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Case Report

Tubo-Ovarian (Adnexal) Ectopic Gravidae: Comparative Analysis of 2 Cases

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ABSTRACT

Ectopic pregnancy occurs as a result of conceptus external to the endometrial cavity. It is a major cause of maternal mortality. Published case notes on this phenomenon fails to make accurate diagnosis of tubal conceptus. Incidence of ectopic pregnancy averages about 2.2% of all gravidae and is a leading cause of female mortality globally. A 30-year-old nulliparous woman registered at Kampala International University Teaching Hospital, Uganda with complain of upper pelvic pain on the right groin and iliac region for 4 days and amenorrhea for 6 weeks. Pelvic ultrasound showed right unruptured tubo-ovarian pregnancy with a fetal pole corresponding to 7 weeks ± 1 day gestational age. Eight weeks later the pregnancy resulted in a missed abortion. A second (asymptomatic) ectopic case in a woman of reproductive age is reported. Incidental sonographic finding confirmed an adnexal mass containing a yolk sac coupled with high levels of beta-Human Chorionic Gonadotropin (β-hCG) in blood and urine; this in sexually active females of pubertal age is a positive ectopic gravida except proven otherwise. It was 6 weeks ± 1 day gestational age and later terminated by elective surgery. Both cases were compared with normal intra-uterine pregnancy of 8weeks + 5days gestational age. It should be noted that past uterine surgical operation may 'alter' uterine physiologic environment to increase the likelihood of an ectopic pregnancy. Tubal-Ring Sign in tubal gravidae is observed by a roundish hyperechoic ring surrounding the extra uterine gestational sac.

Keywords:
Ectopic pregnancy; ultrasound; gravida; yolk sac; conceptus

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INTRODUCTION

Ectopic pregnancy is a significant medical condition in which a fertilized egg implants outside the uterus, most preferably in the fallopian tubes. In other words, it is the implantation of a fertilized ovum external to the endometrial area of the uterus (Hendriks *et al.*, 2020). Due to the incompatibility of the implantation site, ectopic pregnancy rarely passes through the first trimester without demise. In the early 1990's Center for Disease Control estimated the rate of ectopic pregnancy to be about 2% of all gravidaes (CDC, 1995). Although, ectopic pregnancies accounts for 1-2% of pregnancies, they are among the major cause of maternal morbidity and mortality in the first trimester (Tempfer *et al.*, 2019; Hendriks *et al.*, 2020).

All pregnancies are naturally meant to embed in the uterus as it is the right place for implantation. Many literatures explain well the mechanism of implantation in embryology, but it is still a mystery to why some embryos choose to implant in certain areas. These theories point out to some common risk factors such as pelvic inflammatory disease, previous ectopic pregnancy, fallopian tube surgery, chlamydial infection, smoking, and assisted reproductive technologies (Layden and Madhra, 2020). While most ectopic pregnancies occur in the fallopian tubes, others such as cervix, interstitial segment of the fallopian tube, cesarean section scars, ovary, and peritoneal cavity have been mentioned as rare sites of ectopic pregnancy (Chukus *et al.,* 2015). Most of uncommon implantation sites are uncovered using ultrasound. Ultrasound plays a critical role in finding and confirming ectopic pregnancies while also clarifying the type of the ectopic pregnancy to help the physician to make informed decisions (Chukus *et al.,* 2015). On drawing a diagnostic conclusion, patient symptoms, ultrasound report, and human chorionic gonadotropin levels are the three keys to a firm diagnosis of an ectopic pregnancy (Hendriks *et al.*, 2020). Thus, ultrasound undoubtedly plays a crucial role in evaluating ectopic pregnancy.

Patient's symptoms in an ectopic pregnancy are very distinct factors that raises suspicion. These symptoms often include lower abdominal pain, vaginal bleeding, menstrual irregularities, supra-

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pelvic (hypo-gastric) pain and spotting, which is a most standard clinical sign (Lee *et al.*, 2017; Gadayeva *et al.,* 2020). Unfortunately, all ectopic pregnancies may not have all these symptoms; about 50% of patients may show all the symptoms. While 40–50% of patients present with vaginal bleeding, other patients (about 50%) have a palpable adnexal mass on physical examination, and three quarters could show abdominal tenderness. Therefore, patient's symptoms are only indicators of an ectopic pregnancy which is why the physician proceeds to request more investigation to make a final diagnosis. Ultrasound features of ectopic pregnancy are distinct and hard to miss once they are present in a patient's ultrasound scan. The initial finding in ultrasound is an empty uterus in a patient with positive pregnancy test. Secondly, there is a presence of extrauterine gestational sac with its classic double-decidual sac sign coexisting with or without visible fetal parts inside. The double decidual sac sign in sonography which appears as early as before the appearance of both yolk sac and embryo. It is made of two layers which are decidua parietalis (part on the uterine cavity) and decidua capsularis (part on the gestational sac). These two layers form a concentric hyperechoic ring engulfing the gestational sac (Gaillard *et al,* 2024).

At times, the extrauterine gestational sac is not always distinctly seen in ultrasound examination, rather an adnexal cystic mass might be seen instead. It presents as heterogenous cystic mass surrounded by an echogenic rim which is termed blob or bagel or tubal ring sign (Gaillard *et al.*, 2024). The study by Nadim (2018), reported the Tubal Ring Sign, Blob or Bagel Sign has a positive predictive value (PPV) of over 94% for an ectopic pregnancy with its characteristic fluid-filled center and echogenic rim representing trophoblastic tissue. There are other associated sonographic findings that solidifies further the diagnosis for an ectopic pregnancy. These include presence of free fluid collection in pelvis (particularly if bloody, it can be associated with an ectopic pregnancy), and decidual cast which is a fluid collection covered by echogenic ring inside the uterine cavity, and often can mimic an intrauterine pregnancy. All of these features put together is what gives the sonographic appearance of an ectopic pregnancy (Goudie, 2012). Diagnostic pitfalls are often in distinguishing ectopic pregnancy from conditions like heterotopic pregnancy, decidual changes and theca luteal cysts (Goudie, 2012). In this comparison case report, we present the sonographic appearance of ectopic pregnancy in two cases from Kampala International University Teaching Hospital (KIU-TH) in Ishaka-Bushenyi, Uganda. One case is an ectopic pregnancy in adnexal space while the other is also a tubo-ovarian ectopic pregnancy coexisting external to the endometrial cavity. This coexistence is termed heterotopic pregnancy. Therefore, we aim to describe and compare both sonographic appearances.

CASE REPORT I

A multiparous 30-year-old woman came to the hospital for a first trimester ultrasound check-up and was found with an extra-uterine gestational sac diameter (GSD) with a live fetal pole. She had complained of vaginal bleeding, and presented with excruciating (bilateral) pelvic pain. Blood test revealed elevated human chorionic gonadotropin hormones with respect to the calculated gestational age from her last menstrual period. First-trimester ultrasound was performed to check the location and viability of the pregnancy.

CASE REPORT II

A nulliparous 26-year-old woman came to our hospital with no history of menorrhagia. The blood test found elevated level of serum human chorionic gonadotropin hormone. She was sent to our department (Radiology Department, Kampala International University; Teaching Hospital) for ultrasound examination and confirmation of pregnancy. Incidental, we encountered a well-defined concentric cystic lesion with thick hyperechoic wall in the left adnexal (tubo-ovarian) region. The uterus was empty, and there was a small fluid collection in the pelvis. Laboratory results for βhCG ranged from 1,080 – 56,500 mIU/mL.

Control Image in Figure 3 shows longitudinal section of the fetal pole from 8 weeks; with ongoing genesis of upper and lower limb buds. We evaluated the anterior and posterior contours of the embryo, note the nuchal thickening becoming apparent. A correctly measured CRL is the most accurate means of estimating gestational age; provided the full CRL is seen. As any degree of flexion of the fetal spine will produce an underestimate. Comparison was made with cases 1 and 2.

Informed consent was sort from the three women (2 ectopic and 1 uterine); before documentation of these cases and ethical approval (ERC-KIUTH-00BJ46/21) was granted by Kampala International University Teaching Hospital, Uganda. In line with the 1975 Helsinki Declaration on confidentiality, non-disclosure of subject names, protecting means of patient identity, zero tolerance to coercion and inducement to research and generally upholding patient rights.

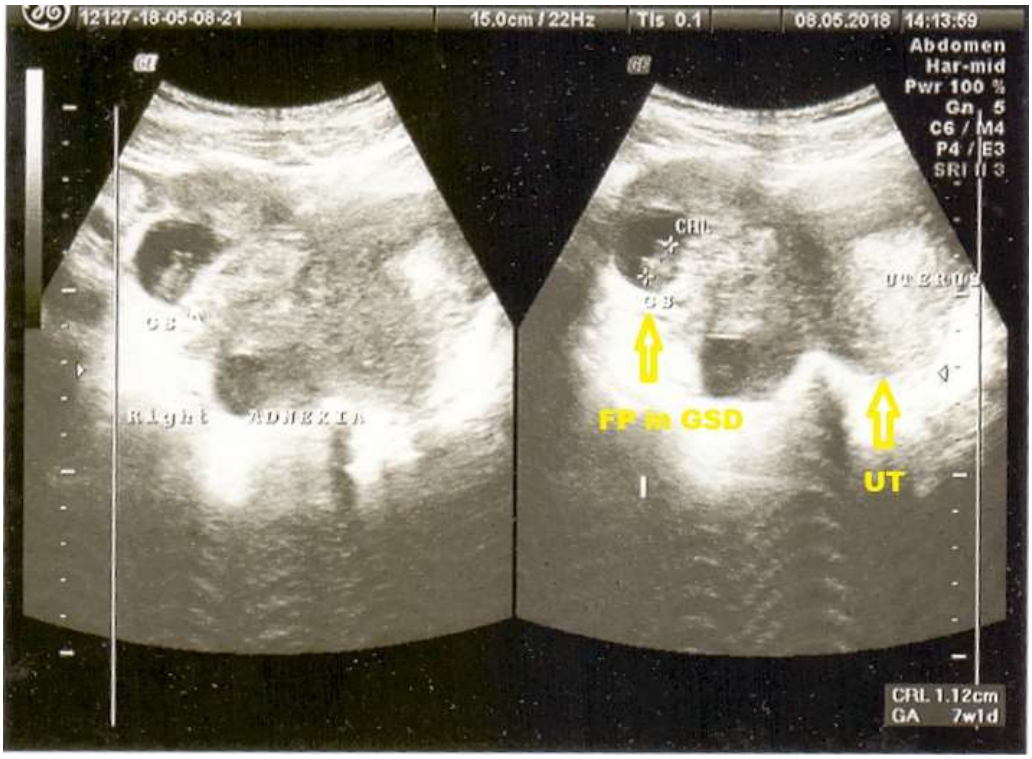

Figure 1: The transabdominal sonogram of the pelvis shows a well-defined oval anechoic lesion with internal solid component (fetal part) and thick hyperechoic walls in the right adnexal space. The gestational sac diameter (GSD) capsulates the fetal pole (FP); with a measured crown lump length (CRL) of 1.12 cm corresponding to 7weeks and 1 day GA. A 3.5 MHz curvilinear probed ultrasound machine, General Electric Equipment/ Volusion, (made in the USA) was used in the diagnosis.

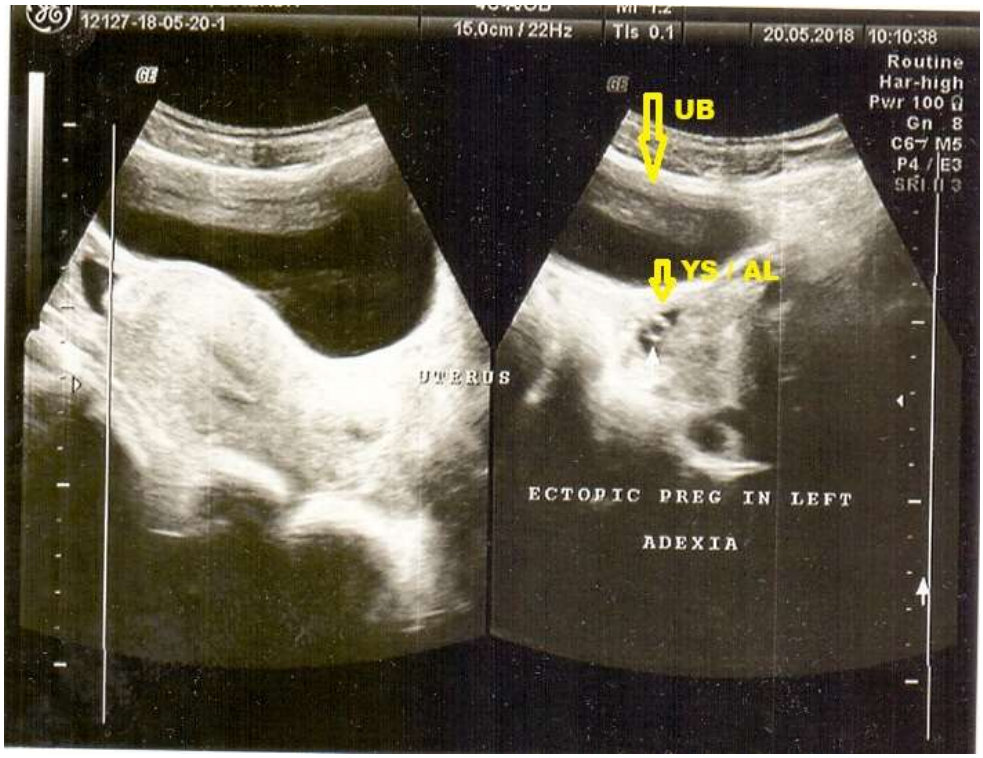

Figure 2: The transabdominal sonogram of the pelvis in sagittal scan shows an empty uterus with a small clear fluid collection in the anterior cul-de-sac (image on the right), and a small well-circumscribed oval anechoic lesion with hyperechoic rim in the left adnexal space (image on the left); in a patient with positive pregnancy test. Note the relationship of the Urinary Bladder (UB), anteverted uterus and ectopic decidua containing a yolk sac (YP) and allantoic (AL) membrane. It corresponded to 6weeks + 1 day; consistent with ectopic pregnancy.

Figure 3. (Normal intra-uterine pregnancy): A transabdominal sonogram shows eccentric cystic sac embedded in the endometrium surrounded by a thick hyperechoic rim and has internal solid component as fetal pole. The fetal pole measured 2.08 cm as the crown lump length (CRL), corresponding to a gestational age of 8weeks and 5 days.

DISCUSSION

Management options for tubal ectopic gravidae include salpingectomy, laparoscopic salpingectomy or explorative laparotomy in agreement with a similar suggestion by De Los Rios and Castaneda (2007). In ectopic pregnancies there is an elevated chance that the gestational sac diameter (GSD) in the adnexal region of the patient; by the one performing sonography may be missed. This may predispose to a false negative scan (Figure 2, has no fetal pole); thereby necessitating a referral; blood-test and repeat ultrasonography in (revert time of) 2 weeks. In consonance with the postulation of Kucera *et al*. (2017) supra-pelvic pain relating to adnexal mass via ultrasonography and positive *β*hCG (urine and serum) in a sexually active female above puberty is an indication of ectopic pregnancy unless similar mimicking scenario proves otherwise. Diagnostic pitfalls of positive *β*hCG (urine and serum) can be seen in some malignant and non-malignant conditions (Kucera *et al*, 2017). Researching the clinical features of ectopic gravidae after previous secondary infertility; the embryo could be implanted in the ovary or adnexae through a needle path after egg retrieval during IVF procedures. Ectopic gravidae (Figures 1 and 2) remain a major cause of mortality in women. Spontaneous tubo-ovarian (fallopian) pregnancies are a rare form of ectopic gravidae and classified as 'spontaneous' when there is no evidence of fertility-aided-interventions. Our findings are in agreement with Tempfer *et al*. (2019); as clear sonographic observation of ectopic pregnancies may be complicated by negative *b*HCG (Beta Human Chorionic Gonadotrophin) due to inactive trophoblastic (cellular) non-proliferation; inter-spaced vaginal-bleeding, fever, pelvic pain, fluid in adnexae and other symptoms complicating diagnostic dilemma. Repeated 'blood' drops forming a haemocele; resulting in inflammatory of the proximal region can appear as a cystic-mass with anechoic borders via ultra-sonography. Bilateral ectopic gravidae in multiple gestation (twining) occurs more often as a result of Assisted Reproductive Technology (ART); more than spontaneous pregnancy. In cases of sonographic doubt about ectopic pregnancy; a combination of medical assessments and laboratory investigations would be required. Pregnancy in the ovary occurs when the ovum is fertilized in the oviduct (distalis) and subsequently implanted in the ovary though rare; it accounts for about 2.5% of ectopic gravidaes (Lin *et al,* 2008). On ultrasound (Figure 1, 2) it may be associated with chronic Pelvic Inflammatory Disease (PID) and IUCD use. In our case a fetal pole (Figure 1) and yolk sac/allantois (Figure 2) are seen in (the right and left) ovarian adnexae respectively. On rare occasions a live fetus (Figure 1) is seen. Vigilance should be observed to distinguish corpus luteal cyst from cystic ovarian pregnancy as supported by an earlier postulation by Bhatt *et al* (2007) and Ukwenya *et al* (2014). This case report elaborates sonographic findings of 2 different ectopic pregnancies. Ectopic pregnancy (Figure 1) mostly leads to an inevitable abortion with a wide range of sonographic signs; flattened gestational sac (wider-than-normal) "sunken" as opposed to "suspended" fetal pole, lack of cardiac activity (FHR= 0 bpm) in some case; ours (Case-I) was viable and uterus large-for-patients' gestational age dates. In agreement with Ghasemi *et al*. (2014); risk factors for tubo-ovarian ectopic pregnancies are earlier use of IUCD (Intra Uterine Contraceptive Device) enhanced/assisted reproductive techniques, recurrent endometriosis, uterine adhesions and

uterine surgeries. IUCD use ranges from around 58% - 90% of patients with primary tubo-ovarian gravidae (Comstock *et al*, 2009). Incidence of tubal ectopic pregnancy is on the rise partly because of Assisted reproductive Technique (ART) and complicated Pelvic Inflammatory Disease. Ultrasound manifestations may be different (Figure 1 and Figure 2/ Right and Left) atypical (one with allantois and yolk sac) the other containing a fetal pole; Case I symptomatic, the later (Case II) asymptomatic. Tubo-ovarian pregnancies are rare and the unruptured gravidaes are much rarer. The diagnosis of tubo-ovarian pregnancy mirrors other types of extra-uterine gravidae. It was noted that in both cases all the sonographic features of ectopic pregnancy were not present as discussed in the introduction. Information on the different location of ectopic gravidae is of great importance in which ultrasonography plays an important role. Pelvic ultrasound is vital part in diagnosing ectopic pregnancies and its specific location in female anatomy. More streamlined diagnosis of tubo-ovarian pregnancies should be recorded in a way to gain better understanding of such conditions. Our report is in line with Odejinmi *et al*. (2009) that gave pre-surgery diagnosis of EP as 11% in terms of diagnostic accuracy. IUCD use may change the mobility of ovarian adnexal respectively the oviduct thereby enhancing implantation. Without a doubt, the administration of ovulation-stimulating medications can spike sex hormone secretion by the ovaries; therefore, increasing the elasticity of the uterine smooth muscle and interfering with oviduct functionality.

Conclusion

With the possibility of medical management, the sonographic value of early detection and prompt initiation of treatment or surgical intervention will improve clinical outcomes preventing the complications of ectopic gravidae. However, that does not affect the correct diagnosis because only a combination of two or more features alongside laboratory test and symptom are what lead to a definitive diagnosis.

In cases of late ultrasound diagnosis, less conservative surgery like laparotomy resection of the uterine adnexae or partial hysterectomy due to heavy bleeding will up the risks for increased gynecological complications.

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