# Ovarian Pregnancy with a Copper-7 Intrauterine Device In Situ

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The possibility of ovarian pregnancy with concurrent use of an intrauterine contraceptive device (IUD) has been recognized since 1929.[1] As IUD use has increased during the last two decades, a number of reports have appeared documenting ovarian ectopic pregnancy with the IUD in situ. Among the general population, there is an incidence of 1 ovarian pregnancy per 150 to 200 ectopic pregnancies; however, among IUD users, this incidence increases to 1 per 7 to 9.[2,3] Although IUDs may actively increase the risk of ectopic pregnancy,[4,5] the major effect of inert plastic devices is to reduce uterine implantation by 99.5 percent, tubal implantation by 95 percent, and ovarian implantation not at all.[3] The increased incidence of ovarian pregnancy in patients with an IUD, therefore, is probably only relative in comparison with the decreased tubal and intrauterine pregnancies.

In recent years, copper-containing devices have been used as the preferred IUD in many patients. Compared with nonmedicated IUDs, copper devices have the advantages that they are less likely to be expelled, produce less menstrual blood loss, are better tolerated by women without children, and are more likely to stay in place after postpartum or postabortion insertion. On the other hand, copper IUDs are more expensive and must be replaced more often than nonmedicated IUDs.[5]

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In this communication, a case of primary ovarian pregnancy involving a Copper-7 (Cu-7) IUD is described, and the pertinent literature is reviewed.

## Case Report

A 29-year-old white woman, gravida 2, para 2, presented with nausea and fatigue of one month's duration and severe bilateral upper abdominal pain with radiation to both shoulders of one day's duration. Her menstrual cycles for the previous four months had been irregular and her last menstrual period started 35 days prior to admission. She was known to have had a Cu-7 IUD in situ for 26 months.

On admission, the patient was in moderate abdominal distress, with a temperature of 99.9°F, blood pressure of 118/70 mmHg, heart rate of 76 beats per minute, and respiratory rate of 20 per minute. Direct and rebound tenderness with some voluntary guarding was found in the upper abdomen, with minimal lower abdominal tenderness. Pelvic examination was normal, except for slight tenderness in the right adnexal area. No vaginal bleeding was observed. Hemoglobin level was 12.2 gm/100 mL; hematocrit, 36.4 percent; platelet count, 259,000/$mm^3$; leukocyte count, 10,000/$mm^3$. The hemoglobin level, hematocrit, and platelet count fell the following day to 11.2 gm/100 mL, 33.3 percent, and 227,000/$mm^3$, respectively, with development of right adnexal fullness. Serum pregnancy test (RIA) was positive. Sonogram of the abdomen showed the IUD in situ, free fluid in the peritoneal cavity, and a mass in the right adnexal area containing fetal parts and a fetal heartbeat.

Dilation and curettage (D&C), after removal of

the IUD, obtained a minimal amount of tissue. Laparotomy revealed 500 to 600 mL of blood. The uterus, both fallopian tubes, and the left ovary were normal. A hemorrhagic cystic area at the distal pole of the right ovary was actively bleeding. Wedge resection of the right ovary was performed. The patient recovered well and was discharged from the hospital four days following operation.

Histopathological examination of the uterine curettings showed fragments of midsecretory endometrium and fragments of endometrium with decidual transformation of the stroma.

The hemorrhagic ovarian mass measured 6.0×4.5×3.0 cm. Section demonstrated a 3.0-cm cavity filled with clear fluid. The cavity was lined with a smooth membrane and contained a 1.6-cm embryo. A corpus luteum, 1.5 cm in greatest dimension, was adjacent to the cavity. Microscopic sections showed an edematous stroma and an area of implantation with vascularized chorionic villi adjacent to a corpus luteum. Hemorrhage extended from the area of implantation to the ovarian surface. Sections of the fetus were histologically normal. Growth and infiltration of chorionic tissue precluded distinction between intrafollicular and extrafollicular implantation. The diagnosis was ovarian pregnancy.

## Comment

This case of ectopic pregnancy satisfied all of Spiegelberg's widely accepted criteria for ovarian pregnancy[6]: (1) the fallopian tube on the affected side must be normal, (2) the gestational sac must occupy the normal position of the ovary, (3) the gestational sac must be connected with the uterus by the ovarian ligament, and (4) ovarian tissue must be present in the wall of the sac.

The etiology of primary ovarian pregnancy remains unknown. The hypotheses that have been suggested include obstructed ovulation, malfunction of the tubes, favorable surface phenomena, parthenogenesis, or simply chance.[7] The remote possibility of parthenogenesis could be addressed in future cases of ovarian pregnancy by establishing karyograms of embryonic tissue.

In a review of the literature from 1966 to the present, information was not complete in every case of ovarian pregnancy associated with IUD use.[8-21] The IUD had been in use for 20 months on the average (SD = 19 months, n = 51). The mean length of amenorrhea was 35 days (SD = 20 days, n = 34). In cases that described symptoms, 48 of 50 (96 percent) presented with abdominal pain, and 26 of 40 (65 percent) with vaginal bleeding. Uterine size was normal in 21 of 26 reported cases (81 percent), and adnexal enlargement was found in 24 of 30 cases (80 percent) for which data were available. In the case described in this report, the pregnancy test was positive. This is in agreement with previous descriptions of ovarian pregnancy, which have documented a relatively high incidence of positive pregnancy tests.[12] Although wedge resection has been advocated to increase detection of ovarian pregnancy,[22,23] the minority of operative procedures used in treating these ovarian pregnancies was wedge resection (11 of 46, 24 percent). In 22 of 46 cases (48 percent) for which information was reported, oophorectomy or salpingo-oophorectomy was the surgical procedure, while cystectomy was performed in 13 of 46 reported cases (28 percent).

Since 1966, 27 percent of the reported cases of ovarian pregnancy associated with the IUD in the United States have involved the Cu-7 IUD.[8-14] The prevalence of the Cu-7 IUD among IUD users in the United States increased from 0.0 percent before 1974 to 29.2 percent in 1976.[24] In 1977, 37.4 percent of IUD users in the United States wore the Cu-7 device (HW Ory, Women's Health Study, personal communication, February 25, 1982). The Cu-7 since its introduction has held a nearly constant proportion of the United States market, varying from 65 to 80 percent of the IUDs distributed each year (RL Alberti, Searle Laboratories, personal communication, March 10, 1982; see also Liskin and Fox[5]). Hence, the prevalence of the Cu-7 among IUD users has probably increased in an approximately linear manner to reach a maximum value within the range of the market share held by the Cu-7 IUD. Information is available concerning the percentage of women in the United States using an IUD[25] and changes in the population of women aged 14 to 44 years in the United States from 1966 to the present.[26,27] These data permit an approximation of the proportion of woman-years

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of IUD use that involve the Cu-7 IUD in the United States since 1966, which is calculated to be 28 percent. This calculation agrees with the observed 27 percent of the cases of ovarian pregnancy with an IUD in situ that involved the CU-7 IUD reported in the United States literature.

The agreement of these calculated and observed values to within 1 percent is well within that expected from the sources of error in the calculation and the imprecision of reporting in the literature. This comparison suggests that the Cu-7 does not increase or decrease the risk of ovarian pregnancy relative to inert plastic IUDs. Similar statements have been made by several investigators concerning the relative likelihood of ectopic pregnancy with copper-containing IUDs and with nonmedicated IUDs.[28,29]

In conclusion, evidence cited in this report suggests that copper-containing or inert plastic devices do not affect the likelihood of ovarian pregnancy. Better understanding of the etiology of primary ovarian pregnancy and the mechanism of action of inert and copper-containing IUDs will allow interpretation of the evidence to date, which suggests that the relationship between IUDs and ovarian pregnancy does not reflect causality. Nonetheless, both copper-containing and nonmedicated IUDs suppress uterine or tubal pregnancies, whereas both types of IUD probably have no effect upon the incidence of ovarian pregnancy. Clinicians, therefore, should be aware of the possibility of ovarian pregnancy in patients who use the intrauterine device.

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# Epigastric Bruit: Prevalence and Clinical Significance in a Student Population

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Localized epigastric bruit is the sole physical sign in celiac artery compression syndrome,[1,2] an association of abdominal symptoms with extrinsic compression of the celiac axis at its origin from the anterior aspect of the abdominal aorta immediately below the diaphragm. This extrinsic compression may be from either the median arcuate ligament of the diaphragm or from strands of the celiac plexus.[3]

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