Diagnosis of Ectopic Pregnancy in the ED: an Update

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key points

• clinical updates for the practicing emergency physician
• discuss management of patients with suspected ectopic pregnancy
• use of bedside ultrasound
• clarifying the role of b-hCG

by then end of the lecture...

• you are seeing a patient with a b-hCG of 250. Should you order an ultrasound?
• what do I need to visualize on EM US to safely discharge the patient?
• how safe it to discharge this patient?
• you are seeing a patient with an indeterminate radiology US and a b-hCG of 250. Is ectopic pregnancy excluded?
• why should I learn to do bedside pelvic US? Will it improve care for patients?

clinical problem = symptomatic 1st trimester patients
what I learned about EP in med school

- 2% of all pregnancies
- triad of amenorrhea, abdominal pain, vaginal bleeding
- ruptured ectopics result in syncope, shock, and mortality
- EP leading cause of death in 1st trimester

update

- universal screening of symptomatic first trimester patients
- improved technology - transvaginal US - high resolution picture of uterus
- identifying EP before rupture
- associated mortality has decreased to 0.5 deaths/1000 pregnancies

maintain vigilance

- 2% of all pregnancies
- prevalence in ED population:
- 5-13% of ED cohort (10 studies)
- 8% of symptomatic 1st trimester pts

Basic strategy

- identify location of pregnancy
- visualizing IUP excludes ectopic
one caveat

- heterotopic pregnancy = simultaneous IUP and EP
- 1/8000-1/30000 pregnancies
- caveat - fertility treatment
- At UCSF, in last 6 years: 1 case in non-IVF patient

Ectopic pregnancy

- approximately 20% of pts
- pregnancy not visualized
- ddx includes:
  - IUP, EP, abortion

intermediate result
**basic protocol**

- Symptomatic 1st trimester patient (non IVF)
- Formal ultrasound
  - IUP
  - EP
  - Indeterminate
  - Correlate with b-hCG
    - Below DZ
    - Above DZ

**bedside pelvic US**

- Emerging technology in last 10 years
- Performed by EP at the bedside
- Visualize the uterus and contents
- Focused question: do I see an IUP?

**TAS**

**TAS - sagittal**
recognizing IUP

- Gestational sac
- yolk sac or fetal parts
- surrounded by myometrium
Detection of Ectopic Pregnancy

- secondary - advanced application
- gestational sac/fetal anatomy outside of uterus
- empty uterus
- complex adnexal mass
- other secondary signs - large free fluid, pseudo-gestational sac

ectopic

- gestational sac in adnexa
- empty uterus
- free fluid

always look for hemoperitoneum

**BRIEF REPORT**

Free Fluid in Morison’s Pouch on Bedside Ultrasound Predicts Need for Operative Intervention in Suspected Ectopic Pregnancy

Chris Aeberli, MD, William T. Teitel, MD, Elizabeth O’Brien, MD, Henry Lin, MD

Abstract

- perform a FAST exam
- if positive - patient likely needs OR
- don’t send patient to radiology
**protocol using EUS**

symptomatic 1st trimester patient (non IVF)

- bedside ultrasound
  - IUP
  - EP
  - indeterminate

- radiology US
  - IUP
  - EP
  - indeterminate
  - correlate with b-hCG
  - below DZ
  - above DZ

**but your patients will benefit**

- sending home patients with IUP is safe
- send home 50-70% of your patients
- decreased ED LOS (2h) if IUP is visualized
- 24/7 availability
- unstable patients - avoid sending patient to radiology

**how safe is it?**

- If IUP is visualized:
  - EP is safely excluded (sensitivity=99.3%, NPV 99.9%)
- exclude majority of patients (50-70%)

**this seems like a lot to learn...**

"Mr. Osborne, may I be excused? My brain is full."
ACEP core US application
recent NEJM review
included in EM residency curriculum

Human chorionic gonadotropin
- hCG is hormone produced by placenta
- serum b-hCG is marker for gestational age

false negative UPT
- dilute urine may result in false negative
- urine SG < 1.005 should be verified
- low levels of b-hCG

role of b-hCG
- b-hCG = gestational age, size of fetus
- DZ = level of bHCG (gestational age) at which operator is certain to see IUP (if IUP exists)
- if radiology US is indeterminate - compare bHCG to discriminatory zone
intermediate result

- $bHCG < DZ$: IUP, EP, embryonic demise
- $bHCG > DZ$: EP, embryonic demise, IUP


using $b-hCG$ clinically

- serum $b-HCG$ is often obtained first
- should $b-HCG$ be used to determine whether US is ordered?
- you are seeing a patient with a $b-HCG$ of 250. Should you order an ultrasound?
- if your US is indeterminate, is EP excluded?

- avoid using $b-HCG$ to decide to order pelvic US
- obtain US even if $b-HCG$ is below discriminatory zone
- do not use $b-HCG$ to exclude EP, only excludes early IUP

- $b-HCG$ level does not predict EP
- EP presents at all level of $b-HCG$
- EP found at levels below discriminatory zone
**b-hCG trending at 48 hrs**

- **traditional teaching - b-hCG should double**
- **recent studies show:**
  - b-hCG in IUP should increase by 53%
  - b-hCG in EP can increase or decrease
  - b-hCG in SAB should decrease

**summary**

- symptomatic 1st trimester patients should be routinely screened for EP
- the prevalence of EP is increased in the cohort of ED patients
- if performed correctly, bedside US can safely r/o EP
- look for free fluid in the RUQ in symptomatic 1st trimester pts
- use b-hCG in the correct context, do not use it to exclude EP

**quiz**

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**enjoy the rest of the course!**

- questions?
selected bibliography


