Case Report

Ovarian Yolk Sac Tumors: Is Fertility Preservation Possible?

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Abstract

Yolk sac tumors make up 14% to 20% of all malignant ovarian germ cell tumors. Serum alpha-fetoprotein (AFP) levels are elevated in a significant number of patients and are useful for monitoring the response to treatment and for post-treatment surveillance. Surgery is required for diagnosis, staging, and treatment. The first case is a 12-year-old girl presented with abdominal pain. The ultrasonography (US) showed a huge pelvic tumor. AFP level was high (1000 mg/ml). Right salpingo-oophorectomy and pelvic lymphadenectomy were done. Histopathology reported yolk sac tumor of ovary. She received 3 courses of bleomycin, etoposide, cisplatin (BEP). The second case is a 25-year-old G1AB1 presented with pelvic pain and distension. The US showed a huge pelvic tumor in the right abdominopelvic region. AFP level was high (1000 mg/ml). Right salpingo-oophorectomy, omentectomy, and appendectomy were done. Histopathology reported yolk sac tumor of ovary. The patient received four cycles of BEP protocol; AFP level decreased to 10 mg/ml after the four cycles of chemotherapy. The third case is a 21-year-old girl presented with abdominal pain. The US showed a huge pelvic tumor in the right adnexa. AFP level was high (8700 mg/ml). Right salpingo-oophorectomy and pelvic lymphadenectomy were done. Yolk sac tumor is rare in children and it could be cured usually. In this study, we described three patients with ovarian yolk sac tumors and their fertility preservation treatments. These cases has reminded that in young age with high AFP levels and rapidly growing ovarian mass, diagnosis of the yolk sac tumor has to be kept in mind.

Keywords: Alpha phytoprotein, Bleomycin, Cisplatin regimen, Etoposide, yolk sac tumor

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Introduction

Yolk sac tumors make up 14%to 20% of all malignant ovarian germ cell tumors (OGCTs). The name was chosen because the tumor structure is similar to that of the endodermal sinuses of the rat yolk sac and is derived from the primitive yolk sac. These neoplasms usually occur in young girls and women, the median age at presentation is 23 years, and one-third of patients are premenarchal.[1]

YSTs are heterogeneous with a number of different histopathological subtypes. In newborns and younger children, YSTs are predominant variant, whereas there are a wide variety of subtypes in adolescents. The typical histopathological features of YST are solid, tubular, and focal papillary patterns with Schiller–Duval bodies and sinusoidal structures with fibrovascular cores lining formed by tumor cells, frequent mitotic figures, and are cytokeratin positive.[2]

Patients with yolk sac tumors often present with abdominal pain and a pelvic mass similar to dysgerminomas. Tumor growth can be very rapid and aggressive with extensive intraepithelial dissemination. Serum alpha-fetoprotein (AFP) levels are elevated, in a significant number of patients and if elevated, are useful for monitoring the response to treatment and for post-treatment surveillance. Serum lactate dehydrogenase (LDH) may also be elevated.[3]

Surgery is required for diagnosis, staging, and treatment. Most patients can be safely treated with fertility-preserving surgery rather than total abdominal hysterectomy and bilateral salpingo-oophorectomy.

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Malignant OGCTs occurring in adult women are highly sensitive to platinum-based chemotherapy, and treatment can be curative.

Case Report

Case 1

A 12-year-old girl presented with complaints of abdominal pain, intermittent fever, and abdominal distension from 4 weeks earlier. On physical examination, there was lower abdomen tenderness, and huge mass was palpable. The ultrasonography (US) showed a huge pelvic tumor measuring 170 mm × 173 mm × 140 mm heterogeneous solid cystic in abdominopelvic region. There was no family history of cancer. The clinical diagnosis was ovarian mass, possibly neoplastic in nature. AFP level was high (1000 mg/ml), beta-HCG and LDH levels were normal. Exploratory laparotomy revealed a huge right ovarian tumor 30 cm × 15 cm × 20 cm [Figure 1a]. Peritoneal fluid cytology was taken. Right salpingo-oophorectomy and pelvic lymphadenectomy were done. Left ovary, uterus, and the other intra-abdominal organs were normal. Frozen section was suggestive of malignant germ cell tumor. Uterus and left adnexa were preserved.

The patient recovered well and was discharged 2 days after operation.

Permanent histopathology report revealed yolk sac tumor of the right ovary with ovarian surface involvement with no evidence of tumor deposit in omentum.Peritoneal cytology was negative for malignancy. All lymph nodes are free.

In macroscopic inspection, a large intact encapsulated mass with smooth surface measuring 22 × 14 × 8 was seen. Cutting revealed solid cystic cut surface with area of necrosis. [Figure 1b] Histopathological slides revealed a reticular microcystic pattern which lined by primitive cells with variable amounts of clear cytoplasm. Eosinophilic hyaline globules also were evident [Figure 2a and b].

All 8 lymph nodes (para-aortic and right iliac lymph nodes), pelvic peritoneum, and omentum were free. Negative peritoneal washing cytology smears showed only a few reactive mesothelial cells.

Consult to parents was done and observation versus chemotherapy was discussed. The parents selected observation and close follow-up. Rise of AFP occurred 3-month later from AFP 8 mg/ml in early postoperative period to 500 mg/ml. Imaging was done and a small mass in the right side of pelvic was reported. She was the candidate for chemotherapy with bleomycin, etoposide, and cisplatin (BEP) regimen. She received 3 courses of BEP. AFP level decreased to 6/6 mg/ml after the chemotherapy. She underwent laparoscopy and pathology reported patchy inflammatory cell infiltration is seen in the peritoneal tissue and AFP level decreased to 1/3 mg/ml after surgery. Twelve month after chemotherapy she has been disease-free with no recurrence. Physical examination and imaging show no suspect lesion, with normal AFP level, clinical surveillance did not reveal any persistent chemotherapy-related toxicity.

Case 2

A 25-year-old G2AB1 presented with intermittent pelvic distension with moderate intermittent pain, nausea, and frequency. On physical examination, there was right lower quadrant tenderness, and huge mass was palpable. The US showed a huge pelvic tumor measuring There was a 150 mm × 66 mm heterogeneous solid cystic lesion with multiple septa in right abdominopelvic region. There was no family history of cancer. An abdominopelvic computed tomography scan showed ovarian mass with free fluid suspicious ascites. Beta-HCG and LDH levels were normal. Exploratory laparotomy revealed a huge solid right ovarian tumor 20 cm × 15 cm which was ruptured in abdomen. Bloody peritoneal fluid was sent for cytology. The vermisform appendix was involved by tumor. Right salpingo-oophorectomy, omentectomy, and appendectomy were done. Left ovary, uterus, and the other intra-abdominal organs were normal. Frozen section was suggestive of ovarian yolk sac tumor.

The patient recovered well was discharged 2 days after operation.

Finish histopathology report revealed that yolk sac tumor of right ovary, omentum, and appendix was involved by tumor, Fallopian tube was free of tumor. Peritoneal cytology was positive for malignancy.

In gross examination, there were several gray–yellow friable fragments containing hemorrhagic area totally measured

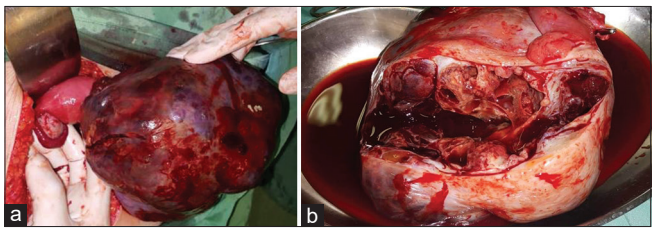

Figure 1: Loose network of anastomosing channels which focally expanded and form variably sized cysts (a); these spaces were lined by primitive tumoral cells with varying amounts of clear cytoplasm (b)

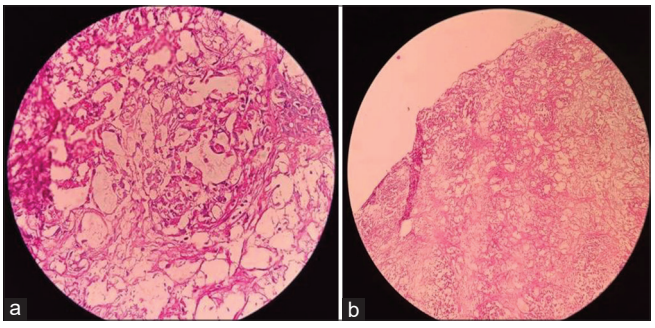

Figure 2: Huge ovarian tumor (a and b)

10 × 8 × 3.5. Microscopically, sections showed a loose network of anastomosing channels which focally expanded and form variably sized cysts; these spaces were lined by primitive tumoral cells with varying amounts of clear cytoplasm. In microscopic examination, appendix and omentum were involved by tumor. All lymph nodes were free and peritoneal washing cytology also was negative [Figure 3a and b].

The patient received four cycles of BEP protocol (BEP), AFP level decreased to 10 mg/ml after the four cycles of chemotherapy. After 1 year, she had two pregnancies both to abortion in the first trimester. After 5 years, she had been disease-free. Physical examination and imaging show no suspect lesion, with normal AFP level, clinical surveillance does not reveal any persistent chemotherapy-related toxicity.

Case 3

A 21-years-old girl presented with complaints of abdominal pain, vomiting, and nausea from 1 week earlier. On physical examination, there was lower abdomen tenderness, and huge mass was palpable. The US showed a huge pelvic tumor measuring 85 mm × 135 mm × 135 mm heterogeneous solid cystic with necrotic area in right adnexa, and right ovary is not visible separately. There was a positive family history of cancer, her father had lung cancer. The clinical diagnosis was ovarian mass, possibly neoplastic in nature. AFP level was high (8700 mg/ml), Beta-HCG and LDH levels were normal. Exploratory laparotomy revealed a huge right ovarian tumor 20 cm × 15 × 20 cm [Figure 4]. Peritoneal fluid cytology was taken. Right salpingo-oophorectomy and pelvic lymphadenectomy were done. Left ovary, uterus, and the other intra-abdominal organs were normal. Uterus and left adnexa were preserved.

The patient recovered well and was discharged 2 days after the operation.

Permanent histopathology report revealed yolk sac tumor of the right ovary with intact capsule, normal histology of tube with no evidence of tumor deposit in omentum. Peritoneal cytology was negative for malignancy. All lymph nodes are free [Figure 4a and b].

She was the candidate for chemotherapy with BEP regimen. She received 3 courses of BEP. Physical examination was done every 3 month, and she had no pathologic sign in physical examination and imaging. She has been disease-free for 6 months.

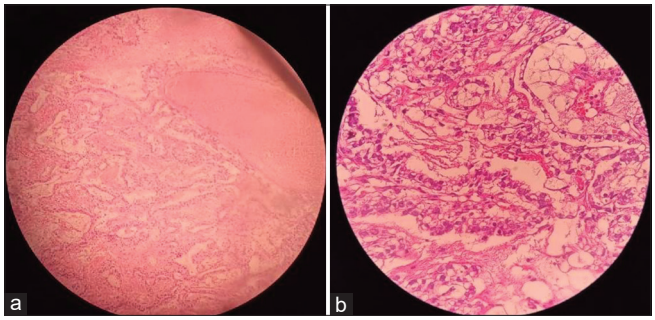

Figure 3: Reticular microcystic pattern which lined by primitive cells. Eosinophilic hyaline globules also were evident (a and b)

Discussion

We reported three cases of ovarian yolk sac tumor.

Case 1: A 12-year-old girl presented with abdominal pain and fever. It highlights the importance of YST in children. Although YST is rare in children, it is important diagnosis and treatment for YST in children.

Case 2: A 25-year-old G2AB1 presented with intermittent pelvic distension with moderate intermittent pain, nausea, and frequency. And case 3, a 21-year-old girl presented with complaints of abdominal pain, vomiting, and nausea from 1 week earlier. On physical examination, there was lower abdomen tenderness, and huge mass was palpable.

Diagnosis was clear in view of raised AFP and CT findings. At young age with high AFP levels and rapidly growing ovarian mass, diagnosis of the yolk sac tumor has to be kept in mind. As yolk sac tumor is 100% unilateral, contralateral ovary should be conserved. The standard of care in young women is a fertility-sparing surgery with adjuvant chemotherapy. Several studies support the regimen of BEP for primary treatment of OGCT patients.[4]

Modern treatment schedules with BEP[4] improved the 5-year survival rate in women with YSTs to the current rates of 94.8%, 97.1%, 70.9%, and 51.6% for the International Federation of Gynecology and Obstetrics (FIGO) Stage I, II, III, and IV tumors, respectively.[5] YSTs often present at an early stage and prognosis is favorable even in women with metastatic disease.[6] Fertility-sparing surgery (i.e., unilateral salpingo-oophorectomy, omentectomy, peritoneal washings, and biopsies) has been found to be equally as effective as radical surgery. The median age at presentation is 18–25 years, the tumor is rarely bilateral.[5,6] Abdominal pain is the most prevalent symptom. Since abdominal pain is a common disorder in children, this symptom has less sensitivity in the infant compare to other age groups. However, patients with ovarian YSTs have a significantly worse prognosis. The patients suffering from this kind of tumor may have vaginal bleeding, fever, ascites, or peritonitis secondary to torsion, hemorrhage, infection, or tumor rupture.[4]

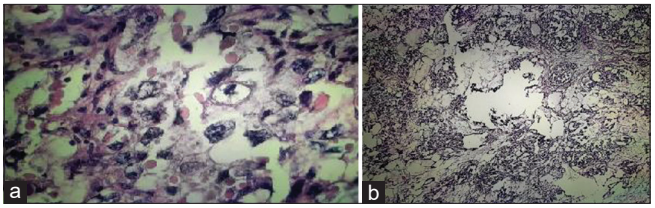

Figure 4: Huge ovarian tumor (a) and open of the tumor outside the surgical field (b)

Most ESTs secrete AFP. There is a good correlation between the extent of disease and the level of AFP, the serum level of AFP is useful in monitoring the patient's response to treatment, as well as in follow-up.[7]

The treatment of an EST consists of surgical exploration, a frozen section in diagnosis, unilateral salpingo-oophorectomy, and limited surgical staging. A hysterectomy and contralateral salpingo-oophorectomy should not be done.[8] Conservative surgery and adjuvant chemotherapy allow fertility preservation as with other germ cell tumors.

International FIGO stage at diagnosis, residual disease after surgery, and declining AFP levels are prognostic markers in GCTs.In general, the FIGO stage of 75% of all ovarian malignancies ranges from Stage II to Stage IV at diagnosis.[9]

All patients with ESTs should be treated with chemotherapy shortly after recovering from surgery.

In comparison with epithelial ovarian tumors, yolk sac tumor is highly malignant growing rapidly with a very brief duration of symptoms which metastasizes fast and intrudes all intra-abdominal structures and retroperitoneal lymph nodes.[10] Yolk sac tumor was universally life-threatening before the development of combination chemotherapy. With the introduction of novel chemotherapeutic regimens at the end of the 1970s, the 5-year survival rates of yolk sac tumors significantly improved from 14% to nearly 90%.[11] Especially, by adding cisplatin to combination therapies, prognosis of the patients reached excellent values, even for patients with advanced stages.[10]

Conclusion

Ovarian yolk sac tumor is the second germinal malignancy after dysgerminoma.

Therefore, yolk sac tumor is rare in children and malignant; however, it could be cured usually. In this study, we described a rare case of yolk sac tumor in a 12-year-old girl in terms of the clinical presentation, imaging findings, diagnosis, and treatment and second case was a woman with a yolk sac tumor و whose tumor was cured (while preserving the patient's fertility).

Declaration of patient consent:

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her clinical information to be reported in the journal. The patients understand that their names and initials will not be published, and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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