Ovarian pregnancy: report of three cases and review of the literature

Introduction

Ovarian pregnancy – the implantation and development of the conceptus in the ovary – is a rare form of ectopic implantation. It often ruptures early in the pregnancy because the ovarian tissue is very fragile. The incidence of ovarian pregnancy worldwide is reported as 0.3–0.5% of all ectopic pregnancies (Raziel et al, 2004). This article reviews three cases of ovarian pregnancy from September 2000 to June 2006 in Wuhan University Renmin Hospital, and outlines the presentation and treatment.

Discussion

Incidence and pathogenesis

With the increased use of assisted reproductive technology and the rise in the prevalence of tubal and pelvic diseases, the incidence of heterotopic pregnancy is increasing (Raziel et al, 2004). The first case of ovarian pregnancy was reported by Saint Maurice in 1682. Ovarian pregnancies are classified into four types according to where the conceptus has embedded: in the follicle, by the side of the follicle, by the side of the cortex or in the medulla. Boronow et al (1965) summarized the possible aetiologies as:

1. Obstructed ovulation as a result of inflammation such as pelvic inflammatory disease or perioophoritis, tenacious discus proligerous and/or low intrafollicular pressure
2. Ineffective tubal ciliary and/or peristaltic function, either idiopathic or as a result of inflammation
3. Favourable surface phenomena such as decidual changes or endometriosis of the ovary
4. Parthenogenesis
5. Chance.

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Case Report 1

A 29-year-old woman presented 77 days after she had undergone in-vitro fertilization and embryo transplantation with a 15-day history of vague pain in the hypogastrium which had increased over the last 8 days. Her pulse rate was 75 bpm and blood pressure was 100/70 mmHg. Abdominal examination revealed tenderness of the hypogastrium and rebound in the left lower quadrant. A routine blood test showed her haemoglobin levels were 79 g/litre. Transvaginal sonography revealed an enlarged uterus with evidence of intrauterine pregnancy and a complex 10.4×5.5 cm mass in the left adnexal region (*Figure 1*).

After admission, the patient was prescribed antibiotic (penicillin) and antihaemorrhagic (aminomethylbenzoic acid and Dicynone) medication, but her symptoms did not improve. On the 85th day of pregnancy, the patient complained of severe and persistent hypogastric pain. Ultrasound showed that the complex structure was now 12.6×10.5 cm. Immediate laparotomy revealed 700 ml haemoperitoneum, 300 ml of sludgy blood in the rectouterine pouch, a normal pregnant uterus, a dark smooth left ovary with a crevice on the back and the left fallopian tube adherent to the abdominal membrane. Pathology showed ovarian pregnancy with bleeding. After ovary wedge resection the patient felt better and the intrauterine pregnancy continued.

To the authors' knowledge, this is the first reported case of ovarian pregnancy along with intrauterine pregnancy after in-vitro fertilization and embryo transplantation. In this case, the transferred embryo moved from the uterus into the ovary.

Case Report 2

A 32-year-old woman, gravida 6 para 1, presented with a 24-hour history of hypogastric pain which had been increasing for 12 hours. Her pulse rate was 80 bpm and blood pressure was 100/70 mmHg. Abdominal examination showed tenderness of the hypogastrium. Pelvic examination revealed a smooth cervix with nodules on the back, and she felt pain when the cervix was touched or pulled up. Ultrasound displayed a low echogenic mass 3.7×3.3 cm within the right adnexa.

Laparoscopy showed a 2.0×3.0 cm mass on the back left of the uterus, and a 400 ml encapsulated effusion on the back of the uterus, the front of the rectum and the left of the ovary. There was a bleeding ovary on the right side. Pathology confirmed the presence of ovarian tissue around the chorionic villi tissue. The diagnosis was right ovarian pregnancy with bleeding.

Case Report 3

A 23-year-old woman presented with a 1-week history of persistent hypogastric pain. Her pulse rate was 80 bpm and blood pressure was 110/70 mmHg. Abdominal examination showed tenderness of the hypogastrium. Pelvic examination revealed normal uterus and cervix. Ultrasound displayed thickening of both fallopian tubes. Her serum beta-human chorionic gonodotropin was 711.3 mIU/litre. On admission, she was given methotrexate, mifepristone and traditional Chinese drugs. Laboratory examination revealed her levels of serum alanine aminotransferase and aspartate aminotransferase were higher than normal, so medical treatment was stopped. Immediate operation revealed the right ovary had a 6.0×3.0×0.5 cm crevice at the bottom without active bleeding, and the right tube was oedematous and bloodshot. Pathology confirmed the presence of chorionic villi tissue in ovarian tissue. The diagnosis was right ovarian pregnancy.

Figure 1. Ultrasonography of ovarian pregnancy.

Clinical manifestation and diagnosis

The Confidential Enquiry into Maternal and Child Health (Neilson, 2007) makes two important points about the diagnosis of ectopic pregnancy: women with ectopic pregnancies may have atypical symptoms suggesting gastrointestinal or urinary tract dysfunction, and that cornual pregnancies are rare but dangerous types of ectopic pregnancy. Clinicians should be aware of the difficulties with both clinical and ultrasound diagnosis. Ovarian pregnancy can be confused with corpus luteum, and it is usually not suspected until an ovarian mass is visualized, and haemoperitoneum and absence of tubal gestation are seen intraoperatively. Owing to the increased vascularity of the ovarian tissue, patients often present with circulatory collapse (Wittich, 2004).

Preoperative diagnosis of ovarian pregnancy is a challenge for clinicians. Diagnosis requires pathological proof and the four diagnostic criteria described by Spiegelberg (1878):

1. The gestational sac must occupy the normal position of the ovary
2. The tube on the side of the pregnancy must be normal
3. The gestational sac must be connected to the uterus by the utero-ovarian ligament
4. Ovarian tissue must be histologically confirmed in the wall of the gestational sac.

Culdocentesis is a very important examination. Ultrasound is also quite useful, but only supplies some diagnostic evidence because of limitations of operator skill and instrumentation. Laparoscopy is the most accurate method of diagnosis, but it is difficult to perform it in time because the gestational sac often ruptures early in the pregnancy.

Management

The management and care of these women was reviewed using the Royal College of Obstetricians and Gynaecologists' (2008) guidelines on management of ectopic pregnancies as well as local guidelines. Surgery is the main treatment for ovarian pregnancy, either oophorectomy or ovarian wedge resection with subsequent methotrexate injections (Erenus et al, 2002). Atabekoglu et al (2002) reported that the laparoscopic approach is feasible and should be attempted.

Medical management of ovarian pregnancy can be used, with intramuscular injections of methotrexate 50 mg/m², either as a single or divided dose, or 0.4 mg/kg body weight. These must be given twice, 5 days apart. Alternatively methotrexate 1 mg/kg body weight can be injected directly into the fetal sac laparoscopically. Other drugs which could be used include prostaglandin $F_{2\alpha}$ (1–3 mg), prostaglandin E_2 (500–1500 mg) and 50% glucose fluid. They can be injected directly into the fetal sac or corpus luteum through laparoscopy or under ultrasound guidance. If the level of beta-human chorionic gonodotropin continues to rise or there is acute haemorrhage, emergency surgery is needed. **BJHM**

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