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# Ectopic Pregnancy

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# Agenda

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We will discuss:

- Facts about ectopic pregnancy
- Basics of ultrasound
- Patient presentation



# Ectopic Pregnancy

Definition: implantation of the fetus in any site other than a normal uterine location

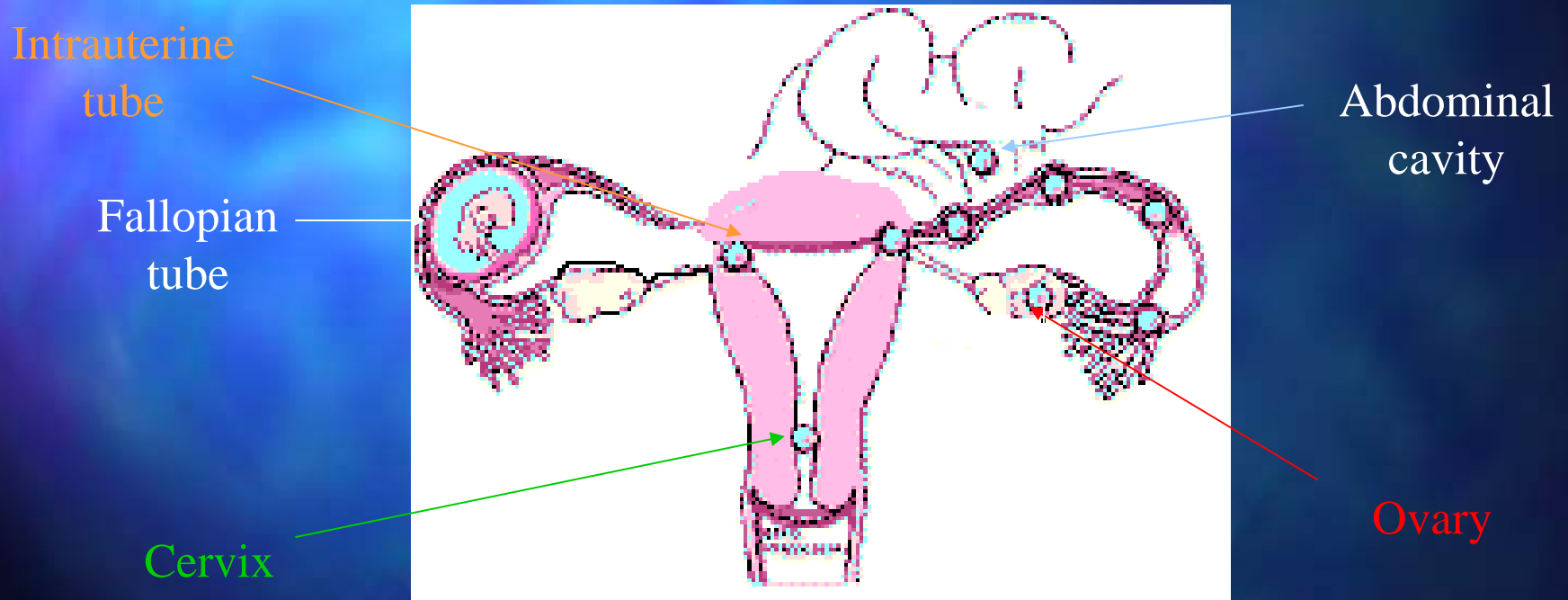
Incidence: 2% of reported pregnancies

Locations:

- Fallopian tubes- 90%
- Ovaries
- Abdominal cavity
- Cervix
- Intrauterine portion of the tube



# Ectopic Pregnancy Locations



Adapted from [http://matweb.hcuge.ch/Selected\\_images?Ectopic\\_pregnancy\\_images/ectopic\\_pregnancy](http://matweb.hcuge.ch/Selected_images?Ectopic_pregnancy_images/ectopic_pregnancy)



# Risk Factors for Ectopic Pregnancy

- PID with chronic salpingitis
- Peritubular adhesions
  - Appendicitis
  - Endometriosis
  - Leiomyomas
  - Surgery
- IVF
- IUD use (?)



# Presentation of Ectopic Pregnancy

## The typical triad

- Abdominal pain
- Vaginal bleeding
- Adnexal mass

\*\*\*Rarely the patient presents with hypovolemic shock secondary to tube rupture



# Differential Diagnosis of Acute Abdominal Pain

- Appendicitis
- Ectopic pregnancy
- Acute PID
- Ruptured graafian follicle or corpus luteum cyst
- Endometriosis
- Mesenteric lymphadenitis
- Acute gastroenteritis
- Acute cholecystitis
- Perforated ulcer
- Acute pancreatitis
- Acute diverticulitis
- Intestinal obstruction
- Ureteral calculus
- Pyelonephritis



# Differential Diagnosis of Acute Abdominal Pain

- **Appendicitis**
- **Ectopic pregnancy** ← Woman of childbearing age with + hCG, bleeding and/or mass
- **Acute PID**
- Ruptured graafian follicle or corpus luteum cyst
- Endometriosis
- Mesenteric lymphadenitis
- Acute gastroenteritis
- Acute cholecystitis
- Perforated ulcer
- Acute pancreatitis
- Acute diverticulitis
- Intestinal obstruction
- Ureteral calculus
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# Diagnosis in the Setting of an Acute Abdomen

Patient presents in hypovolemic shock



hCG if available

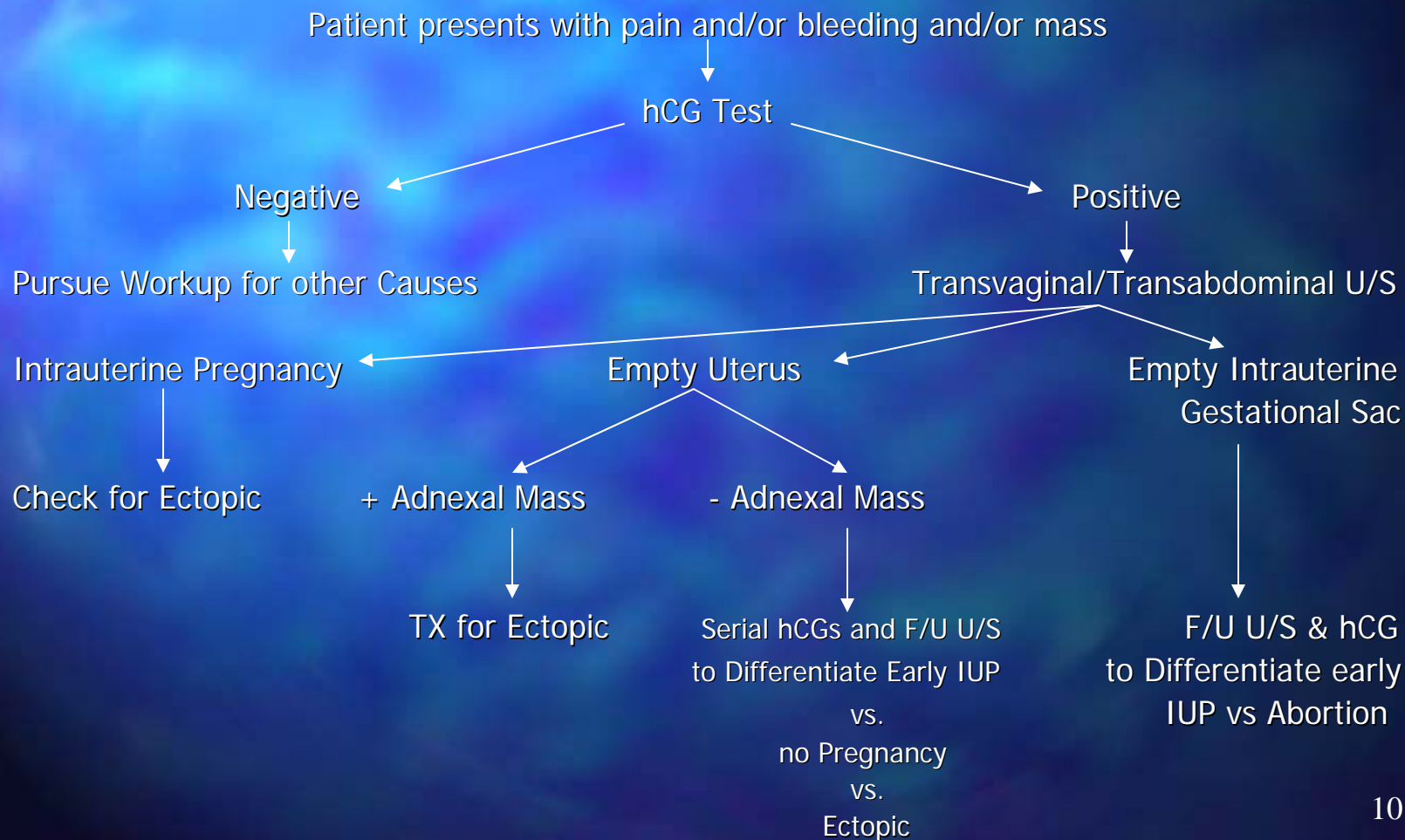
(stabilize patient first!)



Diagnostic/interventional  
laparotomy/laparoscopy



# Diagnosis of a Symptomatic but Stable Patient





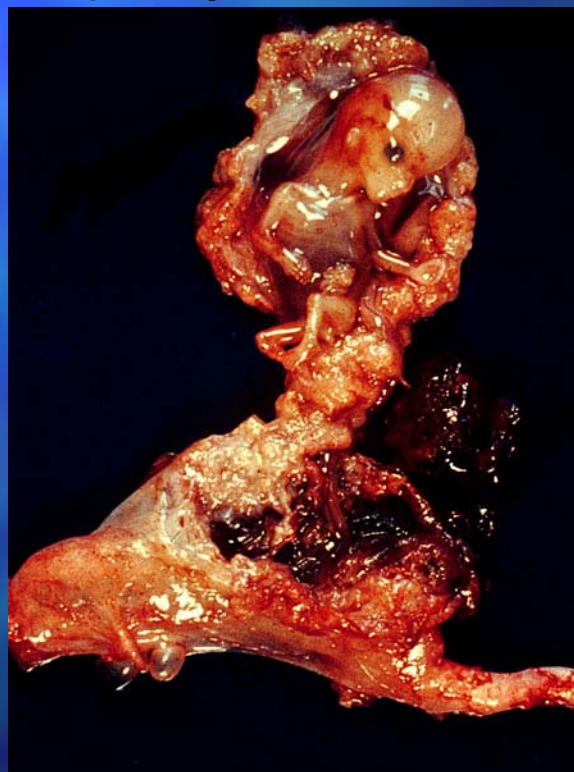
# Treatment of Ectopic Pregnancy

- Emergency hysterectomy
- Laparotomy
  - Removal of ectopic leaving tube intact
  - Removal of ectopic and tube
- Methotrexate
- Relocation of ectopic



# Complications of Ectopic Pregnancy

- Tubal rupture and intraperitoneal hemorrhage (most common)
- Hematosalpinx occurs when poorly adherent ectopic separates from tubal wall





# Basics of Ultrasound

- Transducer
  - Piezoelectric crystal: electric energy → high frequency sound waves
- Narrow beam of sound waves travels into tissues
- Quality of returning beam dependent upon tissue's acoustic impedance
- Echo returns to transmitter and is converted into electrical signals
- Electrical signals → real-time images



# Tissue Appearance on Ultrasound

- Solid organs- isoechoic to tissue density (grey)
  - Consist of tissues with multiple acoustic interfaces
- Cysts/fluid collections- anechoic (black)
  - Lack internal acoustic reflectors
- Bone and air- echogenic (white)
  - Impedance mismatch with adjacent soft tissue is very great- most sound energy is reflected
  - Little sound energy left to image structures beyond the interface



# Uses of Ultrasound

- Dating pregnancy
- Detecting multiple pregnancy
- Monitoring fetal growth/health
- Detect ectopic pregnancy
- Detect spontaneous abortion
- Detect placenta previa
- Detect placental abruption
- Assess fetal abnormalities
- Evaluate pelvic masses
- Oocyte retrieval



# Benefits of Ultrasound

- Safe- no ionizing radiation
  - Excellent for imaging pediatric, ob/gyn, and testicular processes
- Images can be transaxial, sagittal, or at any obliquity
- Less expensive than most modalities
- Portable- can be done at the bedside
- Real-time images





# Pelvic Ultrasound

- Transabdominal
  - Better to image large uterine fibroids, ovarian cysts, and blood clots
- Transvaginal
  - Can identify sac  $\frac{1}{2}$  → 1 week earlier
  - Patient does not need a full bladder
  - Closer to areas of interest
  - Better angles
  - Less bowel gas shadowing

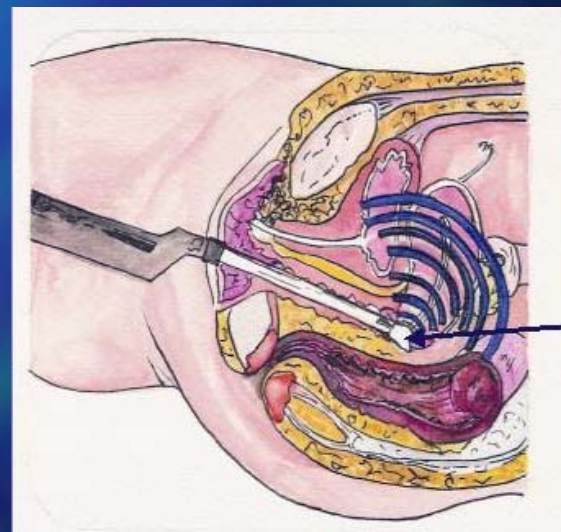
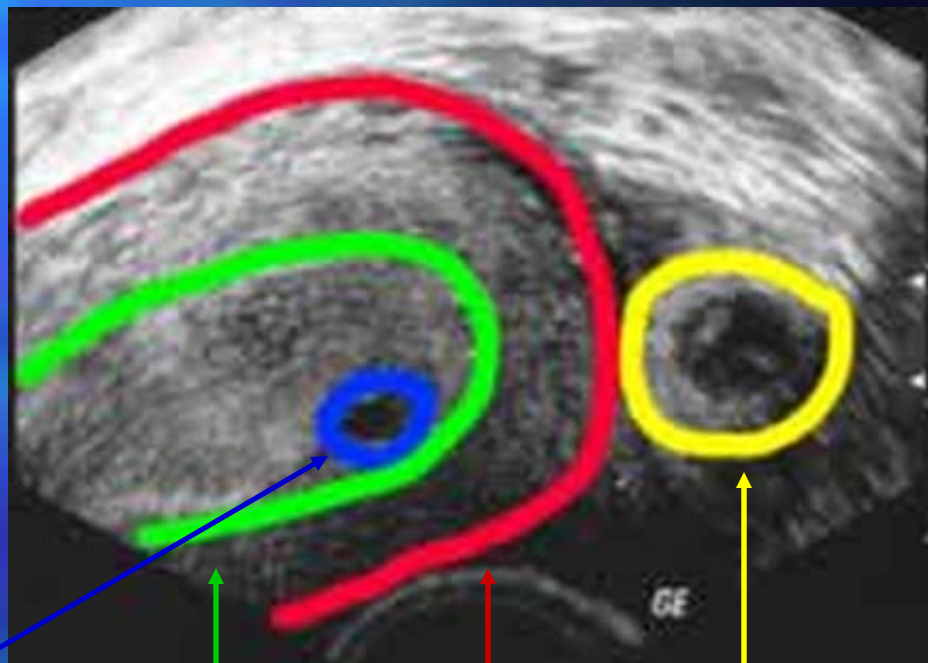


Image from: [www.2womenshealth.co.uk/Figure04-01.htm](http://www.2womenshealth.co.uk/Figure04-01.htm)



# Appearance of an Ectopic on Ultrasound



Pseudogestational sac

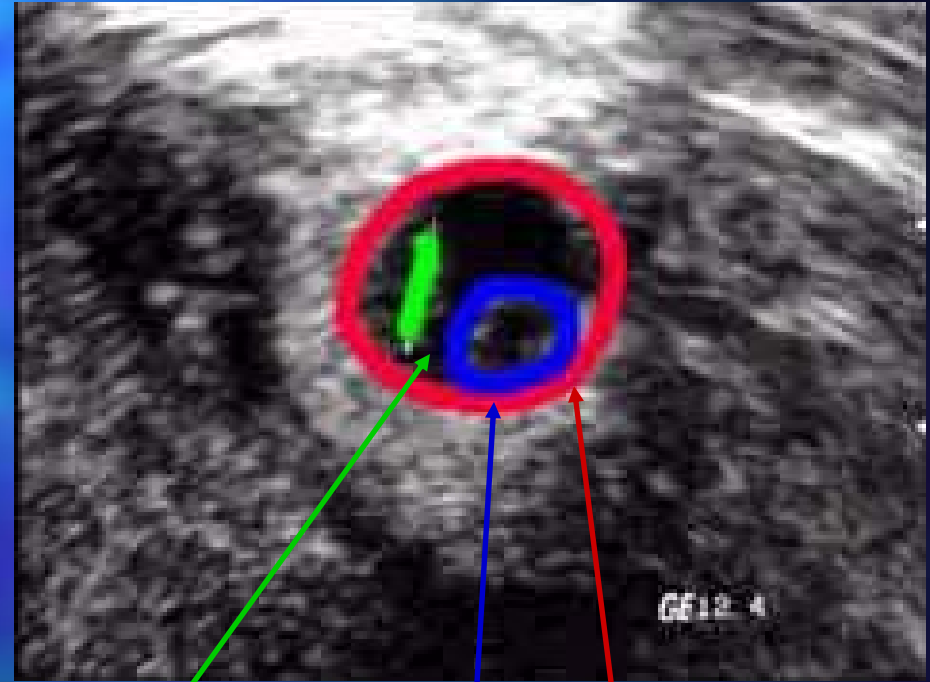
Endometrial lining

Uterus

Ectopic



# Appearance of an Ectopic on Ultrasound



4.5 mm fetal pole

Ectopic

Yolk sac



# Our patient- Ms. T

- Patient information
  - 34 year old female
  - + pregnancy test with appropriately rising hCG
  - 5 6/7 weeks pregnant by LMP
- Chief Complaint on 6/6/2002
  - LLQ pain and vaginal bleeding
- PMH
  - Incomplete abortion- 1/2/2002



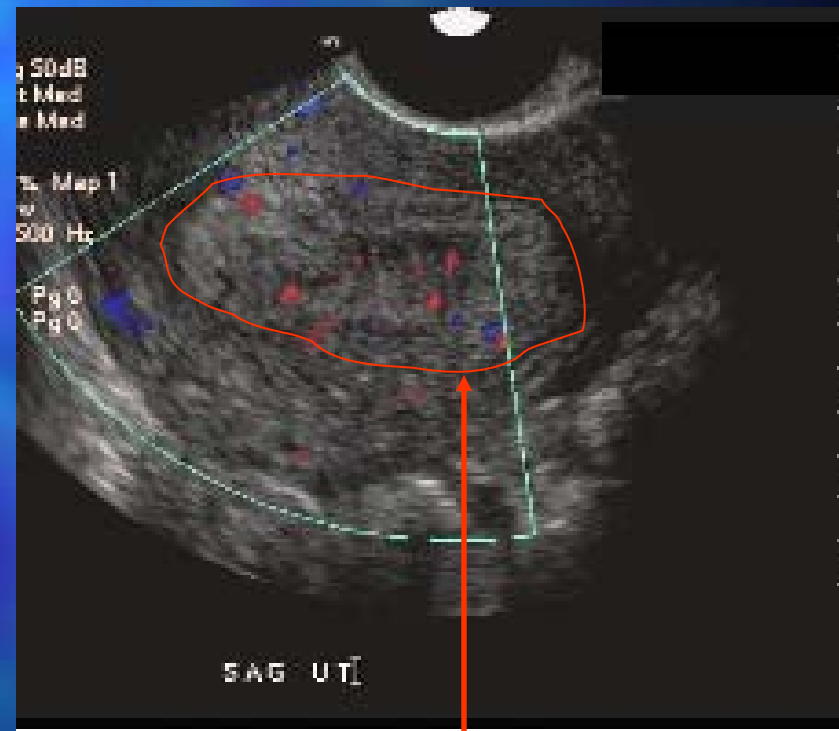
# Ms. T- 6/6/2002

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- Findings
  - Normal uterus and ovaries
  - No free fluid
  - No gestational sac
  - Mass between uterus and left ovary
- Impression
  - Mass in left tube- probable ectopic
- Treatment
  - Methotrexate



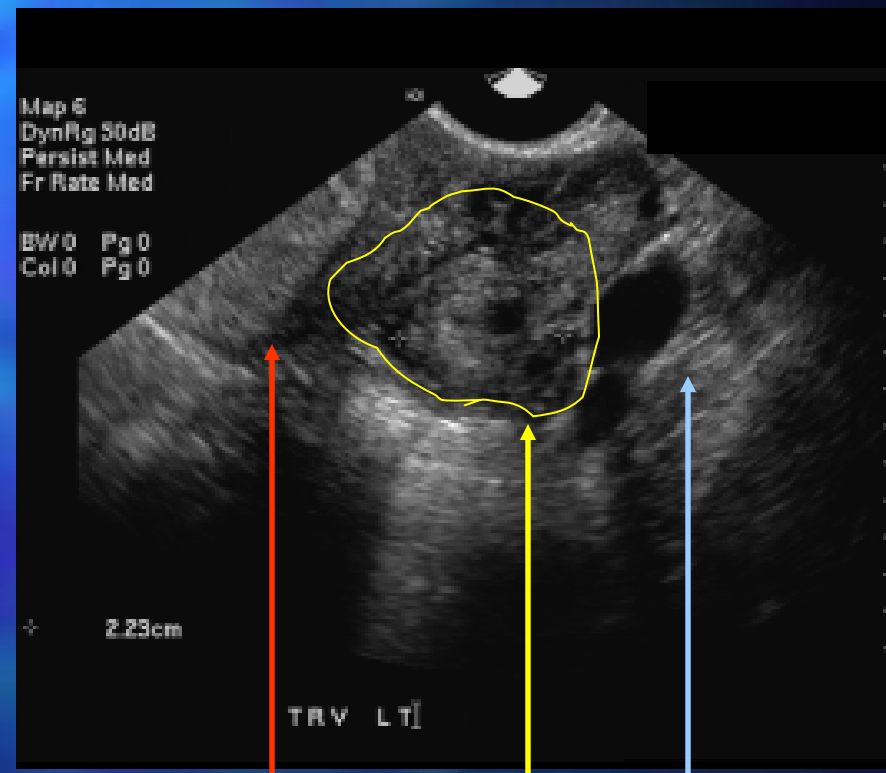
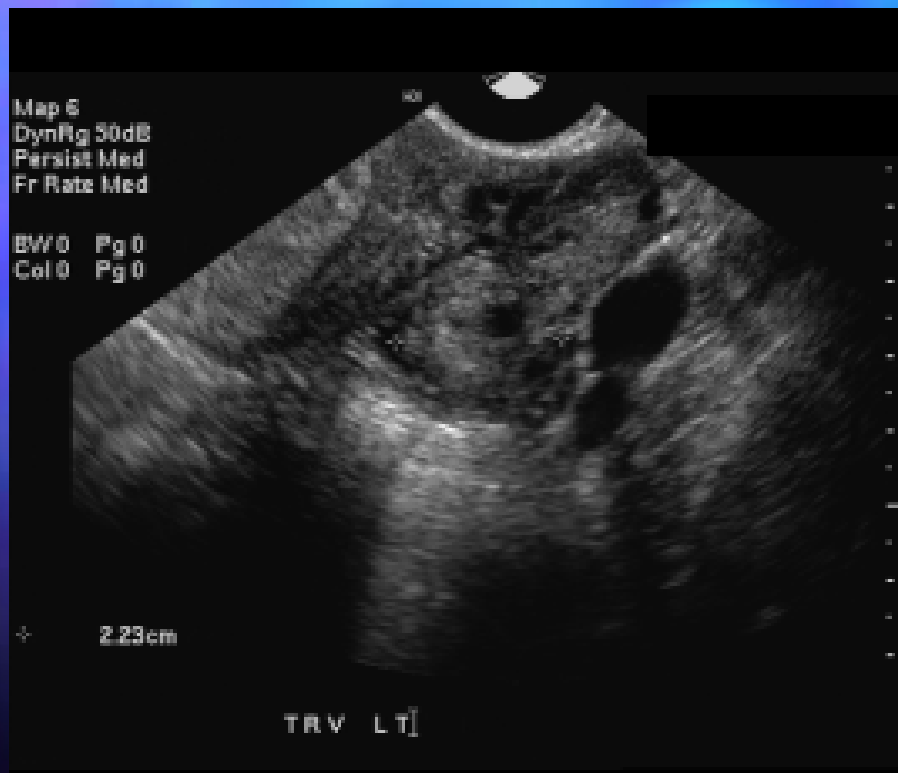
# Ultrasound 6/6/2002



Empty  
Endometrium



# Ultrasound 6/6/2002



Uterus

Ectopic

Ovary



# Ms. T- 6/7/2002- F/U U/S

- Findings
  - Normal ovaries
  - Endometrium somewhat thickened
  - ? Free fluid
  - No gestational sac
  - Mass in left adnexa
- Impression
  - Ectopic in left adnexa
- Treatment
  - None



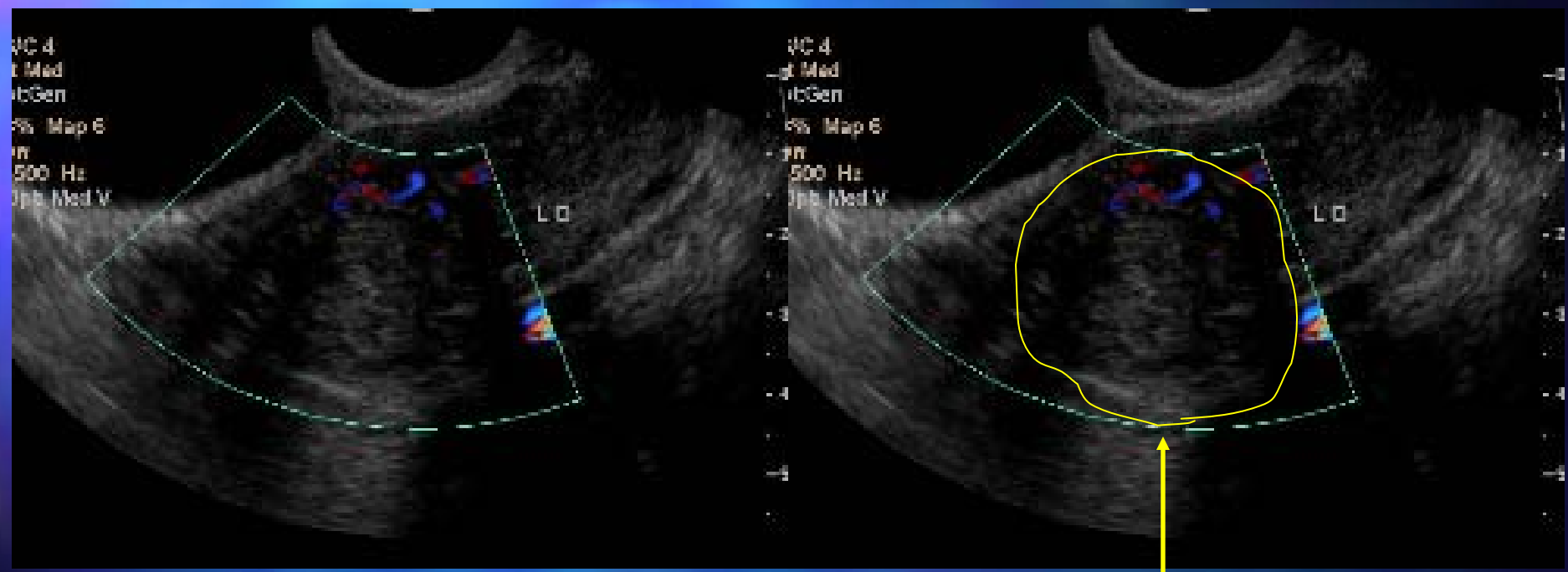


# Ms. T- 6/13/2002- F/U U/S

- Findings
  - Normal ovaries and uterus
  - Small amount of free fluid
  - Left adnexal mass larger and less well-defined
- Impression
  - Hemorrhagic evolution of ectopic
- Treatment
  - None- F/U appointment to assess hCG



# Ultrasound 6/13/2002



More complex  
mass



# Ms. T- 6/18/2002- F/U appt.

- Findings
  - Rising hCG
- Treatment
  - 2<sup>nd</sup> dose of methotrexate



# Ms. T- 6/28/2002

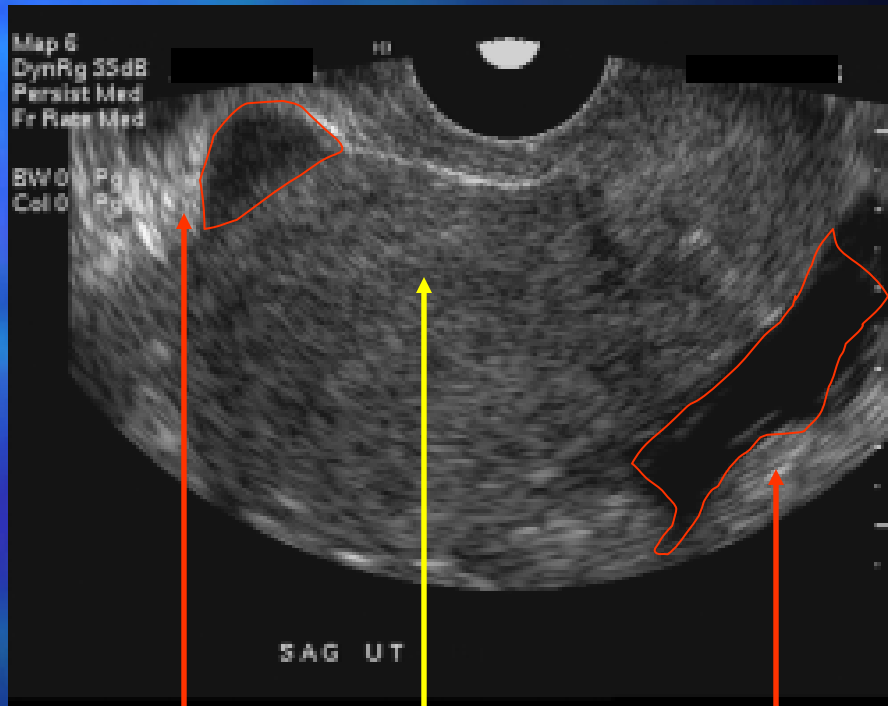
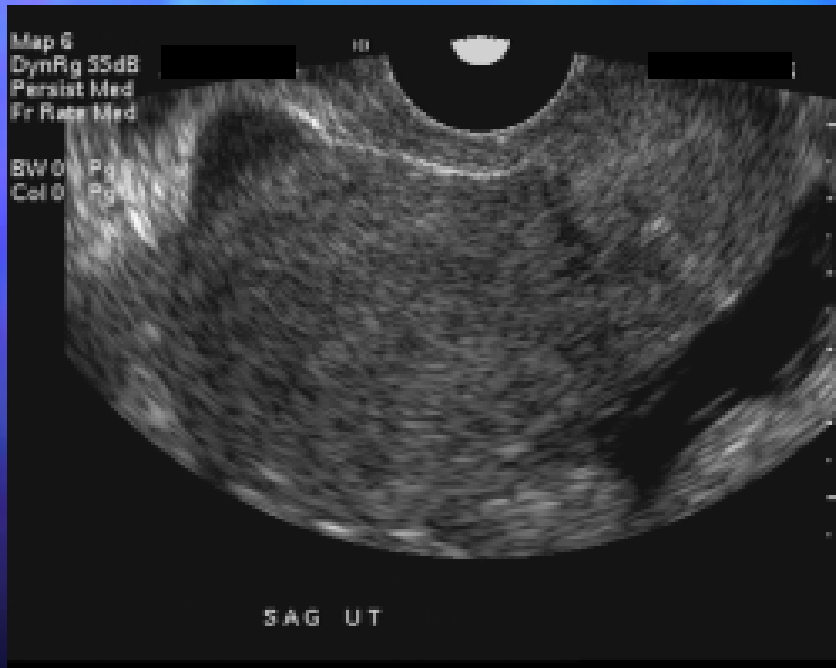
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- Presentation
  - Acute LLQ pain
  - Stable vitals
  - Falling hCG
- Findings
  - Normal ovaries and uterus
  - Free fluid in cul-de-sac and lateral to right kidney
  - Larger, ill-defined mass next to left ovary
- Treatment
  - Patient taken to laparoscopy



# Ultrasound 6/28/2002

## Sagittal view



Blood anterior  
to uterus

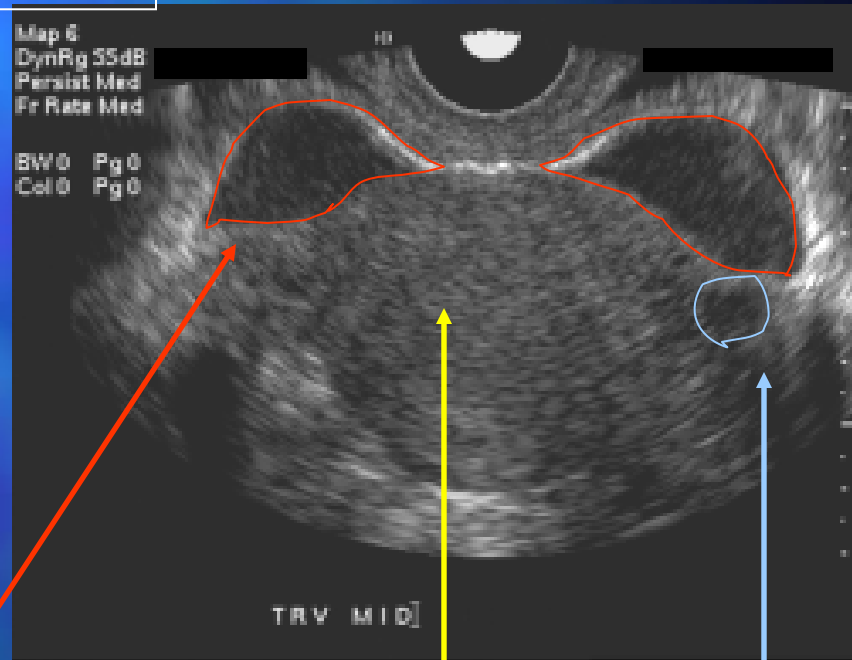
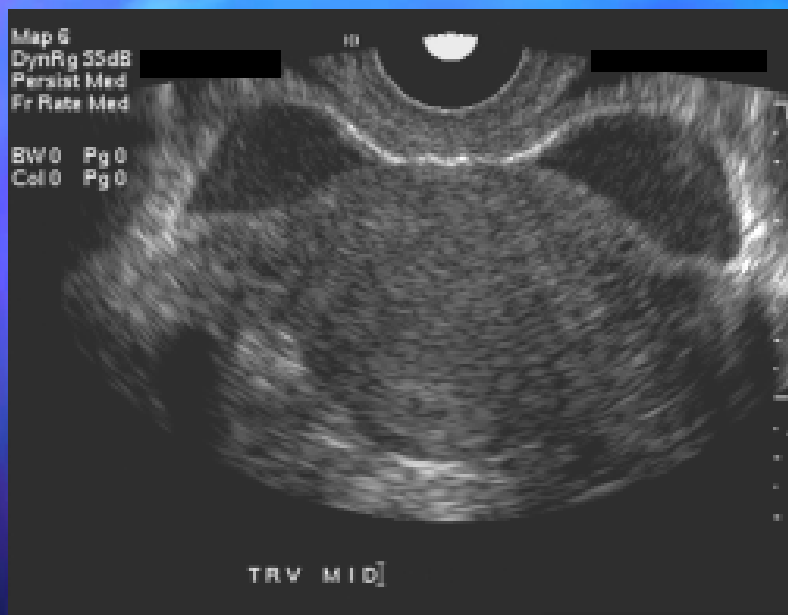
Uterus

Blood in cul-de-  
sac



# Ultrasound 6/28/2002

Axial view



Blood in pelvis

Uterus

Ectopic



# Ms. T- 6/28/2002-laparoscopy

## ■ Impression

- Ectopic in isthmus of left tube
- No evidence of tubal rupture
- 200 cc of blood and clot in pelvis
- Omental adhesions (likely from prior PID)

## ■ Procedure

- Salpingoscopy and removal of ectopic from left tube
- Omental adhesions lysed



# Conclusion

- Main points
  - It is important to include ectopic pregnancy on the DDX of any woman of child-bearing age that presents with abdominal pain and/or vaginal bleeding and/or adnexal mass
  - Ultrasound is the modality of choice to image the female pelvis and detect ectopic pregnancy





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- SLIDE #17- [www.2womenshealth.co.uk/Figure04-01.htm](http://www.2womenshealth.co.uk/Figure04-01.htm)
- SLIDE #18, #19- [www.advancedfertility.com/ectopic.htm](http://www.advancedfertility.com/ectopic.htm)
- SLIDE #22, 23, 26, 29, 30- <http://bidmcpacs.caregroup.org>
- SLIDE #12- [www.kumc.edu/instruction/medicine/pathology/ed/ch\\_18/c18\\_ectopic\\_gross.jpg](http://www.kumc.edu/instruction/medicine/pathology/ed/ch_18/c18_ectopic_gross.jpg)
- SLIDE #4- [http://matweb.hcuge.ch/Selected\\_images?Ectopic\\_pregnancy\\_images/ectopic\\_pregnancy](http://matweb.hcuge.ch/Selected_images?Ectopic_pregnancy_images/ectopic_pregnancy)
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- <http://www.eurorad.org/case.cfm?uid=770>
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