CASE REPORT

Mixed Ovarian Germ Cell Tumor Composed of Immature Teratoma, Yolk Sac Tumor and Embryonal Carcinoma

Ying Wang[1], Feng Zhou[2], Zhida Qian[3], Jiale Qing[3], Mengdam Zhao[3] and Lili Huang[3]

Abstract

We report the case of a 19-year-old woman experiencing lower abdominal distension and pain. Laboratory tests indicated elevated serum levels of Alpha-Fetoprotein (AFP) and human Chorionic Gonadotropin (hCG). A large mass was detected in the abdomen by physical examination and by transvaginal ultrasonography. Exploratory laparotomy was performed, and a smooth-surfaced, spherical, solid tumor was found on the left ovary, measuring 11.5 x 9.9 x 6.9 cm. Histological evaluation revealed that the tumor consisted of a combination of immature teratoma, Yolk Sac Tumor, and embryonal carcinoma; this is a very rare combination in mixed germ cell tumors.

Key Words: *Mixed germ cell tumor. Fertility sparing surgery.*

INTRODUCTION

Germ cell tumors of the ovary are relatively rare, constituting less than 10% of ovarian cancers.[1] About 2 - 3% of ovarian germ cell tumors are malignant,[2] and a fraction of these tumors originate from more than one germ cell. Although malignant germ cell tumors account for a small proportion of ovarian cancers, those affected are frequently young women of reproductive age. Treatment usually involves comprehensive surgery; if the uterus and remaining uterine adnexa are normal, fertility sparing surgery and subsequent chemoradiotherapy should be adopted.

Mixed ovarian germ cell tumors generally consist of combinations of dysgerminoma, embryonal carcinoma, Yolk Sac Tumor, mature teratoma, and immature teratoma. Mixed ovarian germ cell tumors consisting of a combination of immature teratoma and yolk sac tumor are rare,[3] and the combination of immature teratoma with yolk sac tumor and embryonal carcinoma has not been previously reported. Here, we describe a case of mixed ovarian germ cell tumor consisting of immature teratoma, yolk sac tumor and embryonal carcinoma in a 19 years old female.

CASE REPORT

A 19 years old nulliparous girl, with no significant past medical history, was admitted to our hospital for gynecological evaluation following 6 days of lower abdominal distension and pain. Serum levels of AFP and hCG were elevated at 50,112.00 ng/ml and 17.46 IU/L, respectively. The patient's last menstrual period, with normal flow and duration, was 7 weeks prior to presentation. Physical examination revealed a large, smooth-surfaced, non-tender mass in the abdomen. Further investigation using transvaginal ultrasonography identified a 9.6 x 9.5 x 6.4 cm hypoechoic cystic-solid mass on the left uterine adnexa, with a Resistive Index (RI) of 0.59.

The patient underwent exploratory laparotomy, and a smooth-surfaced, spherical, solid tumor, originating in the left ovary, was found. The tumor measured 11.5 x 9.9 x 6.9 cm. Upon dissection, the cut surface showed that the tumor was predominantly solid with small cysts and areas of hemorrhage and necrosis (Figure 1). Microscopically, there were many areas of immature cartilage and immature neuroepithelium with hypercellular stroma, as typically seen in immature teratoma. Polyvesicular vitelline patterns, indicative of a yolk sac

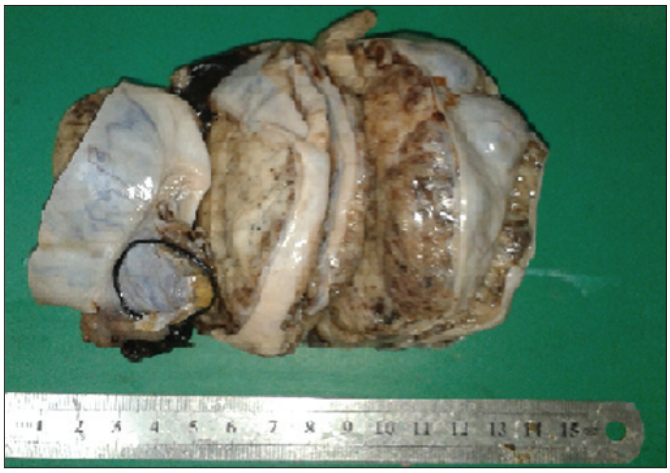

Figure 1: Macroscopically, the cut surface of the tumor shows predominantly solid areas with small cystic areas and visible hemorrhage and necrosis.

[1] *Department of Obstetrics and Gynecology, The Family Planning Publicity and Technical Guidance Station, Yiwu City, Zhejiang Province, China.*

[2] *Department of Pathology / Obstetrics and Gynecology[3], Women's Hospital, School of Medicine, Zhejiang University, Hangzhou, Zhejiang Province, China.*

Correspondence: Dr. Feng Zhou, Women's Hospital, School of Medicine, Zhejiang University, 1 Xueshi Road, Hangzhou, Zhejiang Province, 310006, People's Republic of China. E-mail: 20618235@163.com

Received: January 15, 2014; Accepted: June 06, 2014.

tumor, were evident as pear-shaped vesicles lined partly by attenuated epithelium and partly by cuboidal epithelium. Elsewhere, the presence of a reticular pattern of sievelike spaces, lined by a flattened endothelium-like layer of cells, was suggestive of a yolk sac tumor. Finally, many gland and gland-like structures with obvious atypia were observed, some of which were indicative of embryonal carcinoma. These results suggest that the majority of the specimen was immature teratoma, additionally composed of yolk sac tumor and embryonal carcinoma. The tumor was staged as Ia according to the International Federation of Gynecology and Obstetrics/American Joint Committee on Cancer (FIGO/AJCC) staging system.

Based on these findings, a left salpingo-oophorectomy, omentectomy, pelvic and para-aortic lymphadenectomy were performed. The size and shape of the uterus and the right ovary were macroscopically normal, and no malignant cells were identified in subsequent peritoneal washings. Evidence of dissemination was not observed in the abdominal cavity. The omentum, pelvic and peri-aortic lymph nodes were normal.

The patient's initial hospital stay was for a period of 15 days. Following surgery, the patient was administered four courses of adjuvant chemotherapy consisting of three cycles of Bleomycin, Etoposide, and cisplatin (BEP). Each course required a hospital stay of 3 - 9 days. Serum levels of AFP and hCG decreased gradually and had returned to normal levels at 4 months postoperative; since then, the patient has recovered well. A surveillance program was established by a gynecologic oncologist, later the patient has been on a regular follow-up schedule.

DISCUSSION

A proportion of germ cell tumors are composed of mixed cells, but some combinations of germ cell elements are rare, with very few cases reported in the literature. A case of mixed ovarian germ cell tumor consisting of immature teratoma and yolk sac tumor in a 17-year-old patient has been previously reported.[2] In 1978, Talerman described 13 patients with ovarian germ cell tumors;[3] of these, 8 were mixed germ cell tumors consisting of yolk sac tumor with dysgerminoma, embryonal carcinoma, and choriocarcinoma. More recently, Moniaga reported a mixed ovarian germ cell tumor predominantly consisting of immature teratoma, embryonal carcinoma, and mature teratoma.[4] To date, no cases of mixed ovarian germ cell tumor consisting of immature teratoma, yolk sac tumor, and embryonal carcinoma have been reported in the literature.

Currently, patients with stage Ia grade-1 immature teratoma are treated with surgery alone. Patients with stage-I grade-2 and 3 immature teratoma, and above all advanced stages, require postoperative combination chemotherapy.[5] Indeed, the potential for malignant recurrence from immature ovarian teratoma has prompted chemotherapy after complete resection of the primary tumor to become standard practice. As such, it is recommended that patients with immature teratoma and elevated serum AFP levels at diagnosis receive adjuvant chemotherapy after initial surgical resection.[6] Importantly, fertility sparing surgery is appropriate as long as chemotherapeutic agents are employed.[7] In the 1980s, BEP (bleomycin, etoposide, cisplatin) was first applied to ovarian germ cell tumors and since then has become the standard of care.[8] Studies have shown that three courses of BEP always prevent recurrence in well-staged patients with completely resected germ cell tumors. It is recommended that this therapy is administered to all such patients.[8]

However, other studies suggest that the efficacy of postoperative chemotherapy in girls and adolescents with immature ovarian teratoma has not been established. One study showed that surgery alone is curative for most girls and adolescents with resected immature ovarian teratoma of any grade, even when elevated levels of serum AFP or microscopic foci of yolk sac tumor are present. The authors concluded that long-term effects of chemotherapy in most girls with ovarian immature teratoma should be avoided by reserving postoperative therapy for cases of relapse.[9]

The mixed germ cell tumor reported here was staged as Ia; however, it consisted of embryonal carcinoma and yolk sac tumor; these tumor types are among the most malignant cancers seen in the ovary. Therefore, the patient was treated with fertility sparing surgery followed by adjuvant chemotherapy.

In conclusion, a diagnosis of ovarian germ cell tumor can be suspected based on a patient's age, an elevated level of serum AFP, ultrasound observations, and can be confirmed by pathological examination. Most patients may be treated by comprehensive surgery. If the uterus and other uterine adnexa are normal, fertility sparing surgery and subsequent chemoradiotherapy should be adopted.

REFERENCES

1. Hogg R, Friedlander M. Management of embryonal carcinoma of the ovary. *J Gynecol Oncol* 2002; **7**:234.
2. Pagaro PM, Gore CR, Patil T, Chandanwale S. Mixed germ cell tumors: report of two cases. *Med J Dr D Y Patil Univer* 2013; **3**:298-301.
3. Talerman A, Haije WG, Baggerman L. Serum Alpha-Fetoprotein (AFP) in diagnosis and management of endodermal sinus (yolk sac) tumor and mixed germ cell tumour of the ovary. *Cancer* 1978; **41**:272-8.
4. Moniaga NC, Randall LM. Malignant mixed ovarian germ cell tumor with embryonal component. *J Pediatr Adolesc Gynecol* 2011; **24**:e1-e3.

5. Gershenson DM. Update on malignant ovarian germ cell tumours. *Cancer* 1993; **71**:1581-90.
6. Malogolowkin MH, Ortega JA, Krailo M, Gonzalez O, Mahour GH, Landing BH, *et al*. Immature teratomas: identification of patients at risk for malignant recurrence. *J Natl Cancer Inst* 1989; **81**:870-4.
7. Nishio S, Ushijima K, Fukui A. Fertility-preserving treatment for patients with malignant germ cell tumors of the ovary. *J Obstet Gynaecol Res* 2006; **32**:416.
8. Williams SD, Blessing JA, Liao SY, Ball H, Hanjani P. Adjuvant therapy of ovarian germ cell tumours with cisplatin, etoposide, and bleomycin: a trial of the gynecologic oncology group. *J Clin Oncol* 1994; **12**:701-6.
9. Cushing B, Giller R, Ablin A, Cohen L, Cullen J, Hawkins E, *et al*. Surgical resection alone is effective treatment for ovarian immature teratoma in children and adolescents: a report of the pediatric oncology group and the children's cancer group. *Am J Obstet Gynecol* 1999; **181**:353-8.