

CASE REPORT

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A rare case of hepatic ectopic pregnancy

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Abstract

Background: Hepatic pregnancy is an uncommon ectopic site of gestational sac implantation. Clinical signs and symptoms simulate digestive or hepatobiliary diseases, making this a less common clinical diagnosis. Delay in diagnosis increases the risk of rupture and life threatening torrential hemorrhage. Detailed abdomino-pelvic ultrasound confirms the diagnosis, and MRI along with CT angiography guides the management.

Case presentation: We report a case of a 25-year-old multiparous female who presented with right hypochondrial and lumbar pain. Ultrasound demonstrated live ectopic gestational sac attached to the inferior surface of segment VI of liver with perigestational hematoma and patient underwent successful surgical excision with segmental resection of liver.

Conclusions: Primary hepatic ectopic pregnancy is a very rare entity. Importance resides in maintaining a high level of suspicion along with timely radiological investigations for successful clinical outcome.

Keywords: Hepatic ectopic pregnancy, USG, MRI, Gestational sac and embryonic pole

Background

Primary abdominal pregnancy accounts for only 1% of all ectopic pregnancies [1]. Hepatic ectopic pregnancy is characterized by implantation of the fertilized ovum primarily in the liver. There is high mortality associated with this condition owing to delay in diagnosis and torrential intra-operative hemorrhage. The importance resides in recognizing the atypical presenting signs and symptoms simulating digestive or hepatobiliary diseases in reproductive age females and having a raised index of suspicion, rather than limiting the diagnosis of ectopic pregnancy in patients only with pathognomonic triad of pelvic pain, amenorrhea and intermittent per vaginal bleeding, and limiting the ultrasound (USG) evaluation only to the female reproductive organs. Early diagnosis by imaging favors methodical and swift management and reduces the disastrous consequences following rupture.

Case presentation

A 25-year-old multiparous female was referred to the emergency department of our tertiary care hospital with severe right hypochondrial and right lumbar pain, not responding to pain medication. The patient gave history of abdominal pain for 5 days with progressive worsening, accompanied with an episode of syncope. She also complained of multiple episodes of non-projectile non-bilious vomiting for 5 days. There was no history of fever, constipation, abdominal distension, urinary frequency, urgency or burning micturition. The patient mentioned that her last menstrual period was 3 weeks back. However, it lasted for 1–2 days only and was scanty in comparison with her previous cycles, thus indicating that the patient wrongly thought this as last menstrual period and her true last menstrual period was 7 weeks back.

On examination, the patient was afebrile, with mild pallor, blood pressure of 100/60 mmHg and pulse rate of 84 beats per minute. Guarding and severe tenderness was noted in the right hypochondrium and right lumbar region. There was no evidence of hepatomegaly, no splenomegaly and no renal angle tenderness. Chest auscultation did not reveal any abnormal respiratory findings, and heart sounds were normal.

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On pelvic examination, uterus was normal in size with no evidence of adnexal tenderness and cervical excitation test was negative.

Blood investigations revealed Hb of 10gm%, PCV 29%, TLC of 14,300 cells/mm³-neutrophilic predominance of 74 cells/mm³. Platelet count was in the normal range with normal bleeding and clotting time. Liver function tests were normal. The renal function tests were also within normal range.

Emergency abdomino-pelvic USG was performed within half an hour of patient's presentation to the emergency room, and USG revealed a gestational sac attached to the inferior surface of segment VI of the right lobe of the liver (Fig. 1). Embryonic pole-yolk sac complex was seen with cardiac activity present (Additional file 1: Video1). The crown rump length corresponded to 7 weeks of gestation. This complex was surrounded by a large perigestational hematoma extending along the right paracolic gutter up to the pelvis ~ 20 × 2 cm. Uterus was normal in size and anteverted with an empty endometrial cavity. Both fallopian tubes and ovaries were normal with a corpus luteal cyst of 2.6 cm in the right ovary. There was moderate hemoperitoneum.

A multidisciplinary team consisting of obstetrician, surgeon, radiologist and anesthesiologist recommended urgent magnetic resonance imaging (MRI) which was performed within 1 h of USG and scan confirmed the USG findings of rounded T2 hyperintense cystic lesion corresponding to the gestational sac in relation to inferior aspect of segment VI of right lobe of liver (Fig. 2). There was associated heterogeneous mixed intensity hematoma in the subhepatic region, right paracolic gutter and in pelvis. Free fluid was seen in between bowel loops. Also

the uterus, both fallopian tubes and both ovaries were normal, confirming primary abdominal pregnancy.

Pre-operative catheter arterial embolization was considered in our patient. Multiphase contrast-enhanced computed tomography (CECT) was therefore performed for vascular roadmap immediately after MRI. The hepatic pregnancy was seen receiving blood supply from the posterior segmental branch of the right hepatic artery as well as from multiple (two to three) branches of anterior and posterior divisions of the right portal vein (Fig. 3). Thus, hepatic arterial embolization was not considered appropriate in this situation.

Urgent laparotomy was performed within 4 h of patient's presentation to the emergency room, after obtaining high-risk informed consent. Right paramedian incision was given under combined epidural and general anesthesia. The gestational sac was attached to the inferior surface of segment VI of the liver and hemoperitoneum of 800 cc with clots in right paracolic gutter (Fig. 4). The uterus, fallopian tubes and ovaries were found to be normal. A small right ovarian corpus luteal cyst was seen. After peritoneal lavage, segmental resection of the liver was performed using harmonic scalpel and hemostasis secured of the liver bed using absorbable hemostatic agent. She had completed her family and as part of family planning, bilateral tubal ligation was done after patient's informed consent. An abdominal drain was kept in the Morrison's pouch, and abdomen was closed in layers.

The post-operative stay was uneventful and the patient was discharged on the 13th post-operative day.

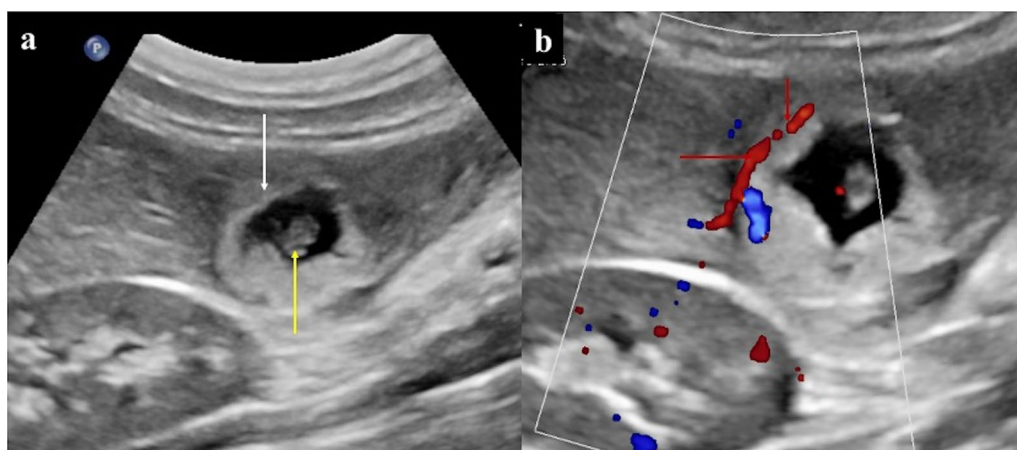


Fig. 1 **a** Transabdominal ultrasound (USG) image showing gestational sac (white arrow) with embryonic pole-yolk sac complex (yellow arrow). Gestational sac is attached to the inferior surface of Segment VI of liver with surrounding peri-gestational hematoma. **b** Transabdominal color Doppler image showing gestational sac is getting blood supply from the posterior segmental branch of the right hepatic artery (red arrow)

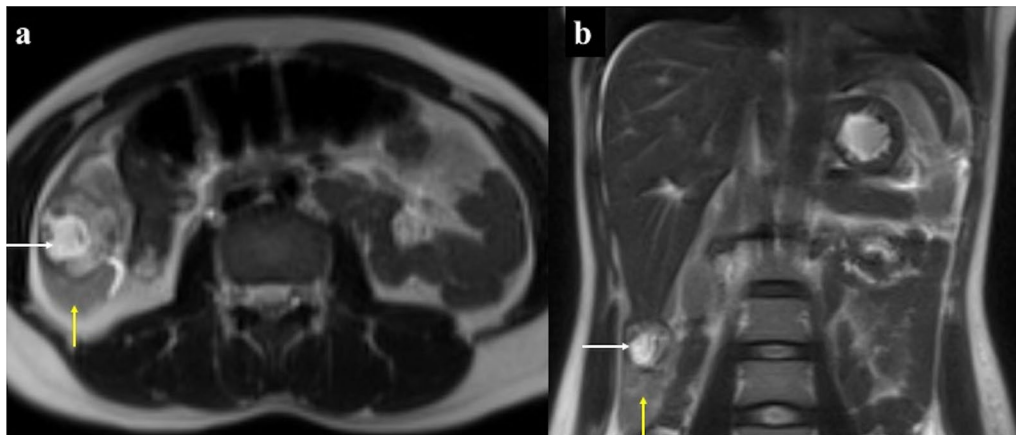


Fig. 2 (a-b) Axial and coronal T2-weighted magnetic resonance images showing gestational sac (white arrows) is attached to the inferior surface of Segment VI of liver with surrounding mildly T2 hyperintense peri-gestational hematoma (yellow arrows)



Fig. 3 (a-b) **a** Coronal contrast enhance computed tomography (CECT) arterial phase image showing gestational sac (white arrow) receiving blood supply from the posterior segmental branch of the right hepatic artery (red arrows). **b** Coronal CECT venous phase image showing gestational sac (white arrow) also receiving blood supply from the posterior division of the right portal vein (yellow arrows)

Discussion

Ectopic pregnancy refers to implantation of the fertilized ovum at sites other than the uterine endometrial cavity. The ectopic implantation usually occurs within the pelvis, i.e., fallopian tubes, uterine cornua, ovary, cervix, uterine caesarean scar; or less commonly in the abdominal cavity like in the peritoneum, omentum, liver, spleen or bowel.

Abdominal pregnancy can be primary or secondary. Secondary abdominal pregnancies are more common

and occur secondary to tubal rupture or tubal abortion with migration of the gestational sac into the abdominal cavity.

The Studdiford criteria for diagnosing primary abdominal pregnancy include (1) normal tubes and ovaries with no evidence of recent or remote injury; (2) absence of any evidence of uteroplacental fistula; (3) presence of pregnancy related exclusively to peritoneal surface; and (4) pregnancy recent enough to eliminate the

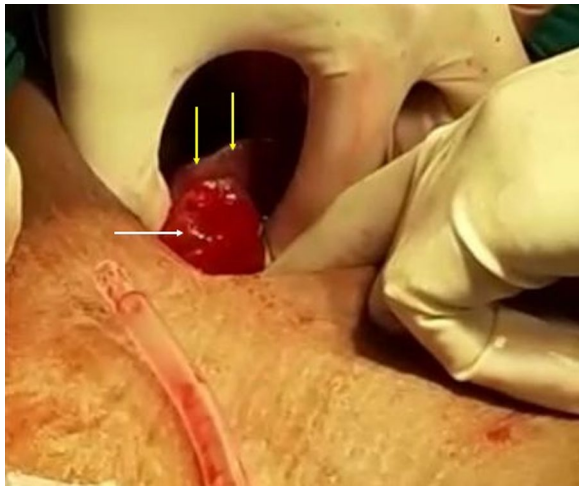


Fig. 4 Intraoperative image showing gestational sac (white arrow) attached to the inferior surface of Segment VI of liver (yellow arrows)

possibility of secondary implantation following nidation in tubes. Primary abdominal pregnancy accounts for almost 1% of all ectopic pregnancies [1]. In primary hepatic pregnancy, the implantation occurs in liver and is associated with high mortality rate owing to the risk of catastrophic intra- or post-operative hemorrhage. The youngest patient reported with hepatic ectopic pregnancy was aged 25 and the oldest was of 46 years [2].

The etiology of primary abdominal pregnancy remains inconclusive with multiple theories proposed including fallopian tube damage secondary to pelvic inflammatory disease, use of oral contraceptives and intrauterine contraceptive devices, conceiving using assisted reproductive techniques in infertility.

Liver is the biggest solid organ of abdominal cavity capsula fibrosa and is a favorable site of profuse blood supply suitable for the growth of an embryo. Fertilized ovum attaches to capsula fibrosa, and as the gestational sac develops, the chorion infiltrates into the hepatic surface to meet constantly increasing blood supply of the embryo. Thus, the placenta mostly attaches to the inferior surface of the right lobe of the liver [3].

The clinical diagnosis may be delayed owing to non-specific symptoms and delayed presentation. Patients usually present with epigastric or right hypochondriac pain and gastrointestinal symptoms, sometimes with bleeding per vaginum as well and are misdiagnosed clinically to be hepatitis, cholecystitis, gastroduodenitis or acute gastroenteritis. Detailed menstrual history in reproductive age females is useful. In case of ruptured

ectopic pregnancy, the patients are brought in to emergency department with low blood pressure and hypovolemic shock.

Early diagnosis can be established with the use of USG. USG has high temporal resolution, is faster and non-invasive and thus the modality of choice in emergency. Trans-abdominal USG confirms the site of pregnancy and is most useful in dating the pregnancy. In early pregnancy, gestational sac is visualized as cystic lesion with embryonic pole-yolk sac complex within. Cardiac activity may or may not be visualized. Surrounding peri-gestational hematoma is an early indicator of impending rupture. Color Doppler is useful to locate the blood supply. In advanced pregnancy, the fetus and placenta can be seen freely within the abdominal cavity separate from the uterus. Transvaginal USG is useful to confirm that there is no intrauterine pregnancy and to confirm that both fallopian tubes are normal.

Owing to its high spatial resolution, MRI is useful for surgical planning to outline the regional anatomy of the implantation site and its relation with the surrounding structures. The location of the placenta is useful in deciding whether to remove the placenta during laparotomy or not due to the risk of hemorrhage in the former [4].

The surgical management of hepatic pregnancy may be either by laparotomy or laparoscopy, carefully considering the high risk of intraoperative catastrophic hemorrhage. To reduce the risk of bleeding, procedures like hepatic artery ligation, omental transplantation, wedge resection or lobectomy and liver packing may be performed. Some authors recommend administering methotrexate injection during diagnostic laparotomy [5]. A combination of preoperative catheter embolization of the arterial feeders followed by laparoscopic extraction of the fetus, and methotrexate injection post-operatively for the placenta left in situ are favored by few others [6]. Methotrexate assists in faster degeneration of the trophoblastic tissue in residual placenta. The least invasive technique includes ultrasound-guided percutaneous injection of potassium chloride into the fetal heart for immediate fetal cardiac arrest, followed by intramuscular injection of 1 mg/kg of methotrexate as mentioned by Shippey et al. [7].

Conclusions

Primary hepatic ectopic pregnancy is a very rare condition. Importance resides in maintaining a high level of suspicion and recognizing the atypical presenting signs and symptoms simulating digestive or hepatobiliary diseases. Detailed and dedicated abdomino-pelvic imaging using USG and MRI can be performed early confirming the diagnosis, and can thus contribute greatly to patient outcome.

Abbreviations

USG: Ultrasonography; MRI: Magnetic resonance imaging; CECT: Contrast-enhanced computed tomography.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s43055-022-00818-9>.

Additional file 1. USG abdomen of right lobe of liver showing ectopic gestational sac attached to the inferior aspect of segment VI of liver. Embryonic pole-yolk sac complex is seen within the gestational sac with presence of cardiac activity.

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Author contributions

Dr. GK contributed to manuscript preparation. Dr. PK helped in literature review. Dr. YF contributed to critical revision and editing. Dr. SL helped in manuscript preparation. Dr. JV contributed to critical revision and editing. All authors have read and approved the manuscript and ensured that this is the case.

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Availability of data and materials

All data generated or analyzed during this study are included in this article.

Declarations

Ethics approval and consent to participate

For case report approval is waived off by the institute ethics committee and written informed consent was obtained from patient.

Consent for publication

Written informed consent to publish this information was obtained from patient.

Competing interests

The authors declare that they have no competing interests.

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