyzed include age, tumor size, tumor stage, histological type, laterality, IOC diagnosis and whether or not patient has received adjuvant chemotherapy.
Results: A total of 218 ovarian mature teratoma cases were identified during the study period. Of the 218 ovarian mature teratoma specimens, eight (3.7%) exhibited malignant tumors. The average age for cases of malignancy associated with ovarian mature teratoma was 44.6 years. The average size of tumors was 10.36 cm. On final pathology, histological types of tumors were as follows: two cases each of squamous cell carcinoma and papillary thyroid carcinoma; one case each of mucinous adenocarcinoma, metastatic adenocarcinoma, sebaceous carcinoma and oligodendroglioma. Only one patient with Stage IIB tumor died of disease. One patient was alive with metastatic disease two months after initial diagnosis. Mean and median follow-up times were 64.1 and 49 months, respectively.
Conclusion: An ovarian mass that has characteristics of a teratoma in a postmenopausal patient should alert for malignancy -regardless of tumor size. IOC is a valuable tool for the detection of malignancy and should be requested to determine the modality of surgical approach.

1. Introduction

Mature teratomas are the most common ovarian germ cell neoplasms, accounting for 10–20% of all ovarian masses. Most commonly occurring during childhood, they are composed of various tissues from ectoderm, mesoderm and endoderm. Ectodermal derivatives are often the most prominent, which include keratinizing epidermis, sebaceous and sweat glands, hair follicles, and neuroectodermal tissues. Mesodermal derivatives include muscle, bone, cartilage, fat, and, occasionally, teeth. Endodermal derivatives include thyroid and salivary gland, as well as respiratory and gastrointestinal tissues [1,2].

Although mature teratomas are usually benign; malignancy associated with mature teratoma can occur, and is more likely among older, postmenopausal women. At 0.17–2%, the possibility of malignancy within a mature teratoma is very low [3]. More than 75–90% of malignant tumors with mature teratomas are squamous cell carcinomas [3,4]. Also, various other malignancies have also been reported, including adenocarcinomas, carcinoid tumors, melanomas, sarcomas and neuroepithelial tumors [5–8].

Detection of the malignant tumor within mature teratoma before surgical treatment could be helpful for determining the modality of surgical approach. Due to the rarity of this entity, guidance for optimal management is lacking. Intraoperative consultation is an option that can verify existence of malignancy with a few sections. Moreover, it may be necessary to request intraoperative consultation in postmenopausal women for whom the radiological findings are consistent with mature teratoma even though there is no evidence of malignancy.

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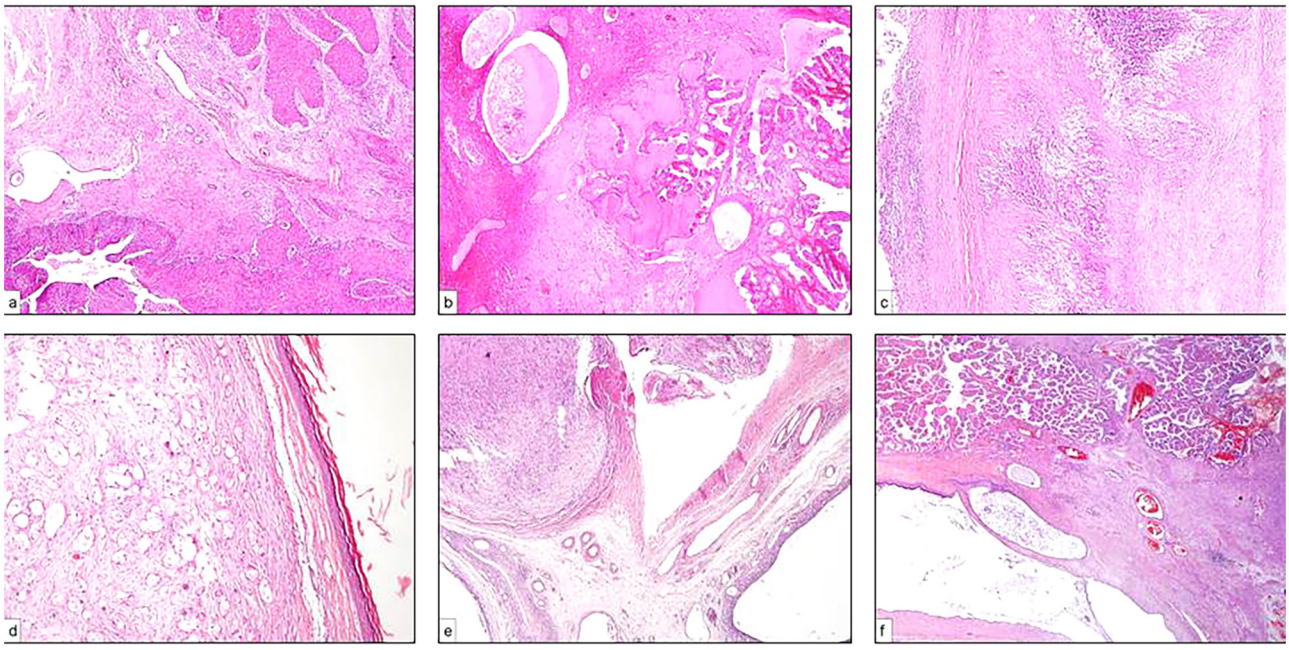

Fig. 1. Microscopic images of malignant tumors and choroid plexus papilloma associated with mature teratomas (H&E).
a, Squamous cell carcinoma (×40). b, Papillary thyroid cell carcinoma (×40). c, Sebaceous carcinoma (×40). d, Metastatic mucinous adenocarcinoma (×100). e, Oligodendroglioma (×40). f, Choroid plexus papilloma (×40).

2. Materials and methods

Single-institution retrospective chart review was completed to identify all cases of ovarian mature teratoma diagnosed from 1998 to 2015 at Kocaeli University Faculty of Medicine Hospital. Clinical information was obtained from the medical records and pathology reports. Multiple variables were also examined including age, tumor size, tumor stage, histological type, laterality, intraoperative consultation diagnosis and whether or not patient has received adjuvant chemotherapy. Survival time was defined as time from the initial diagnosis to the time of death or last contact.

3. Results

A total of 218 ovarian mature teratoma cases were identified during the study period. The average patient age at presentation was 34.5 years (range: 6–82 years). The average age for cases of malignancy associated with ovarian mature teratoma was 44.6 years, compared with 34.1 years for cases of benign ovarian mature teratoma, with no statistically significant difference ($p > 0.05$). There were eight cases of malignancy associated with ovarian mature teratoma. Of these, five were premenopausal and the remaining three of them were postmenopausal. Frequencies of malignancy in postmenopausal and premenopausal women with ovarian mature teratoma were 10.3% and 2.6%, respectively, with a statistically significant difference ($p < 0.05$).

The average size of tumors was 8.37 cm (range: 1.5–30 cm). The average size of tumors in cases of malignancy associated with ovarian mature teratoma was 10.36 cm, compared with 8.29 cm for cases of benign ovarian mature teratoma, with no statistically significant difference ($p > 0.05$). Additional characteristics for each group of benign ovarian mature teratoma and malignancy associated with ovarian mature teratoma are shown in Table 1.

Of the 218 ovarian mature teratoma specimens, eight (3.7%) exhibited malignant tumors. On final pathology, histological types of tumors were as follows: two cases each of squamous cell carcinoma and papillary thyroid carcinoma (25%); one case each of mucinous adenocarcinoma (12.5%), metastatic adenocarcinoma (12.5%), sebaceous carcinoma (12.5%) and oligodendroglioma (12.5%). Additionally, there was one case of benign tumor – choroid plexus papilloma arising in ovarian mature teratoma – in a patient who was 15 years old (Fig. 1).

Table 1
Characteristics of ovarian mature teratomas.

Characteristic	Mature Teratoma (n = 210)	Malignant Tumor Associated With Mature Teratoma (n = 8)
Age (y); mean ± SD	34.1 ± 14.6	44.6 ± 16.7
Tumor site; n (%)		
Right	98 (46.7)	3 (37.5)
Left	84 (40)	4 (50)
Bilateral	18 (8.6)	0
Unknown	9 (4.3)	1 (12.5)
Pregnancy; n	8	0
Tumor size (cm); mean ± SD	8.29 ± 4.88	10.36 ± 8.09

None of the eight patients with malignant tumor within ovarian mature teratoma had preoperative CT or MRI. Therefore, preoperative imaging findings that could predict malignancy were not obtained. Intraoperative consultation was requested in 99 (45.4%) of the 218 cases. Frozen section was performed all cases which are consulted (Table 2). Of these frozen section diagnoses, 97 were benign and two malignant. Of the 97 cases interpreted as benign on frozen section; 95 were diagnosed as benign and two diagnosed as malignant, on permanent sections. Of the two cases interpreted as malignant on frozen section, both diagnosed as malignant on final pathology.

Seven of the eight patients with malignant tumor within ovarian mature teratoma were primary tumors arising in teratoma. Five of them were Stage IA for FIGO Ovarian Cancer Staging System and two of them were Stage IIB. There was no capsule rupture. One patient with primary mucinous adenocarcinoma, FIGO Stage IIB had positive abdominopelvic washing. Omental and adjacent pelvic intraabdominal tissue involvements were detected in Stage IIB tumors. Lymph node metastasis was not detected in any patient.