

# Ultrasound imaging of fallopian tube ectopic pregnancies a life-threatening condition

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## Abstract

Ectopic pregnancy is the implantation of the embryo at any site other than the intrauterine endometrial cavity. The fallopian tube is the most common site of ectopic pregnancies and accounts for almost about 95% of the ectopic pregnancies. Other locations include the caesarian scar, cervical, interstitial, ovarian, intra abdominal, intramural and heterotopic. The ectopic pregnancies account for about 2% of the total pregnancies but however they are the first cause of the mortality due to pregnancy related causes in the first trimester. The incidence of the ectopic pregnancies is also on the raise due to the increase in the number of patients undergoing treatments for infertility. Ultrasound has classic imaging findings in cases of ectopic pregnancies and a thorough knowledge of these imaging findings helps in early and accurate identification thereby significantly reducing the mortality and morbidity caused due to the complications of ectopic pregnancies. The ultrasound findings are to be correlated in correlation with the clinical and lab findings for accurate diagnosis

**Key Word:** Ectopic pregnancy, Ultrasound, Fallopian ectopic, First trimester ultrasound

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## INTRODUCTION

Incidence of ectopic pregnancies has risen significantly in the recent past with the risk factors being history of previous ectopic pregnancies, pelvic inflammatory disease, tubal surgeries, infertility treatments, smoking, endometriosis and congenital uterine anomalies<sup>1,2</sup>. When there is implantation of the blastocyst outside the uterine endometrium; it results in an ectopic pregnancy<sup>1</sup>. Imaging, clinical and lab evaluation in suspected cases of

ectopic pregnancies; helps in the reduction of mortality and in the preserving the fertility for future. When patients present with history of pain in the lower abdomen, amenorrhea of about 5-9 weeks and history of bleeding/spotting the use of ultrasound will help in early identification of ectopic pregnancies<sup>3,4</sup>. If a first trimester patient presents in shock or with symptoms of shoulder pain the possibility of a ruptured ectopic pregnancy is most likely. The use of transabdominal and transvaginal ultrasound and correlation with the beta human chorionic gonadotrophin( $\beta$ -hCG) is of paramount value in the early diagnosis. The misconception that the size of an ectopic pregnancy correlates with the severity of pain does not hold true and the pain may actually reduce if there is rupture of the ectopic pregnancy<sup>4</sup>. Sometimes the tubal ectopic pregnancies continue to bleed slowly through the fimbrial end of the tube and may present with large hemoperitoneum

**Imaging On Ultrasound:** Although transvaginal ultrasound is the preferred imaging modality; a transabdominal ultrasound is always important to identify

the presence of fluid in the upper abdomen; the presence of which with an adnexal mass lesion warrants an emergency surgery. When the  $\beta$ -hCG levels are greater than 2000 mIU/ml the gestational sac should usually be seen on a transvaginal scan ; however when the gestational sac is not seen in the uterine cavity it necessitates a detailed search for the presence of an extra uterine pregnancy or adnexal mass<sup>5</sup>. The most common location of the ectopic pregnancies is in the fallopian tube which constitutes almost 95 % of the ectopic pregnancies. Of these about 70 % occur in the ampulla , 12 % in the isthmus and about 11.1 % in the fimbrial region<sup>6,7</sup>.

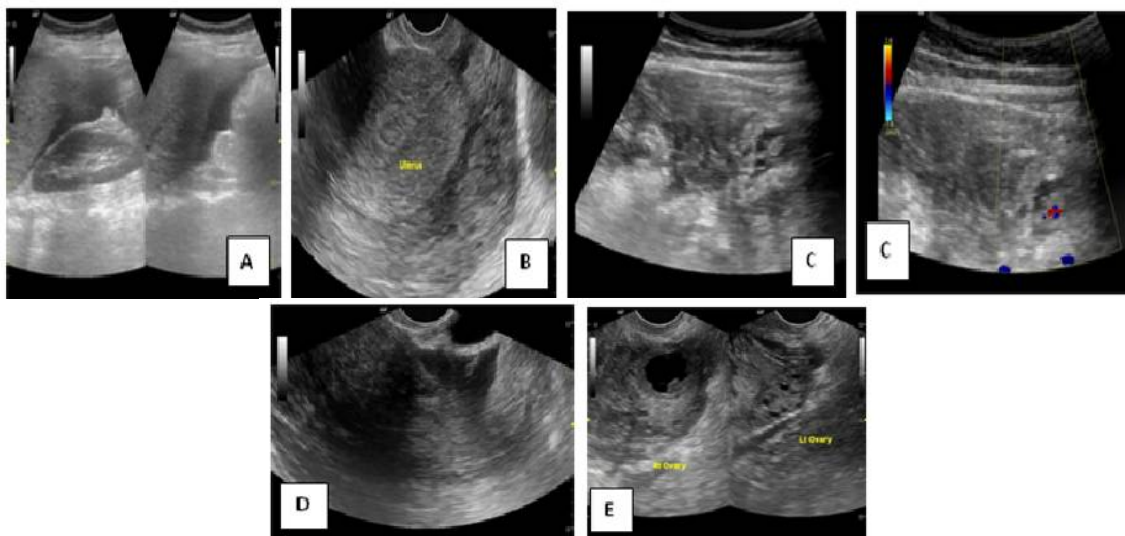
The most common imaging presentation of a fallopian tube ectopic pregnancy is that of a adnexal mass lesion which is separate from the ovary. The presence of a yolk sac, gestational sac or cardiac activity is almost confirmatory for ectopic pregnancy<sup>8,9,10</sup>. Specific signs like tubal ring sign(Presence of a hyperechoic ring around the gestational sac) and ring of fire sign (High velocity low impedance flow around the adnexal mass / ectopic pregnancy) are useful for localization and identification of the ectopic pregnancy<sup>11</sup>. In the presence of ectopic pregnancy ; normal or trilaminar endometrium or the presence of a pseudogestational sac(thick decidual

reaction around the intrauterine fluid) may be seen in the uterus. The pseudogestational sac also needs to be separated from the gestational sac based on the central versus eccentric location respectively<sup>12</sup>. The presence of fluid with internal echoes in the morrison's pouch, pelvis or in the region of the fallopian tube can be indirect signs. In heterotopic pregnancy there is evidence of intra and extra uterine pregnancy. The incidence of heterotopic pregnancies is on the rise due to the increase in the assisted reproductive technology and ovulation induction for various problems causing infertility<sup>13</sup>. The incidence of heterotopic pregnancy raises from 1 in 30000 to 1-3 in 100 in cases of spontaneous conception versus assisted reproduction<sup>14</sup>. Visualization of the ectopic pregnancies in patients who undergo assisted reproductive therapy can be difficult sometimes due to the presence of enlarged ovaries secondary to hyper stimulation<sup>15</sup>. The identification of heterotopic pregnancy is important because the non identification of the intrauterine pregnancy and treatment of the ectopic pregnancy can cause loss of the viable intrauterine pregnancy which in most cases is a precious pregnancy whereas the missing of an ectopic pregnancy in cases with intrauterine pregnancy can cause life threatening haemorrhage.

## OBSERVATIONS AND CASES

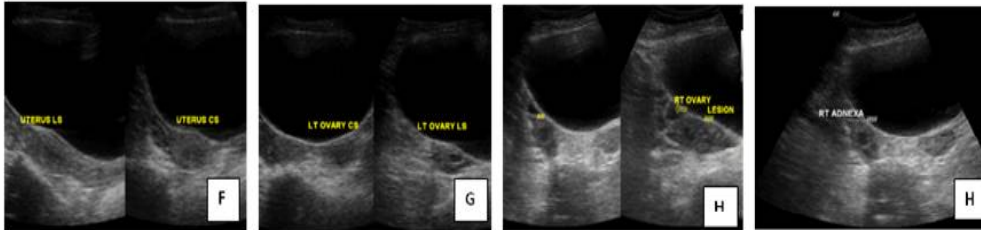
### CASE 1

Presented with a history of positive urine pregnancy test(UPT), 8 weeks by dates ,no previous ultrasound , complaints of right hypochondriac pain with stable vitals with a requisition to see for gallbladder calculi and also for the fetal heart. Ultrasound abdomen showed large amount of free fluid in the hepatorenal and spleenorenal areas and the pelvis(FIG.A). Uterus was empty (FIG.B). Fetal heart was seen in the right adnexal region on b-mode which was confirmed with color Doppler (FIG C).TVS confirmed the findings and showed a dilated tube like structure to the right side of the pelvis with fetal pole within (FIG D). Also seen was a right ovarian corpus luteal cyst (FIG E). An ultrasound diagnosis of right fallopian tube ectopic pregnancy was given which was confirmed on surgery.



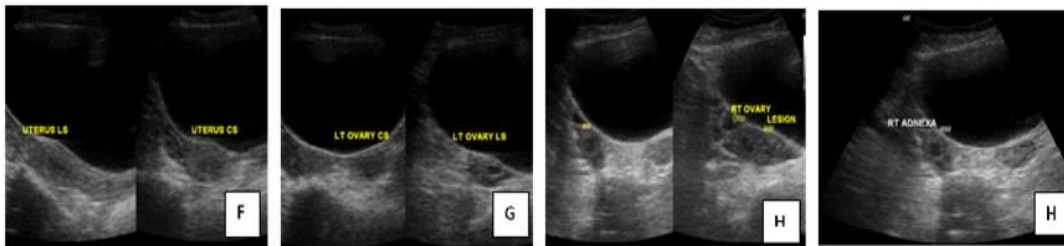
### CASE 2

Patient presented with history of positive UPT and chronic lower abdominal pain from 6 months post diagnostic laparoscopy for ectopic pregnancy in the fallopian tube. She gave a history that the fetus was removed but she continued to have occasional lower abdominal pain. Ultrasound pelvis and TVS revealed an empty uterus (FIG F), normal ovaries (FIG G) but heterogenous echoes; probably retained products was seen in the right fallopian tube (FIG H). A diagnosis of chronic ectopic pregnancy of the fallopian tubes was made



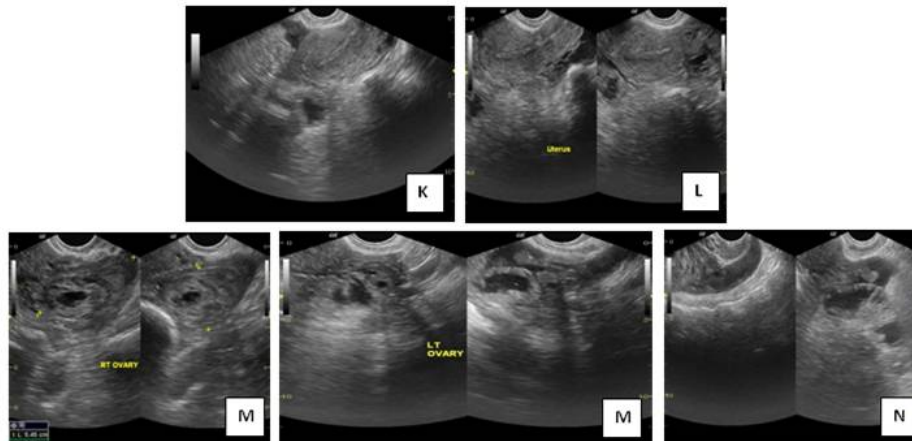
### CASE 3

Patient presented with history of left iliac fossa pain. Urine pregnancy test was not done. USG abdomen was done which revealed free fluid in the abdomen (FIG I). USG pelvis and TVS were done which showed an empty uterus, normal ovaries and a left adnexal mass in which was seen with an irregular cystic structure appearing like an irregular gestational sac (FIG J) was seen. Sonologically a diagnosis of left adnexal ectopic probably fallopian tube was made. On follow-up of the patient the obstetrician had informed that it was a ruptured ectopic pregnancy in the left fallopian tube.



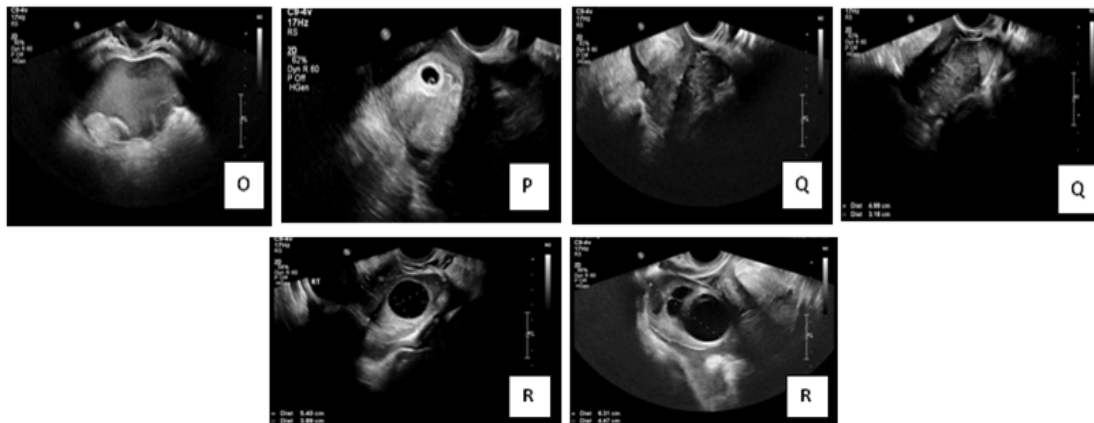
### CASE 4

Patient presented with history of right iliac fossa pain, removal of copper T device the same morning and LMP 10 days back stable vitals. Patient had been referred by the consulting surgeon as? acute appendicitis. On doing an ultrasound abdomen a large amount of free fluid was seen in the morrison's pouch, spleenorenal area. Ultrasound pelvis followed by TVS was done which revealed free fluid (FIG K) and empty uterine cavity (FIG L) with normal ovaries (FIG M). The right adnexal region showed a mass with an irregular gestational sac (FIG N). A sonological diagnosis of right adnexal ectopic pregnancy was given. The patient was transferred to the OBG/GYN department who operated the patient later and confirmed our findings. The patient had an unruptured ectopic pregnancy in the right fallopian tube.



## CASE 5

Patient presented with right lower abdominal pain and was on treatment for infertility with and USG abdomen was done which revealed free fluid in the abdomen with thick internal echoes(FIG O). USG pelvis and TVS were done which showed a gestational sac with yolk sac in the uterine cavity(FIG P) corresponding to about 5 weeks and a right adnexal mass(FIG Q) was seen .Both ovaries were enlarged and showed changes of hyperstimulation(FIG R). Sonologically a diagnosis of intrauterine gestation with right tubal ectopic was made. Diagnostic laparoscopy was done and the right fallopian tube ectopic was operated upon and the intrauterine gestation was continued.



## CONCLUSION

All the patient's presented with complaints of abdominal pain [Hypochondrium, Right Iliac Fossa, Left Iliac Fossa, Pelvis]. If patients had been treated conservatively it could have proven fatal for the the patient This shows the importance of suspecting an ectopic in a patient with abdominal / pelvic pain in patients with irregular/regular menstrual cycles in the reproductive age Ultrasound has classic imaging findings in cases of ectopic pregnancies and a thorough knowledge of these imaging findings helps in early and accurate identification thereby significantly reducing the mortality and morbidity caused due to the complications of ectopic pregnancies. The ultrasound findings are to be correlated in correlation with the clinical and lab findings for accurate diagnosis

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