Ovarian cancer during pregnancy: a case report and literature review

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Abstract

Ovarian cancer during pregnancy is a rare event. Little is known about the treatment of this condition due to lack of prospective randomized trials and cohort studies. In this paper the authors reported a rare case of small cells ovarian cancer, diagnosed at 16 weeks of gestation, treated with conservative surgery at 18 weeks and chemotherapy. At week 38, the patient underwent caesarean section and delivered a healthy baby girl. Staging surgery was then carried out followed by adjuvant chemotherapy. Thus the findings from this case concluded that prognosis and quality of the patient's life should be a priority, chemotherapy during the second trimester seems to be safe however, potential risks of this interventions still has to be considered.

Introduction

Ovarian cancer during pregnancy is a rare event. All chemotherapy agents are potentially teratogenic and there is a potential long-term effect on the offspring.[1,2] Concerns always exist regarding the mother's health. Chemotherapy is contraindicated in the first trimester because of the high rate of abortion and abnormal fetal development.[1] Malformations were present in 83.3% of fetuses when chemotherapy was administered during the first trimester; in contrast, malformations have not been reported in most cases in which chemotherapy was administered during the second or third trimesters.[1] Literature contains numerous reports regarding the use of different combinations of chemotherapeutic agents including the combination of cisplatin/carboplatin, cyclophosphamide and paclitaxel in pregnancy with untoward effects and with good response to therapy and subsequent delivery of healthy baby.

Case Report

We presented a case of 37-year old woman, on her sixth pregnancy (gravida 6), having three deliveries (para 3) and a history of 2 miscarriages was referred to the antenatal clinic at Khartoum Teaching Hospital, Sudan, with a routine 16 weeks ultrasound report showing: A 16 weeks single fetus, and bilateral asymptomatic multilocular-solid cystic adnexal masses with maximum diameter of 8x9 cm in the right ovary and 7x6 cm in the left ovary (Figure 1). The cysts were not vascular at color Doppler. There was no ascites, and peritoneum and liver were normal. The patient had no remarkable medical problems and no previous family history of endometrial, ovarian, colorectal, or breast cancer. The laboratory tests performed were within normal range except elevated serum levels of lactate dehydrogenase. No hypercalcemia was noted. Biological markers: CA125 (normal range: <35 IU/mL), CA15-3 (normal range <35 IU/mL), and CA19-9 (normal range <35 IU/mL) levels were 1015 U/mL, 203 U/mL, and 26 U/mL, respectively. CA 125 was repeatedly high with a range of 1015-1025. Multidisciplinary counseling was applied: surgical interventions and prospect of laparotomy findings, maternal and fetal risks, prospects of chemotherapy treatment during pregnancy and after delivery were discussed with patient and family. Exploratory laparotomy was carried out at 18 weeks. It showed the presence of bilateral ovarian masses (maximum diameter 9x10 cm in the right ovary and 7x6 cm in the left ovary) with intact capsules, and two omental nodules (maximum diameter 6 cm) (Figures 2 and 3). Bilateral salpingo-oophorectomy, infracolic omentectomy, appendectomy, peritoneal washing, and multiple biopsies of the parietocolic and prevescical peritoneum, parieto-visceral adhesions, and diaphragm were performed. Palpation of pelvic and para-aortic lymph nodes was negative. The patient had an unremarkable postoperative course. Histopathology assessment of the multilocular ovarian cysts, omentum nodules and lymph nodes showed: bilateral malignant tumors formed of wide trabeculae and sheet of small malignant cells with dark ovoid nuclei with many mitosis consistent with bilateral small cell ovarian carcinoma (grade 2), in both ovaries and the omental nodules.

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Consent: written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the series editor of this journal.

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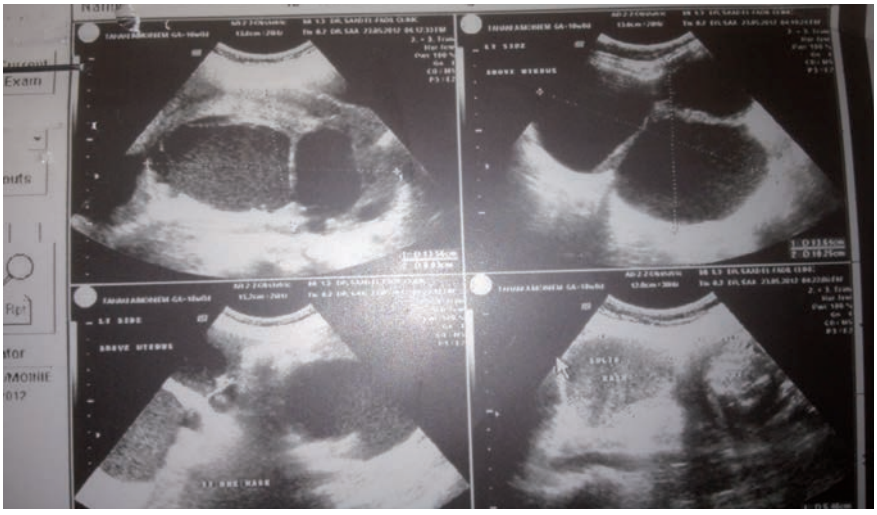

Figure 1. Ultrasound showing bilateral multicystic ovarian tumors during pregnancy

The patient was staged as having an International Federation of Gynecology and Obstetrics (FIGO) stage IIIC disease. Detailed counseling of the patient and her family with multidisciplinary staff has been done and written informed consent was obtained for initiation of chemotherapy with preservation of pregnancy. No gross fetal anomalies were documented at ultrasound examination before treatment. Following surgery the patient received adjuvant chemotherapy with cyclophosamide (600 mg/m^2 intravenously on day one every four weeks for six cycles) and carboplatin (300 mg/m^2 by intravenous injection on day 1 every four weeks for six cycles). The chemotherapy started from the 6th postoperative day and onwards. The patient showed good tolerance to treatment with mild gastrointestinal and hematological toxicity observed in the last cycle of treatment. CA125 levels dropped from 371 U/mL at the beginning of chemotherapy treatment, to normal levels (<35 U/mL) following the second course of treatment. Pregnancy proceeded uneventfully and several periodic obstetric ultrasounds revealed normal fetal growth and development. Exploratory laparotomy with cesarean delivery followed by total hysterectomy, and multiple biopsies were carried out at 38th weeks of gestation. No apparent residual disease was documented at surgery, and final histopathological diagnosis revealed no secondary tumor tissues in the uterus, with section of omentum showing area of fibrosis and foreign body giant cells reaction with no secondary deposits. The outcome was a female infant 2900 g with Apgar scores of 9 and 10 at 1 and 5 min, respectively. The placenta appeared normal at the time of delivery and showed no tumor at histology. Postpartum follow up was uneventful. The patient has been followed by ultra-sound and radiographically with computerized tomography scans of the abdomen and chest radiographs, all of which have been negative. In addition, clinical examinations and serum tumor markers (CA125) have been within normal limits. She is currently without evidence of disease 23 months after diagnosis. The baby now 18-month old, is in fairly good condition and growing normally.

Discussion

We report a rare case of small cell ovarian cancer during pregnancy to highlight the effect of the intervention in particular the chemotherapy on pregnancy outcome. The use of multi-agent chemotherapy during pregnancy has become widespread.[3] The management of early-stage ovarian carcinoma diagnosed during pregnancy should be started without delay. With regard to the chemotherapy administration during pregnancy European Society of Medical Oncology (ESMO) guidelines recommended the following: *the decision to administer chemotherapy should follow the same guidelines as in non-pregnant patients*. In practice, it is possible to administer chemotherapy from 14 weeks gestational age onwards with specific attention to prenatal care. To allow the bone marrow to recover and to minimize the risk of maternal and fetal sepsis and hemorrhage, delivery should be planned at least 3 weeks after the last cycle of chemotherapy, and chemotherapy should not be given after 35 weeks since spontaneous labor becomes more probable.[4]

Incidence of ovarian cancer is increased in older pregnant women.[5] In older women, it is suggested that in addition to gestational dating, routine ultra-sound examination of the adnexae should be considered. Because cancer with pregnancy is rare,[6] there is limited number of researches to guide women and their doctors, however some reports showed that pregnancy has no deleterious effect on the prognosis, and that pregnancy should be preserved whenever possible and that prognosis and treatment success depend on the individual patient and the possibility to treat mothers while safeguarding fetus.[7] Data of effect of chemotherapy during pregnancy was largely derived from case reports and case series, intra-uterine growth restriction and low birth weight, prematurity, fetal toxicity, miscarriage have been reported.[8] Peccator *et al.* stated that chemotherapy in early pregnancy (during the period of organogenesis) is associated with a high risk of miscarriage and congenital malformation.[9] These consequences will be of fewer incidences when treatments are initiated in the second trimester. However, an increased number of fetal complications are still observed even when chemotherapy is used in late pregnancy. In contrast to Peccator *et al.,* Amant *et al.* proved that the outcome of the children exposed to chemotherapy during pregnancy is not different from the general population, however in their report they found that prematurity was common and was associated with impaired cognitive development. Therefore, iatrogenic preterm delivery should be avoided when possible.[7]

The current standard regimen for adjuvant chemotherapy to treat epithelial ovarian carcinoma is the combined use of carboplatin and paclitaxel.[3] Patients receiving carboplatin during the second trimester have been reported with no serious effect on the fetus.[10,11] Termination of pregnancy must be considered in women presenting with advanced stage disease in early pregnancy warranting chemotherapeutic treatment.[11] Until now, the long-term health effects on children exposed to chemotherapeutic agents in utero remain unknown as there are no long-term studies.[12,13] No specific information is available regarding the teratogenic effects of carboplatin or paclitaxel in human studies (Table 1[14-19]). Twenty six Studies in rats have shown carboplatin to be embryotoxic.[20] Potential long-term risks include: compromised physical and neurological development, an increased risk of malignancy in childhood and adult life, and the possibility of mutagenesis of germ-line tissue resulting in an increased risk of malignancy in future generations.[21] Women must be counseled with regard to the administration of chemotherapy in pregnancy and should be advised of the necessary long- term follow up of their children. Breastfeeding during cytotoxic chemotherapy has been discouraged in general. There is no convincing evidence that a synergistic increase in malformation occurs with the use of multi-agent regimes as opposed to treatment with one cytotoxic agent. Regarding the selection of chemotherapeutic agents in our case, multi-agents therapy with cyclophosamide and carboplatin was chosen for the treatment. Cyclophosamide and platinum-based chemotherapy have been reported to be generally well tolerated and not associated with toxicity in the newborn.[1,2,11,22] The addi-

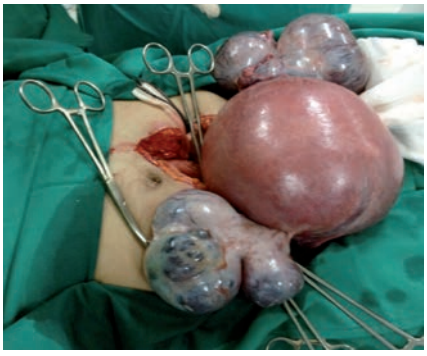

Figure 2. Bilateral ovarian tumors and 18 weeks pregnant uterus.

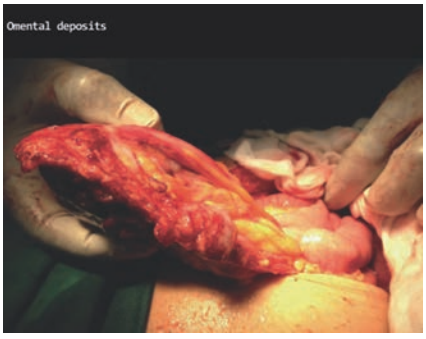

Figure 3. Omentum nodule in ovarian malignancy during pregnancy.

Table 1. Summarizing some of the available current data on ovarian cancer during pregnancy.

Case	Time of detection	Modality of treatment	Outcome	Reference
Adenocarcinoma	6-week gestation	Conservative surgery without chemotherapy	Healthy baby and mother	He *et al.*, 2012[14]
Cystadenocarcinoma papillary GIII	Term during emergency C\S	Total hysterectomy and omentectomy+ chemotherapy	Healthy baby and mother	Grzonka *et al.*, 2002[15]
Serous papillary carcinoma	34 weeks and 5 days	Conservative surgery with chemotherapy	Healthy baby and mother	Roy *et al.*, 2014[16]
Serous ovarian cystadenoma	7-week gestation	Conservative surgery	Lost follow up	Eltayeb *et al.*, 2014[17]
Malignant mixed germ cell tumor	After delivery	Total abdominal hysterectomy and bilateral salphingoopherectomy	Healthy baby and mother	Kaur *et al.*, 2013[18]
Mucinous ovarian adenocarcinoma	35 weeks	Conservative surgery with chemotherapy	Healthy baby and mother	Xu *et al.*, 2014[19]

tion of paclitaxel during pregnancy was also excluded not only in consideration of the recent controversies raised in some studies, but also because of major concerns expressed by the patient about the lack of the experience available at that time of the use of taxanes in her specific clinical situation.[11] However many studies have shown that paclitaxel used alone or in combination with other agents in maternal ovarian cancers, has no significant fetal toxicity when used during the second or third trimester.[8,22]

In conclusion the findings from this case concluded that prognosis and quality of the patient's life should be a priority, chemotherapy during the second trimester seems to be safe however, potential risks of this interventions still has to be considered.

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