

# “Eggs” Marks the Spot: The Diagnostic Dilemma of In Vitro Fertilization-Associated Emergencies

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## Introduction

Unstable pregnant patients who have undergone assisted reproductive technology (ART) require a higher index of suspicion for otherwise rare, life-threatening conditions that may go overlooked if not properly considered. Specifically, ovarian hyperstimulation syndrome (OHSS) and heterotopic pregnancy are emergencies that can be difficult to differentiate in the ED.

## Case Presentation

A 41-year-old female presented to the ED with a several-day history of abdominal pain, vomiting, and lightheadedness. She was five weeks pregnant after having in vitro fertilization (IVF) in which two embryos were implanted. She had a history of one prior miscarriage, but no other pregnancies. She had no vaginal bleeding or discharge, fever, or chills.

Physical exam:

- T 97.3° F, HR 60, BP 58/32, RR 19, O2 sat 98% on RA
- Abdomen diffusely tender and distended with guarding

## Diagnosis and Management

Resuscitation with intravenous fluids was initiated and bedside ultrasound (US) was performed. An intrauterine pregnancy (IUP) was identified and there was free fluid in multiple views. Transvaginal US and labs were ordered.

Labs:

- $\beta$ -hCG: 27631 (5945 three weeks prior)
- Hgb/Hct: 8.2/24.4 (9.9/28.2 five days prior)
- WBC: 29.6 (8.1 five days prior)

Transvaginal US: Single IUP at 6 weeks and 1 day. Large amount of free fluid, suspicious for blood, concerning for ruptured ectopic pregnancy (Figure 1). Ovaries enlarged, consistent with hyperstimulation (Figure 2).

## Diagnosis and Management (continued)

The patient continued to be hypotensive after fluid resuscitation and two units of packed RBCs were ordered. Given concern for ruptured ectopic pregnancy, OB took the patient to the OR, where a right tubal pregnancy was identified. Right salpingectomy was performed, additional blood products and fluids given, and the patient was discharged home the following day with plan for follow-up US to evaluate the IUP.

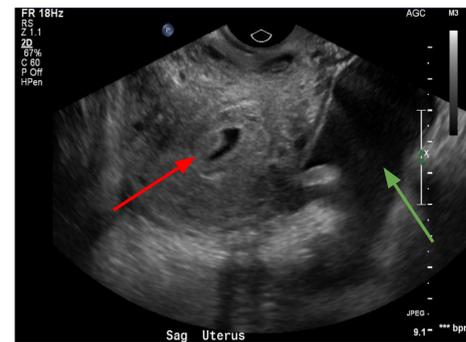


Figure 1: Ultrasound showing intrauterine gestational sac (red arrow) and large amount of free fluid (green arrow)



Figure 2: Ultrasound of the right adnexa showing ovarian hyperstimulation

## Discussion

When a patient who has undergone IVF presents to the ED, OHSS and heterotopic pregnancy are two key emergencies to consider. OHSS occurs when hyperstimulation of the ovaries causes increased vascular permeability and third-spacing of intravascular fluid, resulting in varying severities of organ dysfunction. US commonly shows free fluid due to ascites, and labs are typically suggestive of hemoconcentration.

In contrast, ruptured heterotopic pregnancy, in which there are two simultaneous pregnancies at different implantation sites, presents with free fluid on US, but with anemia due to blood loss. Prior to IVF, the incidence of heterotopic pregnancy was rare (1/30,000), but it is more common with ART (1/100), with an overall incidence of approximately 1/3900.<sup>[1]</sup>

## Discussion (continued)

This case illustrates a diagnostic dilemma, as the patient presented with evidence of both OHSS and heterotopic pregnancy due to concurrent leukocytosis and anemia and free fluid on US. Though some case studies describe the challenge of differentiating OHSS and heterotopic pregnancy, these are in patients who presented prior to rupture or who were asymptomatic, therefore allowing more workup to determine the diagnosis.<sup>[2],[3],[4]</sup> Additionally, these case studies are from the perspective of obstetrics, with a paucity of similar literature in emergency medicine.

## Follow-Up

The patient had an ultrasound the following week which was suggestive of intrauterine fetal demise. She returned to the ED several weeks later with vaginal bleeding and was found to have a complete abortion.

## Pearls and Pitfalls

- Patients who have undergone ART require special consideration when they present to the ED due to their increased risk for life-threatening disorders that are otherwise rare in spontaneous pregnancies.
- OHSS and heterotopic pregnancy can present similarly, but can usually be differentiated by the presence of hemoconcentration vs. anemia.
- Remember that the presence of an intrauterine pregnancy does not rule out a concomitant ectopic pregnancy!

## References

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