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Case Series

Management of Heterotopic Pregnancy: A Case Series

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Abstract

Heterotopic pregnancy, defined as the coexistence of intrauterine and ectopic gestations, is a rare but potentially life-threatening condition. This case series presents multiple instances encountered in early pregnancy, each with distinct clinical presentations and diagnostic pathways. The report highlights the importance of high clinical suspicion, timely imaging, and individualized management strategies. Through these cases, we underscore the challenges of conservative versus surgical intervention and the need for multidisciplinary coordination to optimize maternal and foetal outcomes.

Keywords: *Heterotopic Pregnancy (HP); Assisted Reproductive Technologies (ART)*

Introduction

Heterotopic pregnancy (HP) is a rare but clinically significant complication, defined as the coexistence of an intrauterine pregnancy, singleton or multiple, with one or more ectopic pregnancies [1]. The estimated incidence of spontaneous HP is approximately 1 in 30,000 pregnancies [2], while the incidence increases markedly to around 1 in 100 among patients who have undergone assisted reproductive technologies (ART) [3]. Risk factors for HP overlap with those of singleton ectopic pregnancies and include a history of tubal disease, pelvic inflammatory disease, previous ectopic pregnancy, and smoking. In addition, the widespread use of ART and ovulation induction therapies has been strongly associated with the higher incidence of HP in patients undergoing fertility treatment [1].

The diagnosis of HP using ultrasound imaging can be challenging, as distinguishing an ectopic pregnancy from a haemorrhagic cyst or corpus luteum cyst is often difficult [4,5]. The presence of a viable intrauterine pregnancy further complicates the diagnostic process by elevating serum β-hCG levels, thereby limiting the utility of common diagnostic algorithms such as serial β-hCG monitoring, which are routinely applied in cases of ectopic pregnancy and pregnancy of unknown location [4,6].

In this paper, we report three cases of spontaneously conceived heterotopic pregnancies, all diagnosed and managed at a district general hospital in the United Kingdom

Cases Presentation

Case 1

Presentation and diagnosis

A 33-year-old woman with a history of a previous caesarean section at term following an IVF pregnancy and an early miscarriage presented to the gynaecology ambulatory unit (GAMBU) with intermittent right iliac fossa pain. The pain had been present for two weeks but had become more persistent over the preceding 48 hours. A urine pregnancy test was positive, and gestational age based on her last menstrual period (LMP) was 7 weeks and 3 days. A bedside scan performed in GAMBU demonstrated an intrauterine gestational sac. Serum β-hCG was >15,000 mIU/ml. She was hemodynamically stable, and her observations, full blood count, and renal function tests were within normal limits.

A subsequent transvaginal ultrasound revealed a viable singleton intrauterine pregnancy consistent with a gestational age of approximately 8 weeks (Figure 1A). Posterior to the right ovary, an oval hyperechoic lesion with a central anechoic area-the characteristic 'bagel sign' (best visualised in figure 1D)-was identified, strongly suggestive of a right tubal ectopic pregnancy (Figure 1B). No free fluid or hemoperitoneum was observed.

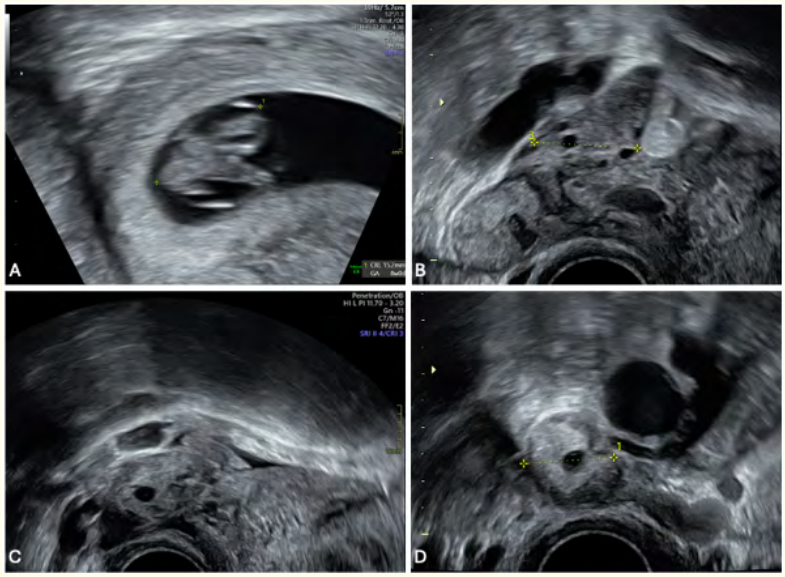


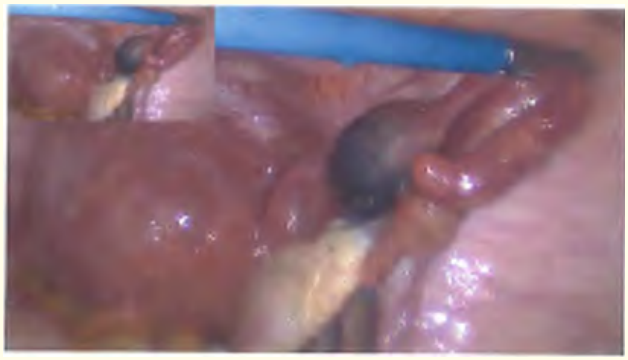
Figure 1: *USS images belonging to case 1.*

1A: Longitudinal view of the intrauterine pregnancy using transvaginal ultrasound. 1B and 1C: Transvaginal ultrasound images demonstrating the relationship of the right ovary (denoted by callipers in figure 1B) and the adjacent right tubal ectopic pregnancy. 1D: Axial view of the right tubal ectopic pregnancy, measuring approximately 17 mm, demonstrating the so-called 'bagel sign'.

Treatment

The patient was admitted on the day of her scan with a presumptive diagnosis of HP. At admission, her symptoms remained stable, and the pain was mild. She provided informed consent for laparoscopic salpingectomy with removal of the ectopic pregnancy, which

was successfully performed as an emergency procedure the following day. Intraoperatively, there was no evidence of hemoperitoneum, and laparoscopy confirmed an unruptured right tubal ectopic pregnancy (Picture 1). Salpingectomy was completed uneventfully, with minimal estimated blood loss.



Picture 1: *Intraoperative image of the right tubal ectopic pregnancy.*

Outcome and follow-up

The day after surgery, the patient underwent a viability scan to assess the intrauterine pregnancy. Crown–rump length (CRL) measured 16.4 mm, and foetal cardiac activity was confirmed. No adnexal abnormalities were noted apart from the expected absence of the right salpinx. She experienced transient urinary retention, which resolved on the same day, and was discharged the following day.

The patient subsequently received consultant-led antenatal care in the same unit. Her pregnancy was complicated by episodes of reduced foetal movements and reduced growth velocity, but no acute concerns warranted early delivery. She delivered at term by elective caesarean section.

Case 2

Presentation and diagnosis

A 43-year-old primiparous woman presented to the gynaecology ambulatory unit (GAMBU) with a two-day history of vaginal spotting and mild back pain. Gestational age by her last menstrual period (LMP) was approximately 8 weeks. A bedside abdominal scan demonstrated an intrauterine gestational sac. Serum β-hCG on the day of presentation measured >15,000 mIU/ml, and a formal ultrasound scan was arranged. She was hemodynamically stable with normal observations, full blood count, and renal function results.

A transabdominal ultrasound performed 10 days later confirmed a viable singleton intrauterine pregnancy, with an estimated gestational age of 10 weeks (CRL: 36.8 mm) (Figure 2A). Adjacent to the left ovary, an ovoid hyperechoic area was identified (Figure 2B). A subsequent transvaginal ultrasound (Figure 2C) showed the left ovary containing a corpus luteum cyst, alongside an ovoid hyperechoic lesion with a central anechoic area, the classic 'bagel sign.' Colour Doppler demonstrated peripheral circumferential vascularity-the 'ring of fire sign.' These findings were consistent with a left tubal ectopic pregnancy. No free fluid or hemoperitoneum was visualised.

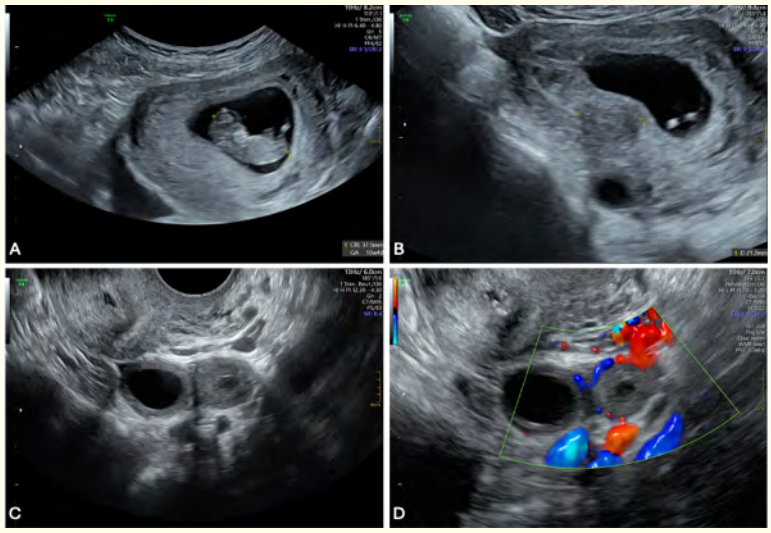
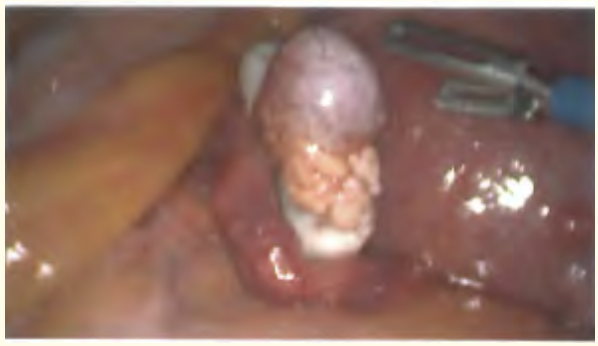


Figure 2: *USS images belonging to case 2.*

2A: Longitudinal view of the viable singleton intrauterine pregnancy on transabdominal ultrasound examination. 2B: View of the left adnexa on transabdominal ultrasound, revealing the intrauterine pregnancy, left ovary containing a corpus luteum cyst, and a hyperechoic structure adjacent to the left ovary (in measurement callipers). 2C and 2D: Transvaginal ultrasound images of the left ovary and adjacent tubal ectopic pregnancy. Both characteristic signs are exhibited in this case - the 'bagel sign' and the 'ring of fire sign'.

Treatment

The patient was admitted on the same day and underwent emergency laparoscopy for removal of the ectopic pregnancy. Intraoperatively, the fallopian tubes appeared normal; however, a cystic structure was visualised adjacent to the left ovary (Picture 2). This was excised using a cautery device. The procedure was uneventful, and estimated blood loss was minimal.



Picture 2: *Intraoperative image of the left para ovarian ectopic pregnancy.*

Outcome and follow-up

A scan performed the day after surgery confirmed the previously identified viable singleton intrauterine pregnancy, with a CRL of 39.4 mm. Postoperatively, the patient developed a chest infection, which was managed with oral antibiotics, and she was discharged on postoperative day two. Her anomaly scan at 20 weeks was normal. She remained under consultant-led antenatal care with regular growth surveillance and was 24 weeks pregnant at the time of writing this report.

Case 3

Presentation and diagnosis

A 31-year-old woman presented to the emergency department with right iliac fossa pain, mildly elevated inflammatory markers (CRP: 11 mg/L; WBC: 15.5 × 10^9/L), and a positive pregnancy test. She was initially reviewed by the surgical team to rule out appendicitis. Her last menstrual period (LMP) was 8 weeks prior. Serum β-hCG was 15,000 mIU/ml. Observations, haemoglobin, and renal function tests were within normal limits.

She was admitted under the gynaecology team and underwent ultrasound the following day. A transabdominal scan demonstrated a viable singleton intrauterine pregnancy (Figure 3A) as well as a live coexisting ectopic pregnancy inferior to the right ovary (Figure 3B). Layering of blood was noted posterior to the uterus and in the right adnexa. A subsequent transvaginal ultrasound confirmed these findings (Figure 3C and 3D).

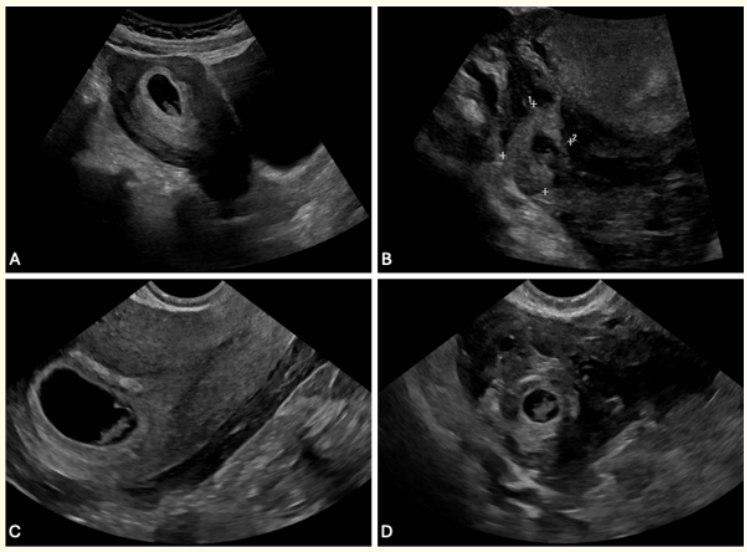
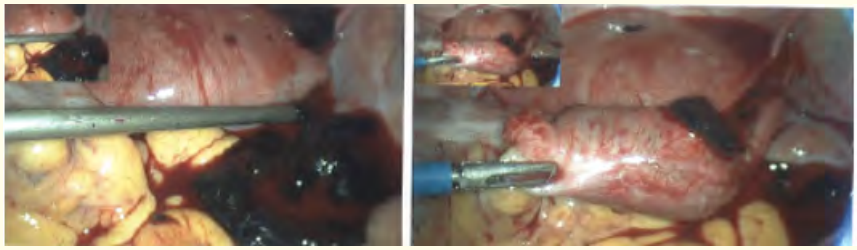


Figure 3: *USS images belonging to case 3.*

3A and 3C: Longitudinal view of the intrauterine pregnancy on transabdominal and transvaginal ultrasound, respectively. 3B and 3D: Transabdominal and transvaginal, respectively, ultrasound images of the right adnexa, revealing a live co-existing ectopic pregnancy, with a layering of blood seen adjacent.

Treatment

She was offered an emergency laparoscopy for right salpingectomy and removal of the ectopic pregnancy. The procedure was performed on the same day.



Picture 3: *Intraoperative images of the hemoperitoneum and ruptured right tubal ectopic pregnancy.*

Outcome and follow-up

She had a scan the day after her procedure, which showed a live singleton pregnancy with a CRL of 13.8 mm. She was discharged from the hospital following the scan. She was re-admitted 10 days later with a fever and raised inflammatory markers. Repeat scans and cultures did not reveal a source of infection. She was treated with broad-spectrum antibiotics in accordance with local guidelines for infection of unknown origin. She showed clinical improvement and was discharged with oral antibiotics. Her anomaly scan at 20 weeks was normal.

Discussion

All our cases were conceived spontaneously and presented within the same year. None of them had underlying risk factors for ectopic pregnancy. In a systematic review investigating the clinical outcomes of spontaneous heterotopic pregnancies with an unaffected intrauterine pregnancy. Oancea., *et al*. reported that most cases had no identifiable risk factors. Although the exact aetiology is unknown, it has been suggested that this rare occurrence may result from an ovulatory abnormality or a delay in the capture of the fertilised egg by the tube, leading to a difference in the pace of migration between the two embryos [1].

Oancea., *et al.*'s review reported that the most common presenting symptom was abdominopelvic pain due to distension of the fallopian tube, followed by vaginal spotting or bleeding, with diagnoses mostly made in the first trimester. All three of our cases presented similarly. The first two cases experienced mild pain managed with oral analgesics at around 8 weeks of gestation. Their observations, physical examinations, and blood tests were normal, with βHCG levels >15,000 mIU/mL. Both had unruptured ectopic pregnancies on ultrasound scans and no evidence of hemoperitoneum. The third case presented with more significant pain, tenderness in the right iliac fossa, raised inflammatory markers, and was found to have a hemoperitoneum.

It is important to note that these symptoms are also common in early normal intrauterine pregnancies, creating difficulty in distinguishing them based on symptoms alone [7]. Visualization of an intrauterine pregnancy can be falsely reassuring for the healthcare practitioner scanning the patient in an emergency setting [7,8]. Therefore, a detailed transvaginal ultrasound examination of both adnexa in a patient with a confirmed intrauterine pregnancy is crucial for diagnosing a co-existing ectopic pregnancy. An early intrauterine pregnancy at 8 weeks may still be visible on bedside transabdominal ultrasound, which can be falsely reassuring and delay diagnosis and treatment. In our second case, a bedside transabdominal scan at presentation visualized an intrauterine gestational sac. Her departmental

scan, performed approximately two weeks later, identified the ectopic pregnancy; the delay was likely due to false reassurance from the bedside scan, which misled the clinical picture. Based on this, implementing transvaginal ultrasound training into the curriculum could help shorten outpatient ultrasound waitlists and enable timely diagnosis and treatment of acute gynaecology patients.

Due to the rarity of the condition, there are no established guidelines for the management of HP [1]. Once diagnosed, literature lists several treatment options: conservative management with close monitoring, ultrasound-guided aspiration of the ectopic pregnancy, foetal reduction, and surgical management [9,10]. Although successful conservative management has been reported, with patients observed closely as inpatients for several weeks, it may not be preferred by healthcare providers or patients for several reasons [11,12]. Limited access to emergency beds and appointments, coupled with extended waiting times, can make conservative management a less feasible option in many healthcare settings. Conservative management often require long-term inpatient monitoring, which may be undesirable for patients. The success rate of conservative management is reported to be 65.52%, meaning that approximately 1 in 3 cases require further treatment, making it a less appealing management options for patients seeking definitive management [11]. Foetal reduction, while listed as a treatment option, carries serious safety considerations for both the woman and the co-existing viable foetus and is therefore considered only in selected cases [13,14]. The most common treatment for adnexal ectopic pregnancy is surgical, typically performed via minimally invasive techniques [15-17].

Some studies suggest higher rates of pregnancy loss with laparoscopy compared to laparotomy, while others indicate that general anaesthesia may cause neurological complications in the surviving foetus; however, the evidence remains inconsistent [9,15]. The systematic review by Oancea., *et al.* suggests that clinical outcomes were favourable regardless of the method chosen [1]. In our series, all patients retained their viable intrauterine pregnancies and were at 20 weeks of gestation or beyond at the time of writing. No major anomalies were observed on the patients' anomaly scans. All patients were discharged 24-72 hours after their procedure. Only one patient required short-term re-admission for infection, but no identifiable source was found.

Conclusion

HP is a complication which isn't as rare as once thought, and early diagnosis and management of the ectopic twin is crucial for the well-being of the mother and intrauterine foetus, therefore it is very essential that the units should be able to recognise and treat these cases timely. Units must follow strict protocols in examining the bilateral adnexa of every pregnant woman with abdominal pain so as not to miss diagnosis and treatment should be provided early prior to further complications. The treatment requires multi departmental collaboration and communication with the patient as well as good surgical planning. The prognosis for the mother and the co-existing IU pregnancy is favourable when the treatment is successful, and our report shows that successful management can be achieved in a district general hospital setting.

Consent and Ethical Approval

Written consent was obtained from all patients for the publication of clinical details and accompanying images. No ethical approval was required for this study.

Author Contributions

SS collected the clinical data, consented the patients, carried out a literature review and drafted the manuscript. EA contributed scan images and provided radiological interpretation. TK and NI supplied surgical images and contributed operative insights. ZA oversaw the project and provided critical revisions and editorial guidance. All authors reviewed and approved the final version of the manuscript.

Disclosure of Interest

No competing interests were disclosed by any of the authors.

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