

Incidental Detection of Interstitial Pregnancy on CT Imaging

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Ectopic pregnancy is a potentially life-threatening condition. Detection of ectopic pregnancy on CT images is rare. In this case, we describe the CT findings of interstitial pregnancy both before and after rupture. If CT images demonstrate the presence of a strong enhancing ring-like mass in the pelvis, ectopic pregnancy should be considered.

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Ectopic pregnancy is a potentially life-threatening condition and can cause massive hemoperitoneum. The fallopian tube is the most common site of ectopic implantation. Only three cases of ruptured tubal pregnancies with CT findings have been reported in the clinical literature (1–3). Previous reported CT findings of ruptured tubal pregnancy include massive hemoperitoneum and an adnexal cystic structure with dramatic peripheral enhancement that represents the CT appearance of the classical sonographic “ring of fire”. We report a case of tubal pregnancy with CT findings both before and after rupture.

CASE REPORT

A 37-year-old woman was referred to our hospital for further evaluation of gallstones that had been found on sonography at a private clinic. The patient had right upper quadrant abdominal discomfort on admission. The patient denied that she was pregnant. Contrast enhanced CT imaging was performed for further evaluation of the biliary tract and gallbladder.

A CT image demonstrated a strong enhancing ring-like mass that abutted the uterine fundus in the right pelvis (Fig. 1A). There was no ascites in the abdominopelvic cavity. An ectopic pregnancy was not considered as the pregnancy was missed. Non-contrast enhanced CT images showed the presence of gallstones in the gallbladder lumen and no stones in the extrahepatic bile duct.

After four days, the patient presented to the emergency room with acute right lower abdominal pain. A follow-up CT examination was performed and showed massive high attenuation fluid in the peritoneal cavity that represented hemoperitoneum. An amorphous hematoma in the pelvic cavity was noted. The previous strong enhancing ring-like mass in the right pelvis was now seen as a heterogeneous enhancing mass on a follow-up CT image (Fig. 1B). The heterogeneous mass abutted the uterine fundus in the right pelvis and a linear hypodense line was noted between the mass and the uterus (Fig. 1C). Ruptured ectopic pregnancy was suspected as a cause of massive hemoperitoneum. The patient had an intrauterine device removed one month prior. The serum beta-human chorionic gonadotropin level was approximately 1,500 IU/ml.

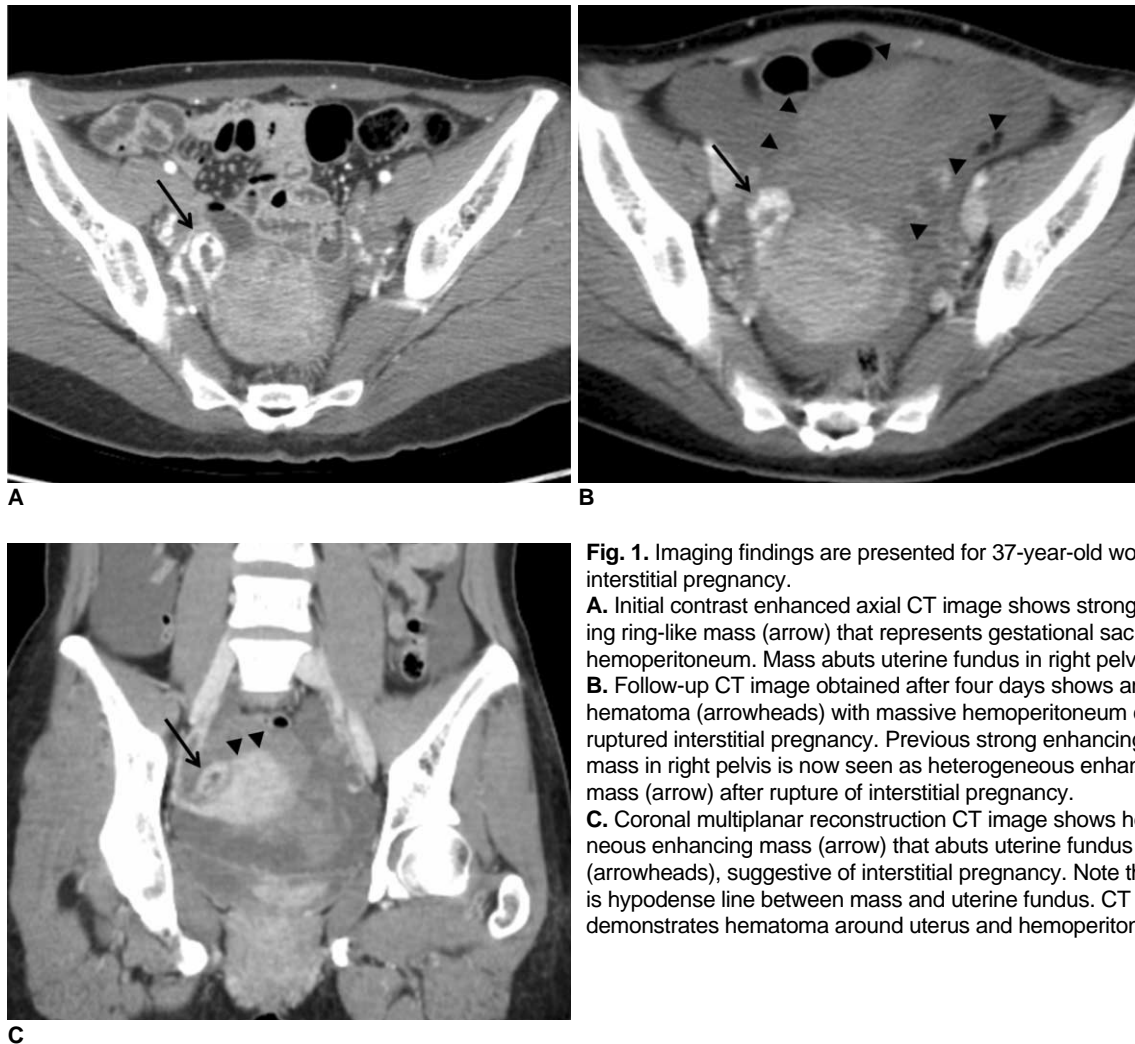


Fig. 1. Imaging findings are presented for 37-year-old woman with interstitial pregnancy.

A. Initial contrast enhanced axial CT image shows strong enhancing ring-like mass (arrow) that represents gestational sac without hemoperitoneum. Mass abuts uterine fundus in right pelvis.
B. Follow-up CT image obtained after four days shows amorphous hematoma (arrowheads) with massive hemoperitoneum caused by ruptured interstitial pregnancy. Previous strong enhancing ring-like mass in right pelvis is now seen as heterogeneous enhancing mass (arrow) after rupture of interstitial pregnancy.
C. Coronal multiplanar reconstruction CT image shows heterogeneous enhancing mass (arrow) that abuts uterine fundus (arrowheads), suggestive of interstitial pregnancy. Note that there is hypodense line between mass and uterine fundus. CT image demonstrates hematoma around uterus and hemoperitoneum.

After an emergency laparotomy, right interstitial pregnancy with hemoperitoneum was found and a right cornual resection was performed. The postoperative period was uneventful.

DISCUSSION

Ectopic pregnancy is a potentially life-threatening condition as ectopic pregnancy can cause rupture of the organ where implantation has occurred with severe bleeding (4). Ectopic pregnancy may occur in several sites; the fallopian tube is the most common site. The ampullary or isthmic portion of the fallopian tube is a common site. Only 2–4% of ectopic pregnancies occur in the interstitial portion of the fallopian tube (5).

The diagnosis of ectopic pregnancy is based on sonography and the demonstration of pregnancy using a serum beta-human chorionic gonadotropin assay. Sonography is the modality of choice for diagnosis of ectopic tubal

pregnancy. Ectopic pregnancy is considered when there are no normal uterine pregnancy findings on sonography (5).

As pregnant women should not undergo CT imaging, CT findings of ectopic pregnancy are not well known. However, if pregnancy is not identified during an early pregnancy, CT may be inadvertently used for evaluation of abdominal pain. With the increasing use of CT as an initial diagnostic image modality, radiologists may encounter ectopic pregnancy with the use of CT imaging and it is important to know the CT features of ectopic pregnancy. There have been only three reported cases in the clinical literature where CT revealed ruptured ectopic tubal pregnancies (1–3). To the best of our knowledge, CT findings of unruptured ectopic tubal pregnancy have not been reported in detail. The dramatically enhancing ring in adnexa with hemoperitoneum has been reported as a CT finding of ruptured tubal pregnancy. Pham and Lin have suggested that the enhancing ring in adnexa on CT images

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was correlated with the sonographic “ring of fire” sign of tubal pregnancy (3). In this case, a CT finding of unruptured ectopic tubal pregnancy was also a strong enhancing ring-like mass that represented the gestational sac without hemoperitoneum. However, the morphological change of the CT appearance of tubal pregnancy after rupture was observed. After rupture of tubal pregnancy, the previous strong enhancing ring-like mass of unruptured tubal pregnancy was seen as a heterogeneous enhancing mass on a CT image with massive hemoperitoneum.

The differential diagnosis of an adnexal mass with peripheral enhancement includes a tubo-ovarian abscess, cystic ovarian neoplasm and a functional ovarian cyst including a corpus luteum cyst. The degree of peripheral enhancement of an adnexal mass can be a diagnostic clue. Pham and Lin (3) have suggested that peripheral enhancement of an adnexal mass of tubal pregnancy was significantly greater as compared to a tubo-ovarian abscess and a cystic ovarian neoplasm. The location of an adnexal mass may help in the differential diagnosis between ectopic tubal pregnancy and a corpus luteum cyst as a corpus luteum cyst is located on an ovary (3, 6, 7). The presence of hemoperitoneum does not aid in the differential diagnosis between ruptured tubal pregnancy and a ruptured corpus luteum cyst as both conditions cause hemoperitoneum. We suggest that the size of an adnexal mass is also a clue for the differential diagnosis. An adnexal mass of tubal pregnancy may be smaller as compared to a tubo-ovarian abscess and a cystic ovarian neoplasm.

CT findings of interstitial ectopic pregnancy have not been previously reported in the literature. For interstitial pregnancy, myometrium partially surrounds a portion of

the gestational sac. The part of the ring-like mass that abuts the uterine fundus might represent the portion of the gestational sac surrounded by the myometrium.

The diagnosis of ectopic pregnancy was missed, as we did not consider the possibility of pregnancy on initial CT images before rupture. We learned that ectopic pregnancy should be considered without hemoperitoneum on CT images and prompt further evaluation such as determination of the serum beta-human chorionic gonadotropin level is needed for a correct diagnosis.

In summary, we have reported an interstitial pregnancy that appeared as a strong enhancing ring-like mass that abutted the uterine fundus in the pelvis on CT images. This characteristic CT finding can be a clue for the diagnosis of ectopic pregnancy.

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