A Practical Approach to Ectopic Pregnancy

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Common Scenario
- Woman of child bearing age presents to the emergency room with pelvic pain and/or vaginal bleeding
- Clinical exam may reveal a palpable adnexal mass with tenderness during examination
- Pregnancy test (urine or blood) is positive
- Differential Diagnosis: Normal intrauterine pregnancy vs. abnormal IUP/spontaneous abortion vs. ectopic pregnancy
- Next step: Transvaginal Ultrasound if the patient is clinically stable

Ectopic Intro
- Frequency is usually listed as 16/1000 reported pregnancies
- Remains the leading cause of pregnancy related death in the first trimester in the USA
- Risk factors include: previous ectopic, h/o PID, tubal surgery, assisted fertilization, IUD
- Any woman of child bearing age at risk

Location
- Tubal (95-97%)- ampulla>isthmus>interstitial
- Ovary (0.5-1%)
- Cervix (0.1%)
- Fimbria (very rare)
- Abdomen (?reimplanted)

Ultrasound-Normal IUP
- 4-4.5 wks.-gestational sac seen on TVUS
- 5-5.5 wks.-yolk sac (MSD 6-8 mm max)
- 6 wks.- embryo (MSD 16-18 mm max)
- Careful before yolk sac seen (gsac vs. decidual cysts)-intradecidual sign and double decidual sac sign suggestive of an IUP but likely require f/u ultrasound at this stage before the yolk sac is demonstrated
Intradecidual Sign

- Earliest US finding of an IUP
- Eccentric location of an echogenic ring surrounding the small fluid collection (2 mm) embedded in the decidua adjacent to the endometrial canal-seen at approximately 4.5 wks
- Laing et al in Radiology 1997 reported sensitivity/specificity/accuracy of 48%, 66%, and 45%
- Chiang, Levine et al in AJR Sept. 2004 reported 60-68%, 97-100%, and 67-73%-stressed the unchanging appearance of the fluid collection on multiple views
- DDx: Pseudogestational sac, “decidual cyst”
**Double Decidual Sac Sign vs. Pseudosac**

- Later finding than the intradecidual sac sign - most effective at 5-6 wks.; performed transabdominally
- Inner echogenic ring surrounding fluid (gestational sac-decidua capsularis) displacing the endometrial cavity with the outer ring representing the decidua vera
- DDx from a pseudogestational sac occasionally difficult
Abnormal IUP

- Gsac > 16 mm without a live embryo
- Gsac > 8 mm without a yolk sac
- Gsac growth of <0.6 mm/day (normal 1.1 mm/day)
- Abnormal yolk sac/amnion > 5mm without a visible embryo
- Embryo without cardiac activity (5mm CRL or more)
US findings in Ectopic Pregnancy

Uterus
- Pseudogestational sac - 5-10% of ectopics
  - Central fluid, possibly with debris
  - Less echogenic wall than a gestational sac;
    often irregular shape
  - No double decidual sac sign
- Empty uterus
- Thickened endometrium
- Decidual cysts
  - thin walled, tiny fluid collections in the
    endometrium
  - indicator of ectopic pregnancy
    seen in nonpregnant patients and normal IUPs

Adnexal
- Gestational sac with yolk sac or embryo-
  100% specific (8-34% sensitive)
- Echogenic “ring” separate from the ovary-
  100 % specific (40-68% sensitive)
- Complex mass separate from the ovary-
  92-99% specific (89-100% sensitive)

*Data compiled by Levine from multiple authors-in Callen 4th edition pg. 924
Adnexal complex mass

- Use gentle pressure with the transvaginal probe to help locate the echogenic ring
- Suggests leakage or rupture but US cannot diagnose rupture with certainty
US findings in Ectopic Pregnancy

Cul-de-sac
- Due to active bleeding from end of tube, tubal rupture, tubal abortion, occasionally ruptured corpus luteum
- Echogenic fluid-
  - 96% specific (56 % sensitive)
- Any fluid-
  - 69-83% specific (46-75 % sensitive)
- Moderate/large amount-
  - 21-96 % specific (29-63 % sensitive)
Use of Doppler

- Pulsed and Color Doppler may occasionally be useful in the diagnosis of ectopic pregnancy but not considered a necessity at this time.
- Overlap of RIs for ectopics and corpus luteum cysts.
- False positives for PID, pedunculated fibroids, ovarian cysts.
- May assist in management of ectopic patients-expectant with no observable flow.
- Intrauterine low resistance flow may suggest intrauterine location of trophoblastic tissue (normal/abnormal IUP).
- Careful with use of Pulsed Doppler in the uterus with a likely normal IUP due to potential heating of tissue.
**Ectopic vs. Corpus Luteum**

- Both consist of a low resistance, increased flow pattern; “ring of fire”
- Ectopic is separate from the ovary but this may be difficult to determine in some cases; use probe to id site of maximum tenderness
- Corpus luteum is intra-ovarian; usually thin-walled
- 1/3 of patients have the ectopic on the opposite side from the corpus luteum
Correlation with beta-hCG

- Quantitative beta-hCG:
  - International Reference Preparation (IRP)
  - Second International Standard (2nd IS)
  - IRP = 2 x 2nd IS
  - Use mIU/ml
- Discriminatory Level:
  - Should always see a normal IUP at this level-4-4 ½ wks. gestational age
  - 1000-2000 mIU/ml

Correlation with beta-hCG

- Negative US; hCG below discriminatory level for your lab: DDx includes:
  - Early, normal IUP (<4 ½ wks.)
  - Spontaneous abortion
  - Ectopic pregnancy
- Stable patient-repeat hCG in 48 hrs:
  - Normal IUP-doubling of hCG
  - Abortion-hCG decline
  - Ectopic (live) – hCG subnormal increase; no change; occasional doubling

Interstital Ectopic

- 2-4% of ectopic pregnancies
- Delayed onset of symptoms
- Delay in diagnosis
- Increased incidence of violent rupture (increased morbidity/mortality)
- US:
  - eccentric gsac, thin myometrium
  - Interstitial line sign (interstitial portion of tube)
Cervical Ectopic

- 0.15% of ectopic pregnancies
- Risk factors: IVF, IUD, fibroids, scarring from prior D&C Asherman’s
- DDx from spontaneous abortion in progress, Nabothian cyst
- Round sac, echogenic rim, especially with yolk sac, live embryo, blood flow
- With early TV diagnosis, Rx: local KCL, local or systemic Methotrexate to preserve the uterus
Treatment
- Laparoscopic Surgery
- Medical therapy:
  - Systemic or local Methotrexate
  - beta-hCG >2,000, <10,000 mIU/ml (IRP)
  - tubal mass < 4 cm. diameter
  - stable patient without significant pain
  - absent cardiac activity
- US may be useful to monitor response
- Complications:
  - acute hemoperitoneum, pain
- Expectant management-controversial

Bibliography
7. Mehta TS, Levine D, Beckwith B, Treatment of Ectopic Pregnancy: Is a Human Chorionic Gonadotropin Level of 2,000 mIU/mL a Reasonable Threshold? Radiology 1997; 205:569-573