First Trimester Vaginal Bleeding

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First trimester vaginal bleeding occurs in approximately 5% of pregnancies.

A. True
B. False

Women with 1st trimester bleeding have about a 50/50 chance of having a miscarriage.

A. True
B. False

Up to 50% of patients with an ectopic pregnancy are misdiagnosed on their first ED visit.

A. True
B. False
The incidence of ectopic pregnancies is declining in the USA.

A. True  
B. False

Ectopic Pregnancy

- Leading cause of non-traumatic pregnancy related death
- Approx. 2% of pregnancies
- Incidence is on the rise
- Many missed on first visit to ED

The classic triad of abd pain, vag bleeding and missed period is a sensitive indicator for ectopic pregnancy

A. True  
B. False
Clinical Presentation

• Classic Triad
  ✓ Abdominal pain (80-85%)
  ✓ Missed menses (75-90%)
  ✓ Vaginal bleeding (50-80%)
• NOT sensitive

Physical Exam

• Abdominal tenderness (80-90%)
• Adnexal tenderness (75-90%)
• Adnexal mass (50%)
• Uterine enlargement (25%)
• Orthostasis (10%)

Clinical Pearl

• Vital signs and volume of blood loss correlate poorly
  – One study of 51 patients with ruptured ectopic
  – 20% pts had normal vitals and class IV shock
• Paradoxical bradycardia common

Hicks et al. AJEM 2001

Case 1

25 yo female presents to the ED with vaginal bleeding over 2 days. Initially she was spotting, but for the past couple of hours she has been bleeding heavily and developed abd pain.

LMP 8 wks ago
Causes of Vaginal Bleeding in Pregnancy

<table>
<thead>
<tr>
<th>Common</th>
<th>Less Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ectopic pregnancy</td>
<td>Vaginal wall lesion</td>
</tr>
<tr>
<td>SAB</td>
<td>Cervicitis</td>
</tr>
<tr>
<td>Implantation bleeding</td>
<td>Bacterial vaginosis</td>
</tr>
<tr>
<td></td>
<td>Cervical lesions</td>
</tr>
<tr>
<td></td>
<td>Non-vaginal source</td>
</tr>
</tbody>
</table>

Clinical Pearl

- ≈ 20% of pregnant women have some vaginal bleeding during the first 3 months of pregnancy
  - Approximately half of these women will have a miscarriage
- 10% of women with known pregnancies will have a miscarriage

Spontaneous Abortions

<table>
<thead>
<tr>
<th>Type</th>
<th>PE</th>
<th>Ultrasound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatened</td>
<td>VB or abd pain, os closed</td>
<td>varied</td>
</tr>
<tr>
<td>Complete</td>
<td>h/o VB, os closed</td>
<td>empty uterus</td>
</tr>
<tr>
<td>Incomplete</td>
<td>VB +/- os closed</td>
<td>endometrium thick</td>
</tr>
<tr>
<td>Inevitable</td>
<td>VB + os open</td>
<td>expulsion of GS</td>
</tr>
<tr>
<td>Embryonic Demise</td>
<td>varied +/- os closed</td>
<td>no cardiac activity</td>
</tr>
<tr>
<td>Blighted Ovum</td>
<td>varied +/- os closed</td>
<td>GS &gt; 20 mm no fetus</td>
</tr>
<tr>
<td>Septic</td>
<td>Tender uterus, CMT, vag discharge</td>
<td>endometrium thick</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+/- POC</td>
</tr>
</tbody>
</table>

Adverse Outcomes for Threatened Abortions

- Large empty gestational sac (GS)
  - 15 mm at 7 wks
  - 21 mm at 8 wks
- Discrepancy between crown rump length and gestational age
- Heart rate (slow or absent)
- h/o recurrent pregnancy loss
- Serum progesterone < 45 nmol/L
- Low BHCG
Threatened Abortion Management

- Serial HCG
- Follow-up in 48 hrs

Note:
Bedrest and progesterone do not affect outcome

Soitriadis et al. BMJ 2004

Incomplete Abortion Management

- Use ring forceps to remove POC
  - Send specimen to lab
- GYN consult if difficulty removing POC or open os and brisk bleeding

Note: US can identify residual tissue

Blighted Ovum Management

- No rush
- Schedule evacuation per patient and GYN preference

Septic Abortion Management

- Polymicrobial infection - broad spectrum antibiotics
- Evacuate uterus
- Admit severe cases
Rho-Gam

- Prevents Rh isoimmunization
- Administer within 72 hrs of bleeding
- Dose depends on gestational age
  - GA < 12 weeks: 50 mcg IM
  - GA > 12 weeks: 300 mcg IM

Kleihauer-Bethke test

Ectopic Pregnancy - Abdominal Pain

Differential Diagnosis

- UTI
- Acute appendicitis
- Spontaneous abortion
- Ovarian torsion
- PID
- Ruptured corpus luteum cyst or follicle
- TOA
- Round ligament pain
- Urinary calculi

Ectopic Pregnancy Risk Factors

- PID
- Assisted reproduction
- Tubal surgery
- IUD
- Previous ectopic

Which of the following is the diagnostic study of choice for patients with a possible ectopic pregnancy?

A. Culdocentesis
B. Serum BHCG
C. Serum progesterone
D. Ultrasound
E. Urine BHCG
Diagnostic Tests

- BHCG Urine Pregnancy Test
  - Marker of trophoblastic activity
  - Positive when BHCG >25 mIU/mL
  - 94.4% sensitive 2 wks after missed menses
- CBC
- Consider type and screen
- CPK/Progesterone ratio
  In women < 45 days of amenorrhea,
  CPK/Progesterone ratio >15
  87% sensitive and 83% specific for ectopic

Clinical Pearl

- Ruptured ectopics can present with negative urine BHCG
- Occurs in less than 1% of ectopics
- False negatives:
  - very low urine specific gravity
  - test results read before test ready
  - individual patient genetic variation in BHCG subunit

Case 2

19 yo female presents to the ED with vaginal bleeding and lower abd pain

Vitals: BP 78/54 HR 65

Stat Urine BHCG: negative

Quantitative BHCG levels rise throughout pregnancy, and decline rapidly after delivery.

A. True
B. False
Hemodynamically stable patients with abd pain or vaginal bleeding and a low BHCG should be sent home from the ED and receive an outpatient US.

A. True
B. False

Serum BHCG

- Positive 8 days post ovulation
- Normally doubles every 2 days in early pregnancy
  - 85% of ectopics have abnormal kinetics
- Serum half-life of HCG
  - SAB <1.4 days
  - Ectopic 7 days
- US Discriminatory zone = 1,000-1,500 mIU/mL

Should patients have an US if their BHCG < 1,500 mIU/ml?

SFGH 2004 Study - women with pain or VB and BHCG <1,500 more than doubled the odds of ectopic or abn preg

- 17% of all pts will have a diagnostic US
- 30% of pts with ectopic will have a diagnostic US

ACEP Clinical Policy
**Ultrasound**

- Study of choice for patients with possible ectopic pregnancy
  - Full bladder for transabdominal images
  - Empty bladder/foley for endovaginal images
    - Discriminatory Zone = 1,000-1,500 mIU/mL
- Culdocentesis in pregnant unstable patients with no US available

**Culdocentesis**

- Aspiration of cul-de-sac
  - Positive: non-clotting blood aspirated
  - Negative: clear fluid
  - Indeterminate: dry or clotted blood
- Sensitivity
  - 65-75% unruptured
  - 85-90% ruptured

**Pelvic Ultrasound**
Rule Out Ectopic Pregnancy Algorithm

+ Urine BHCG plus
  Vag bleed, pain, syncope/dizziness at

Perform Bedside US
  Transabdominal and Endovaginal US
  + FAST US (looking for free fluid)

+ Ectopic OB/GYN consult

Indeterminate
  Formal US by Radiology

+ IUP
  DC with OB/GYN FU

Quantitative BHCG
  Discriminatory Zone (1,500 mIU/mL)

<table>
<thead>
<tr>
<th>BHCG &lt; Discriminatory Zone</th>
<th>BHCG &gt; Discriminatory Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>No findings suggestive of ectopic pregnancy</td>
<td>with indeterminate US findings</td>
</tr>
<tr>
<td>DC with Ectopic precautions</td>
<td>OB/GYN consult</td>
</tr>
</tbody>
</table>

Transvaginal US findings

<table>
<thead>
<tr>
<th>Ectopic Pregnancy</th>
<th>LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ectopic cardiac activity</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Ectopic gestational sac</td>
<td>23</td>
</tr>
<tr>
<td>Ectopic mass + free fluid</td>
<td>9.9</td>
</tr>
<tr>
<td>Free fluid</td>
<td>4.4</td>
</tr>
<tr>
<td>Ectopic mass</td>
<td>3.6</td>
</tr>
<tr>
<td>No IUP</td>
<td>2.2</td>
</tr>
<tr>
<td>Normal adnexae</td>
<td>0.55</td>
</tr>
<tr>
<td>IUP</td>
<td>0.07</td>
</tr>
</tbody>
</table>
### US Findings of Early Pregnancy

<table>
<thead>
<tr>
<th>Endovaginal US Finding</th>
<th>Gestational Age (weeks)</th>
<th>Serum BHCG (mIU/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational sac</td>
<td>4.5</td>
<td>&gt;1,500</td>
</tr>
<tr>
<td>Yolk sac</td>
<td>5.5</td>
<td>1,000-7,500</td>
</tr>
<tr>
<td>Cardiac activity</td>
<td>6.5</td>
<td>7,000-23,000</td>
</tr>
</tbody>
</table>

### Indeterminate US

<table>
<thead>
<tr>
<th>US Finding</th>
<th>Description</th>
<th>PPV for Ectopic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty uterus</td>
<td>Endometrial cavity empty</td>
<td>13.9</td>
</tr>
<tr>
<td>Non-specific fluid</td>
<td>Anechoic fluid collection &lt; 10 mm in mean sac diameter without echogenic border (pseudogestational sac)</td>
<td>4.7</td>
</tr>
<tr>
<td>Echogenic material</td>
<td>Heterogeneous material in endometrial cavity with no sac</td>
<td>4.5</td>
</tr>
<tr>
<td>Abnormal sac</td>
<td>Anechoic intrauterine fluid collection &gt; 10 mm in mean sac diameter</td>
<td>0</td>
</tr>
</tbody>
</table>
### Outcome of Patients with Indeterminate US

<table>
<thead>
<tr>
<th>Category</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embryonic Demise</td>
<td>158 (53%)</td>
</tr>
<tr>
<td>Normal IUP</td>
<td>88 (29%)</td>
</tr>
<tr>
<td>Ectopic Pregnancy</td>
<td>44 (15%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>10 (3%)</td>
</tr>
</tbody>
</table>

*Tayal et al. AEM 2004*

### Ectopic Pitfalls

- Atypical symptoms
- No mass on exam
- US non-diagnostic or misinterpreted
- Failure to appreciate blood loss
- Passage of tissue
- Failure to appreciate risk factors
- Inaccurate interpretation of BHCG

*Abbott et al. AJEM 1990*

### Management

- **Surgical**
  - Laparotomy vs. laparoscopy
  - Salpingectomy vs tube conserving
    - Dependent on extent of tube damage
    - Risk for future ectopics if later chosen
- **Medical**
  - Methotrexate
    - Cytotoxic to rapidly dividing cells

### Methotrexate

- Success depends on BHCG level
- **Indications**
  - Hemodynamically stable
  - Ectopic mass < 3.5 to 4 cm
  - No free fluid
  - HCG < 5,000
  - Reliable FU
  - Normal blood work (renal, liver, heme)
Methotrexate

- Dosing - 50 mg/m$^2$
- Repeat dose if BHCG not falling in 4-7 days
- Adverse effects:
  - 4% rate of tube rupture
  - GI side effects - abd pain, N/V/D
  - Neutropenia
  - Pneumonia

Case 3

38 yo female complains of severe pelvic pain increasing over the last 4 hours. She is brought in my EMS for syncope.

Vitals: BP 90/60 HR 56

Ill appearing with tense abd and involuntary guarding

Stat Urine BHCG: positive

Case 3

Long history of infertility and received assisted reproduction 5 weeks ago

ED US shows IUP

What do you do now?

Heterotopic Pregnancy

Definition: ectopic and IUP concurrently

- In 1948 incidence was estimated to be 1 in 30,000 pregnancies, now likely > 1 in 8,000 pregnancies
- Much higher in patients with aided fertility estimated as high as 1 per 100
Heterotopic Pregnancy Risk Factors

- H/O ectopic pregnancy
- Bilateral salpingectomy
- In vitro fertilization
- PID

Management

- Ultrasound
- Rate of rupture approx 50%
- Treatment can be medical or surgical
- Live birth rate 66%
  - Best if treated surgically

Case 4

27 yo Chinese woman G1PO at 10 weeks gestation by dates presents with vaginal bleeding. She has severe hyperemesis gravidarum.

Vitals: BP 160/90
Molar Pregnancy

- 1 in 1,700 pregnancies (up to 1% Asians)
- Presentation: vaginal bleeding, uterus large for dates, severe hyperemesis, early preeclampsia, markedly elevated BHCG
- Diagnosis: Ultrasound - snowstorm or grape-like appearance
- Treatment: Evacuation and close FU
  - At risk for choriocarcinoma

1st Trimester Vaginal Bleeding

- Take a good history
  - Remember vitals can fool you
- R/O ectopic
- Check a BHCG
  - Check SG on urine and wait required amount of time for urine tests
- Ultrasound is key
- Don’t forget follow-up