Case Report

ANNALS OF MEDICINE & SURGERY

OPEN

The challenging presentation of gastric cancer during pregnancy with krukenberg tumor: a case report

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Introduction: The incidence of ovarian tumors in pregnancy is around 0.05%. Primary ovarian cancer and metastatic malignancy are rare in pregnancy, and women often delayed in diagnosis.

Importance: This is the first case ever reported on gastric cancer diagnosed during pregnancy presenting with a Krukenberg tumor and mimic ovarian tumor torsion, cholecystitis. By reporting this case, we could sensitize physicians to be more vigilance of abnormal abdominal pain in pregnant women.

Case presentation: A 30-year-old female came to our hospital at the 30th week of gestational age due to preterm uterine contraction and worsening abdominal pain. A cesarean section was performed due to preterm uterine contraction and intolerable abdominal pain suspected to be ovarian torsion. Microscopic examination of the ovarian specimen showed signet-ring cells. The patient was diagnosed with gastric adenocarcinoma at stage IV after complete surveillance. Postpartum chemotherapy consisted of oxaliplatin and high-dose 5-fluorouracil. The patient died 4 months after delivery.

Clinical discussion: Malignancies during pregnancy should be kept in mind while encountering atypical clinical presentations. Krukenburg tumor is rare in pregnancy and gastric cancer is the most common cause. Early diagnosis of the gastric cancer in the operable stage is the key to a better prognosis.

Conclusion: Diagnostic examinations for gastric cancer in pregnancy could be performed after first trimester. Treatment should be introduced after balancing maternal-fetal risks. Early diagnosis and intervention are crucial to decrease the high mortality rate of gastric cancer in pregnancy.

Keywords: case report, gastric cancer, pregnancy, signet-ring cell

Introduction

During pregnancy, the incidence of concomitant presence of adnexal masses ranges from 1 in 81 to 1 in 2500 pregnancies. Among all the presence of the adnexal masses, only 3% are malignant[1]. A Krukenburg tumor from gastric cancer in pregnancy is even more scarce. Generally, gastric cancer is often seen in older age and in male; however, it is more common in women in younger populations[2]. Gastric cancer in pregnancy is usually diagnosed in advanced stages with a dismal maternal and fetal prognosis. Most women were diagnosed at second trimester and up to 80% of children would be preterm due to preeclampsia, maternal deterioration, or therapy planning. The 5-year survival rate in women complicated with gastric cancer is zero, and most cases would be deceased within 6 months after diagnosis[1]. We report a rare case of gastric carcinoma diagnosed at the 32nd week of gestation, who underwent cesarean section and right oophorectomy at the same time initially due to suspicion of ovarian torsion, which turned out to be a Krukenburg tumor metastasis from gastric cancer at a tertiary medical center. This is the first pregnant case ever reported complicating with a Krukenberg tumor, which mimicking both ovarian torsion and acute cholecystitis. By reporting this case, we could sensitize physicians to be more vigilance of abnormal abdominal pain in pregnant women. This work has been written in line according to the Surgical Case Report (SCARE) 2020 Criteria[3]. Written

HIGHLIGHTS

- This is the first case being published that Krukenberg tumor mimicking acute cholecystitis and ovarian torsion.
- Prompt diagnostic procedures and treatment for gastric cancer in pregnancy could be performed after the first trimester.
- Surgical intervention is the primary treatment following by adjuvant chemotherapy in pregnant women with gastric cancer.

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Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

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Annals of Medicine & Surgery (2023) 85:2056–2058

Received 2 December 2022; Accepted 18 March 2023

Published online 11 April 2023

http://dx.doi.org/10.1097/MS9.0000000000000499

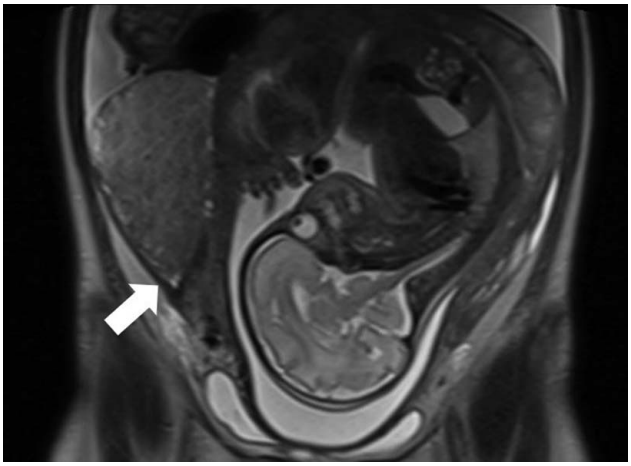

Figure 1. The ovarian tumor with suspected torsion (white arrow) on the MRI.

informed consent was obtained from the patient for the publication of this case report and accompanying images with anonymized presentation.

Presentation of case

This is a 30-year-old nulliparous Chinese woman with an unremarkable medical and family history. Early pregnancy scanning had been done at local clinics, and no adnexal tumor was reported. Lower abdominal pain consistent with preterm uterine contractions began at the 30th week of gestation and was partially improved after administering tocolytic agents. However, intermittent break through intolerable pain was noted on the following days. An MRI was performed and showed moderate ascites and a solitary homogenous right adnexal mass with suspected torsion (Fig. 1). During the pregnancy, she suffered from frequent nausea and vomiting but she thought it were normal pregnancy-related discomforts. A cesarean section and right oophorectomy were performed at 32nd week of gestation by an obstetrician and general surgeons. The neonate's birth body weight was 1560 grams, and the APGAR score was 7 and 9 at the first and fifth minutes after birth. A moderate amount of ascites, multiple nodules on the greater omentum, liver surface, and abdominal-pelvic peritoneum were noted during the operation (Fig. 2). The right ovary is densely adhered to the peritoneal wall, which might be the cause of the severe abdominal pain. Under microscopic inspection, the right ovarian tumor showed diffuse infiltration of poorly cohesive tumor cells with abundant intracytoplasmic mucin and eccentric nuclei (Fig. 3).

The postoperative recovery course was smooth. Histologic analysis of the resected tissue from the right ovary, peritoneum, and greater omentum all revealed signet-ring cells. Eventually, the patient was diagnosed with stage IV gastric adenocarcinoma. Due to her inoperable status, she received palliative chemotherapy with oxaliplatin and 5-fluorouracil. The patient died 4 months after the delivery. Moreover, she is grateful for the operation not only relieving her symptoms but also giving her the opportunities to spend some valuable time with her family.

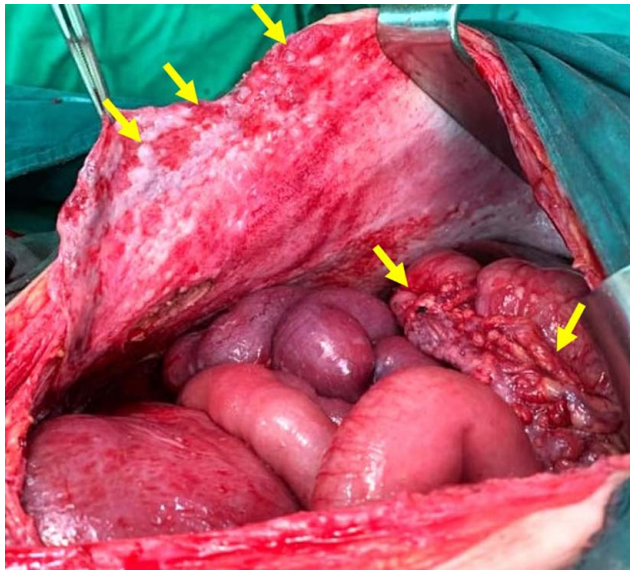

Figure 2. Intraoperative image showing multiple nodules on the greater omentum, and abdominal-pelvic peritoneum (yellow arrows).

Discussion

The most common type of ovarian tumor during pregnancy is a mature teratoma[4]. The incidence of ovarian tumor torsion during pregnancy is 0.05% and ovarian tumor torsion requires emergent surgical management[5]. Compared to nonpregnant women, there is a fivefold increased risk of ovarian torsion during pregnancy[5]. The diagnosis of ovarian tumor torsion in pregnancy relied on clinical presentation and image evaluation. Ultrasound is the most commonly used imaging method, and MRI can also assist on diagnosis.

The incidence of pregnancy-associated gastric cancer is 0.026–0.1% among all pregnancies[6]. Gastric cancer in pregnancies has a poor prognosis with a reported median survival of 7 months and a 3-year overall survival rate of 23.3%[1]. From an age- and stage-matches comparison in women diagnosed with gastric cancer between the pregnant and nonpregnant groups, the independent prognostic factors are advanced stage and tumor location[1].

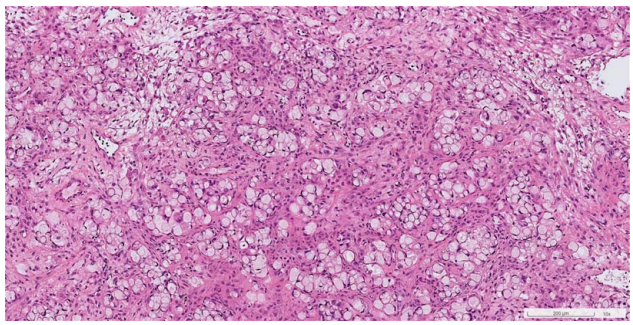

Figure 3. Microscopic findings showed a signet-ring cell carcinoma composed of poorly cohesive tumor cells with abundant intracytoplasmic mucin and eccentric nuclei (× 100).

Treatment for gastric cancer in pregnancy includes primary resection and chemotherapy. Treatment of gastric cancer during pregnancy depends on gestational age and the stage of the gastric cancer. The treatment option aims to make a balance between fetal outcome and maternal condition. The recommended cytotoxic drugs in gastric cancer were flurouracil, capecitabine, platinum-derivates, epirubicin, taxanes, and trastuzumab. Most of the cytotoxic medications administered in pregnancies were used in cases of gynecology and breast malignancies. There is limited experiences of cytotoxic medication used in gastric cancer.

From Goidescu *et al.* the mean age of women complicated with a Krukenberg tumor during pregnancy was 30.4 years, and the most common primary cancer origin was the stomach (68.6%) followed by the colon (14.3%)[7]. The most common symptoms of a Krukenberg tumor are general gastric-intestinal discomfort, including abdominal pain, nausea, and vomiting all of which are similar to pregnancy-related discomfort.

Krukenburg tumor is rare in pregnancy, and gastric cancer is the most common cause. Early diagnosis of the gastric cancer in the operable stage is the key to a better prognosis. Prompt to a diagnostic endoscopic examination in pregnant women if persistent nausea, vomiting, and gastrointestinal symptoms that could not be relieved by standard treatments. The treatment plan should be made to balance the benefits of the mother's prognosis and the possible side effects on the fetus.

Conclusion

Krukenberg tumors are rare in pregnancy. Symptoms could mimic pregnancy-related discomfort and difficult to differentiate. However, always be alert of unusual abdominal pain could help making accurate diagnosis of rare diseases in pregnancy. Early diagnosis and treatment are the keys to decrease the high mortality rate of gastric cancer complicated with pregnancy.

Ethical approval

Ethic approval from National Taiwan University Hospital's research ethic committee office, the case number is 202209111RINA.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Sources of funding

None declared.

Author contribution

H.-Y.C.: data collection, data analysis, data interpretation, writing the paper, C.-N.L.: study concept, study design, data collection, S.-Y.L.: study concept and study design, writing the paper.

Conflicts of interest disclosure

The authors declare that they have no financial conflict of interest with regard to the content of this report.

Research registration unique identifying number (UIN)

Name of the registry: NA.
Unique Identifying number or registration ID: NA.
Hyperlink to your specific registration (must be publicly accessible and will be checked): NA.

Guarantor

Han-Ying Chen, Chien-Nan Lee, Shin-Yu Lin.

Provenance and peer review

Not commissioned, externally peer reviewed.

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