ECTOPIC PREGNANCY REVIEW: SYMPTOMS, RISKS AND SUGGESTIONS FOR SONOGRAPHERS

Ectopic pregnancy poses the greatest threat of adverse outcomes for pregnant women. Therefore it remains the greatest medical/legal concern for Pregnancy Resource Medical Clinics (PRMCs) offering sonograms to pregnant women. It is imperative that the possibility of ectopic pregnancy always be at the forefront of the sonographer’s mind during scanning.

ECTOPIC PREGNANCY
Any pregnancy not implanted on the uterine wall is ectopic. Ectopic pregnancy (EP) is a high-risk medical condition (an incidence of 1.9% in reported pregnancies) and is the most common cause of pregnancy-related deaths in the first trimester. The fallopian tube is the most common location for an ectopic pregnancy, accounting for approximately 97% of all ectopics.

Other types of ectopic pregnancy include interstitial, cornual, ovarian, cervical, scar, intra-abdominal and heterotopic pregnancy. Interstitial pregnancy occurs when the gestational sac implants in the myometrial segment of the fallopian tube. Cornual pregnancy refers to the implantation of a blastocyst within the cornua of a bicornuate or septate uterus. An ovarian pregnancy occurs when an ovum is fertilized and is retained within the ovary. Cervical pregnancy results from an implantation within the endocervical canal. In a scar pregnancy, implantation takes place within the scar of a prior cesarean section. In an intra-abdominal pregnancy, implantation occurs within the intraperitoneal cavity. Heterotopic pregnancy occurs when an intrauterine and an extrauterine pregnancy occur simultaneously. A spectrum of intra- and extrauterine findings may be seen on sonographic images. Although many of the sonographic findings are nonspecific by themselves, when several of them are seen, the specificity of sonography in depicting an ectopic pregnancy substantially improves.

RISKS AND INCIDENCE:
Ectopic tubal pregnancy remains a serious cause of maternal morbidity and mortality. Hospitalizations for ectopic pregnancy increased almost 500% between 1970 and 1989, although death from EP decreased by nearly 90% between 1979 and 1992. This is due mainly to improvements in sonography imaging and β-hCG accuracy. Despite the dramatic decline in death from EP, tubal rupture remains a significant cause of maternal morbidity with rates ranging from population-based reports of 18% to hospital-based reports up to 79%. The incidence of ectopic pregnancy rose during the 1970s and
1980s; thereafter it remained stable or even declined. A renewed rise in the incidence of ectopic pregnancies has been observed for young women. It appears to be related to the significant increase in positive tests for genital Chlamydia trachomatis during recent years. The majority of women with ectopic pregnancies have had inflammation of the fallopian tube (salpingitis) or an infection of the uterus, fallopian tubes or ovaries (pelvic inflammatory disease). Gonorrhea or chlamydia can cause tubal patency problems that increase the risk of ectopic pregnancy. A condition that causes the tissue that normally lines the uterus to develop outside the uterus (endometriosis) also may slightly increase the risk of ectopic pregnancy.

There are other risks related to EP. A previous ectopic pregnancy increases the risk for ectopic to about one in eight, or 12%. Smoking is another risk factor. Pregnancy is rare when using birth control pills or an intrauterine device (IUD), but, if pregnancy occurs, it's more likely to be ectopic. Although pregnancy is rare after tubal ligation, if it happens it's more likely to be ectopic (Mayo Clinic 2010).

**SYMPTOMS AND DIAGNOSIS:**
Ectopic pregnancy is difficult to diagnose and exclude, often involving numerous clinic visits, with the investigation process involving significant psychological stress on patients. Clinical characteristics including abnormal level of β-hCG, tubal mass size on ultrasound examination, and the presence of tachycardia, rebound, pain and vaginal bleeding are associated with EP. In a study of 221 New York City women found to have ectopics, 15 (6.7%) had no symptoms at the time of diagnosis of ectopic. Seventy-five percent had abdominal or pelvic pain as their first symptom. For women with early rupture, it appears that their initial warning sign was in fact, the rupture. Risk of rupture was highest within the first 48 hours of symptom onset (5-7%). Overall 32% of women experienced tubal rupture, with 17% requiring blood transfusions. Of note in this study involving two hospitals, in the hospital where the rate of ruptured ectopics was 47%, the women were more likely to be African American, and uninsured. There tends to be a higher rate of adverse outcome with ectopic pregnancy among those with Medicare, Medicaid and no insurance. There were no deaths or intensive care unit admissions. The risk of rupture is always present regardless of duration or chronicity of symptomatology (Bicknell, 2004).

Another study noted that fifty-four percent (54%) of ectopics were diagnosed by transvaginal ultrasound (TVUS), and that improving TVUS skills could lead to more ectopics being diagnosed at initial presentation. Tubal rupture occurred in 36% of those patients. In sonography, an adnexal mass that is separate from the ovary and the tubal ring sign are the most common findings of a tubal pregnancy. The likelihood of actually visualizing an embryo with ectopic pregnancy is low.

**Treatment:**
Treatment options for tubal ectopic pregnancy are; (1) surgery, e.g. salpingectomy or salpingo(s)tomy, either performed laparoscopically or by open surgery; (2) medical treatment, with methotrexate (the most common drug, with usage now at about 35%, though approximately 50% of those eventually require surgery), (3) expectant management. Laparoscopic salpingostomy is significantly less successful (about 50%) than the open surgical approach in the elimination of tubal ectopic pregnancy due to a significant higher persistent trophoblast rate in laparoscopic surgery. The main indication for moving from laparoscopy to laparotomy was hemoparitoneum (hemorrhage in the...
abdomen) (Caminiti 2006).

**SUMMARY AND SUGGESTIONS FOR PRACTICE:**

- Pain is the primary symptom of ectopic and any complaints of pain must be assessed. Significant pain (greater than menstrual cramps), characterized by guarding, ongoing, increasing, on one-side necessitate refusal of a sonogram and prompt referral to a physician’s care.

- Patients with active bleeding are not appropriate for scanning in the PRMC. Though bleeding is common in 15-25% of pregnancies, adverse outcomes for the patient can occur. With ectopic pregnancies, the risk of rupture is always present regardless of duration of time of the symptoms. Rupture is an emergency with the possibility of death occurring within one half hour.

- PRMC sonographers must be careful to scan every patient systematically and thoroughly to image the pregnancy as intrauterine. If not able to do so, give precautions and refer for care with an OB provider or emergency room.

- If unable to visualize the fetal pole or yolk sac in the uterus on a patient past six LMP with a positive pregnancy test, EP must be suspected and appropriate precautions given. Though the pregnancy dates may be inaccurate and it is “too early” to visualize, this must never be assumed. Patient safety requires acting to protect her health with EP precautions.

Therefore this should be evaluated by a physician. The three main differential diagnoses associated with vaginal bleeding are spontaneous abortion, ectopic pregnancy, and gestational trophoblastic disease. Other causes of first-trimester vaginal bleeding include implantation bleeding, lesions involving the female reproductive system and perineal area infections.

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