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# Metastatic secondary ovarian cancer from gastrointestinal primary (Krukenberg Syndrome) during pregnancy: A case report and literature review

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## Abstract

Gastric cancer in pregnancy is extremely rare and often diagnosed at advanced stages. Well-recognized pregnancy-related symptoms, such as nausea and epigastric discomfort, can be the first symptoms of gastric cancer. Thus, the diagnosis of gastric cancer in pregnancy is difficult.

**Case presentation:** We present a case of 30 years old woman, on her first pregnancy. This lady was self referred to A&E, on the 19$^{th}$ week, with epigastric pain and vomiting. Her blood pressure was elevate. Due to the early onset of hypertension, had abdominal scan, which revealed the presence of a single live fetus. However, the abdominal ectopic pregnancy couldn't be excluded. She then had a MRI, which revealed bilateral suspicious adnexal masses and a small gastric mass. Patient was at the 23rd week of gestation, it was agreed to proceed with laparotomy and removal of the larger right adnexal mass. She recovered well. Histology confirmed a poorly differentiated adenocarcinoma, upper GA origin. Therefore diagnosis of Krukenberg syndrome was established. Patient had two cycles of chemotherapy. Pregnancy proceeded uneventfully and several periodic obstetric ultrasounds revealed a normal fetal growth and development. Patient had an elective classic Caesarean Section at 33+5 weeks and the left ovary and tube was removed the same time. The outcome was a healthy male baby 2.05 kg. Histology of the left ovary confirmed a poorly differentiated adenocarcinoma, consistent with metastatic gastric adenocarcinoma. Post delivery patient had 4 further cycles of chemotherapy. The last CT scan has shown no measurable peritoneal disease.

**Discussion:** Early diagnosis of gastric cancer is very important for a better outcome. As soon as cancer is diagnosed, a therapeutic plan should be promptly made by a multidisciplinary team.

## Keywords

ovarian cancer; pregnancy; gastrointestinal cancer; krukenberg syndrome

## Introduction

The diagnosis of an asymptomatic adnexal lesion during pregnancy has become more common after the widespread use of routine ultrasonography (USS) [1]. It is estimated that approximately 1-4% of pregnant women are diagnosed with an adnexal mass, while about 90% of such lesions revealed during

the first trimester will disappear spontaneously [2]. The most commonly diagnosed adnexal masses during pregnancy are the mature cystic teratomas, the endometrioid cysts and the corpus luteum cysts [1]. On the other hand, the risk of malignancy for the adnexal masses diagnosed during pregnancy is only 2-3% [2]. Ovarian cancer is considered to be the third most frequent gynecological cancer complicating pregnancy and cervical cancer is the second [3]. Most patients are clinically asymptomatic and diagnosis is often based on scheduled USS examination during prenatal screening.

This paper presents a case of a pregnant woman whose prenatal ultrasound examination revealed the presence of a large adnexal mass with sonographic characteristics that led to surgical intervention and diagnosis of secondary ovarian cancer. The aim of this paper was to discuss the diagnostic and therapeutic dilemmas in cases of pregnant women with adnexal masses and cancer. A brief a review of the literature is also included.

## Case Report

We present a case of 30 years old woman, on her first pregnancy (G1Po). She was 19 weeks and self-referred to A&E, feeling unwell, with suprapubic pain and vomiting. Her blood pressure was found elevated, but otherwise nothing else was remarkable. Due to the early onset of hypertension, had abdominal scan to rule out any other causes of high blood pressure. The scan revealed the presence of a single live fetus. However, a pelvic mass was seen and the fetus was located, higher than usual in the abdomen. The mass was suspected to be the uterus with the fetus superior to it. Therefore the abdominal ectopic couldn't be excluded. She then had a MRI in a tertiary center. MRI revealed bilateral suspicious adnexal masses and a small gastric mass. The case was discussed in the Multi-Disciplinary Meeting with suspicion of malignancy options of management explained to the patient and her partner. As the patient was approximately 23 weeks of gestation, it was agreed to proceed with laparotomy and removal of the larger right adnexal mass as a partial debunking and diagnostic procedure. It was felt that it was best to leave the other ovary with the smaller mass on the left, considering patient's young age, parity and uncertainty regarding diagnosis. The patient recovered well from procedure and histology confirmed a poorly differentiated adenocarcinoma, upper GA origin. Therefore diagnosis of Kuechenberg syndrome was established. There was no evidence of lymph adenopathy or peritoneal disease.

The patient had no significant medical problems, apart from hypertension and no previous family history of endometrial, ovarian, gastric or breast cancer.

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. Consent was obtained for chemotherapy with preservation of the pregnancy. Patient had two cycles of chemotherapy (Epirubicin and infusional 5FU). Pregnancy proceeded uneventfully and several periodic obstetric ultrasounds revealed a normal fetal growth and development. Patient had an elective classic Caesarean Section at 33+5 weeks and the left ovary and tube was removed the same time. The outcome was a healthy male baby 2.05 kg. Histology of the left ovary confirmed a poorly differentiated adenocarcinoma, consistent with metastatic gastric adenocarcinoma.

Post-delivery patient had 4 further cycles of epirubicin and oxaliplatin. She had also CTs, which showed no measurable residual disease, ascites or lymphadenopathy. The last blood tests for tumor markers, 6 months after delivery, have been reported as normal.

## Discussion

In agreement with literature's data, the patient in this reported case was clinically asymptomatic and diagnosis was based on incidental findings on US examination. It is true that the early diagnosis of ovarian lesions during pregnancy is achieved thanks to serial ultrasound examinations for prenatal monitoring. This early diagnosis probably explains the generally good prognosis for pregnant women diagnosed with ovarian cancer [1].

Ultrasonography is considered to be the best diagnostic tool in order to reveal adnexal masses in both pregnant and non-pregnant women [4]. Several studies suggest that the sonographic characteristics of the adnexal lesions can be sufficient to determine which patients are truly at increased risk for malignancy versus those who can be followed up expectantly [1]. With color Doppler examination, a pulsatility index below 1.0 in a morphologically suspicious area would suggest malignancy [4].

Additional imaging with magnetic resonance helps in better defining the morphological characteristics of any suspicious lesion. Computed Tomography (CT), although is the most common imaging examination to detect the extension of a suspected ovarian cancer, is usually avoided during pregnancy due to the possible negative effects of ionizing radiation on organogenesis.

High serum levels of CA125 are normal finding during the first trimester and they return into normal ranges later in pregnancy. This marker is not really useful during pregnancy, but serial measurements might still be helpful during the differential diagnosis procedure and postoperative follow-up [5].

We report a rare case of secondary ovarian tumor 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 [5]. Therefore the management of early-stage ovarian carcinoma diagnosed during pregnancy should be started without delay. 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 [6].

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 [7]. 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 [5]. 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.