1. Background

The presentation of positive β-hCG and an adnexal mass in a reproductive age female is an ectopic pregnancy until proven otherwise given its acute potential to cause maternal death (American College of O. and Gynecologists, 2008). However, rare neoplasms can cause this constellation of findings. Outside of pregnancy, β-hCG can be secreted by neoplastic, even malignant germ cell, placental, or embryonal tissues. This includes germ cell tumors, gestational trophoblastic disease, teratomas, and testicular cancers (American College of O. and Gynecologists, 2008). Rarely, β-hCG can be secreted by hepatic, neuroendocrine, breast, pancreatic, cervical, and gastric cancers, but in small quantities insufficient to be confused with ectopic pregnancy (Curtin et al., 1994). Of the hCG secreting neoplasms, there are a select few that produce the amount necessary to reach above the discriminatory zone (2000IU). These neoplasms mimic an ectopic pregnancy if no intrauterine gestational sac is seen on transvaginal ultrasound (American College of O. and Gynecologists, 2008). These include malignant ovarian germ cell tumors (dysgerminomomas, mixed-germ cell tumors, ovarian choriocarcinoma and embryonal carcinoma). These malignant germ cell tumors are often rapidly growing and can present with subacute pelvic pain related to distention, hemorrhage, and necrosis (American College of O. and Gynecologists, 2007).

2. Case report

A 19 y female presents to the emergency department with a reported ectopic pregnancy diagnosed at an outside facility and desired definitive management. She reports a positive pregnancy test approximately one week ago. She was seen at a local women’s health with ectopic pregnancy based on ultrasound findings and positive pregnancy test. She was then taken by her parents to our facility. Based on her last menstrual period, she was presumed to be a gravida 1 at 9 weeks and 6 days gestational age. On review of systems she denied vaginal bleeding or abdominal pain and reported recent unprotected intercourse. She denied any contributing medical history including history of sexually transmitted diseases or pelvic inflammatory disease, endometriosis, abdominal surgery, or other risk factors for altered reproductive anatomy. She denied tobacco or drug use. Her physical exam was unremarkable. A pelvic ultrasound and quantitative β-hCG were ordered. Notably, the interpreting radiologist was aware of the gynecology team’s concern for an ectopic pregnancy. Her β-hCG was 2121 and pelvic ultrasound was reported as the following (Fig. 1A and B):

“Anteverted uterus with normal endometrial stripe without irregularities. No pseudo gestational sac appreciated. Left adnexal mass measuring 5.0 × 3.5 × 2.8 cm, presumably within the fallopian tube with components of involuted gestational sac/products of conception with possible increased vascularity and mildly surrounding the mass.”

The patient was extensively counseled on risks of ectopic pregnancy and offered either medical management with methotrexate or surgical management. The patient opted for surgical management, secondary to her inability to follow up closely. The patient was taken to the operating room for a laparoscopic salpingectomy versus salpingostomy however the operative team found a pedunculated left ovarian mass that measured 8 × 4 cm and normal fallopian tubes bilaterally. The mass was described as firm, white and light gray in color, similar to ovarian tissue. Upon removal, the endocatch bag ruptured. The left lower quadrant port site was extended and allowed removal of the intact mass. A full pelvic and abdominal survey was completed without any other abnormalities noted. The left fallopian tube and contralateral ovary and tube appeared normal. No evidence of ectopic pregnancy was visualized. The patient was meeting all milestones and was discharged on postoperative day 1 with repeat β-hCG 970.

Pathology report showed a mixed germ cell tumor consisting of both dysgerminoma and embryonal carcinoma elements measuring 8.5 × 3.5 × 2.0 cm, with ovarian capsule involvement. The patient was referred to the gynecologic oncology service and the patient was taken back to the OR for an exploratory laparoscopy with left salpingo-
Oophorectomy. A full lymph node staging procedure was not performed in the absence of obviously positive lymph nodes but abdominal washings and peritoneal biopsies were performed. Given the patient already had an embryonal carcinoma component to her germ cell tumor, the aggressive histology required chemotherapy regardless of the extent of her disease. Residual dysergerminoma was found in her left ovary when it was removed on final pathologic analysis, but there was no further evidence of malignant disease within her abdomen. The final diagnosis was FIGO stage 1C Mixed Germ Cell Tumor (80% Dysgerminoma, 20% Embryonal carcinoma). The patient underwent 3 cycles of chemotherapy (Bleomycin, Etoposide, Cisplatin). Patient received 3 cycles of Bleomycin 30 units IVP on days 1, 8, and 15 and 3 cycles of Etoposide 100 mg/m² days 1–5, and Cisplatin 20 mg/m² on days 1–5. Patient had normal tumor markers after three cycles of chemotherapy and currently has no evidence of residual disease. She is currently disease free at 15 months. She resumed menses soon after she completed chemotherapy, and is now on long acting contraception using a subdermal contraceptive implant.

3. Discussion

The presentation of an adnexal mass with positive β-hCG in a sexually active reproductive age woman is an ectopic pregnancy until proven otherwise. In our case, ultrasound findings were consistent with ectopic pregnancy since the pedunculated nature of the tumor gave it an appearance of a tubal pregnancy. Although our patient did not have physical exam findings, a diagnostic laparoscopy with a high suspicion for ectopic in absence of symptoms is reasonable given the potential for fatality, and 50% of all ectopic pregnancies are asymptomatic (American College of, O. and Gynecologists, 2008). Paradoxically most malignant germ cell tumors often present with abdominal pain secondary to distention, hemorrhage or necrosis (Ozkaya et al., 2005).

On literature review, we found 5 similar case reports of neoplasms mimicking ectopic pregnancy. Two mixed germ cell tumors (Ozkaya et al., 2005; Rozenholc et al., 2012), one mature teratoma (Dawley et al., 2012), one ovarian choriocarcinoma (Balat et al., 2004), and one mediastinal germ cell tumor that did not involve the adnexa (Rivera et al., 2011). Malignant germ cell tumors make up less than 1% of ovarian cancers and rarely have an embryonal carcinoma component. At the time of the patient’s presentation she had no contraindications for medical ectopic management apart from the inability to follow up closely. However if she had elected medical management, the diagnosis of her malignant germ cell tumor may have been delayed unless inappropriate drop in β-hCG levels, inappropriate rise in β-hCG levels, or onset of abdominal pain led to repeat imaging. Fortunately, surgical management identified the germ cell tumor and led to referral to subspecialty care. Upon entry into the abdomen, it was noted that the mass appeared to be similar to ovarian tissue and did not appear to be an ectopic pregnancy. Given the age of the patient the decision was made to remove the mass and send to pathology with the intention of saving her ovary, pending pathology. The mass was intact but was present on the ovarian surface making it stage 1C2 prior to surgical spill. Adjuvant chemotherapy is advised for most ovarian germ cell tumors, particularly for embryonal subtypes regardless of stage. It is a theoretical possibility that surgical spill could alter long term outcomes. Although this possibility is unlikely given that malignant germ cell tumors have a good prognosis if treated with chemotherapy. In our particular case the treatment plan was not altered by surgical spill.

In conclusion, careful evaluation of patients and consideration of neoplasms as a source of β-hCG production in the presence of an adnexal mass is critical. When any patient is referred to a tertiary medical center with a preset, potentially fatal diagnosis, due diligence must be carried out to investigate that diagnosis. At the time of emergent laparoscopy when an ectopic pregnancy was not found, the immediate recognition of a germ cell tumor was unrealistic given the rareness of the phenomenon. Ultimately, the lack of immediate recognition did not delay her definitive treatment. We wish to share this case so that others can learn from our experience.

Author note

The views expressed are those of the presenters and do not reflect the official views or policy of the Department of Defense or its Components.

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.

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