The use of ultrasound and serum biochemistry to assess health of early pregnancy

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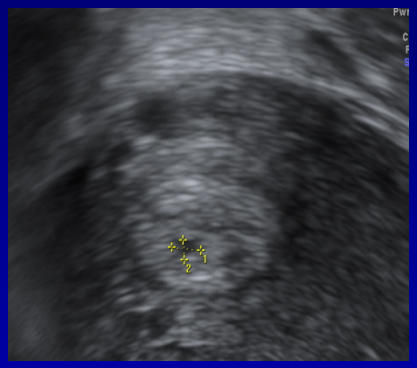
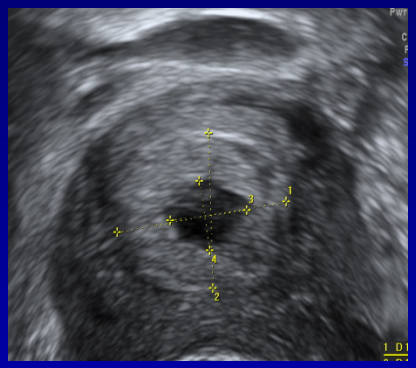
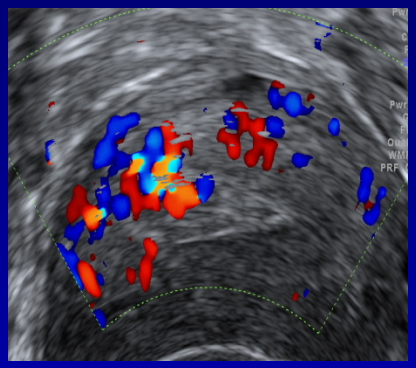
What do women want to know?

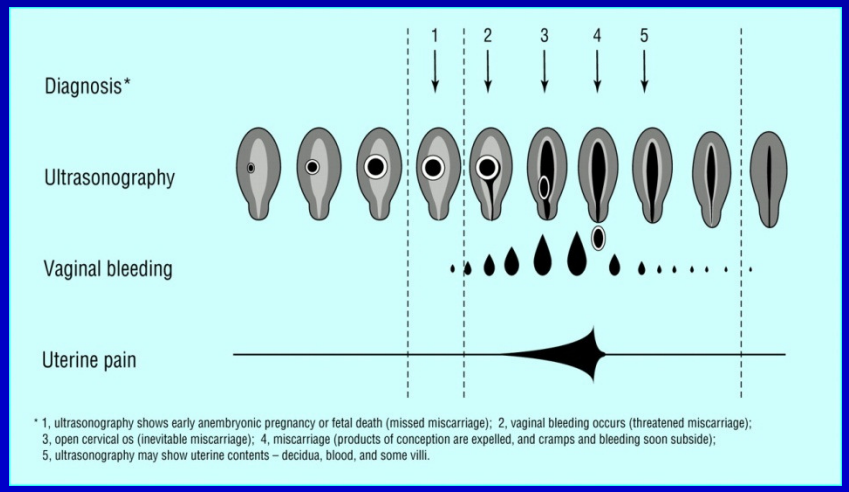
- Is the pregnancy in the right place?
- Is it going to continue?
- Is it likely to be normal?

Natural history of miscarriage





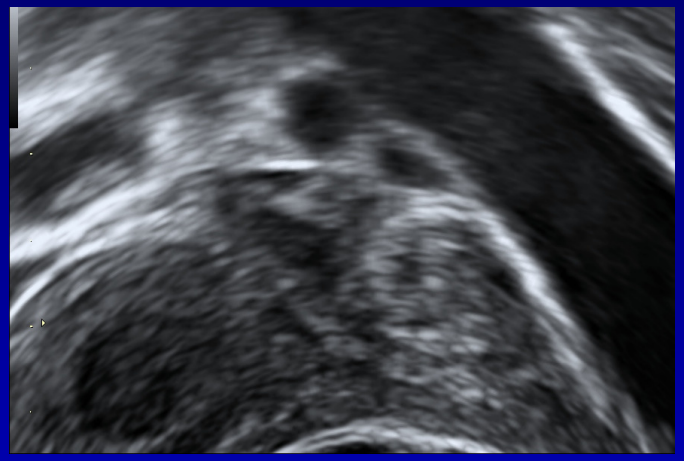


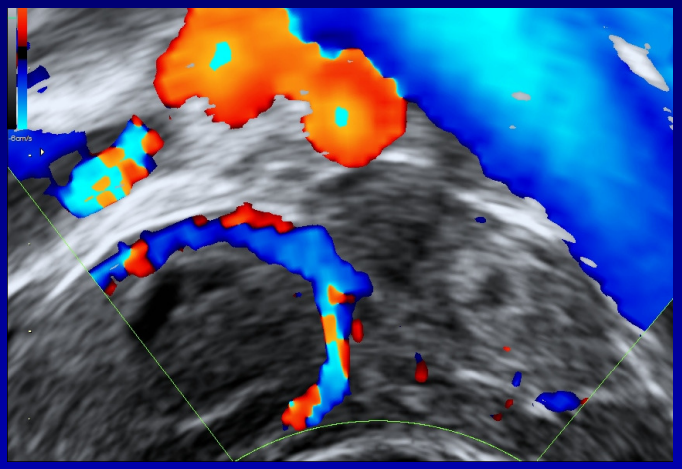


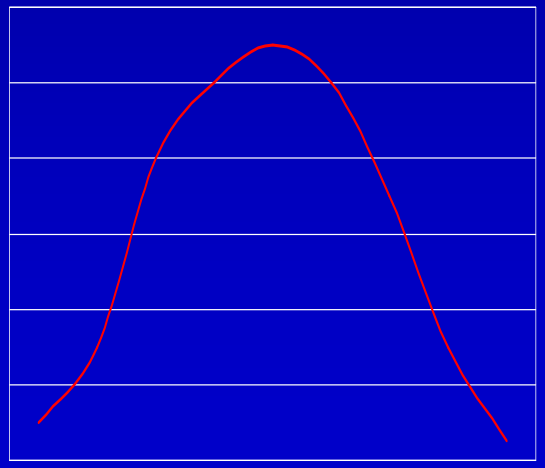
* 1, ultrasonography shows early anembryonic pregnancy or fetal death (missed miscarriage); 2, vaginal bleeding occurs (threatened miscarriage); 3, open cervical os (inevitable miscarriage); 4, miscarriage (products of conception are expelled, and cramps and bleeding soon subside); 5, ultrasonography may show uterine contents – decidua, blood, and some villi.

Ankum et al. 2001

Natural history of ectopic pregnancy



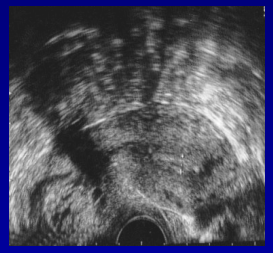


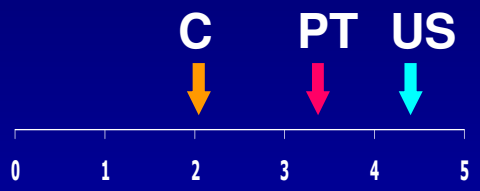


- Day 1 - hCG 679, prog 45
- Day 3 - hCG 1184, prog 44
- Day 5 - hCG 1315, prog 33
- Day 7 - hCG 1401, prog 25
- Day 11 - hCG 242, prog 3
- Day 18 - hCG 88, prog 2

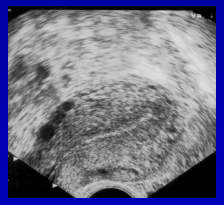
Pregnancy cannot be found. Why?

- Too early



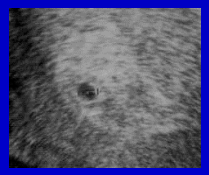


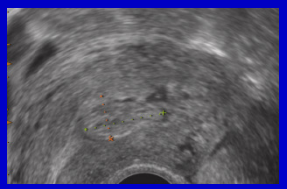
- Too late

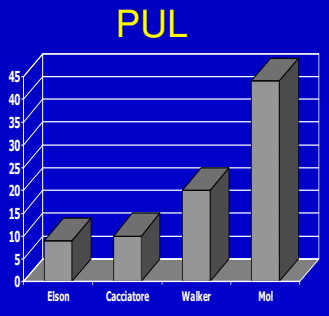


- Too difficult

- Too bad







Current concepts

Aims

- To diagnose an ectopic pregnancy as early as possible in order to initiate treatment
- To differentiate patients with pathological pregnancy that will resolve spontaneously form those with pathological pregnancy necessitating active therapeutic intervention and those with an early normal intrauterine pregnancy

PUL - Logistic models

$$P_{ectopic} = \frac{e^{5.79-4.21\ \text{hCG ratio}}}{1 + e^{5.79-4.21\ \text{hCG ratio}} + e^{9.92-7.66\ \text{hCG ratio}}}$$

$$P_{failing} = \frac{e^{9.92-7.66\ \text{hCG ratio}}}{1 + e^{5.79-4.21\ \text{hCG ratio}} + e^{9.92-7.66\ \text{hCG ratio}}}$$

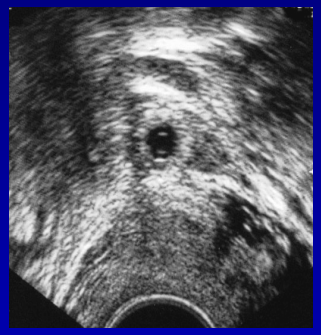
$$P_{IUP} = \frac{1}{1 + e^{5.79-4.21\ \text{hCG ratio}} + e^{9.92-7.66\ \text{hCG ratio}}}$$

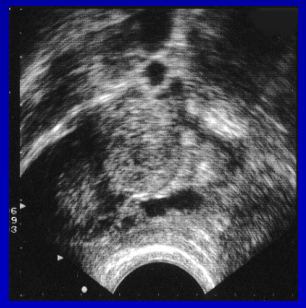
hCG ratio = hCG 48 hours/hCG 0 hours

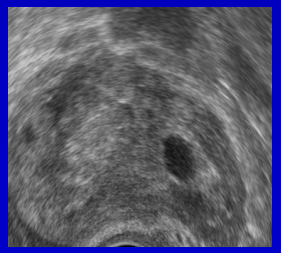
Condous 2004

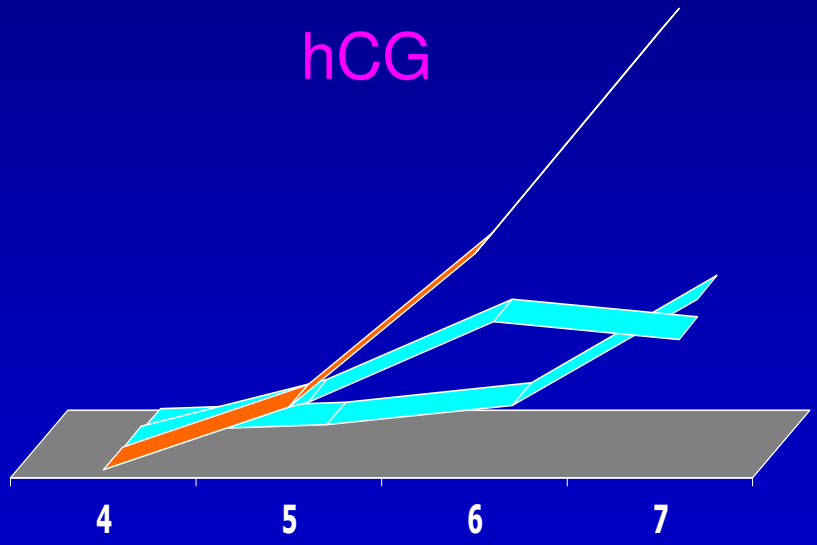
Tubal ectopics

Morphology and hCG

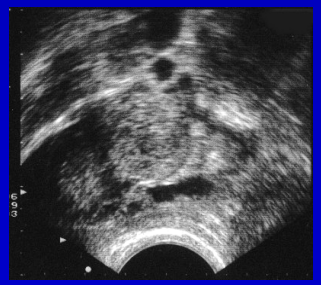


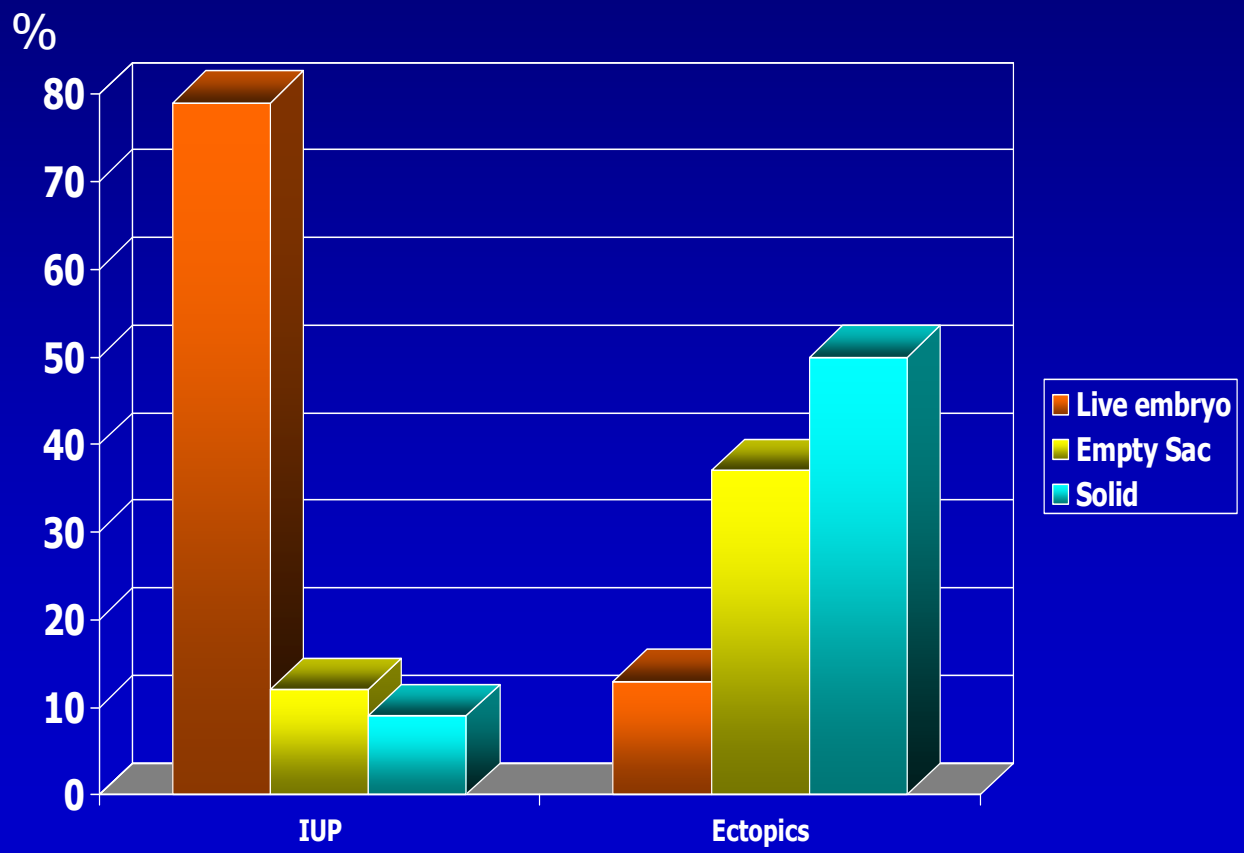






Morphology of IUPs and Ectopics

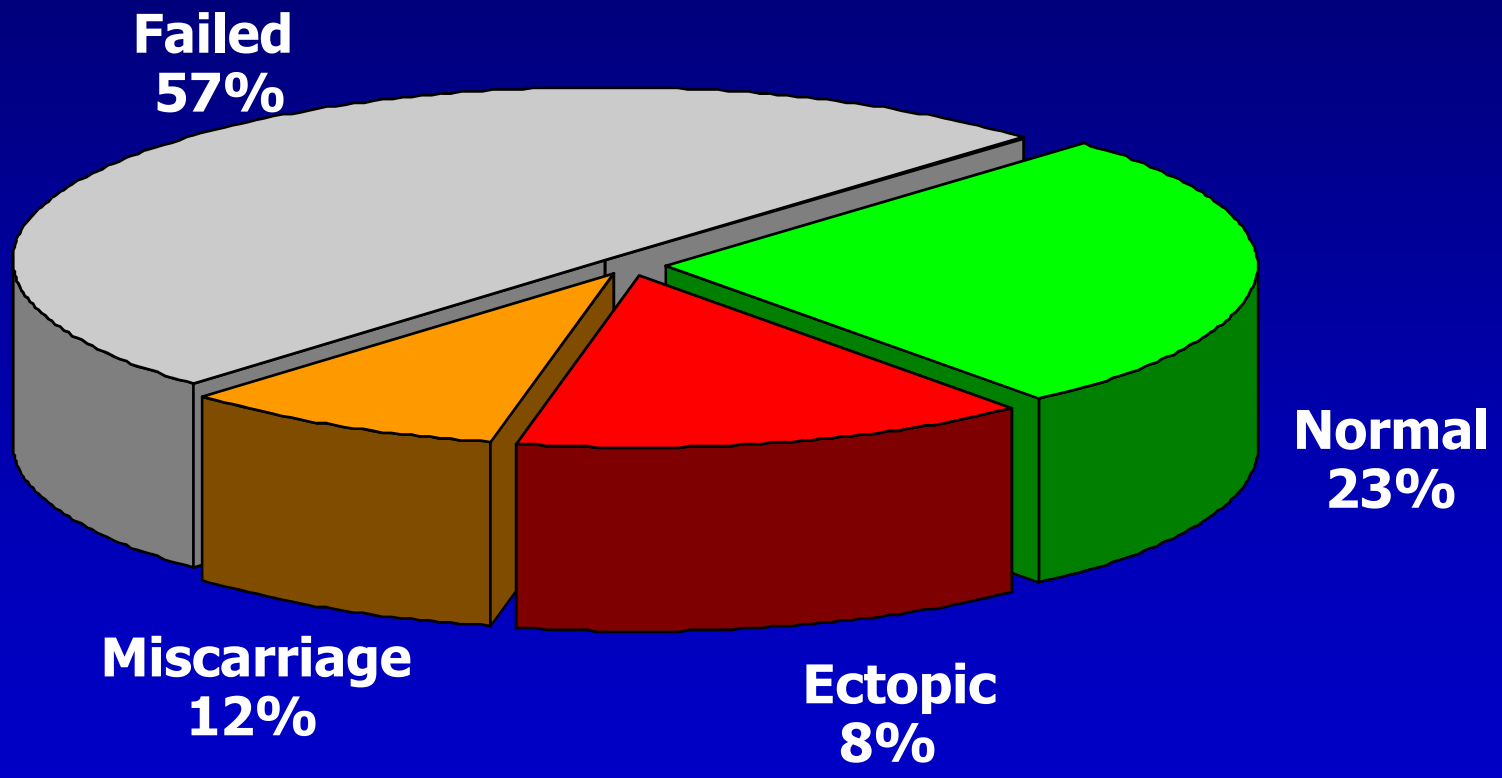




UCL

Pregnancies of unknown location

Final diagnosis



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What are the roles of hCG and progesterone?

hCG = measure of size
Progesterone = measure of speed

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