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## Case report

# Quadruplet heterotopic pregnancy; ectopic managed successfully with laparotomy with subsequent viable intrauterine pregnancy: A case report ☆,☆☆

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## ARTICLE INFO

## Article history:

Received 24 January 2022

Revised 1 February 2022

Accepted 2 February 2022

## Keywords:

Multiple gestations  
 Extrauterine pregnancy  
 Fallopian tube  
 Ampulla  
 Artificial insemination  
 Heterotopic pregnancy  
 Ascites  
 Hemoperitoneum

## ABSTRACT

Heterotopic pregnancy is characterized by a concurrent intrauterine and ectopic pregnancy. It can occur after natural conception, however, it is more common with assisted reproductive techniques, when over one embryo is transferred. Quadruplet heterotopic pregnancy is an exceedingly rare subset. Our case describes a woman who presented to the emergency room with amenorrhea for 9 weeks and lower abdominal pain for 3 days. Transvaginal ultrasound revealed three alive intrauterine fetuses and one left tubal ectopic pregnancy (Quadruplet heterotopic pregnancy). Patient benefited from emergent laparotomy with favorable outcome both in the short term and in the long term. In a patient with a history of assisted reproductive techniques, a high index of suspicion is warranted towards extra-uterine pregnancy. Sonologists should precisely look for adnexal mass. The presence of peritoneal free-fluid requires further investigation. The prognosis of intrauterine fetuses is good, provided the ectopic pregnancy is managed timely and in an effective manner.

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☆ Acknowledgments: No financial support was gained for this article.

☆☆ Competing interests: None to declare.

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<https://doi.org/10.1016/j.radcr.2022.02.007>

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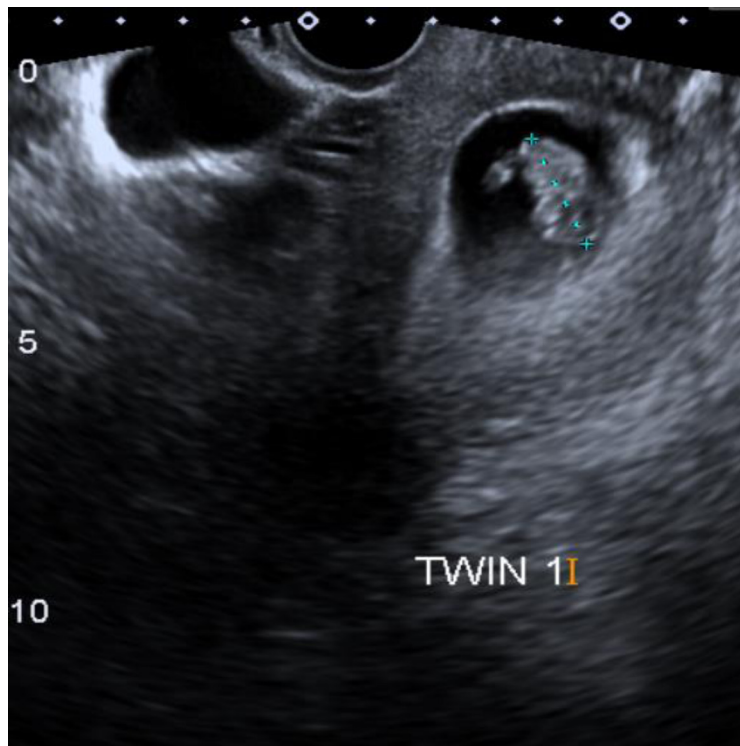
## Introduction

Heterotopic pregnancy (HP) occurs due to the simultaneous presence of both the intrauterine pregnancy (IUP) and ectopic pregnancy (EP), either live or demised. It is commonly found in patients who conceive via artificial reproductive technique (ART), in which the incidence is reported between 1 of 100 and 1 of 3600. In patients conceiving naturally, the incidence of HP is much rarer, 1 of 10,000–50,000 [1].

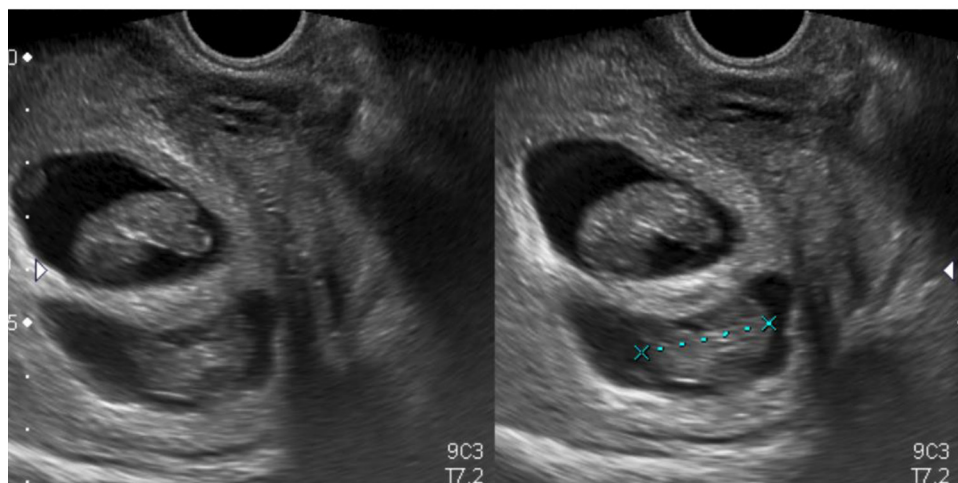
The simultaneous presence of an EP and twin or triple IUPs is of extremely rare occurrence [2,3]. The most common site

of EP in HP is the ampulla of the fallopian tube, similar to any other. An endovaginal 2-dimensional ultrasound (2D US) is routinely used in the investigation of HP. However, it is not uncommon to misdiagnose the condition. The risk involved with HP is because of the potential for rupture of EP and the serious consequences of multiple intrauterine pregnancies [4,5].

Because of the increased use of ARTs, future obstetricians will encounter such cases more frequently. Increased education about the correct diagnosis and management of HP must be emphasized among health care practitioners, especially ob-

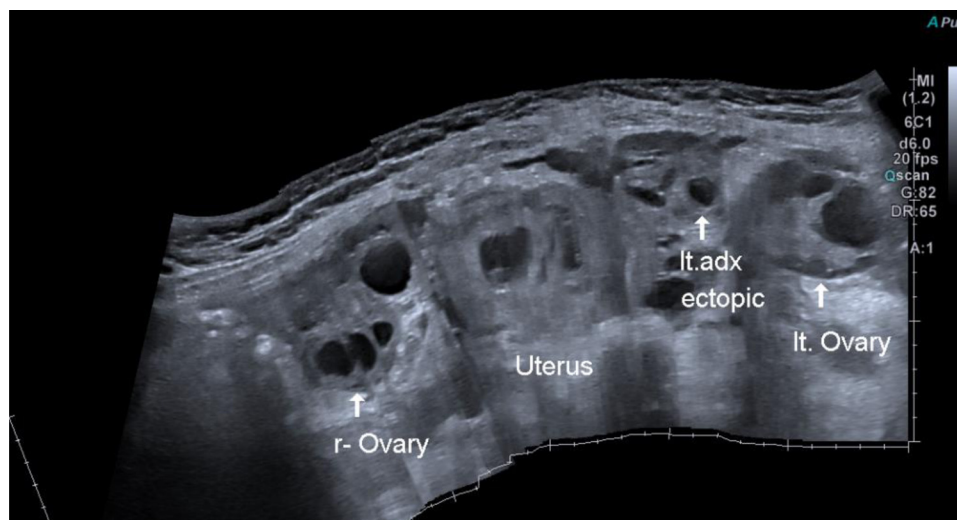


a



b

**Fig. 1 – A and 1B: Transvaginal ultrasound images showing triplet intrauterine fetuses.**



**Fig. 2 – Panoramic view of transvaginal ultrasound showing ectopic gestational sac in left fallopian tube next to the left ovary. The right ovary is normal.**

stetricians and emergency doctors. Our case describes a patient with triple IUP and a left-sided tubal pregnancy following ART.

### Case

A 26-year-old woman G3 P1+1, was brought to the emergency department with amenorrhea for 9 weeks and lower abdominal pain for 3 days. The patient had used clomiphene citrate (50 mg/day) for 5 days for ovulation induction due to secondary infertility of 2 years. The patient was pale and cold, with GCS (Glasgow Coma Scale) level 15 out of 15. Her blood pressure was 85/60 mm Hg. Hemoglobin and serum human chorionic gonadotropin (Hcg) were 8 g/dL and 405220 mIU/mL respectively. On physical examination there was significant diffuse abdominal and rebound tenderness. Transvaginal ultrasound revealed three alive intrauterine fetuses (Figs. 1A and B) and one left tubal ectopic heterogeneous mass of approximately 6 × 5.8 cm (Fig. 2). Mild free fluid with internal echoes was noted in the abdomen and pelvis, representing haemoperitoneum. Both ovaries were enlarged with a cystic appearance due to ovarian hyperstimulation. A provisional diagnosis of a heterotopic quadruplet pregnancy was made. Emergency laparoscopy was carried out which showed ruptured left tubal pregnancy. Due to multiple adhesions, the procedure was converted to laparotomy. Left segmental salpingectomy was performed along with adhesiolysis of dense omental adhesions along the anterior abdominal wall and uterus. Approximately 1.5 liters of hemoperitoneum was drained. Repeat Transvaginal ultrasound showed alive tri-chorionic and tri-amniotic intrauterine pregnancies. The crown-rump lengths of all the fetuses were 24 mm corresponding to a gestation of 9 weeks. The previously diagnosed ectopic gestational sac was resolved. The patient was discharged after 4 days of uncomplicated hospital stay. The patient had regular outpatient follow up until spontaneous labor at the 28th week of pregnancy. The

neonates were shifted to the neonatal intensive care unit for post-birth management.

### Discussion

Multiple gestations are the most common side-effects of ARTs. HP, a rare form of multiple gestations, occurs due to simultaneous IUP and EP. Such a phenomenon commonly occurs due to the implantation of multiple embryos in the uterus. History of pelvic inflammatory disease, endometriosis, tubal surgery and prior EP are among the known risk factors [1,4-6]. Alterations in the fallopian tube during in vitro fertilization- embryo transfer increase the chances of EP [7]. The most common site for EP in HP is the ampulla of the fallopian tube. However, cases of HP in cornu and isthmus of the fallopian tube and cervix have also been reported [1,8-10].

The median age for diagnosing HP is 7.5 weeks of gestation [6]. HP is often an asymptomatic condition. However, it can mimic EP or abortion. Vaginal bleeding and abdominal pain, signs of peritonitis and adnexal mass are the commonly found features in symptomatic cases. Hypovolemic shock is more commonly found in HP compared to EP requiring blood transfusion [5,6,11,12].

Serum b-HCG is not of any significance in the diagnosis. However, levels of b-HCG on the 14th day after AVF is an independent risk factor for HP. Ultrasonography (USG) is the most useful technique for diagnosis HP [5,11]. USG shows a para- or retro uterine mass and a “ring of fire” sign, signifying the ectopic gestational sac [12,13]. It is difficult to diagnose HP due to the crowding of the pelvis due to the gestational sac and hyperstimulated ovaries. In some cases, free fluid in the peritoneum is the only finding on USG without any adnexal mass. The specificity of USG in diagnosing EP is 94%-99% whereas the sensitivity is 84%-90% [3,6,14]. When sonographic findings are indeterminate, MRI can serve as a problem-solving tool owing to its excellent tissue contrast [13,15].

Laparoscopy serves as a diagnostic as well as therapeutic purpose. Depending on the situation of the patient, conversion to laparotomy may be required, as occurred in this case [5,6,13,16]. In cases of cervical HP, non-surgical methods, such as injection of methotrexate and potassium chloride has proven favorable outcomes [16,17]. The main precaution that should be taken into account is to preserve the normal IUP while treating the EP. Embryo reduction has been commonly practiced in cases with a risk of IUP and it can be performed non-invasively [2,8].

Elective single embryo transfer is linked to reducing the risk of multiple gestations due to ART. Even so, the rate is still high [4]. In addition, the elective single embryo transfer is not adopted by all the countries. It is predictable that the current incidence of HP (around 1/5000-1/7000 [1]), would rise. Unequivocally, the increased use of ART has multiplied the risk of HP, therefore, the diagnosis and management of HP must be emphasized. HP is a rare entity and is a potentially life-threatening condition. This entity requires early diagnosis and closed supervision and follow up to achieve favorable clinical outcomes.

### Ethics approval

Ethical approval was granted by the Ethics Review Committee.

### Patient consent

Informed written consent was obtained from the patient for their anonymized information to be published in this paper.

### REFERENCES

- [1] Felekis T, Akrivis C, Tsirkas P, Korkontzelos I. Heterotopic triplet pregnancy after in vitro fertilization with favorable outcome of the intrauterine twin pregnancy subsequent to surgical treatment of the tubal pregnancy. *Case Rep Obstet Gynecol* 2014;2014:356131.
- [2] Tamhane NA, Parikh A, Joshi VM. Heterotopic quadruplet pregnancy after ICSI conception. *J Obstet Gynaecol India* 2018;68:505–7.
- [3] Hassani K, Bouazzaoui A, Khatouf M, Mazaz K. Heterotopic pregnancy: a diagnosis we should suspect more often. *J Emerg Trauma Shock* 2010;3(3):304.
- [4] El-Toukhy T, Bhattacharya S, Akande V. Multiple pregnancies following assisted conception: scientific impact paper no. 22. *BJOG: Int J Obstet Gynaecol* 2018.
- [5] Liu M, Zhang X, Geng L, Xia M, Zhai J, Zhang W, et al. Risk factors and early predictors for heterotopic pregnancy after in vitro fertilization. *PLoS ONE* 2015;10(10):e0139146.
- [6] Soriano D, Shrim A, Seidman DS, Goldenberg M, Mashiach S, Oelsner G. Diagnosis and treatment of heterotopic pregnancy compared with ectopic pregnancy. *J Am Assoc Gynecol Laparosc* 2002;9(3):353–8.
- [7] Shaw J, Dey S, Critchley H, Horne A. Current knowledge of the aetiology of human tubal ectopic pregnancy. *Hum Reprod Update* 2010;16(4):432–44.
- [8] Qiong Z, Yanping L, Prasad DJ, Lin Z. Treatment of cornual heterotopic pregnancy via selective reduction without feticide drug. *J Minim Invasive Gynecol* 2011;18(6):766–8.
- [9] Anderson J, Patterson C, Riley A. Heterotopic interstitial pregnancy: a case report. *Case Rep Womens Health* 2018;17:8–10.
- [10] Hafner T, Ivkovic IE, Serman A, Bauman R, Ujevic B, Vujisic S, et al. Modification of conservative treatment of heterotopic cervical pregnancy by Foley catheter balloon fixation with cerclage sutures at the level of the external cervical os: a case report. *J Med Case Reports* 2010;4:212.
- [11] Tandon R, Goel P, Saha PK, Devi L. Spontaneous heterotopic pregnancy with tubal rupture: a case report and review of the literature. *J Med Case Reports* 2009;3:8153.
- [12] Clayton HB, Schieve LA, Peterson HB, Jamieson DJ, Reynolds MA, Wright VC. A comparison of heterotopic and intrauterine-only pregnancy outcomes after assisted reproductive technologies in the United States from 1999 to 2002. *Fertil Steril* 2007;87(2):303–9.
- [13] Sun SY, Araujo Júnior E, Elito Júnior J, Rolo LC, Campanharo FF, Sarmento SGP, et al. Diagnosis of heterotopic pregnancy using ultrasound and magnetic resonance imaging in the first trimester of pregnancy: a case report. *Case Rep Radiol* 2012;2012:317592.
- [14] Sivalingam VN, Duncan WC, Kirk E, Shephard LA, Horne AW. Diagnosis and management of ectopic pregnancy. *J Fam Plann Reprod Health Care* 2011;37:231–40.
- [15] Tamai K, Koyama T, Togashi K. MR features of ectopic pregnancy. *Eur Radiol* 2007;17:3236–46.
- [16] Hewlett K, Howell CM. Heterotopic pregnancy: Simultaneous viable and nonviable pregnancies. *JAAPA* 2020;33(3):35–8.
- [17] Deka D, Bahadur A, Singh A, Malhotra N. Successful management of heterotopic pregnancy after fetal reduction using potassium chloride and methotrexate. *J Hum Reprod Sci* 2012;5(1):57–60.