Clinicopathological Analysis of 4 Cases of Juvenile Ovarian Mucinous Tumor

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Abstract: Objective To investigate the clinicopathological features, immunophenotype, diagnosis and differential diagnosis of juvenile ovarian mucinous tumors. Methods The clinical data, pathological features and immunophenotypes of 4 cases of ovarian mucinous tumors were analyzed retrospectively, and the related literature was reviewed. Results The 4 patients were aged 13-17 years, with an average age of 15 years. The main clinical manifestations were abdominal pain or distension. The maximum tumor diameter was 5-27cm, with an average of 16cm. All tumors were unilateral, 2 cases were left side, 2 cases were right side, 2 cases were benign and 2 cases were malignant. The benign is cystic, the malignant is cystic solid, the inner wall of the capsule can be seen papillary neoplasm and contain thick liquid. Microscopically, the tumor was composed of mucinous epithelium and clear cell grip. It was dominated by complex papillae with adenoid, cribriform or solid structure.

Immunophenotype: CK7, CDX2, CEA, PCK, Her2, P16, the Ki67, P53, MSH6, MLH1, MSH2, PMS2, CK20 of tumor cells were positive, PAX8, ER, PR positive, PAS staining were positive. TNM/FIGO staging :IA case, 1 case, IC case. Follow-up 1-12 months, all patients tumor free survival. Conclusion The juvenile ovarian mucinous tumor has its unique clinicopathological features and needs to be differentiated from other epithelial ovarian tumors.

Keywords: Ovarian Tumor; Mucinous Tumor; Mucinous Carcinoma

Introduction

Ovarian mucinous tumor is a common epithelial tumor of the ovary, but the incidence of juvenile mucinous tumor is relatively rare. This paper retrospectively analyzed the clinicopathological features and immunophenotype of 4 cases of juvenile primary mucinous tumor of the ovary, and reviewed the relevant literature to improve the understanding of the juvenile.

1. Materials and Methods

Clinical data 4 cases of primary ovarian mucinous tumors in minors who were surgically removed in our hospital from 2020 to 2022 were collected, clinicopathological data were collated, and the sections were reviewed.

Methods All specimens were fixed with 10% neutral formalin, dehydrated, paraffin embedded, sliced, stained by HE, and observed by light microscope. Immunohistochemical using EnVision footwork, a resistance including CK7, CDX2, CEA, PCK, Her2, Ki67, P53, MSH6, MLH1, MSH2, PMS2, CK20, PAX8, ER, PR (as shown in figure lE1F), special dyeing including PAS staining. All 4 cases were reviewed by two pathologists with senior professional titles, and the disease was re-evaluated and diagnosed by WHO(2014) Female Reproductive Organ Oncology.

2. Results

Clinical features 1 case of ascites exfoliated cells were positive. There were no obvious signs of peritoneal and pelvic metastasis. TNM/FIGO staging :IA, IB, 1, and 4 patients underwent unilateral adnexectomy and postoperative chemotherapy for ovarian cancer (table).

Pathological examination of the eye view: the tumors were 5-27cm in diameter, with an average of 16cm. All benign

ovarian mucinous cystadenomas were cystic, single locular, and the inner wall of the sac was smooth. Malignant mucinous adenocarcinoma is unicellular or multilocular cystic, with papillary neoplasm on the inner wall, and rich in stem fluid. The section of the solid area is grayish white and brittle in quality. Microscopic examination: Benign mucinous cystadenoma of ovary was lined with a single columnar epithelium, and the nucleus was located at the base (FIG. lA). At low magnification, mucinous adenocarcinoma appears adenoid or solid, with the glands tightly packed with back-to-back or sieve structures (Figure lB), and the poorly differentiated regions appear solid (Figure lC). The cancer tissue often presents with an expansive or destructive interstitial infiltration (lD) of >5mm. At high magnification, the tumor cells were mainly composed of mucous and transparent cells. The cells showed moderate to severe atypia, and some cytoplasm was transparent.

The immune phenotype CK7, CDX2, CEA, PCK, Her2, P16, the Ki67, P53, MSH6, MLH1, MSH2, PMS2, CK20 were positive (as shown in figure lE1F), PAX8, ER, PR negative. Special staining :PAS staining positive.

Follow-up The 4 patients were followed up for 6-12 months, with an average of 6 months. All the 4 patients had no tumor survival so far.

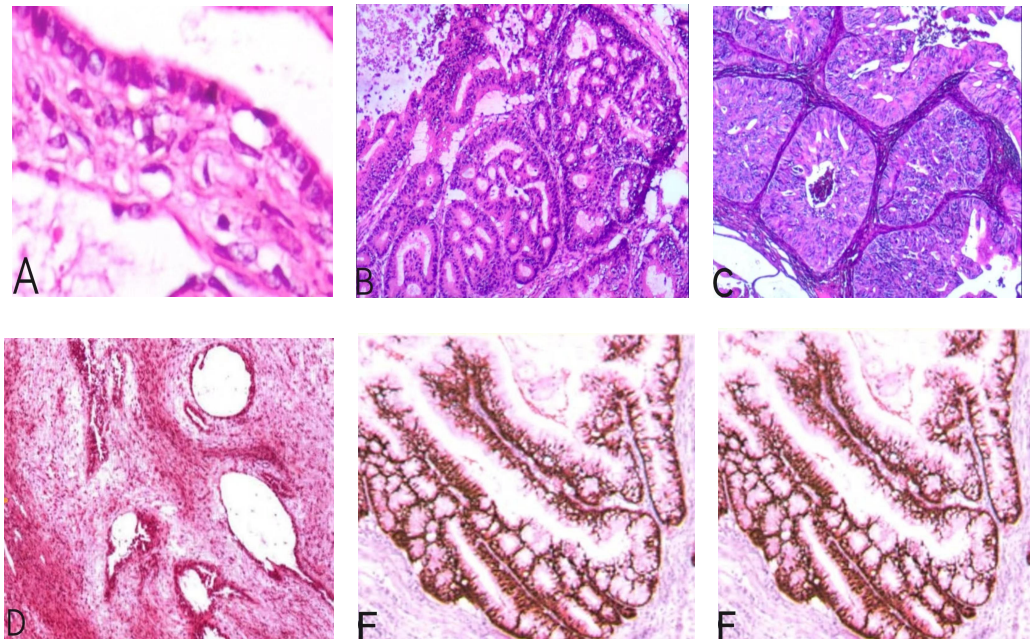

Figure 1A Mucinous cystadenoma lined with a single columnar epithelium B mucinous adenocarcinoma with a sieve structure C mucinous adenocarcinoma with a solid structure D

Refer to the relevant SOC guidelines for diagnosis and treatment. In most EOC clinical trials, MOC accounted for less than 3%. In view of the differences between the biological behavior, molecular markers, chemotherapy sensitivity and prognosis of MOC and SOC, it is obviously biased to guide the clinical diagnosis and treatment of MOC based on the relevant evidence of SOC. MOC is more common in women between 20 and 50 years old, and the average age of onset is lower than that of SOC patients [6]. 80% are diagnosed at an early stage and usually present as a large solid cystic mass in the pelvic cavity with a median diameter of 18cm (5-48 cm). Patients with large masses may have pressure symptoms such as frequent urination, urgent urination, dysuria, urinary retention, difficulty defecating and constipation, and severe cases may be urinary tract obstruction and intestinal obstruction. The late symptoms of lower abdominal discomfort, abdominal distension, ascites, poor tolerance and other accurate histopathological diagnosis is the premise of standard treatment of MOC. It was previously thought that the mucous epithelium contained three types of mucous cells: gastric, endocervical and intestinal. In 2014, WHO classified endocervical mucinous tumors as plasma-mucinous tumors, and in 2020, WHO also believed that the mucous epithelium of ovarian mucinous tumors was actually composed only of gastric and intestinal epithelium [7]. Normally, ovarian tissue does not contain any type of mucous epithelial cells. At present, it is generally believed that the occurrence of MOC is a continuous change process from benign to borderline to malignant, showing a

"stepped-progression pattern" [5,8,9]. In general MOC examination, most of the cysts were unilateral, single-locular or multilocular, with an average diameter of 18cm. Larger cysts could fill the pelvic cavity, and the cystic cavity was filled with mucus, which was gel-like at room temperature [10]. Under microscope, MOC was a heterogeneous tumor, that is, benign, border and mucinous carcinoma co-existing. Therefore, the diagnosis of MOC requires extensive and adequate tissue sampling, especially rapid pathological diagnosis. Due to time constraints, it is difficult to obtain adequate sampling, and accurate intraoperative diagnosis has certain limitations, which requires good communication between clinicians and pathologists. In 2020, WHO diagnosed those with the maximum diameter of stromal infiltration lesion under the microscope exceeding 5mm as invasive myxocarcinoma, and those lacking the above criteria were classified as "microinfiltration" of borderline myxoid tumors [7]. According to the growth and invasion patterns of tumors, MOC can be divided into two types: expansive and invasive [11]. The dilatation microscope shows a dense distribution of fused or complex malignant glands (back-to-back phenomenon) with little interstitial separation between the glands. The infiltrating type destroys and invades the interstitium in the form of glands, cell clusters or single cells, and is more aggressive than the dilatant type [11-13]. 80% of ovarian mucinous cancers are MMC, of which 45% are derived from gastrointestinal primary tumors, 20% from pancreas, 18% from cervix and/or endometrium, and 8% from breast cancer [2]. The histological features of MOC and MMC are very similar, especially in colorectal ovarian metastases, and the differential diagnosis is difficult. MOC often co-exists with a variety of components and growth patterns, such as benign and borderline components, dilatation and infiltration, or other pathological types. MMC has an obvious reaction of promoting fibroplasia, showing nodular or invasive growth, and clusters of tumor cells can be seen in the corpus luteum or the white body of the ovary [14]. More than 90% of MOC tumor cells contain a large amount of mucin, while MMC is rich in extracellular mucus, accounting for more than 50% of the tumor volume [6]. Mocs were mostly unilateral and larger than MMC tumors (16 to 20cmvs 11 to 12cm). However, size alone is not enough to diagnose primary or metastatic tumors, and 32%-48% of MMC tumors have a diameter greater than 10cm [15]. Seidman et al. [3] established a model to distinguish MOC and MMC based on tumor size and side: more than 90% of bilateral tumors were metastatic regardless of their diameter. The tumors were more than 10cm in diameter on one side, and 82% were primary. Unilateral tumors <10cm in diameter, 87% were metastatic. This suggests that MMC cannot be excluded even if it is unilateral mucinous carcinoma. Other valuable features in the diagnosis of MMC include bilateral ovarian involvement, ovarian surface involvement, mucin presence outside the cell, destructive interstitial infiltration, nodular growth, hilar involvement, vascular invasion, sig-ring cells, and extensive necrosis [14,16].

3. Conclusion

Juvenile ovarian mucinous tumors have their own characteristics in terms of pathogenesis, clinicopathological features, molecular genetics and prognosis, and it is of great significance to distinguish diagnosis from other epithelial ovarian tumors.

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