emDocs

The EM Educator Series

Controversial elements of ectopic pregnancy

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A 24-year-old female presents with abdominal pain and nausea. She is 9 weeks pregnant by dates. She has noted some spotting, but no severe bleeding. VS include HR 122, BP 87/42, RR 22, Sats 98% RA, T 98 oral. Her abdomen is diffusely tender, and she appears ill. Her pregnancy test is positive, and US reveals a right-sided adnexal mass, with free fluid in the pelvis.

Questions for Learners:

1) What are the risk factors for ectopic pregnancy?

2) How can patients with ectopic pregnancy present?

3) What is the ED work-up?

4) For the crashing patient with ectopic pregnancy, what's the management, and who can help?

5) What are other types of ectopic pregnancy: cervical ectopic, interstitial ectopic, heterotopic? How can these be challenging?

6) How can the hCG fool you? What about following hCG trends?

7) When is an ultrasound needed, and how can this fool you?

8) What are pitfalls of medical management with methotrexate?

Suggested Resources:

- ✓ Articles:
  - emDOCs – Ectopic Pregnancy
  - CORE EM – Ectopic Pregnancy
  - EM Cases – Vaginal Bleeding in Early Pregnancy
  - EM Cases – Ectopic Pregnancy Pitfalls in Diagnosis
  - emDOCs – US Probes: Ultrasound for Ectopic Pregnancy
  - EM Updates – Rule Out Ectopic in the Emergency Department
  - EM PharmD – MTX, Obesity and Ectopic Pregnancy

Answers for Learners:

1) **What are the risk factors for ectopic pregnancy?**

Prior ectopic, history of a tubal ligation or prior tubal surgery, pelvic inflammatory disease (PID), and infertility. **Only 50%** of patients have classic risk factors (past history of ectopic, tubal surgery, tubal ligation, infertility treatment, or PID).

2) **How can patients with ectopic pregnancy present?**

Symptoms and exam findings really depend on whether tubal rupture has occurred. Signs and symptoms can vary from just pelvic pain or vaginal bleeding to bleeding from massive intraperitoneal hemorrhage. While most women do present with abdominal pain and vaginal bleeding, up to 9% of women have no pain at all. In addition, more than half of all ectopic pregnancies occur in women without any known risk factors. Thus, ectopic pregnancy can be a difficult diagnosis to make and physicians should maintain high clinical suspicion, even in patients with minimal symptoms and benign exam findings.

- Classic Triad
    - Abdominal pain
    - Vaginal bleeding
    - Missed menstrual period
    - **The classic triad of abdominal pain (80–90%), missed menses 4–12 wks after LMP (75–90%) & vaginal bleeding (50–80%) is NOT sensitive. Up to 25% lack the full triad, and 10% may have no symptoms.**
- Patient's typically present 6-8 weeks after the last normal menstrual period
- Signs and symptoms suggestive of rupture
    - Vital sign abnormalities
        - Hypotension
        - Tachycardia
        - Shock
        - **Vital signs may be falsely reassuring in ectopic pregnancy: Patients with ectopics often have normal vital signs, even with significant bleeding, and may have a reflex bradycardia caused by a vagal response to intraperitoneal blood.**
    - Lightheadedness/syncope
    - Cool, pale skin
    - Nausea + emesis
    - Severe abdominal pain
- Referred pain
    - Diaphragmatic irritation from free blood in the peritoneal space may present as shoulder pain
    - Referred neck or rectal pain are reported
- Vagal stimulation from intra-peritoneal blood can present as hypotension and bradycardia

3) **What is the ED work-up?**

The diagnosis of ectopic pregnancy is typically made by confirmation of pregnancy with a positive urine beta human chorionic gonadotropin (B-hCG) and a pelvic ultrasound showing an extra-uterine

pregnancy. If the ultrasound shows an intrauterine pregnancy (IUP), then ectopic can typically be ruled out since the incidence of concomitant ectopic and IUP is extremely low.

Rule Out Ectopic in the Emergency Department

4) **For the crashing patient with ectopic pregnancy, what's the management, and who can help?**

Rapid identification is paramount

- Ruptured ectopic should be considered in any hemodynamically unstable woman of child bearing age
- Presence of free fluid in absence of trauma in this group should be considered ectopic pregnancy until proven otherwise

Basic Management

- ABCs, Large bore (> 18 gauge) IV X 2, Supplemental O2 if necessary
- Approach similar to exsanguinating trauma patient

Key actions:

- Perform a FAST exam
    - Positive result requires immediate OB/Gyn or surgical consultation for surgical exploration
    - Can improve sensitivity by placing patient in Trendelenburg position
- Hemodynamic instability should trigger massive transfusion protocol
- Start resuscitation with O negative blood (start with crystalloid resuscitation if blood not immediately available)

5) **What are other types of ectopic pregnancy: cervical ectopic, interstitial ectopic, heterotopic? How can these be challenging?**

Ectopic Location (Arleo 2014)

- Greater than 95% of extrauterine implantations occur in the fallopian tube.
- Interstitial pregnancies: occur in to the most proximal segment of the fallopian tube within the uterine wall
- Cornual pregnancies occur in the upper and lateral portion of the uterus.
- Rare cervical pregnancies implant in the uterine endocervix. They may be confused with an aborting intrauterine pregnancy (IUP) residing in the cervix and may lead to massive hemorrhage if disturbed.

Heterotopic pregnancy: An ectopic pregnancy in conjunction with an IUP

- Natural conception rate: 1/30,000
- Assisted reproduction rate: 1/100

6) **How can the hCG fool you? What about following hCG trends?**

The index beta HCG measurement does not discriminate among ectopic pregnancy, failed/failing intrauterine pregnancy, and early/healthy intrauterine pregnancy with sufficient accuracy to guide decision-making. Put more simply, the beta does not help you.

Serial BhCG measurement is most useful to confirm fetal viability (BhCG should rise at least 66% over 48hrs) rather than to identify ectopic pregnancy.

- However if the BhCG >50,000, ectopic is very unlikely.
- VERY LOW BHCG (<1000) DOES NOT RULE OUT ECTOPIC; ULTRASOUND IS STILL NEEDED!

In 2012, the American College of Emergency Physicians (ACEP) addressed issues mentioned above in an update of their clinical policy on the evaluation and management of patients in early pregnancy. Overall, based on panel consensus or class III studies, the authors recommend obtaining a pelvic ultrasound for symptomatic pregnant patients with a β-hCG level below any discriminatory level. The authors do say that at this time, there is not enough evidence to estimate risk of rupture or death if an ultrasound is not obtained, but essentially this may reduce delays in diagnosis.

In regards to the use of serum β-hCG levels in determining risk of ectopic pregnancy, ACEP indicates that, based on class II studies or strong class III studies, that the β-hCG value should not be used to exclude the diagnosis of ectopic pregnancy in patients who have an indeterminate ultrasound. They also recommend that, based on panel consensus or class III studies, consultation and/or close follow-up should be arranged for patients with an indeterminate US. The article is listed below for further review.

7) **When is an ultrasound needed, and how can this fool you?**

- ED U/S for ectopic is very specific for ruling out ectopic, and involves looking for intrauterine pregnancy (IUP), and free fluid in the pelvis and abdomen.
- To confirm an IUP by U/S, a decidual reaction with a gestational sac and yolk sac (+/- fetal pole) must be seen *within* the uterus.
- Even if an IUP is seen, if the patient is unstable with free fluid in the abdomen, it may be a ruptured cyst or a “heterotopic”!

8) **What are pitfalls of medical management with methotrexate?**

In obese and morbidly obese patients, dosing based on BSA may lead to underdosing (not to mention inadvertent subcutaneous administration and altered absorption characteristics), treatment failure and potential complications or surgery. On the flip side, methotrexate can cause dose-dependent toxicities including stomatitis, esophagitis, kidney failure, myelosuppression, hepatitis, and central nervous system dysfunction. Therefore, it is necessary to limit the exposure of patients to this drug to the minimum necessary to achieve the desired clinical outcome.

Unfortunately, there is no recommendation from ACOG on how to approach methotrexate dosing in obese patients, and until recently there was no evidence of whether dose adjustments or capping in safety or efficacy.