Case Report

Effusion Cytology of Dysgerminoma: A Case Report with Review of Literature

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Abstract

Ovarian dysgerminoma is a rare malignant ovarian germ cell tumor (MOGT) with its peak incidence in women younger than 20 years. Peritoneal and pleural dissemination of ovarian tumors is a major prognostic parameter in ovarian malignancies. Effusion cytology of germ cell tumors are not frequently reported in the literature. We report a case of a MOGT in a 15 year old female who presented with severe painful abdominal distention and respiratory distress. Ascitic and pleural fluid cytology were positive for malignant cells which on immunocytochemistry supported the diagnosis of metastatic dysgerminoma. The histopathology of the ovarian mass was confirmed to be dysgerminoma FIGO stage IVA. This case report highlights the salient cytomorphologic features of metastatic dysgerminoma in ascitic and pleural fluid discussing the differential diagnoses.

Keywords:

Ovary, Dysgerminoma, ascitic fluid cytology, pleural fluid cytology

Introduction

Dysgerminoma is a rare malignant ovarian germ cell tumor (MOGT). It accounts for 2-5% of all ovarian malignancies[1]. Dysgerminoma occurs mainly in children and young women. The average age is 22 years, and 90 percent of patients are less than 30 years of age. Clinical presentations vary from abdominal distension, abdominal mass to ovarian torsion [2]. Despite being of large sizes, ovarian tumors may still be confined to the ovaries however, omental, peritoneal and pleural spread of ovarian cancers has been reported which has a huge impact on prognosis and upstages prognostic morbidity[2,3].

We report here a case of advanced ovarian dysgerminoma with metastasis to pleural and ascitic fluid presenting as acute respiratory distress.

Case Report

We report a case of a 15-year-old girl who presented in the emergency department with painful abdominal distension and respiratory distress There was no relevant past medical history. The laboratory results were normal except for low hemoglobin (11.8 g/dl).

Initial radiological evaluation revealed massive right pleural effusion with tracheal shift and massive ascites. Ascitic fluid and pleural fluid was tapped as a therapeutic measure and these samples was sent for cytological examination. A subsequent abdominal CT scan revealed a large heterogeneous mass measuring 11.7x19.2x 25.5cm with solid and cystic areas arising from the right ovary with widespread omento-peritoneal carcinomatosis with metastatic lymph nodes and ascites. She was taken up for diagnostic laparotomy which ended as right salphingo -oopherectomy and omentectomy.

Cytospin smears were prepared from both ascitic and pleural fluid and stained with Papanicolaou stain and May Grunwald Giemsa stain. Smears showed predominantly singly scattered round to oval cells with high N:C ratio, vesicular nuclei and variably prominent nucleoli. The cytoplasm was clear and vacuolated. Frequent mitosis and apoptotic activity were also noted (Figure-1A, B, C, D). Admixed benign mesothelial cells with reactive changes were seen in the background. An initial provisional diagnosis of undifferentiated round cell tumor was rendered. Immunohistochemistry was done on the cell block based on the clinical history of ovarian mass. Tumor cells on cell block sections were positive for CD117 and PLAP and a final diagnosis of metastatic dysgerminoma was made (Figure-2A, B).

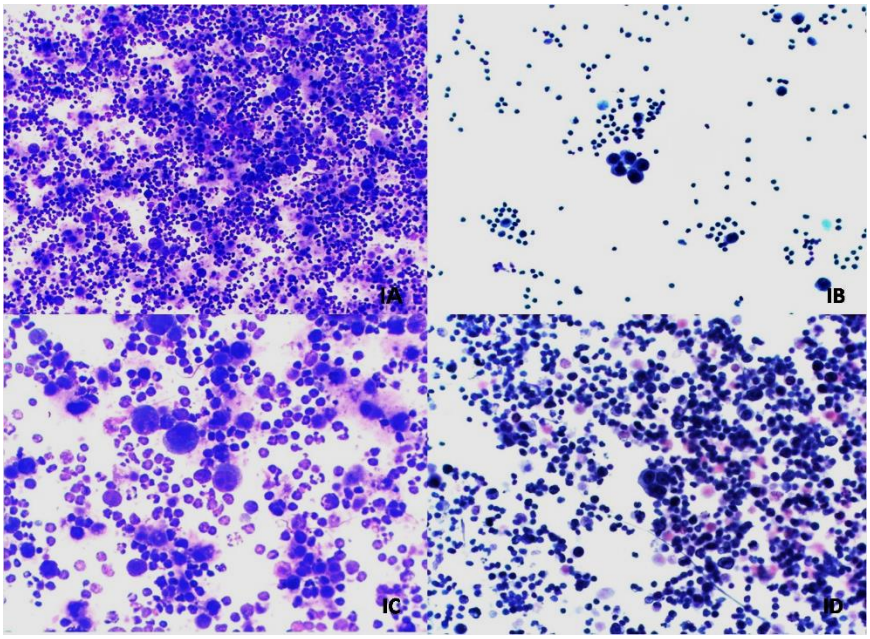

Figure 1: A and B shows low power view of the ascitic fluid showing singly scattered round to oval cells with high N:C ratio and anisonucleosis . (May–Grunwald–Giemsa stain Ax200; PAP stain Bx200). C and D shows high power view of the pleural fluid showing singly scattered and loose clusters of round to oval cells with high N:C ratio and prominent nucleoli.May–Grunwald–Giemsa stain Cx400; PAP stain Cx400).

Meanwhile, histopathology department received a 2810gm right salpingo - oophorectomy specimen comprising of ovarian mass (23 x 17 x 6 cm) with attached fallopian tube(7.5 cm in length and 0.5 cm in diameter)and fragments of omentum (16 x2 x 7cm).

Sectioning of the ovarian mass with intact capsular surface showed variegated cut surface with heteromorphic solid grey white and cystic areas with foci of necrosis, haemorrhage and edema. Microscopic picture was distinctive and the tumor displayed epithelioid morphology with eosinophilic cytoplasm and brisk mitotic activity of >65/10 hpf in areas (Figure-3A, B). Scattered multinucleated giant cells consistent with synctiotrophoblasts were noted. Sections studied from the right fallopian tube were unremarkable. Sections from the omentum also showed the tumor deposits with the same morphology along with multinucleated gaint cells (Figure-3C,D). On immunohistochemistry, the tumor cells showed positivity for CD117, PLAP, D2-40. A final diagnosis of right ovarian dysgerminoma of FIGO stage IV A was made, taking into consideration the positive peritoneal and pleural fluid cytology.

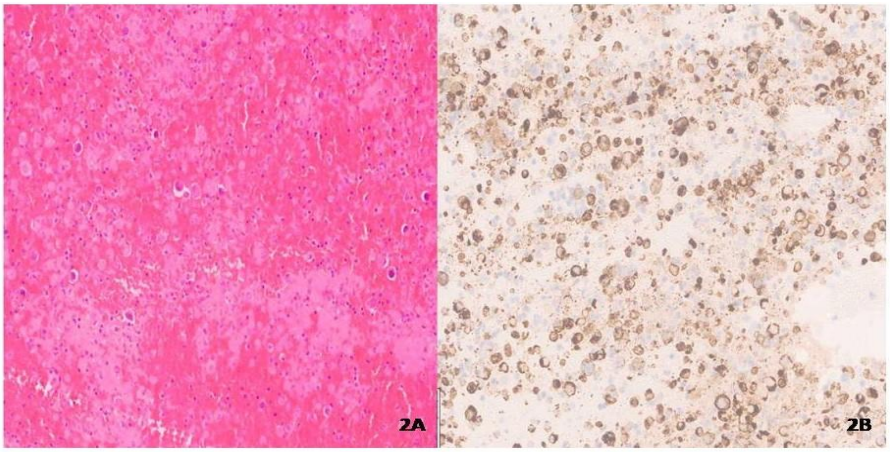

Figure 2: A. Cell block preparation shows the tumor cells (Hematoxylin and Eosin x400). B The tumor cells are positive for PLAP (Immunoperoxidase x200).

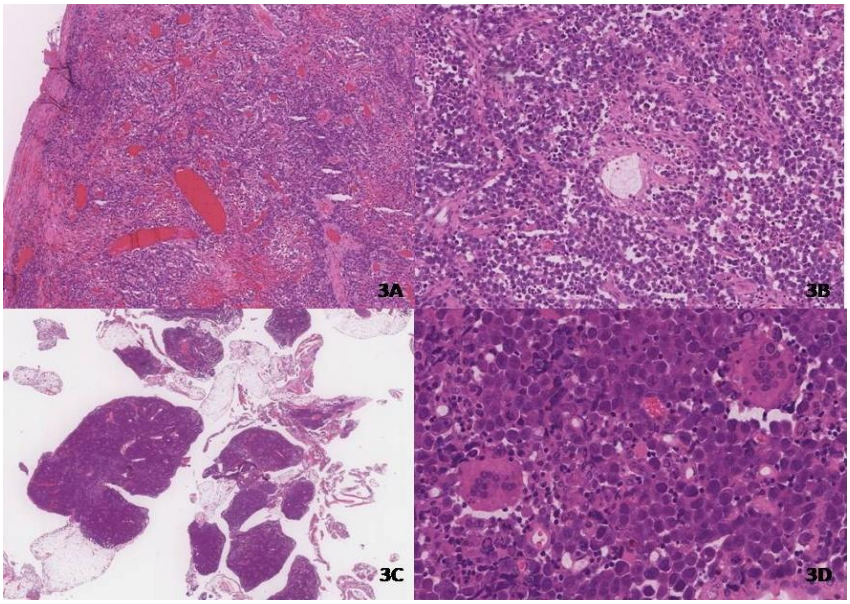

Figure 3: A. Low power view of the ovary tumor dysgerminoma. (Hematoxylin and Eosin x200). B.Tumor showing epithelioid morphology. (Hematoxylin and Eosin x400), C shows tumor metastasis to omentum (Hematoxylin and Eosin x200), D. High power view of the tumor metastasis in the omentum showing multinucleated gaint cells. (Hematoxylin and Eosin x400)

Discussion

The differential diagnoses considered in this young patient with ovarian mass includes germ cell tumors, lymphoma particularly B cell lymphoma and rhabdomyosarcoma[4-7]. Germ cell tumors of the ovary in this age include dysgerminoma, yolk sac tumor, embryonal carcinoma, mature and immature teratoma, and mixed germ cell tumor. The cytomorphology of germ cell tumors varies with the type [4] .Even though several fine-needle aspiration studies on the morphology of ovarian masses have been well documented, little appears in the literature concerning the fluid cytomorphology of these tumors[5].

Dysgerminoma in effusions show individual malignant cells or loose groups rather than tight clusters with scant to moderate amounts of indistinct, fragile, vacuolated cytoplasm. The nuclear membranes are irregular with coarsely clumped to vesicular chromatin and one or two, large nucleoli[3],[6-8]. The cytoplasm is usually slightly granular and eosinophilic to light blue, but may also contain large "punched-out" vacuoles due to the presence of large aggregates of glycogen which show Periodic acid-Schiff (PAS) positivity. Some of the cells have abundant glycogen, resulting in completely clear cytoplasm. The classic "tigroid" background and lymphocytes often seen in FNAC specimens of dysgerminomas will not be present in effusion specimens [6,8]. Our case showed a similar morphology of singly scattered round to oval cells with high N: C ratio, vesicular nuclei, prominent nucleoli and vacuolated cytoplasm.

Other germ cell tumors such as embryonal carcinoma and yolk sac tumor may pose as a diagnostic challenges with dysgerminoma. The tumor cells of embryonal carcinoma have a centrally placed, large, round or highly irregular nucleus with several nucleoli. The cytoplasm is indistinct and pale. Bizarrely shaped cells and mitoses are common [6,8]. While the cells of yolk sac tumors resemble those of poorly differentiated adenocarcinomas. They are cohesive, pleomorphic cells with prominent nucleoli. Some tumor cells contain intracytoplasmic dense hyaline globules, and others have vacuolated cytoplasm [6,8]. However accurate distinction between these tumors requires immunohistochemistry. Most dysgerminomas are reactive for placental alkaline phosphatase,. Presence of alpha fetoprotein remains the gold standard for the diagnosis of yolk sac tumor and embryonal carcinomas are CD 30 positive [4].

Non Hodgkin lymphoma, in particular B cell lymphoma is a close differential diagnosis to be entertained in this age group given the urgency of treatment[5,8].According to studies by Das et al[9] burkitts lymphoma in effusions show monomorphic non cohesive cells with non cleaved nuclei, prominent multiple nucleoli, scanty to moderate basophilic cytoplasm along with cytoplasmic and or nuclear vacuoles[9].These cytoplasmic vacuoles are more uniform in size and contain cytoplasmic lipid which are oil red O positive.

Lastly, rhabdomyosarcoma although rare can present as a primary ovarian tumor in children or as a somatic malignancy arising in mixed germ cell tumor. There are only a few studies regarding the cytologic features of sarcoma in serous effusions. According to Abadi et al [10] metastatic sarcomas on fluids are generally arranged either singly or in loose clusters. The nuclear shapes vary from round or oval to spindle or fusiform. These cells are usually binucleated or multinucleated with irregular contours, high nuclear/cytoplasmic ratio and nuclear pleomorphism. Immunopositivity for desmin and myogenin stain helps in clinching the diagnosis [10, 11].

Conclusion

Effusion cytology is an important component in the staging of ovarian carcinomas and are prognostically significant if found positive. Recognizing various malignancies in fluids is tricky as they display cytomorphologic features that overlap with benign

mimickers. Therefore correlating cytologic findings with clinical, radiological ,histopathological, and immunohistochemical findings is necessary to arrive at an accurate diagnosis.

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