Ectopic Pregnancy

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Ectopic pregnancy

- Pregnancy that develops after implantation of the blastocyst anywhere other than the endometrium lining the uterine cavity
We’ve come a long way

- Ectopic pregnancy was first described in the 11th century, and was often fatal

- Viewed as the consequence of violent emotion, usually fright or surprise during coitus in the cycle of conception

- Early treatment options: starvation, purging, bleeding, strychnine

- 1791 first abdominal surgery for ectopic, in 80 years 5 out of 30 women survived
1876 John Parry described the prognosis of ectopic pregnancy in his era

“when one is called to a case of this kind, it is his duty to look upon his unhappy patient as inevitably doomed to die, unless he can by some active measure wrest her from the grave already yawning before her”

1884 London physician Robert Lawson Tait performed the first deliberate laparotomy to ligate bleeding vessels
Epidemiology

- True incidence is difficult to estimate
- In the USA in 1992, 2% of known conceptions were ectopic pregnancies
- In the USA the annual ectopic rate is approximately 1.5 per 1000 women ages 15-44
- Marked increase in rate with increasing age
- Rates are higher in non-white population
- Most occur in multiparous women, 85-90%
Mortality

- Ectopic pregnancy is the leading cause of maternal mortality in the first trimester.
- Death-to-case mortality rate is similar among age groups, but highest in the non-white population.
- Unmarried women of all races have 1.7 times greater chance of dying from ectopic pregnancy.
Mortality

- 33% of deaths attributed to patient delay in consulting a physician after symptoms
- 50% of deaths attributed to treatment delay and misdiagnosis
- Most common misdiagnoses
  - Intestinal disorders
  - Intrauterine pregnancy
Etiology

- Risk factors
  - Salpingitis (~50%)
  - Previous ectopic pregnancy
  - Tubal surgery
  - Hormonal imbalance affecting tubal contractility (IUD, ART)
  - Salpingitis isthmica nodosa (SIN)
  - Infertility
  - Smoking
  - DES exposure
Sites of implantation

- Oviduct (97%)
  - Ampullary portion (81%)
  - Isthmus (12%)
  - Fimbrial (5%)
  - Interstitial (2%)
- Abdominal (1.4%)
- Ovarian or cervical (<1%)
Diff. Dx of symptomatic ectopic pregnancy

- Salpingitis
- Threatened, incomplete AB, septic AB
- Ruptured corpus luteum
- Appendicitis
- DUB
- Adnexal torsion
- Degenerative uterine leiomyoma
- Endometriosis
Diagnosis

- H&P, physical exam
- Most common symptoms: abdominal pain, absence of menses, irregular vaginal bleeding
- Early diagnosis is aided by a high index of suspicion
- Labs
  - Hcg levels
  - progesterone
- Transvaginal ultrasound
- D&C
HCG levels

Normal pregnancy

- Normal serum concentrations double Q2-3 days
  - 66% at 48 hrs
- Peak at 500-100K IU/L at 8-10 weeks gestation

Abnormal pregnancy

- Abnormally low levels or slow rate of rise
- Possibly normal rise of levels initially
- Levels with abnormal rise or that are falling are almost certainly not viable
  - Location yet to be determined
- Failure of 53% increase in 48 hrs is 99% sensitive of abnormal pregnancy
HCG levels

- Multiple pregnancy
  - Usual standards for singletons may not apply
  - HCG levels higher than normal, but still rise at normal rate
- Combined contribution of all gestations
  - Viable gestations
  - Spontaneous pregnancy reduction
  - Heterotopic pregnancy
Progesterone

- Probability of viable IUP increase with serum progesterone levels
- Levels >20ng/mL almost always associated with viable IUP
- Levels <5ng/mL almost always associated with non-viable pregnancy
- 50% ectopic, 20% SAB, and 70% of viable IUP fall between 5-20ng/mL
Transvaginal Ultrasound (discriminatory zone 1500-2000)

Normal pregnancy

- Gestational sac: sonolucent center, thick echogenic ring formed by surrounding decidual reaction
  - 38d post LMP
  - 24d post conception
Any takers?
Culdocentesis

- Previously an integral part of diagnostic evaluation
- Determined presence or absence of un-clotted blood in peritoneal cavity
- No longer routinely used with advancement of ultrasound
Dilation and Curettage

- Abnormal HCG levels, progesterone <5, no evidence of gestational sac at >38 days gestational age, no IUP seen

- Frozen section is approx 93% accurate in identifying chorionic villi

- Possibly less complications and at least as cost effective as empiric use of methotrexate
## Treatment options

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Expectant management

- This is not simple observation alone
  - Close monitoring of clinical symptoms
  - HCG levels
  - Transvaginal ultrasound

- Approx 25% of all ectopic pregnancies have falling HCG levels, of these 70% (approx 18% of all ectopic) will resolve spontaneously

- Success is highest with no identifiable extrauterine sac and low levels of baseline HCG
  - Baseline level <200 and falling, 88% resolve
Methotrexate: contraindications

**Absolute**
- Breastfeeding
- Immunodeficiency
- Alcoholism, liver disease
- Blood dyscrasias
- Allergy to MTX
- Active pulmonary disease
- Peptic ulcer disease
- Hepatic, renal or hematologic dysfunction

**Relative**
- Gestational sac >3.5cm
- Embryonic cardiac motion
Methotrexate

- Single dose regimen (50mg/m² IM) Day 1
  - Draw hcg levels on days 4 and 7
  - If 15% drop, continue weekly hcg draws until zero
  - If <15%, consider repeating MTX

- Double dose regimen (50mg/m² IM) Day 1 and 4
  - Draw hcg levels on days 4 and 7
  - If 15% drop, continue weekly hcg draws until zero
  - If <15% repeat MTX on days 7 and 11 with hcg levels
    - If <15% between 7 and 11, consider surgical management

- Fixed dose regimen (1mg/kg IM) Day 1,3,5,7
  - Folic acid (0.1mg/kg IM) Day 2,4,6,8
  - Measure hcg on MTX days until 15% drop from previous measurement, then weekly
Surgical treatment

- Laparotomy
- Laparoscopy
- Salpingostomy (closed by secondary intention)
- Salpingotomy (closed primarily)
- Salpingectomy

- Women whom desire future fertility, conservative management with linear salpingostomy is preferred (ampullary ectopic pregnancy)
Surgical treatment

- Indications for salpingectomy
  - Completed childbearing
  - Recurrent ectopic pregnancy in the same tube
  - Uncontrolled bleeding
  - Extensive tubal damage
- Isthmic ectopic pregnancies are best managed with segmental excision followed by tubo-tubal reanastomosis
- Fimbrial expression is not recommended due to extensive tubal trauma
Results of surgical treatment

- Overall cumulative IUP rates are significantly higher with salpingostomy than after salpingectomy: incidence of recurrent ectopic pregnancy is similar

- Salpingostomy is successful, no additional tx in approx 90% of women with unruptured ectopic pregnancies
Persistent Ectopic Pregnancy

- Overall incidence of PEP is approximately 5% with salpingostomy
  - 2-11% after laparotomy
  - 5-20% after laparoscopy
- Less likely if pre-op hcg <3000, if pre-op hcg>3000 PEP incidence 22-42%
- If POD#7 hcg levels >1000 or 15% greater than pre-op, PEP is nearly always present
- Treatment
  - Surgical: symptomatic patients
  - Methotrexate: asymptomatic patients
Subsequent fertility

- Overall conception rate s/p ectopic pregnancy is 60%
- 1/3 of subsequent pregnancies are ectopic pregnancies, and 1/6 are SABs
- Subsequent fertility rate is higher in multiparous women, and those with un-ruptured tubal pregnancies, those with no history of infertility or salpingitis
Now, the weird stuff
Abdominal pregnancy

- Estimated incidence of 1/10,000 pregnancies and 1/100 ectopic pregnancies
- Associated with highest mortality rate of all ectopic pregnancies
- Primary implantation or secondary from re-implantation of partial tubal abortion
- Most frequent physical findings are abdominal tenderness, abnormal fetal lie, and displaced uterine cervix
Cervical pregnancy

- 1/2,500 – 1/10,000
- Possible risk factors: previous D&C, CD, IVF
- Painless vaginal bleeding
- Gestational sac between external and internal os

Treatment
- Radical: Hysterectomy
  - Hemorrhage
  - Later gestations
- Conservative; MTX, systemic or local
- Hemorrhage strategies
  - UAE
  - Potassium Chloride
  - Intracervical balloon tamponade
Ovarian Pregnancy

- <3% of all ectopic pregnancies
- Presents similar to tubal ectopic pregnancies
- Diagnostic criteria
  - Intact ipsilateral tube, separate from ovary
  - Gestational sac occupying position of the ovary
  - Gestational sac connected to uterus by ovarian ligament
  - Ovarian tissue in wall of gestational sac
- Treatment is surgical
Interstitial Pregnancy

- <2% of ectopic pregnancies
- Eccentric gestational sac or heterogenous mass
- Abnormal thinning of myometrial mantle
- Abnormally prominent interstitial tubal segment
- Treatment is generally surgical
Heterotopic Pregnancy

- Coexisting IUP with extrauterine pregnancy
- 1/7000 pregnancies, higher with IVF
- 90% with ectopic implantation in fallopian tube
- Often missed due to IUP seen on sono, with normally rising HCG levles
- Symptoms similar to ectopic pregnancies, often diagnosed only after tubal rupture
- Tx surgical removal or less often, local injection of potassium chloride or hyperosmolar glucose
Case presentation

- 38 y.o. G4P0030 presented to the ED with vaginal bleeding, pain, and positive pregnancy test

- OB history
  - Right ectopic pregnancy x2, right salpingectomy
  - SAB, with D&C

- HCG level 353
Sono report

- Cystic structure with echogenic rim within endometrial cavity, may represent early gestational sac, no evidence of yolk sac or fetal pole

- Heterogeneous rounded structure within or just adjacent to the left ovary demonstrating internal vascularity
Outcome

- Laparoscopic removal of left ectopic pregnancy
References

• ACOG practice bulletin “Medical Management of Ectopic Pregnancy”
