Case

- 37 yr old carried in by her husband after having a syncopal episode at home
- currently unconscious

- VS: 91/63 115 99° 18 pulseOx 98%
- Accu check 90
- ST on monitor

icon +
Vaginal bleeding: ectopic pregnancy vs. threatened abortion

- H & P
- labs
- ultrasound
- algorithm for diagnostic work-up
  - R/O ectopic
  - SAB
- management options
R/O ectopic pregnancy

Axiom 1: All women are pregnant until proven otherwise.
(à negative history is unreliable)

- urine pregnancy test
  - 99.4% sensitive for diagnosing pregnancy
  - corresponds to serum hCG of 10-50 mIU/mL
  - false negatives with dilute urine

Ramoska, EA, Ann EM 1989;18:84-50

history

- amenorrhea
- pain
- bleeding
- risk factors for ectopic

ectopic pregnancy risk factors

- prior ectopic
- tubal infection (6x incr.)
- tubal surgery (9x incr.)
- concurrent IUD
- hx of infertility for > 2 yrs
- Age > 35 (3x incr.)
- DES exposure
- smoking
- frequent douching

- 50% of women with ectopic have one or more
- 25% of those with threatened AB also have one or more

Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

physical exam
- vital signs/hemodynamic stability
- abdominal exam
- pelvic exam
  - peritoneal signs
  - os
  - uterine size
  - CMT
  - adnexal findings

Question 1

R/O ectopic pregnancy

Axiom 2: All pregnant women have an ectopic until proven otherwise.
i.e. No combo of H&P elements can exclude ectopic reliably, so everyone needs a work-up.

For
- Lateralizing pain and tenderness (OR 2.2)
- Peritoneal signs (OR 7.9)
- CMT (OR 3.3)

Against
- Open internal cervical os
- + FHTs with doppler
- >8cm uterus (OR 0.42)
- Midline pain (OR 0.31)

Dart, Ann EM 1999;33:283-290
Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

**Work up**
- Icon
- CBC
- UA, C&S
- blood type and Rh
- quantitative β-hCG
- pelvic ultrasound

- 99.4% sens. for pregnancy
- …she’s bleeding
- even if asymptomatic
- prevent isoimmunization
- helps now and in F/U
- makes the dx now in >70%

**Sono-embryology and the discriminatory zone**

<table>
<thead>
<tr>
<th>US</th>
<th>EGA(wks)</th>
<th>β-hCG</th>
</tr>
</thead>
<tbody>
<tr>
<td>gestational sac</td>
<td>4.5</td>
<td>&gt;1500</td>
</tr>
<tr>
<td>yolk sac</td>
<td>5.5</td>
<td>1000-12000</td>
</tr>
<tr>
<td>embryo with cardiac activity</td>
<td>6.5</td>
<td>7000-23,000</td>
</tr>
</tbody>
</table>

**Beta levels and US Dx**

- Beta<1000 = 4x risk of EP vs. pts with beta>1000
- Beta<1000 - 29% of ectopics ruptured
- When ectopic is present, 1/3 of those with beta<1000 have an US diagnostic of EP
- 17% of pts with beta<1000 have an US diagnostic for IUP or EP
- 70% of pts with EP who have beta>1000 have an US diagnostic for EP

**Vaginal Bleeding in Early Pregnancy**

Pamela L. Dyne, MD

---

**serial βhCG dynamics**

- Normal = ≥ 66% increase over 48 hr.
  (for βhCG < 10,000 mIU/mL)
- Rising βhCG by < 50% over 4 days makes EP very likely
  – Slowest rise in a viable gestation was 53% at 2 days*
- Falling βhCG by > 50% over 4 days rules out EP
- Falling βhCG by < 50% over 4 days makes EP likely


---

**ectopic pregnancy - intrauterine findings**

- empty uterus
- decidual reaction
  – homogenous low level echo pattern
  – endometrial thickness not predictive*
- pseudogestational sac (10-20%)
- concurrent IUP, aka heterotopic,
  (1:30,000 - 1:3000), but 1% if assisted reproduction


---

**ectopic pregnancy - extrauterine findings**

- Any non-cystic adnexal mass
  – PPV 96.3%, NPV 94.8%, sens 99%, spec 84.4%
- live embryo (6-28% of EPs)
- hyperchoic ring around a gestational sac
  (“bagel sign”)
- small inhomogeneous mass next to ovary
  (“blob sign”) – most common
- free fluid in cul-de-sac (55% of EPs)
  – >25 cc present in 80% of EPS
- corpus luteum cyst – on ipsilateral side > 85% of cases
- nothing (20% of EPs)

---
### Extra-uterine Ultrasound finding

<table>
<thead>
<tr>
<th>Extra-uterine Ultrasound finding</th>
<th><em>Sens</em></th>
<th><em>Spec</em></th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adnexal embryo with cardiac activity</td>
<td>20.1%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Adnexal mass with yolk sac or embryo</td>
<td>36.6%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Adnexal mass with tubal ring or with yolk sac or embryo</td>
<td>64.6%</td>
<td>99.5%</td>
<td></td>
</tr>
<tr>
<td>Complex adnexal mass discrete from ovary</td>
<td>84.4%</td>
<td>98.9%</td>
<td>70%</td>
</tr>
<tr>
<td>Large volume free fluid in abdomen or pelvis</td>
<td></td>
<td></td>
<td>70%</td>
</tr>
<tr>
<td>Moderate volume free fluid in pelvis</td>
<td></td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Complex adnexal mass AND abnl pelvic fluid</td>
<td></td>
<td></td>
<td>90%</td>
</tr>
</tbody>
</table>

*Brown, JUM 1994;13:259-266*

### Intra-uterine US findings

<table>
<thead>
<tr>
<th>Intra-uterine US findings</th>
<th>Incidence of EP (no. of EP/total no. in US category)</th>
<th>PPV for EP (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty Uterus (thickness of endometrium not predictive*)</td>
<td>36/879 (13.9 (10.1-18.5))</td>
<td></td>
</tr>
<tr>
<td>Nonspecific Fluid collection (pseudogestational sac)</td>
<td>6/453 (4.7 (1.9-9.6))</td>
<td></td>
</tr>
<tr>
<td>Echogenic Material</td>
<td>4/323 (4.5 (1.4-10.5))</td>
<td></td>
</tr>
<tr>
<td>Abnormal Sac &gt; 10 mm</td>
<td>0/349 (0 (0.0 – 2.9))</td>
<td></td>
</tr>
<tr>
<td>Normal Gest. Sac</td>
<td>0/191 (0 (0.0 – 5.5))</td>
<td></td>
</tr>
</tbody>
</table>

Dart, Ann EM 2002;39:382-388


### VB with clinical suspicion

1. **Ectopic preg.*
2. **US**
3. **PUL**
4. **IUP**
5. **Quant. βhCG**
6. **> 1500**
7. **< 1500**

*Get gyn c/s*
Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

βhCG < 1500

- stable patient
- unstable, peritoneal signs

Gyn consult NOW for laparoscopy

management options for EP

- surgical
- medical
- expectant

indication for methotrexate

- unruptured ectopic mass < 4 cm on US or 3.5 cm if + cardiac activity
- β-hCG < 5000 mIU/ml
- hemodynamic stability
- good follow-up available
- no evidence of hepatic or renal disease
- WBC > 2000, platelets > 100,000

Consider prior EP an independent RF for MTX failure*

Lipscomb, NEJM 1999;341:1974-1978
*Lipscomb, Fertil Steril 2004;81:1221-4

*Gyn follow-up

decreasing

normal rise

abnormal rise

repeat βhCG in 48 hr. *
Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

Question 2

methotrexate: the morning after...

- increased abdominal pain (up to 60%)
- tubal rupture (4%)
  - βhCG doesn't predict
  - unchanged from without Rx initially
  - Can still occur even with falling BhCG
- N/V/D (3-20%)

expectant management of EP

- 179 pts with ultrasound diagnosed tubal EP
- stable, no evidence hemoperitoneum
- able to have close F/U
- BhCG < 175, 96% spont resolution rate
- BhCG > 1500, 21% spont resolution rate
- <175 BhCG < 1500, 66% spont resol. rate

Elson, Ultrasound Obstet Gynecol 2004;23:552-6
Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

**Case 2**

- 40 yr old G3P2 at 9 wks EGA
- c/o 12 hrs VB, moderate abdominal cramps
- VS: 110/56 82 37 16
- Pelvic exam: moderate VB, no clots, mildly tender 8 wk sized uterus, no CMT, cervical os closed
- βhCG = 9306 mIU/ml

**Spontaneous Abortions**

<table>
<thead>
<tr>
<th>Term</th>
<th>Clinical</th>
<th>US Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threatened AB</td>
<td>VB or abd pain,</td>
<td>varied intrauterine findings, +/- subchorionic</td>
</tr>
<tr>
<td></td>
<td>closed os</td>
<td>hemorrhage</td>
</tr>
<tr>
<td>Complete AB</td>
<td>h/o VB, benign</td>
<td>empty uterus</td>
</tr>
<tr>
<td></td>
<td>exam, closed os</td>
<td></td>
</tr>
<tr>
<td>Incomplete AB</td>
<td>h/o VB, tender</td>
<td>thickened, irreg. endometrium (5 mm of double</td>
</tr>
<tr>
<td></td>
<td>exam, closed or</td>
<td>stripe)</td>
</tr>
<tr>
<td></td>
<td>open os</td>
<td></td>
</tr>
</tbody>
</table>
Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

### Spontaneous Abortions, cont.

<table>
<thead>
<tr>
<th>Term</th>
<th>Clinical</th>
<th>US Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB in progress</td>
<td>VB, open os</td>
<td>gest. sac in process of expulsion</td>
</tr>
<tr>
<td>Embryonic demise (AKA missed AB)</td>
<td>varied, closed os</td>
<td>embryo lacking cardiac activity with CRL&gt;5mm</td>
</tr>
<tr>
<td>Blighted ovum</td>
<td>varied, open or closed os</td>
<td>gest. sac too big to not have embryo (&gt;20 mm)</td>
</tr>
<tr>
<td>Septic AB</td>
<td>varied, open or closed os</td>
<td>gest. sac thickened, irregular endomet. (&gt;5 mm stripe)</td>
</tr>
</tbody>
</table>

---

**Diagnostic Algorithm**

1. **Internal cervical os open?**
   - No: TV US: empty uterus? 
     - No: Dx: probable retained POC => surg, med, or expectant mgt
     - Yes: Dx: probable complete AB => ensure F/U
   - Yes: Dx: missed AB or early preg failure => med or expectant mgt
2. **VB, icon +, ectopic ruled-out?**
   - No: See previous algorithm
   - Yes: Dx: threat. AB => ensure F/U with OB

---

#
Management options for spontaneous abortions:

- **Surgical curettage**
  - Bleeding stops in ave of 9 days (IUFD) and 7 days (incompl AB)
  - Requires admission

- **Medical**
  - Misoprostol 800 microgm intravaginally or PO
  - Repeat the dose in 1 day if not complete
  - No proven benefit to “priming” with mefepristone (RU486)
  - Outpatient
  - 87-100% success rate (missed AB vs. incomplete AB)

- **Expectant**
  - Success rate 29% (IUFD) and 85.7% (incompl AB)
  - Bleeding stops in ave of 12 days (IUFD) and 10 days (incompl AB)

BMJ 2006, doi:10.1136
So what’s the prognosis?

20-30% of all pregnancies bleed; 50% miscarry...

**Favorable**
- embryonic cardiac activity (at 8wks)
- age < 35yrs: SAB rate 3-5%
- age > 35yrs: SAB rate 8%

**Unfavorable**
- slow heart beat (<90)
- small GS or large yolk sac (>6mm)
- large subchorionic hematoma
- age > 35yrs: overall SAB rate 14% vs 7%

---

**review case**

- 28 yr old G3P2 with unknown LMP
- c/o 4 days of crampy abd pain and VB
- VS: 111/51 89 36º 18
- Pelvic exam: blood in vaginal vault, cervical os closed, no uterine enlargement or tenderness, no adnexal tenderness or mass
- βhCG = 350 mIU/ml
Vaginal Bleeding in Early Pregnancy
Pamela L. Dyne, MD

**review case, 48 hr f/u**

- continued symptoms and unchanged exam
- repeat $\beta$hCG = 480 mIU/ml

*What's the dx?*

**summary**

- Think “ectopic vs. threatened AB” in every woman with any pelvic complaint.
- Use tests appropriately to help make the dx.
  - $\beta$hCG discriminatory zone
  - US findings
- Consider retained POC if uterine tenderness and/or persistently open internal cervical os
• Tell patient and family it's not her fault!
• Treat pain
• Work together with gyn to make the best dispo plan for the individual patient.
• Don’t take bad advice.