

Clinics in diagnostic imaging (98)

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Fig. 1 Sagittal TVUS image of the uterus.

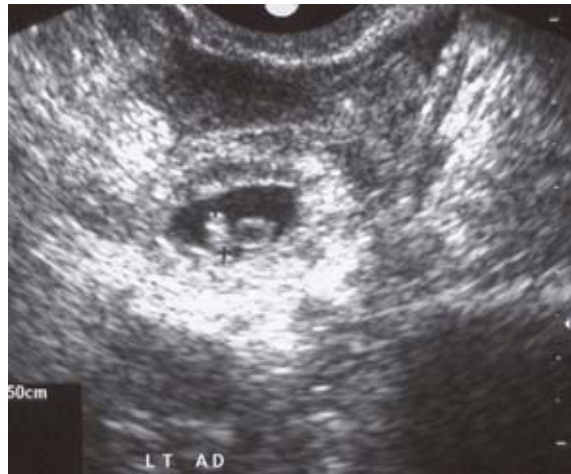


Fig. 2 TVUS image of the left adnexa.

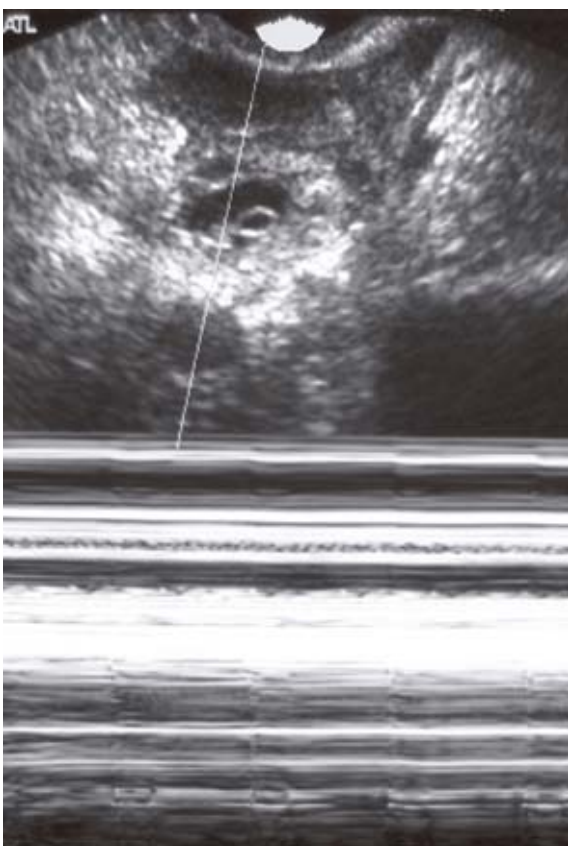


Fig. 3 TVUS image of the left adnexa with M-mode trace.

CASE PRESENTATION

A 26-year-old woman, who was six weeks amenorrhoeic, presented with complaints of vaginal spotting and mild abdominal pain. She had been coming to the 24 hours women's clinic at two day intervals for the past one week with the same symptoms. Ultrasonography (US) two days ago showed one intrauterine gestational sac (IUGS) with a yolk sac within. The patient was gravida 3 and her current pregnancy was clomiphene-related. On physical examination, her abdomen was soft and non-tender. At admission, her serum β -human chorionic gonadotrophin (β hCG) level was 25,282.9 IU/L. During the admission, transvaginal ultrasonography (TVUS) was performed. What do these images show (Figs. 1-3)? What is the diagnosis?

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IMAGE INTERPRETATION

TVUS of the uterus (Fig. 1) showed an intrauterine gestational sac (IUGS) measuring 18 x 18 x 6mm, which contained a yolk sac measuring 3mm but there was no foetal pole. TVUS of the left adnexa showed a mass containing a yolk sac and a foetal pole (Fig. 2). M-mode TVUS confirmed the presence of a foetal heartbeat within this left adnexal mass (Fig. 3).

DIAGNOSIS

Heterotopic pregnancy with an intrauterine blighted ovum and a live tubal ectopic pregnancy.

CLINICAL COURSE

The patient subsequently underwent a diagnostic laparoscopy. A left unruptured tubal ectopic pregnancy and a small haemoperitoneum was identified. A left salpingectomy was done with removal of products of conception from the fallopian tube. The patient was well when discharged. Histopathology of the left fallopian tube showed luminal chorionic villi and trophoblast, in keeping with a left tubal pregnancy.

Follow-up outpatient ultrasonography four days later again showed an IUGS and a yolk sac, but with no foetal pole. Her serial β hCG level was also on a decreasing trend, declining from 32,625.1 IU/L to 29,967.1 IU/L. A diagnosis of a missed abortion was made and she was admitted for evacuation of uterus. Histopathology showed products of conception.

DISCUSSION

The coexistence of intrauterine and extrauterine gestations, also known as heterotopic pregnancy, was previously a rare phenomenon. In 1948, De Voe and Pratt⁽¹⁾ estimated the world-wide incidence to be 1 in 30,000. This has now been thought to be more frequent, given the widespread use of ovulation-induction therapies such as clomiphene and other assisted reproduction techniques^(2,3). The incidence of heterotopic pregnancies with assisted reproductive techniques have recently been reported to be as high as 0.75-1.3%^(4,5), or even higher if there has been pre-existing tubal disease⁽⁶⁾.

Heterotopic pregnancies come in different permutations. In Reece et al's⁽⁷⁾ comprehensive review of heterotopic pregnancies, among the extrauterine pregnancies, 93.9% were tubal and 6% were ovarian. Of the tubal pregnancies, 31.8% occurred on the right and 36.3% occurred on the left. Of the 37 patients who underwent laparotomy for an extrauterine pregnancy, 75.6% delivered at term. Of the intrauterine pregnancies, 75.6% of patients who underwent laparotomy for an extrauterine pregnancy were delivered of their infants at term, while 16.2% had

pre-term deliveries. Three per cent of patients (one patient) had a spontaneous abortion.

In our case, our patient had a left tubal live ectopic pregnancy and an intrauterine pregnancy that was a blighted ovum. This was confirmed after surgery for the live tubal ectopic pregnancy. A left salpingectomy was performed for our patient instead of a salpingostomy, as the latter option would require β hCG tracking and possibly methotrexate which would be harmful to the intra-uterine pregnancy. There was a high suspicion even before the salpingectomy that the intra-uterine pregnancy was not viable, as the IUGS measured 18 x 18 x 6mm with a yolk sac diameter of 3mm but without a foetal pole.

In many patients, the embryo is not visualised on initial US and the diagnosis of demise cannot be made on the basis of abnormal cardiac activity⁽⁸⁾. It is therefore possible to make the diagnosis of pregnancy failure based on gestational sac characteristics. The most reliable gestational sac criteria for poor outcome is the size⁽⁹⁾. The mean sac diameter is measured using the sum of three orthogonal dimensions of the fluid-sac wall interface divided by three. These measurements are most accurate when obtained by a high-frequency endovaginal probe in the sagittal and coronal planes at right angles to one another.

Our patient showed a serial increase in the size of the gestational sac from 8 x 3 x 5mm when she was five weeks one day of amenorrhoea, to 18 x 18 x 6mm at six weeks two days of amenorrhoea (day of left salpingectomy). When the patient was six weeks six days amenorrhoeic, the IUGS measured 17 x 8 x 14mm (four days post-salpingectomy), with a mean sac diameter of 13mm and no embryo seen. This mean sac diameter is slightly less than the cut-off value of 16mm which was proposed by Lindsay et al⁽¹⁰⁾ to be abnormal and indicative of pregnancy failure.

In Pennell et al's⁽¹¹⁾ study of 175 normal pregnancies, 100% of embryos were visualised when the mean sac diameter was greater than or equal to 12mm. Our patient, who had a mean sac diameter of 13mm without an embryo, fits this criteria. The diagnosis of a blighted ovum for our patient was confirmed with a decreasing β hCG level. Other gestational sac criteria⁽⁹⁾ for poor outcome which are less reliable in isolation, but taken together or with an abnormally large gestational sac support the diagnosis for early pregnancy failure, would be a distorted gestational sac (Fig. 4), a thin trophoblastic reaction, weakly-echogenic trophoblast or an abnormally-low position of the gestational sac within the endometrial cavity. These minor criteria were not seen on US in our patient.



Fig. 4 Sagittal TVUS image of the uterus shows a distorted intrauterine gestational sac with a foetal pole. Subchorionic haemorrhage is noted.



Fig. 5 Colour Doppler TVUS image of the right adnexa shows a tubal ectopic pregnancy. The normal right ovary is arrowed.

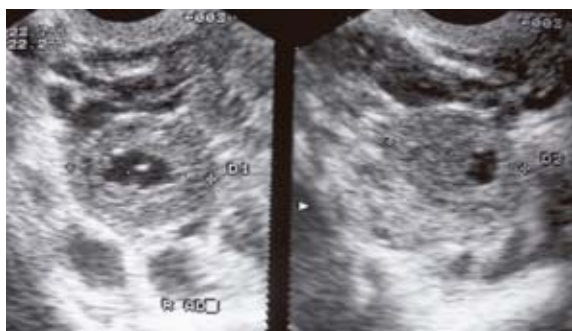


Fig. 6 TVUS images of the right adnexa show a corpus luteal cyst, mimicking a tubal ectopic pregnancy. The cyst lies wholly within the ovary, unlike an ectopic pregnancy.

This discussion on indicators of pregnancy failure would not be complete if embryonic cardiac activity is not mentioned, although our intrauterine pregnancy did not have a foetal pole. The single most important indicator for the confirmation of foetal life is still the identification of cardiac activity⁽⁸⁾. In the past, it was abnormal to identify an embryo without cardiac activity. The caveat now is that given the improved resolution of the transvaginal probes, normal embryos

with a crown-rump length measuring less than 5mm do not demonstrate cardiac activity⁽¹¹⁾.

Another indicator of pregnancy failure is the size and shape of the yolk sac, which is controversial. Kurtz et al⁽¹²⁾ suggested that detection of the yolk sac in the first trimester was not an early predictor of pregnancy outcome. Lindsay et al⁽¹⁰⁾ and Johnson⁽⁸⁾ opined that the yolk sac diameter was of value in predicting early pregnancy failure. Lindsey et al⁽¹⁰⁾ reviewed the normal and abnormal yolk sac appearances in pregnancies between five to 10 weeks of menstrual age, and noted that non-visualisation of the yolk sac in patients with a mean sac diameter of greater than 8mm is abnormal. They also observed that non-visualisation of the yolk sac in the presence of an embryo is associated with embryonic demise in 100% of patients. At six weeks two days of menstrual age, our patient's yolk sac measured 3mm in diameter, which is not suggestive of embryonic demise. In summary, yolk sac abnormalities may predict abnormal outcome in early pregnancies which appear otherwise completely normal by all other ultrasonographical criteria⁽⁸⁾.

US is important in the diagnosis of heterotopic pregnancy. Tal et al⁽²⁾ in 1996 showed that clinical and ultrasonographical findings have led to diagnosis in 41.1%, with Marcus et al⁽⁵⁾ in 1995 showing diagnostic success of up to 84%. The diagnosis was made by TVUS alone in 54% of Louis-Sylvestre et al's cases⁽¹³⁾. Careful ultrasonographical assessment of the whole pelvis is critical, both transabdominally and transvaginally. Transabdominal US is of use in demonstrating a large mass which may be outside of the pelvis and therefore outside the range of the endovaginal probe. This mass may be an extrauterine gestational sac or a large haematoma⁽⁸⁾.

TVUS can depict an adnexal mass. The diagnosis of an ectopic pregnancy is easy when a gestational sac with a yolk sac or a foetal pole is present, as was seen in our case. The classic "ectopic tubal ring" (Fig. 5) is only seen in 49% of patients with ectopic pregnancy⁽¹⁴⁾. In other cases, especially in the presence of an intra-uterine pregnancy, it may be difficult to distinguish an ectopic pregnancy from a corpus luteal cyst (Fig. 6), endometriotic cyst (Fig. 7) or an abscess (Fig. 8)⁽⁸⁾.

In summary, heterotopic pregnancy is a difficult diagnosis and a potentially dangerous condition for both the mother and the intra-uterine pregnancy. Given the increasing incidence of heterotopic pregnancies, this diagnosis has to be considered in all patients who present with per vaginal bleeding and abdominal pain, and in those who are on ovulation-inducing agents or who are on assisted

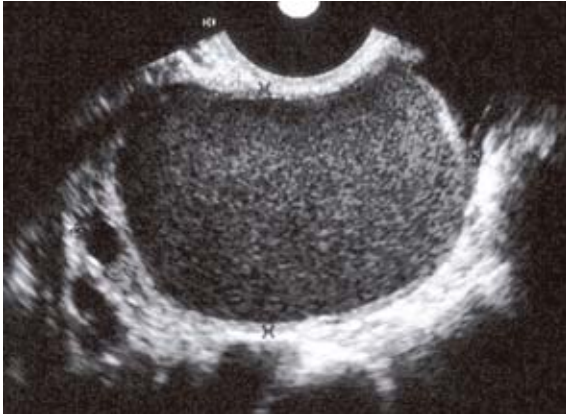


Fig. 7 TVUS image shows an endometriotic cyst of the ovary. It contains fairly homogeneous low-level internal echoes.

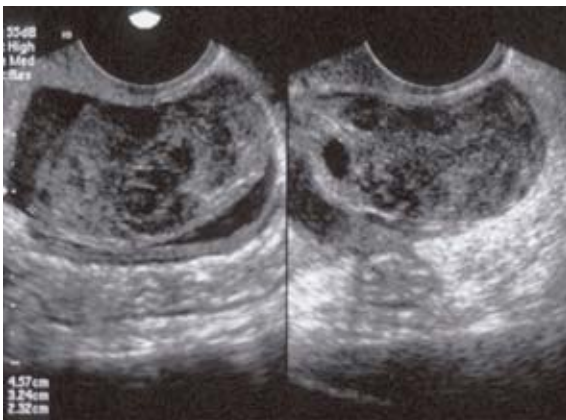


Fig. 8 TVUS images of a tubo-ovarian abscess. Correlation with the clinical findings is important in the diagnosis.

reproduction techniques. The presence of an intra-uterine pregnancy cannot rule out a co-existing ectopic pregnancy, and may actually result in a delay in diagnosis of a patient with pelvic symptoms and a positive β hCG.

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ABSTRACT

A 26-year-old woman who was six weeks amenorrhoeic presented with vaginal spotting and mild abdominal pain. She had been coming to the 24 hours women's clinic at two-day intervals for the past week with the same symptoms. Ultrasonography two days ago showed one intrauterine gestational sac (IUGS) with a yolk

sac within. Her pregnancy was clomiphene-related. Repeat transvaginal ultrasonography during this admission showed an IUGS, together with a left live tubal ectopic pregnancy. Heterotopic pregnancies used to be a rare entity. Now, given the increasing rise in assisted reproduction techniques, there should be a high index of suspicion for heterotopic pregnancy as this would impact upon clinical management. The ultrasonographical features of heterotopic pregnancy, and its differential diagnoses, are discussed.

Keywords: blighted ovum, clomiphene, heterotopic pregnancy, transvaginal ultrasonography, tubal ectopic pregnancy

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