

Imaging diagnosis of hepatic ectopic pregnancy: A report of one case

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Summary

This article is about a case of hepatic ectopic pregnancy. A patient suffered from an acute abdomen with 14-day vaginal bleeding. A serum, human chorionic gonadotrophin (HCG) of 8,988 mIU/mL revealed a bit of pelvic effusion. A computed tomography (CT) plain scan displayed a polygonal, moderate density shadow of the left liver lobe. An enhanced CT had no sign of intensification. A magnetic resonance imaging (MRI) plain scan was undertaken. On a T1-weighted imaging (T1WI), the lesion appeared to be a low signal; on a T2-weighted imaging (T2WI), the lesion appeared to be a high signal. With enhanced MRI, the lesion showed an irregular mild plague-like intensification during the venous phase. It was excised by an operation and chorionic tissue was seen under a microscope. The result of pathological diagnosis was hepatic ectopic pregnancy.

Keywords: Hepatic ectopic pregnancy, ultrasound, computed tomography, magnetic resonance imaging

1. Introduction

Ectopic pregnancy refers to the attachment of fertilized eggs to the extrauterine cavity. It often occurs in fallopian tubes, then in ovaries, broad ligaments and so on, but seldom in the abdominal cavity such as liver, spleen, or peritoneum. Recently a hepatic ectopic pregnancy has been found and accurately diagnosed by a preoperative imaging examination. The details are as follows.

2. Case report

Clinical Manifestations: A 33-year-old woman, accountant, unable to bear children after years of marriage, was admitted to hospital for acute abdominal pain with a 14-day history of vaginal bleeding and a 49-day menolipsis. A T-type contraceptive ring was pulled out of her uterine cavity one year ago presenting symptoms including the last menstruation

on November 26, 2006 (the 49th day of menolipsis), no morning sickness, a small bit of vaginal bleeding on December 31 with dark red blood, no evident outflow of granulation tissue and uncomfortable swelling pain in upper abdomen.

Physical examination: Her temperature was 36.8°C, pulse beats 80 times per minute, breath 20 times per minute, and blood pressure 13.3/8.0 kPa. Nutrition was moderate, face painful, and skin and mucous membranes not yellow. The whole body revealed no lymph node enlargement. The trachea was in the middle and breath sounds in two lungs were normal with no cardiac murmurs. The abdomen was flat but a little stiff. Upper left abdominal tenderness was remarkable, and rebound tenderness was obvious. The spleen was not big, and there was no percussion tenderness over the kidney region. Gynecological examination revealed no evident abnormality. There was clear tenderness in the uterine appendages.

Laboratory examination: Total of white blood cells was $10.17 \times 10^9/L$, granulocytes 87.6%, and lymphocytes 4.8%; the number of red blood cells was $3.56 \times 10^{12}/L$, hemoglobin 114 g/L, packed red cells 33.1% and the content of hemoglobin averaged 32.0 pg. Hemodiastase (AMY) was 38 U/L and within normal limits. Fibrinogen (FIB) was 4.538 g/L, and slightly elevated. Human chorionic gonadotrophin (HCG)

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was 8,988 mIU/mL (normally less than 2.7 mIU/mL) and progesterin (Prog) 35.7 nmol/L in serum. Liver and kidney function and routine urine examination showed no abnormalities.

Imaging examination: On January 14, 2007, an ultrasound (US) examination of abdomen displayed the retroposition of uterus of normal size with a 4 mm thick intimate membrane, recto-uterine pouch, no gestational sac, no abnormal echo around bilateral uterine appendages and an approximately 23 mm dark area of fluid in the pelvic cavity. The US diagnosis revealed pelvic effusion (Figures 1A and 1B). On the 15th day, an US of the vagina showed a uterus of normal shape

in correct size with the middle endometrial line, and a homogeneous echo. There was no abnormal echo in the uterine cavity. A free opaque dark area of fluid was seen in the right iliac fossa with a maximum of 34 mm in diameter, in which a tiny light echo was visible. The US diagnosis revealed pelvic effusion, but no gestational sac-like echo in the uterine cavity (Figures 1C and 1D). A computed tomography (CT) plain scan performed between the left liver edge and stomach displayed a polygonal, moderate density shadow with a smooth and clear edge and an irregular low-density region in the middle (Figure 2A). Enhanced CT of the focus margin and inside showed no sign of intensification during the

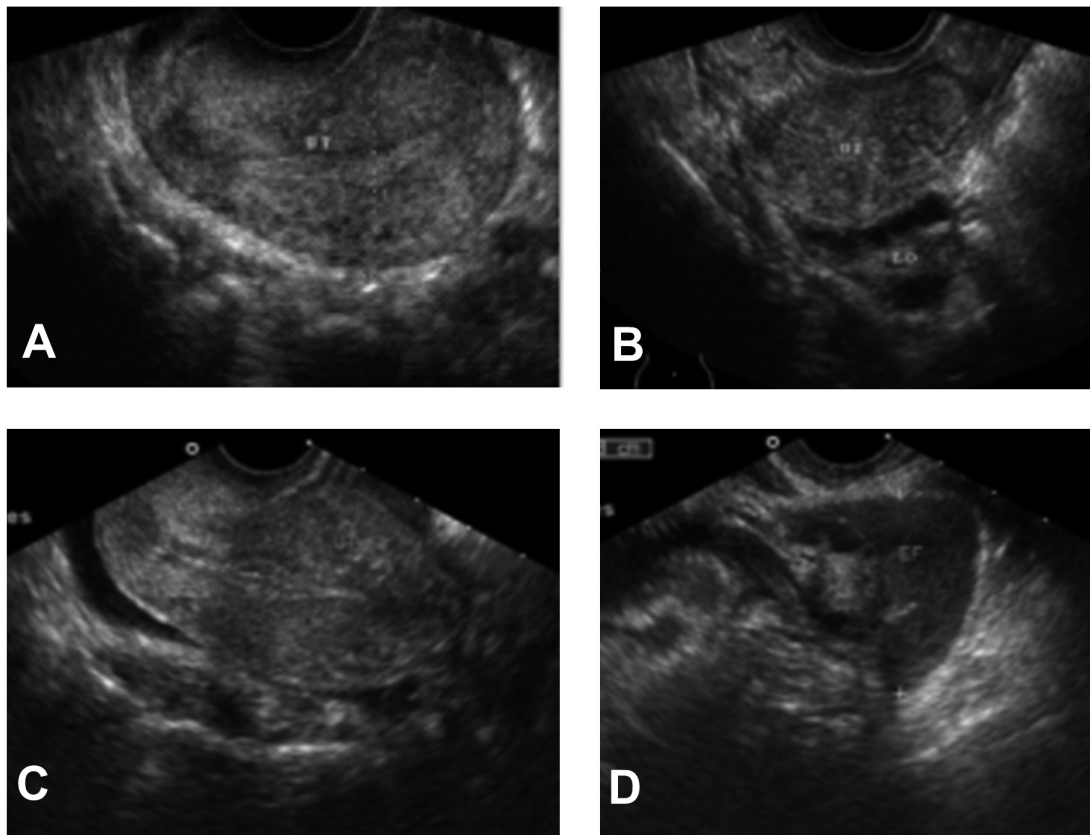


Figure 1. US findings. (A, B), A routine gynecology US reveals no gestational sac-like echo, no abnormal echo around bilateral uterine appendages and a dark area of fluid in pelvic cavity. (C, D), US of vagina shows no gestational sac-like echo in uterine cavity, no abnormal echo around bilateral uterine appendages, and a free opaque dark area of fluid in right iliac fossa.

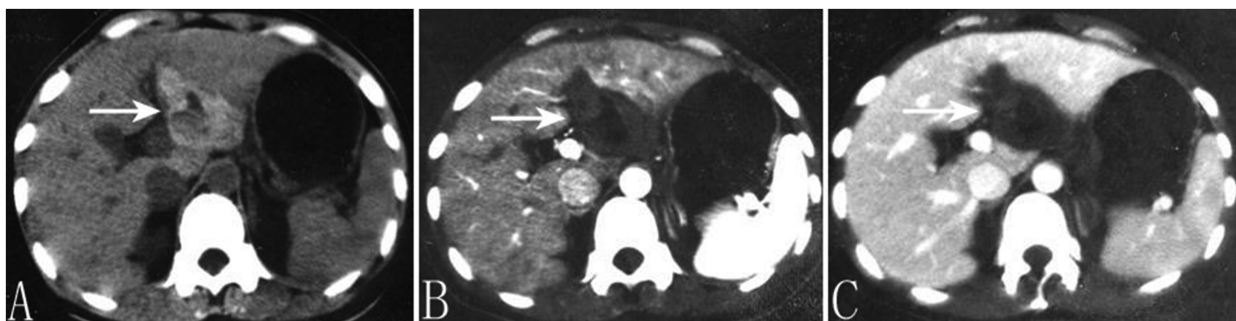


Figure 2. CT findings. (A), CT plain scan performed between left liver edge and stomach displayed a polygonal, slight high-density shadow with a smooth and clear edge and irregular low-density region in the middle. (B), Enhanced CT of the focus shows no sign of intensification during the arterial phase with a smooth and clear edge and lower-density region in the middle. (C), No sign of intensification during the venous phase.

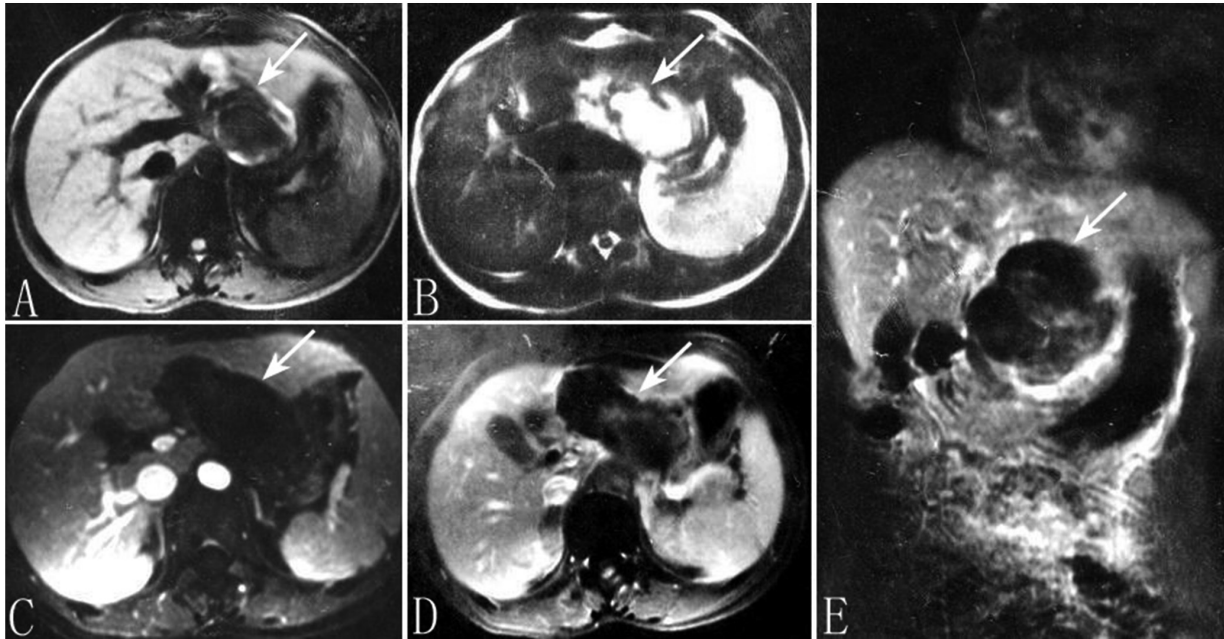


Figure 3. MRI findings. (A), T1WI reveals a round low signal focus (about 3×4.5 cm in size) between the inferior margin of the left hepatic lobe and lesser curvature of stomach. Most edges of the focus are clear. (B), T2WI reveals the focus appears to be obvious high signals, most of which are homogeneous. (C), The focus appears to be elliptical low signals with enhanced MRI during the arterial phase and there is no sign of intensification inside the focus and on the edge. (D), Slight intensification is displayed in the focus during the venous phase; a bit of ring-shaped intensification may be seen on the edge of the right frontal. (E), Coronal scan clearly reveals that the disease takes on a round-like low signal with a slight non continuous ring-like intensification and with slight irregular intensification inside.

arterial and venous phase. The focus appeared to be a high-density area with a clear margin (Figures 2B and 2C). On the 16th day, a magnetic resonance imaging (MRI) plain scan of T1-weighted imaging (T1WI) demonstrated an abnormal round-like low-signal mass between left lobe of the liver and stomach, with irregular ring-shaped high-signal wall on the margin (Figure 3A). The heart of the disease on T2-weighted imaging (T2WI) appeared to be an evidently high signal with an unclear margin. The lesser curvature of stomach was compressed and displaced (Figure 3B). Enhanced MRI of the focus margin and inside showed no intensification during the arterial phase (Figure 3C). An irregular mild plaque-like intensification in the focus was seen during the venous phase, with no distinct boundary from the stomach wall (Figure 3D). A coronal scan clearly revealed that the disease, located between liver and stomach, took on a round-like low signal with no smooth margin, and that there was an irregular mild plaque-like intensification and that the lesser curvature of stomach was clearly compressed and displaced with no distinct boundary (Figure 3E).

Surgical treatment: On the day, a 12 cm incision into abdomen was performed to discover a 1,000 mL hemoperitoneum. There was a ruptured mass with clotted blood and a tissue mixture between the inferior margin of the left hepatic lobe and stomach, closely adherent to the anterior margin of the left hepatic lobe, hepatic ligaments and the membrane of lesser curvature of the stomach. At first, we cleared away the clotted

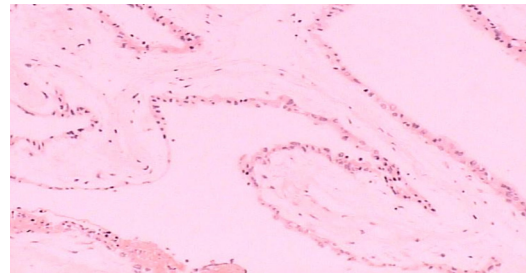


Figure 4. Pathological diagnosis of hepatic ectopic pregnancy (H&E Staining, Original magnification 100 \times).

blood and separated chorionic villi. Then, the mass was excised away from the membrane of lesser curvature of the stomach, the lesser omentum, hepatic membrane and small hepatic tissue. Finally, bleeding was arrested with gauze and the abdominal incision was closed layer by layer. The operative process was uneventful.

Pathological examination: Chorionic tissues, hyperplastic granulation and hepatic tissues were seen under a microscope (Figure 4). The result of pathological diagnosis was hepatic ectopic pregnancy.

3. Discussion

3.1. Disease incidence

Ectopic pregnancy in the fallopian tube is a very common form of extrauterine pregnancy. Ectopic

pregnancy in the abdomen is seldom seen, accounting for almost one percent of all ectopic pregnancies (1). But ectopic pregnancy in the liver is exceptionally rare. According to the statistics of ERIC and so on, in the past 35 years before November 1999, only 14 cases have been reported in the world, of which a majority was discovered due to postoperative pathological diagnosis of acute abdomen and abdominal hemorrhage and of which a minority, according to medical history (2-11), were a preoperative diagnosis of HCG and US. Only one case was discovered with a diagnosis of US and CT (12). In the case, hepatic ectopic pregnancy had a complete imaging examination and preoperative diagnosis using US, CT and MRI. No other cases like this have been reported up to now.

3.2. Clinical manifestations

The youngest patient with hepatic ectopic pregnancy was aged 25 (5) and the oldest was aged 46 (12). Their common clinical manifestations were persistent epigastralgia and irregular vaginal bleeding. Once the gestational sac was ruptured, clinical manifestations were acute abdomen such as epigastralgia, rebound tenderness, and right upper abdomen pain, hemorrhage in abdominal cavity, a decrease in blood pressure and shock. Laboratory examination showed a decrease in red cells and hemoglobin, and a rise in partial HCG. The 35-year-old patient in this case was marked with all the clinical characteristics of hepatic ectopic pregnancy, but the only exception was that pain was located in the left upper abdomen, which happened to be the location of the pathological change.

3.3. Etiology and pathogenesis

The etiology of hepatic ectopic pregnancy is very complicated. According to document reporting, it may have a relationship with a birth-control operation on the uterus, inflammation of fallopian tube and so on (7,9). The pathogenesis of this case is not quite clear. On the basis of document reporting and detailed clinical data of this case, we have inferred the pathogenesis is related to the following factors:

i) *Contraception*: It includes oral contraceptives and contraceptive devices placed inside women's wombs. The cause of the former is unknown. As Duane reported (2), a patient who had taken oral contraceptives for 5 years, fell ill after one year of quitting the drug. The latter may connect with the shape of contraceptive devices and the dissection of fallopian tubes. Borlum *et al.* reported one case with a history of using intrauterine devices (7).

ii) *Inflammation of fallopian tubes and pelvis*: The research revealed pelvic inflammation easily extended to the upper abdomen and resulted in inflammation of the hepatic periphery (9). Most patients with abdominal

pregnancy were discovered by operating to have one-sided or bilateral different inflammation of fallopian tubes, pelvic inflammation and pelvic effusion. Some scholars raised the opinion that this case followed tubal pregnancy and that its pathogenesis was that fertilized eggs were displaced from fallopian tubes first, and then entered into the pelvic cavity and contacted the surface of the peritoneum, or were dependent on flow of celiac fluid, then attached to capsula fibrosa in the upper abdomen, grew and developed (7,9). The academic opinion won complete support in that the operation of this case was performed, finding wide-ranging inflammation and pelvic effusion in bilateral fallopian tubes and the pelvic cavity.

iii) *Characteristics of pathological dissection of the liver*: Liver is the biggest solid organ of abdominal cavity capsula fibrosa and liver is a favorable site of profuse blood supply suitable for the growth of an embryo. Fertilized eggs were first attached to capsula fibrosa. As the gestational sac developed, chorion infiltrated into the surface of liver to meet constantly enlarged blood supply of the embryo. In general, the gestational sac was ruptured due to the shortage of blood supply in less than 12 weeks (12). Shukla *et al.* reported that the longest embryonic development period was 28 weeks (5). Surgery was performed finding a normal live fetus. In this case, it was 49 days (7 weeks) from impregnation after menolipsis due to the rupture of the gestational sac.

3.4. Diagnosis and differentiation

Hepatic pregnancy occurred on the inferior margin of the right hepatic lobe, approaching the gallbladder and duodenum. The reported cases were all on the inferior margin of the right hepatic lobe and only one case on its superior margin. Due to the main clinical findings of acute abdomen and intra-abdominal hemorrhage, the case is easily misdiagnosed for diseases of acute biliary system and gastroduodenitis (4). It is very difficult to diagnose preoperatively. Through this case in combination with document reporting, we think preoperative diagnosis is not difficult according to the following standard only if we make careful observations and analyze patients' clinical data by US, CT and MRI examination.

i) This case is characterized by sudden and quick disease development, acute epigastralgia, a history of menolipsis and an elevated HCG level.

ii) Gestational sacs are invisible in the uterus, fallopian tubes and pelvic cavity by US.

iii) CT and MRI reveal solid tumors, located on the edge of liver and complicated by hemorrhage, appeared to be a disorder of density inside, and have no obvious intensification after injection of contrast-medium. In particular, MRI may be formed in different directions, which has superiority for finding gestational sacs and

localizing the disease.

iv) Ectopic pregnancy, especially in the left liver lobe, is more easily misdiagnosed in the clinic, excluding the possibility of acute abdomen in gallbladder, biliary tract and gastrointestinal tract, subcapsula hematoma, rupture and hemorrhage of hepatic tumor, *etc.*

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