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GUIDELINES

Early Pregnancy Step by Step

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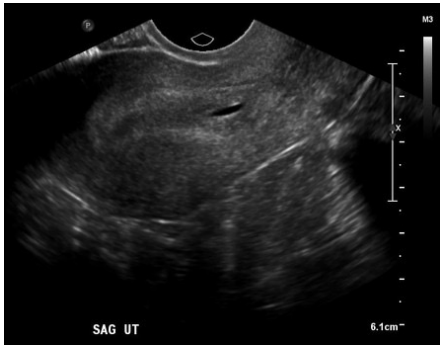
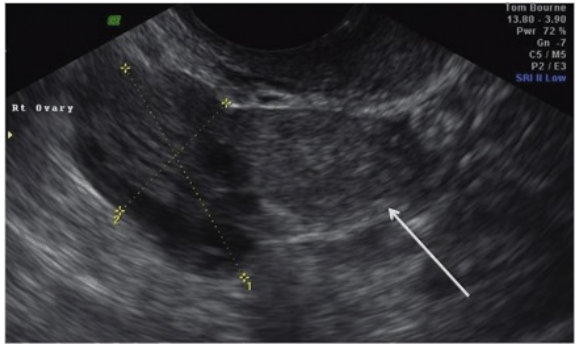
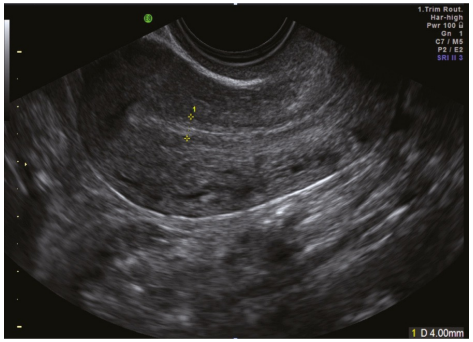
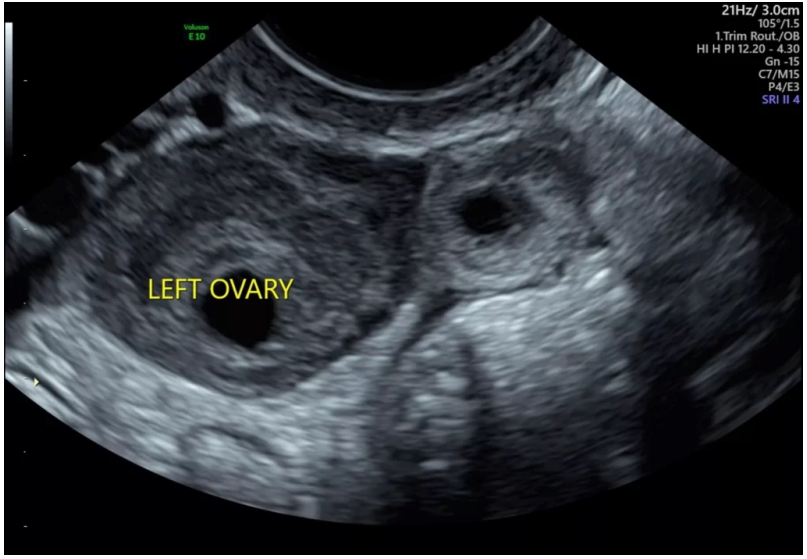
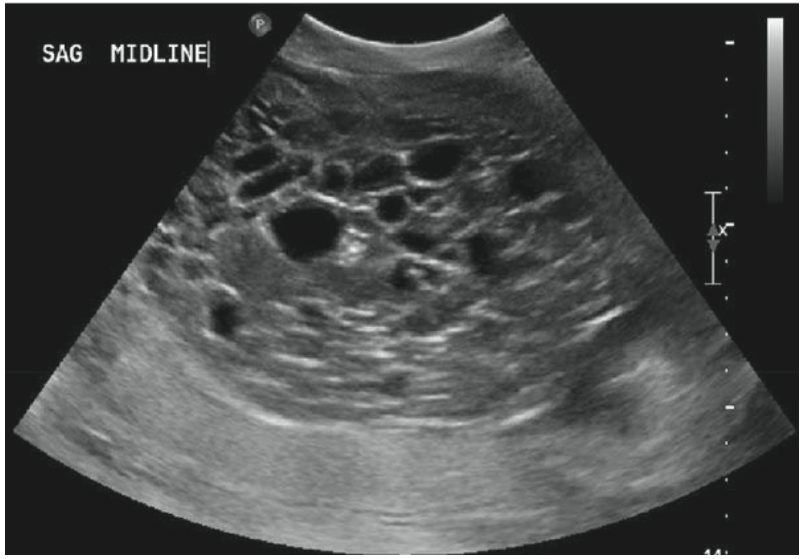

SAG UT
6.1cm


Rt Ovary


D 4.00mm

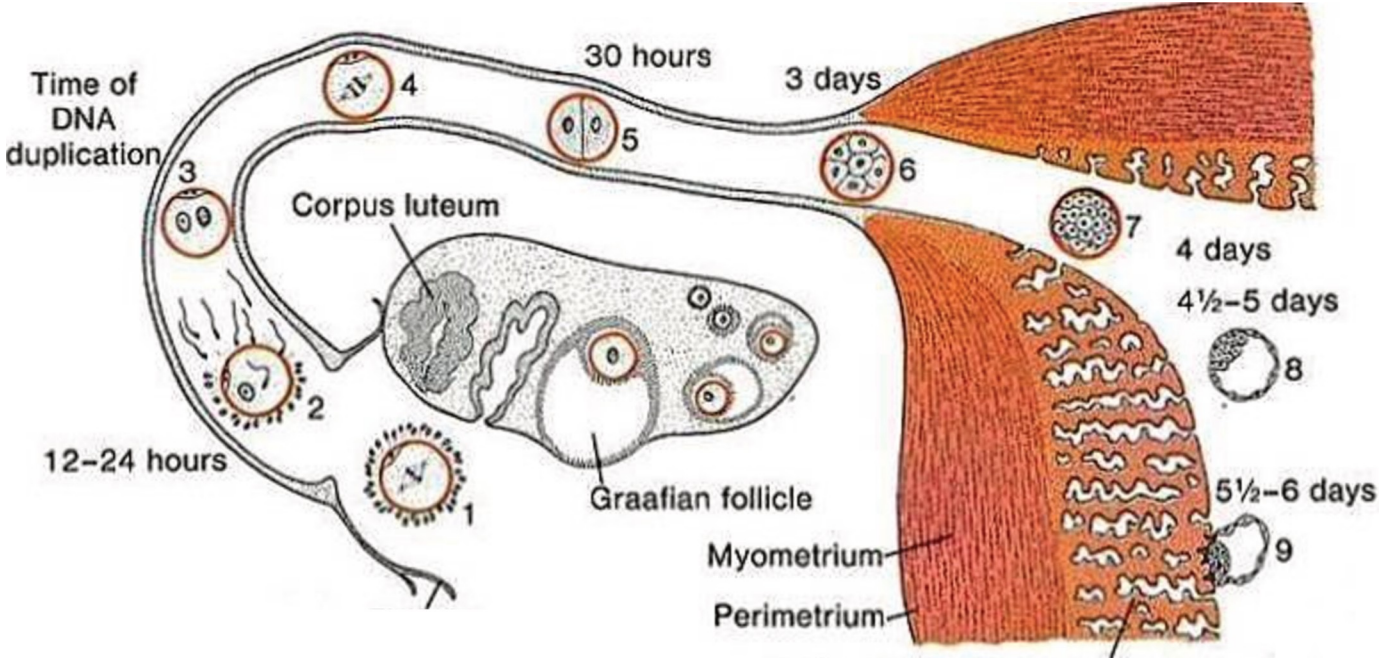

LEFT OVARY


SAG MIDLINE

Goals 4-10 week assessment by US

1. Normal appearance gestational sac (GS), yolk sac (YS) and embryo
2. Assessment of mean sac diameter (MSD) and CRL
3. Viability criteria and terminology in non-viable pregnancy
4. Recognition of ectopics, principles of pregnancy of unknown location (PUL)
5. Role hCG and management of PUL
6. Molar pregnancy

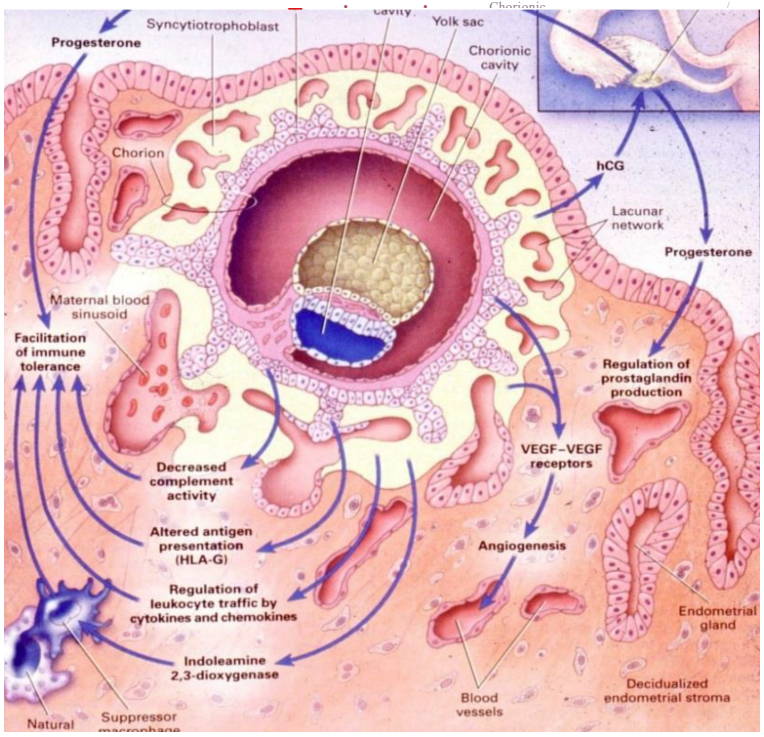
Conception and implantation

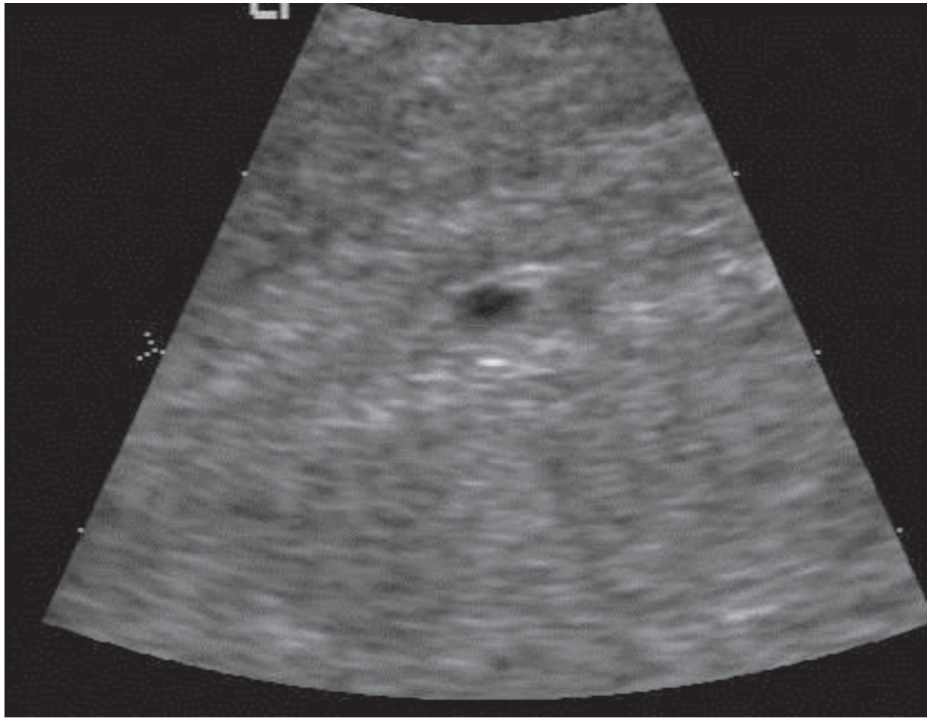


Embryo from 0-8 weeks

Source: The Virtual Human Embryo Project

Implantation > gestational sac





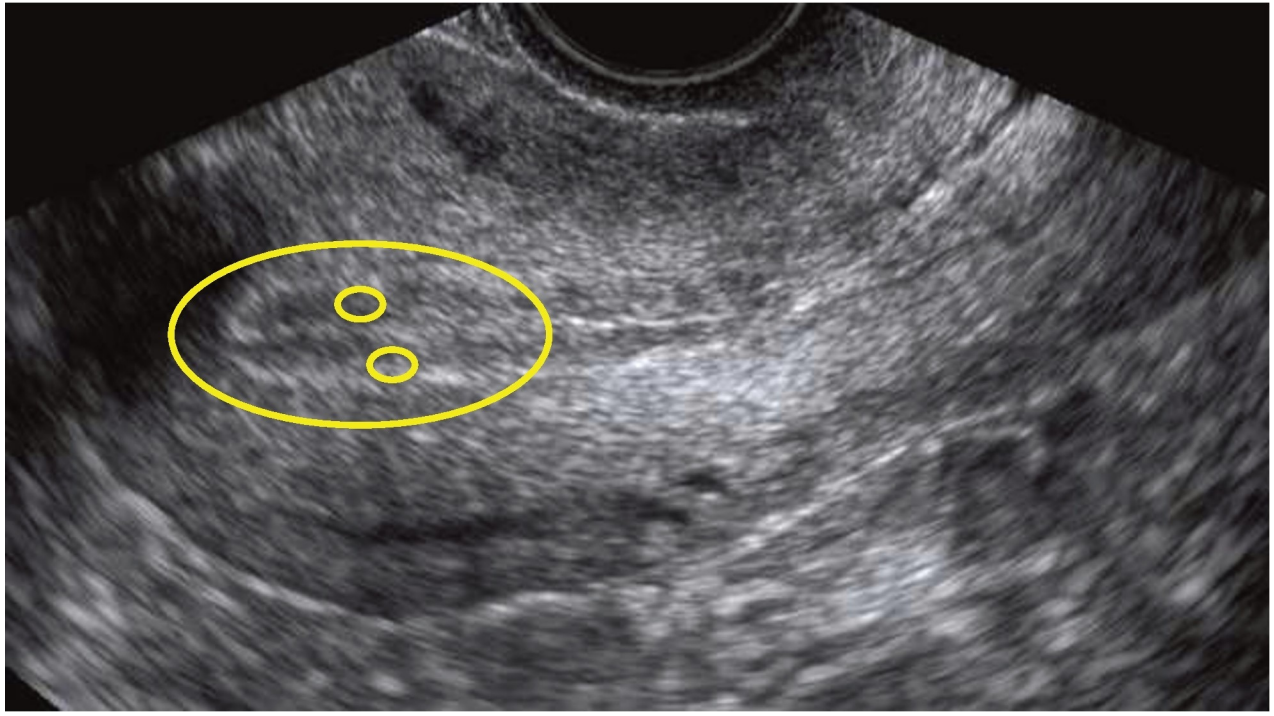
1st evidence pregnancy on ultrasound; completely embedded blastocyst 14 days post conception

NEJM 2001 ;345/1400

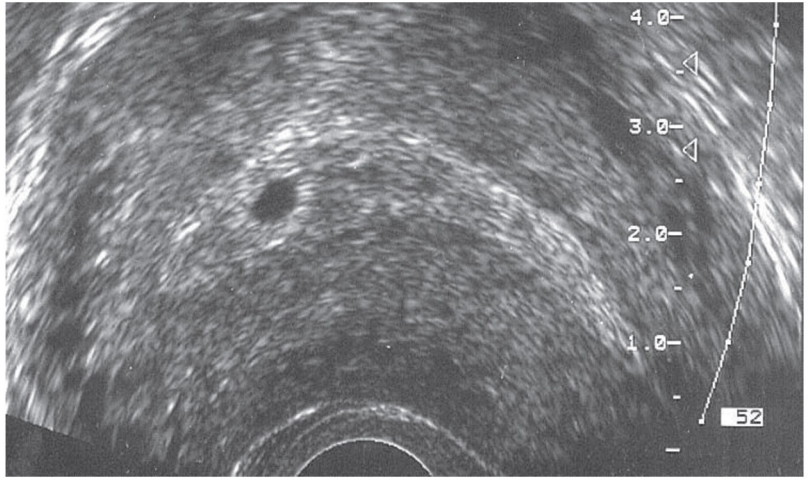
Gestational sac

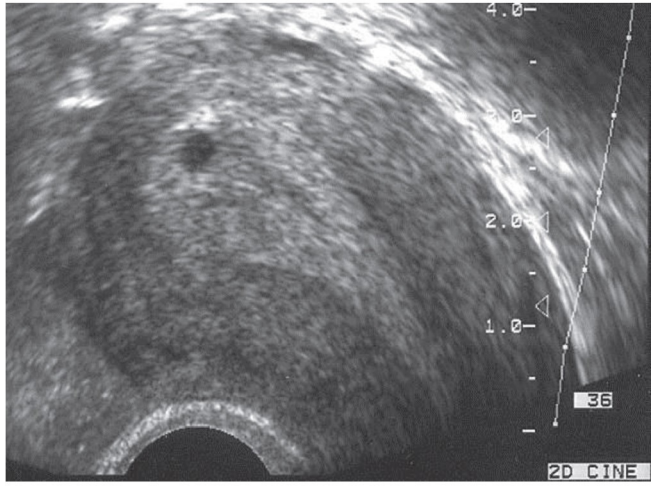
1. Small, round fluid collection inside uterine cavity
2. Normally positioned in mid-to upper uterine cavity
3. Surrounded by a hyperechogenic rim
4. Visible at approximately 5 weeks of gestation
5. Beware of difference in gestational age and embryo age

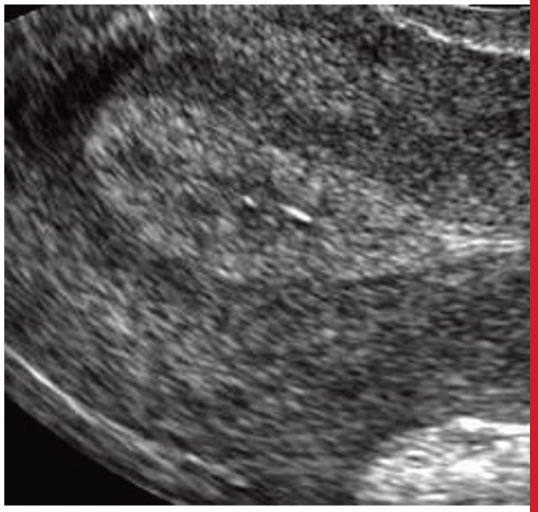
LOCATION OF GESTATIONAL SAC WITHIN UPPER HALF OF UTERUS

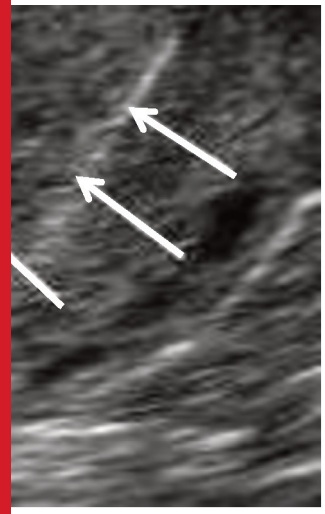


4° weeks - 2 mm





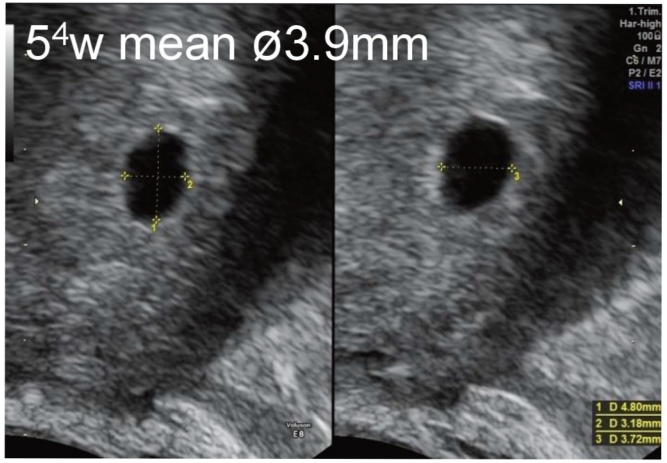


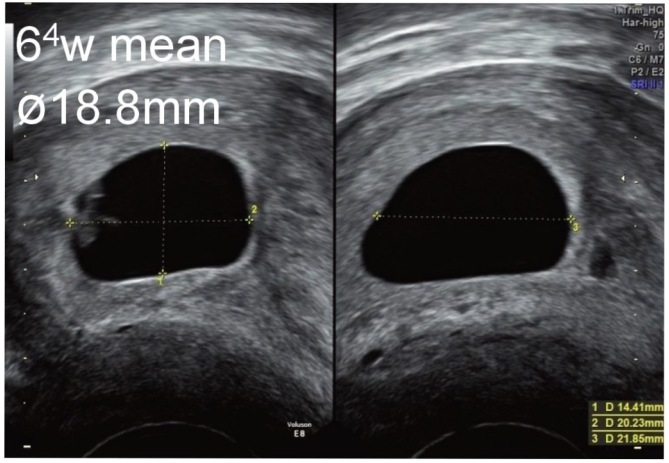


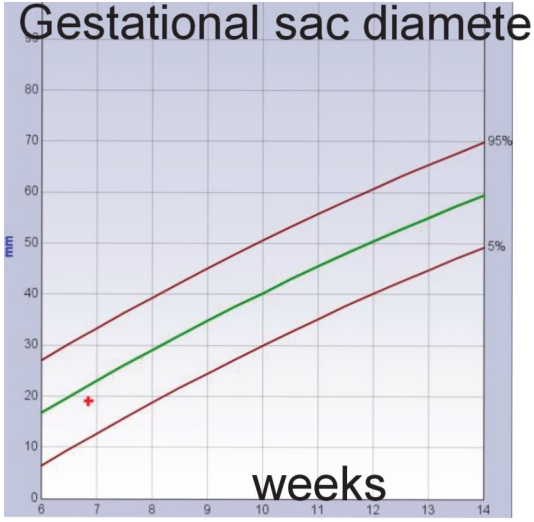
1st choice: Repeat Scan

2nd Choice: serum b-HCG 48h measurements

Gestational sac measurement







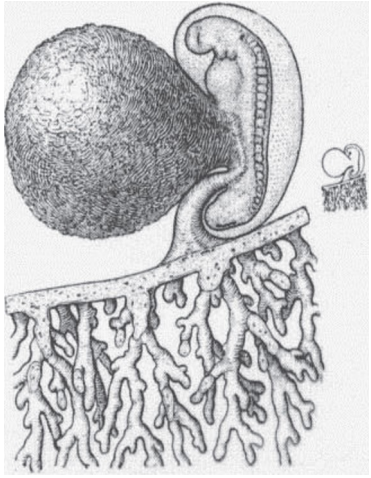
Mean of 3 orthogonal planes

Growth in early pregnancy 1mm/day

Knez et al Best practice Reseach Clin O & G 2014;28:621-36

Yolk sac

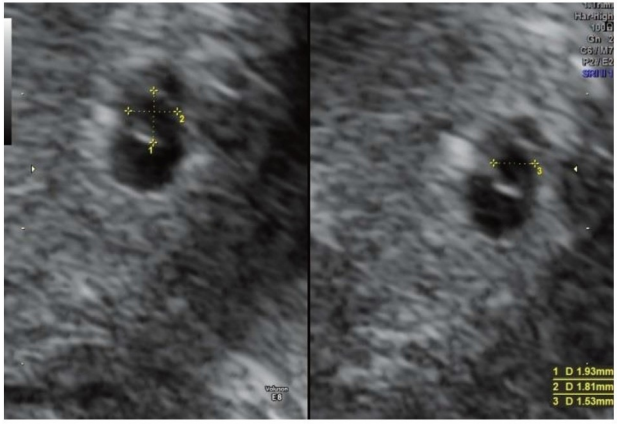
1. First structure identified within gestational sac
2. Confirms intra uterine pregnancy, 100% PPV
3. Spherical in shape
4. Echogenic periphery
5. Sonolucent center
6. Attaches to embryo by vitelline duct

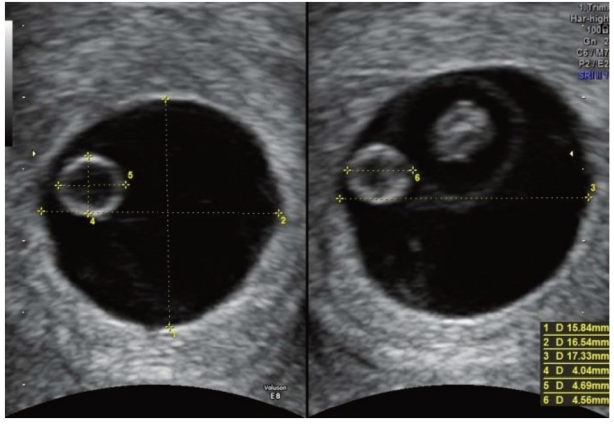


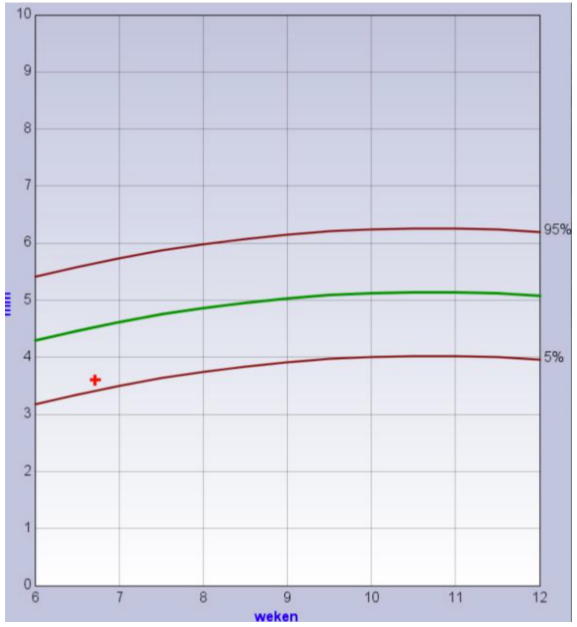
Yolk sac

1. Imaged 5 - 5.5 w
2. Imaged when MSD > 5 - 6 mm
3. Imaged 3 - 5 d prior to embryo
4. Diameter peaks at 6 mm at 10 w then decreases
5. Usually not visible after first trimester

Yolk sac 5 + 7^4 weeks







Yolk sac in multiple pregnancy

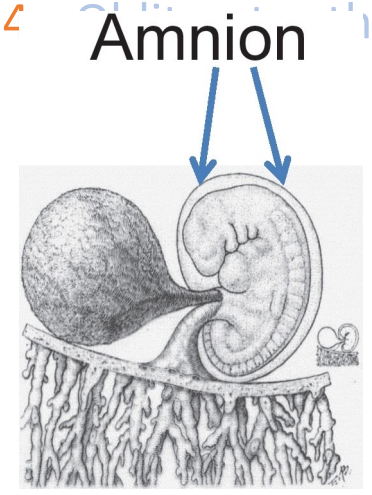
Dichorionic diamniotic monoamniotic

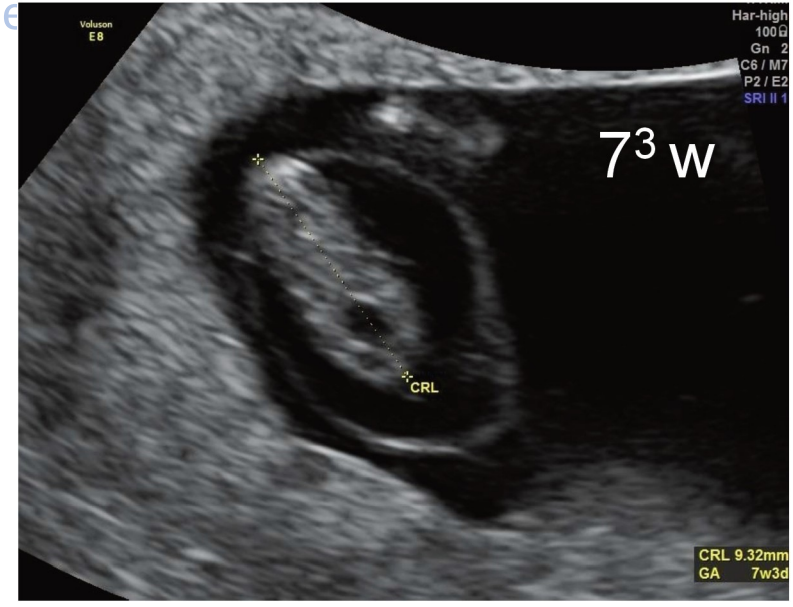
Monochorionic diamniotic

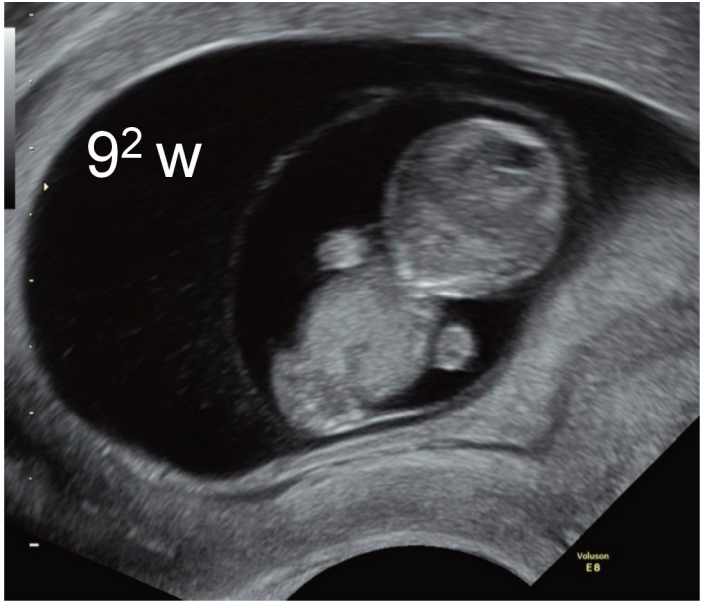
Monochorionic

AMNION

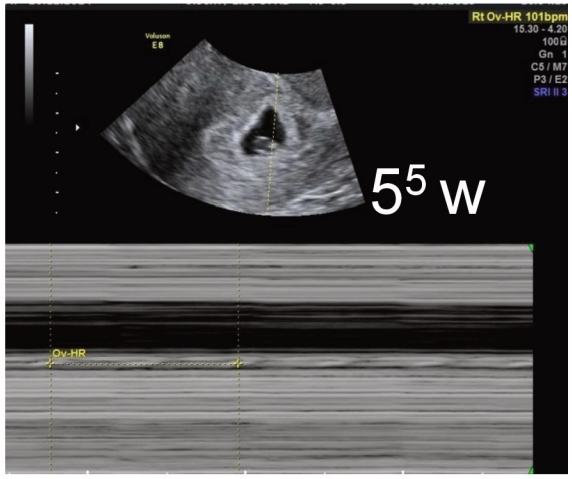
1. First seen - 5.5 w - small membraneous structure continuous with the embryo
2. Contains clear fluid
3. Separates the embryo and amniotic space from the extraembryonic coelom
4. Obliterates the [illegible]

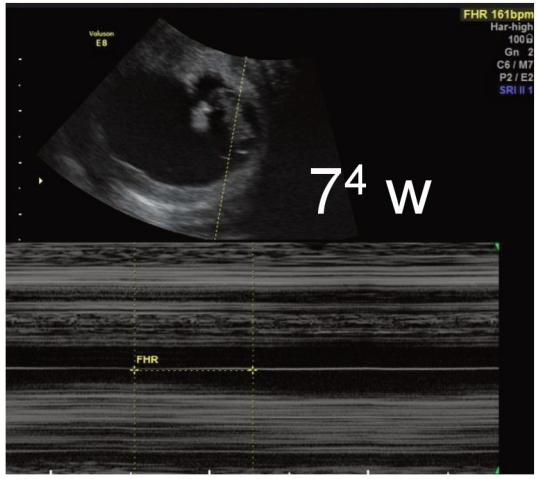


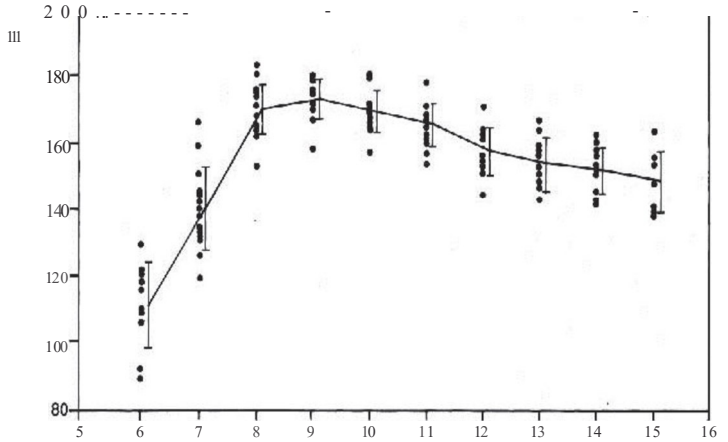




Heartbeat use M-mode







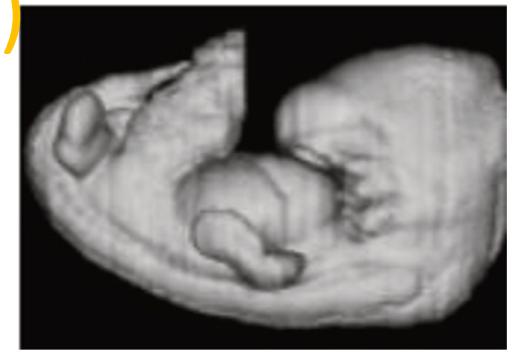
Heartbeat visible > CRL > 2-4 mm

Rapid frequency 5-9 weeks
Use M-mode

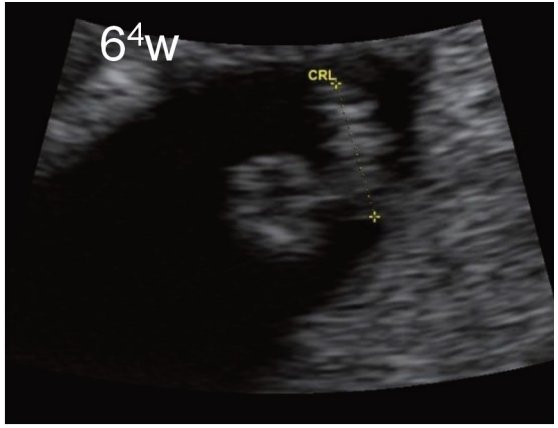
Crown Rump Length (CRL)

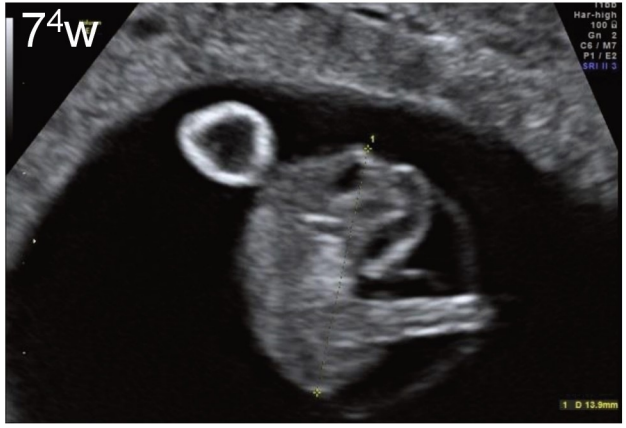
1. ISUOG guideline
2. Midline sagittal section of whole fetus
3. Ideal orientation horizontally
4. Magnification fill most of width of screen
5. Fetus in neutral position
6. Amniotic fluid between chin and chest
7. Endpoints clearly defined

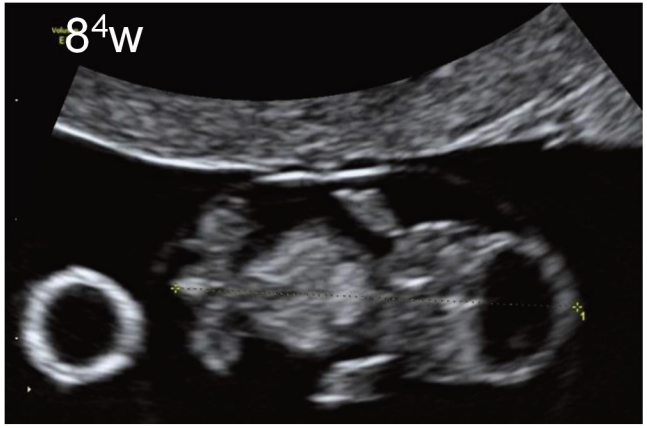
ISUOG guideline 1st trim us scan UOG 2013;41:102-113



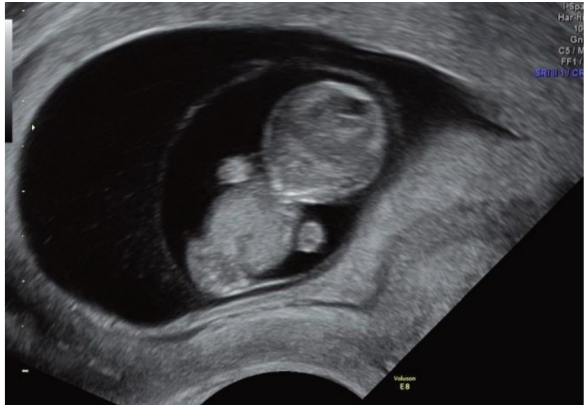
Embryo 6-8 weeks







9^4 weeks



10 weeks

Practical rules early pregnancy

	Transvaginal ultrasound		Abdominal ultrasound	
	Gestational age (weeks)	Measurement	Gestational age (weeks)	Measurement
GS	4	2 mm	5	10 mm
YS	5	2 mm	5	3 mm
Heartbeat	5^4	70 bpm	6^4	110 bpm
CRL	5^3	3 mm	6^4	6 mm
Movement	7		7	

CRL (in cm) + 6,5 =GA in weeks

PAIN & BLOOD LOSS IN EARLY PREGNANCY

Event	Frequency
Pain & vaginal bleeding	1:5 pregnant women
Blood loss	50% continue into normal pregnancy
50% remaining blood loss	Non viable, of which 10-15% ectopic pregnancy

Pain in early pregnancy

Obstetric cause:

Miscarriage, ectopic, haemorrhage ruptured corpus luteum cyst, ovarian torsion

Non-obstetric cause:

Cystitis, appendicitis, ureteric stones, constipation

Knez et al Best Practice Res Clin O & G 2014·28·621-636

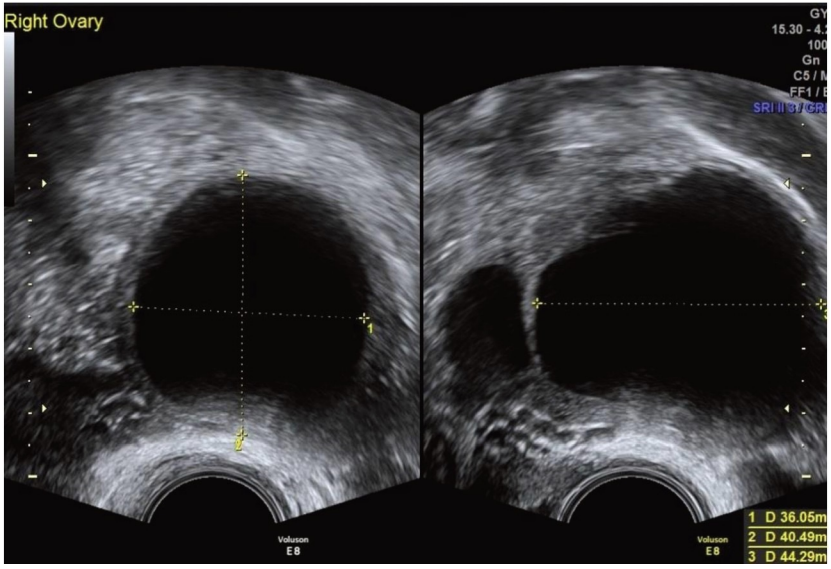
Guideline TV US intrauterine pregnancy failure and uncertain viability

Diagnostic for pregnancy failure	**Suspicious** / not diagnostic pregnancy failure
CRL ≥ 7 mm no heartbeat	CRL < 7mm no heartbeat
Mean GS Ø 25 mm no embryo	Mean GS Ø 16-24 mm no embryo
Absence embryo with heartbeat ≥ 2 wk after scan GS without YS	Absence embryo with heartbeat ≥ 7-13days after scan GS without YS
Absence embryo with heartbeat ≥ 11 days after scan GS with YS	Absence embryo with heartbeat 7-10 days after scan GS with YS
	Absence embryo ≥ 6 wks after LMP
	Empty amnion adjacent to YS no embryo
	Enlarged YS > 7mm
	Small GS in relation to size of embryo (< 5 mm difference between mean GS Ø and CRL

If viability in doubt rescan after 1 week

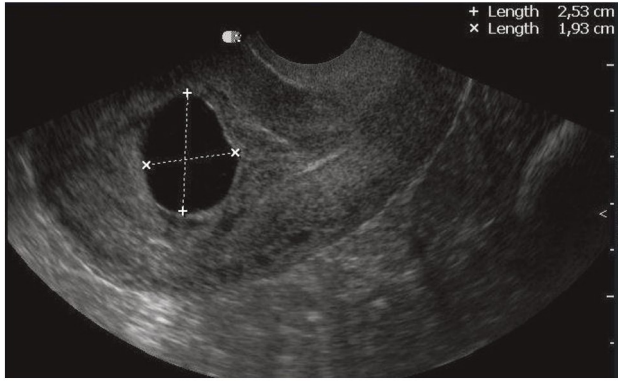
Doubilet et al NEJM 2013;369:1443-51

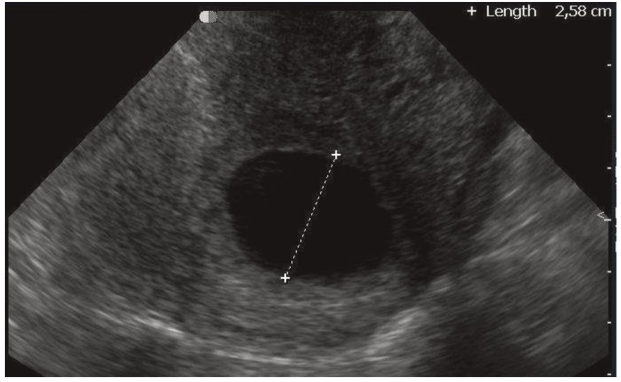
Uncertain viability 6^2 weeks

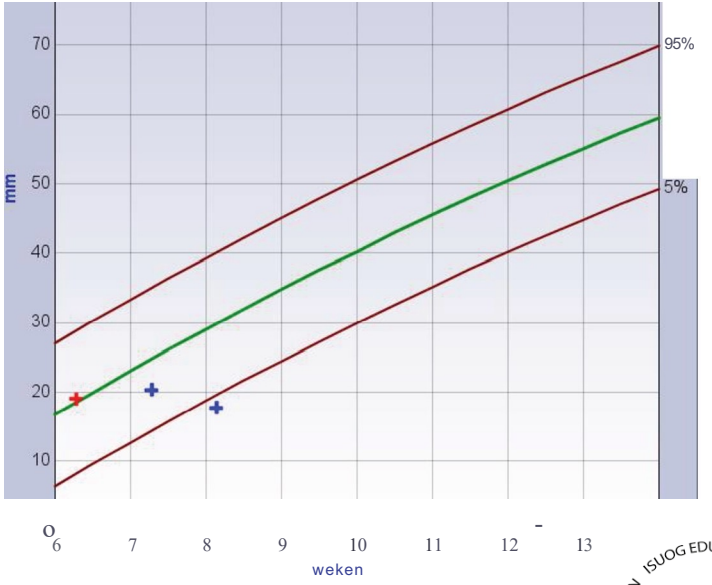


GS and YS, no heartbeat
Repeat scan 1 week

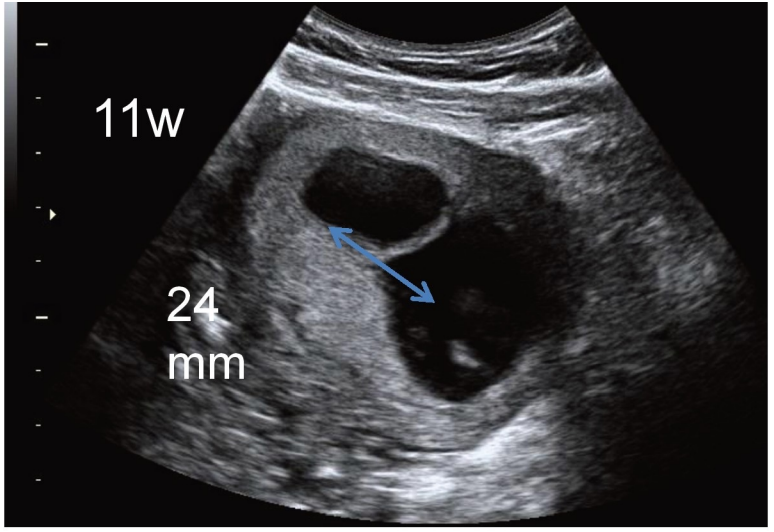
GESTATIONAL SAC: FAILING PREGNANCY 100







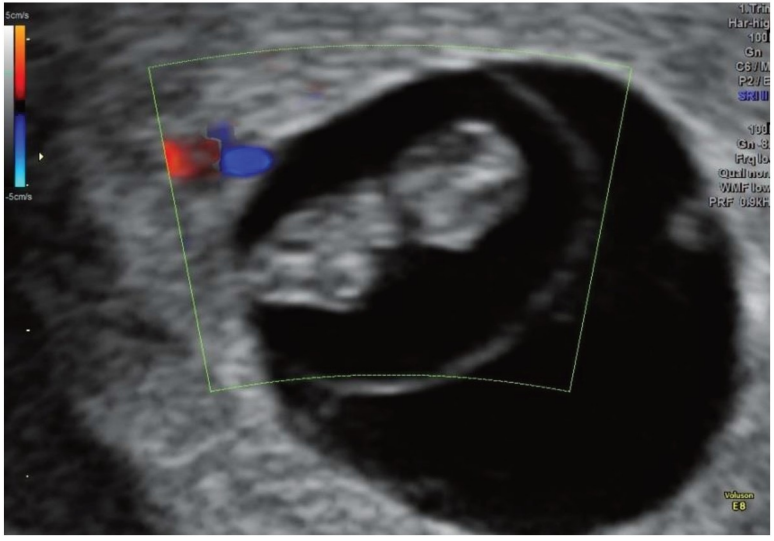
Twin pregnancy with vanishing twin

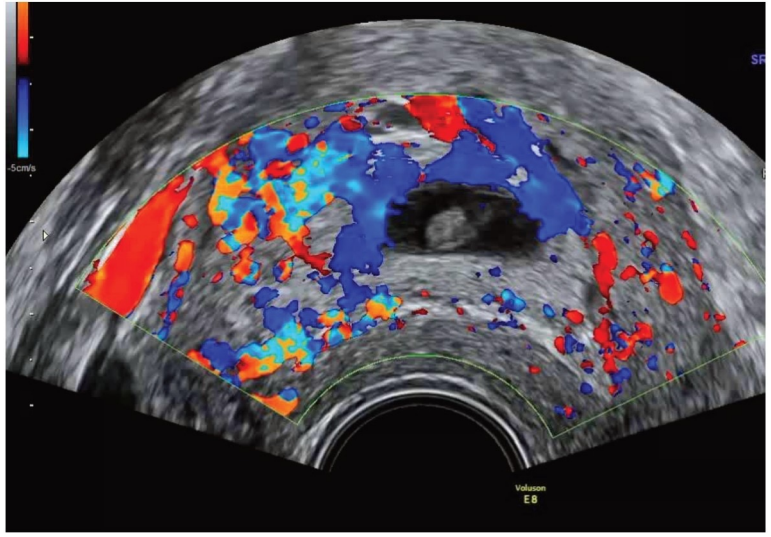


Evron et al Fertil Steril 2015;103:1209-14

HAEMATOMA

MISCARRIAGE





8 weeks no heartbeat

Sites of ectopic pregnancy

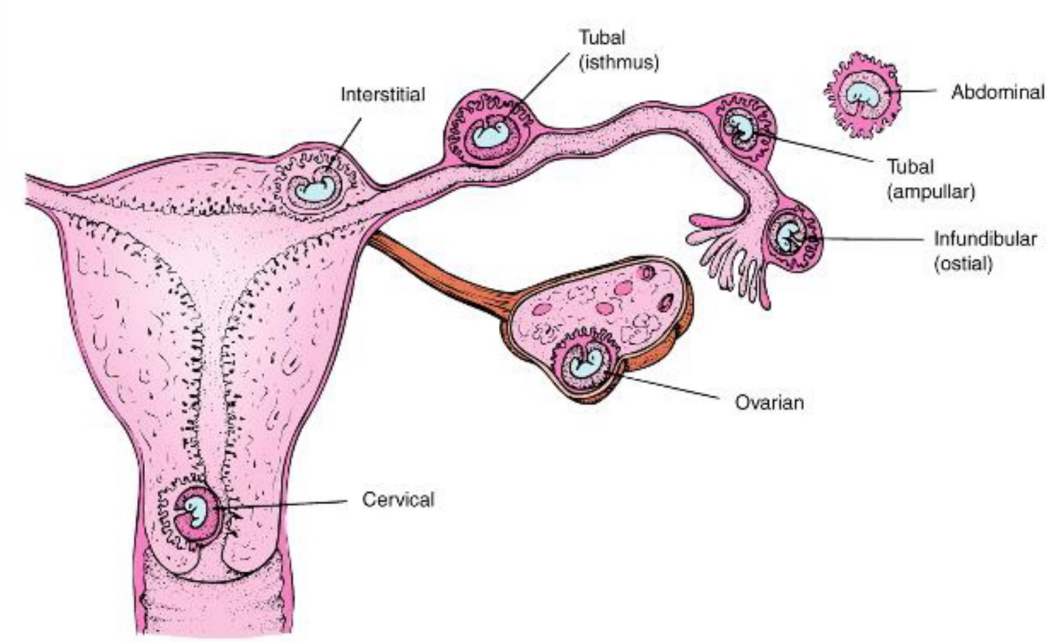
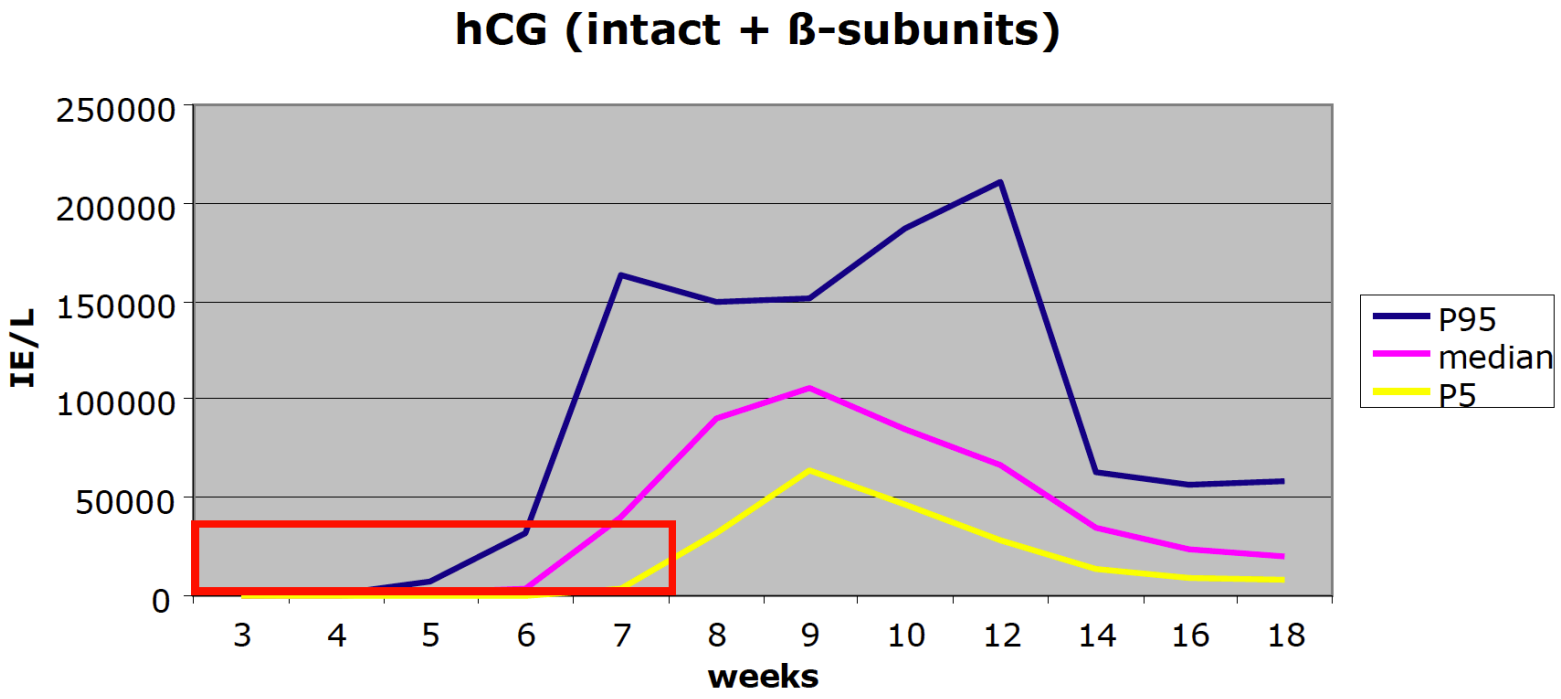
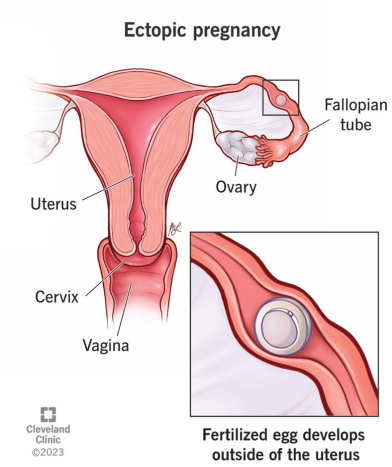


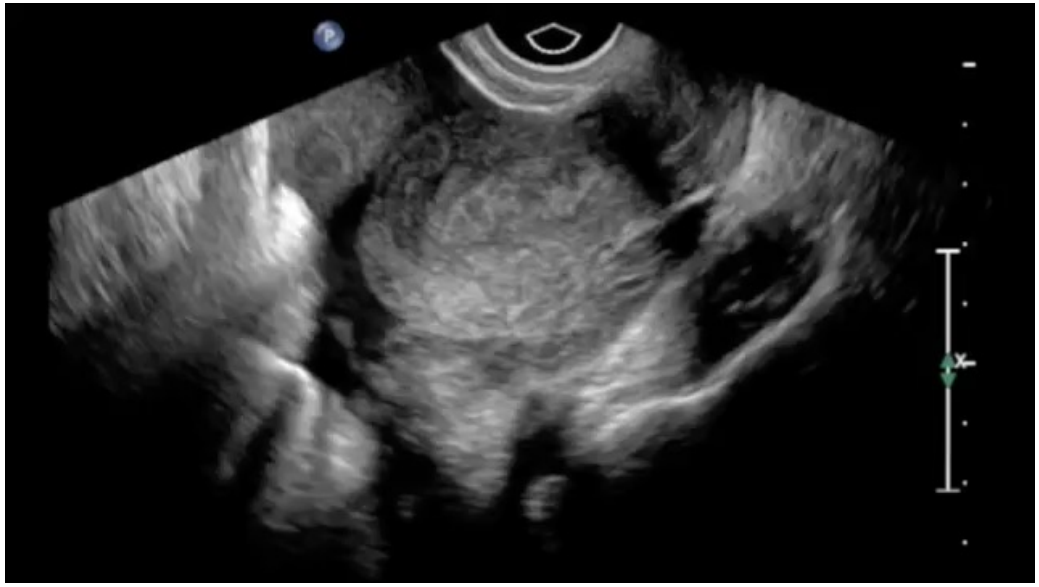
Figure 46-9 Sites of ectopic pregnancy.

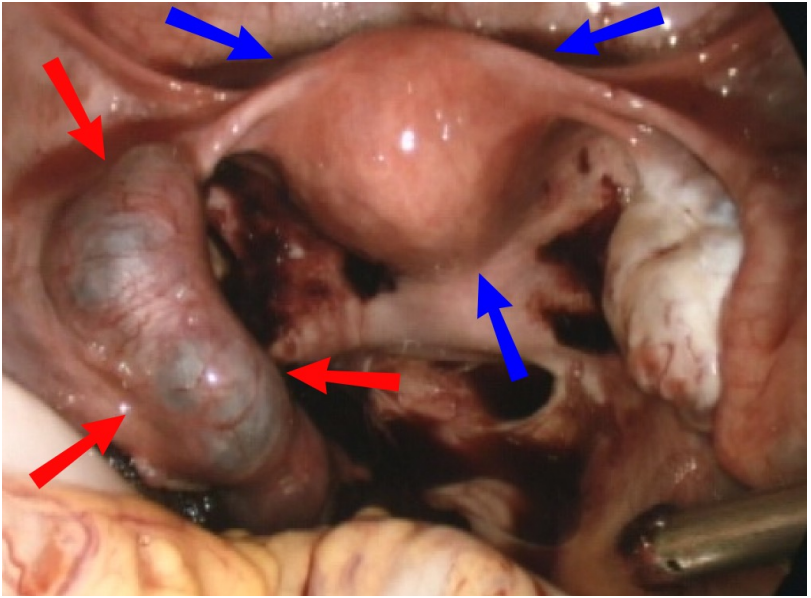
Early pregnancy: normal values of hCG



ECTOPIC PREGNANCY

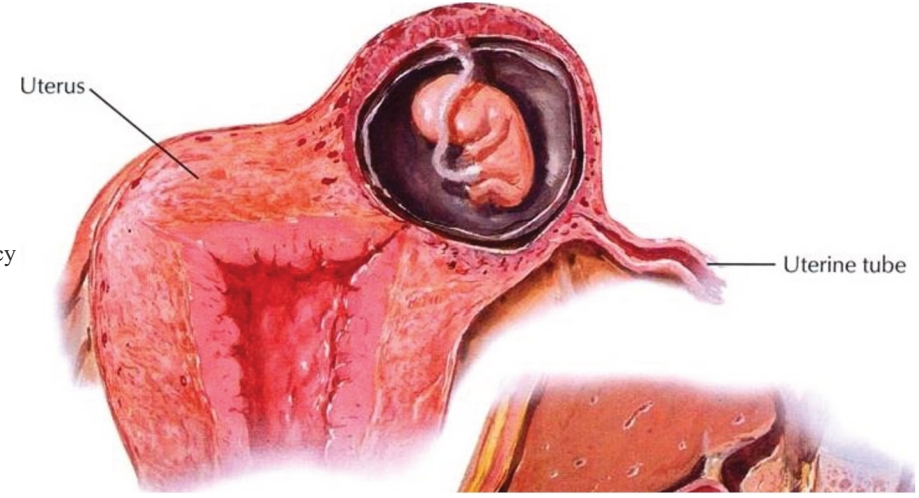


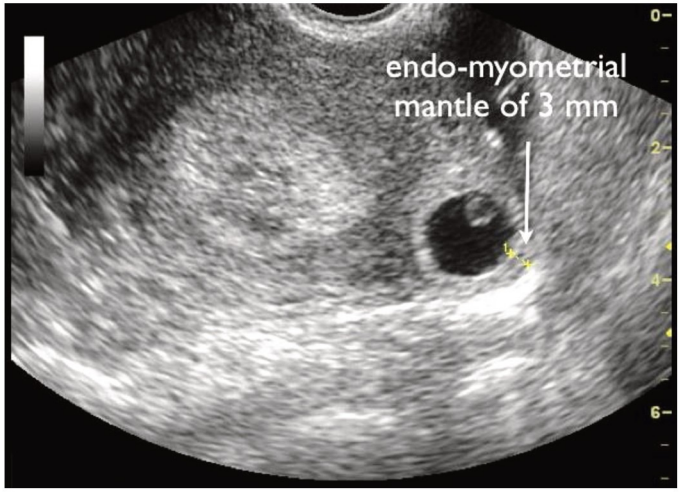




Interstitial pregnancy

Interstitial pregnancy





Cervical ectopic pregnancy
Gestational sac in lower segment in cervical canal

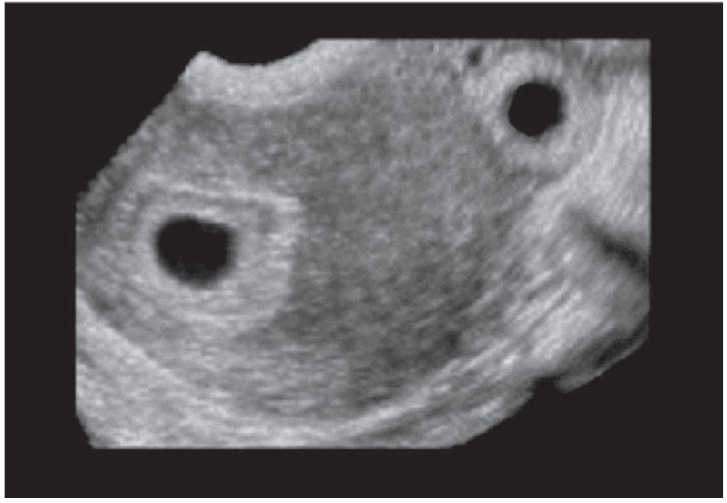
Gestational sac in lower segment - in cs scar

HETEROTOPIC PREGNANCY

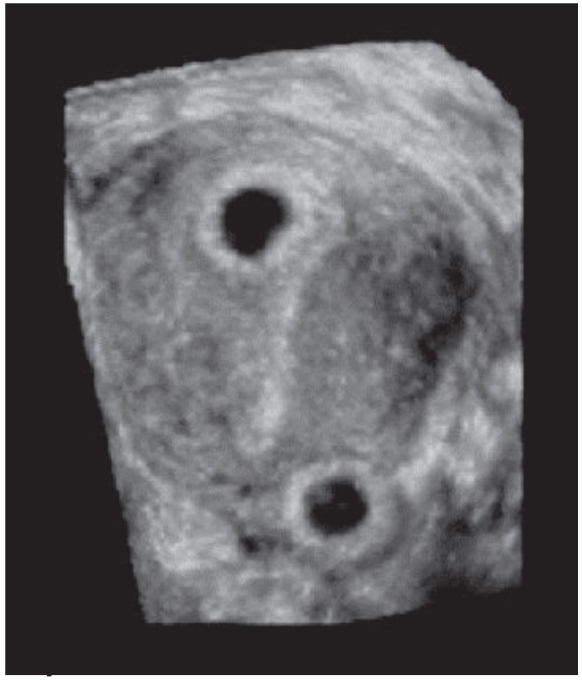
Prevalence heterotopic pregnancy

Spontaneous pregnancy 1:30,000

ART pregnancy 1:100-500



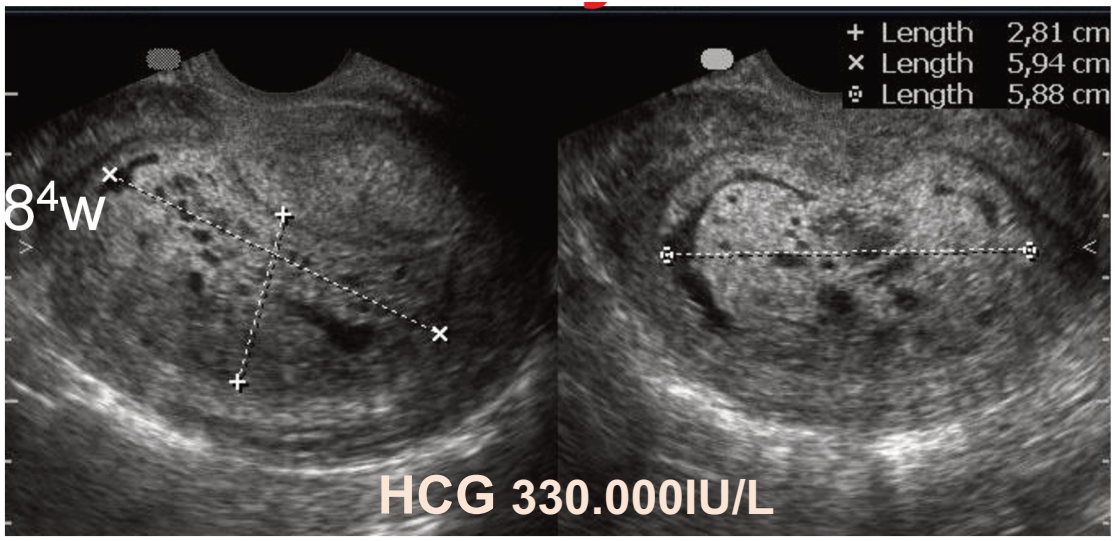
Intrauterine

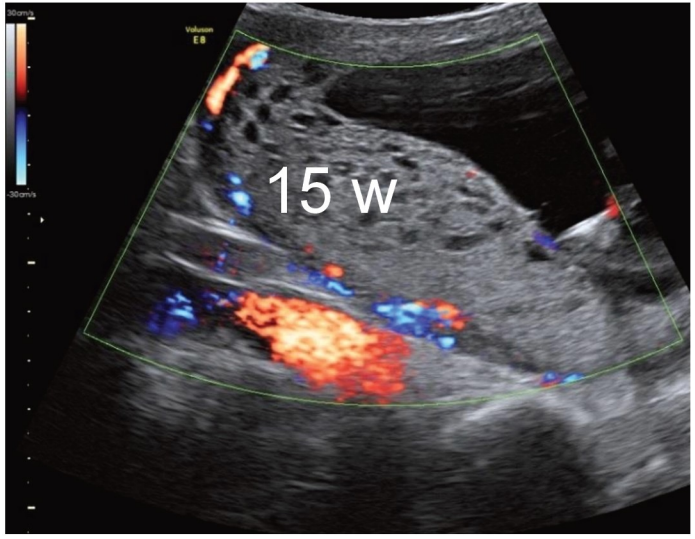


Ectopic

Maruotti & Russo Fert Ster 2010;94:e49

Hydatiforme mole

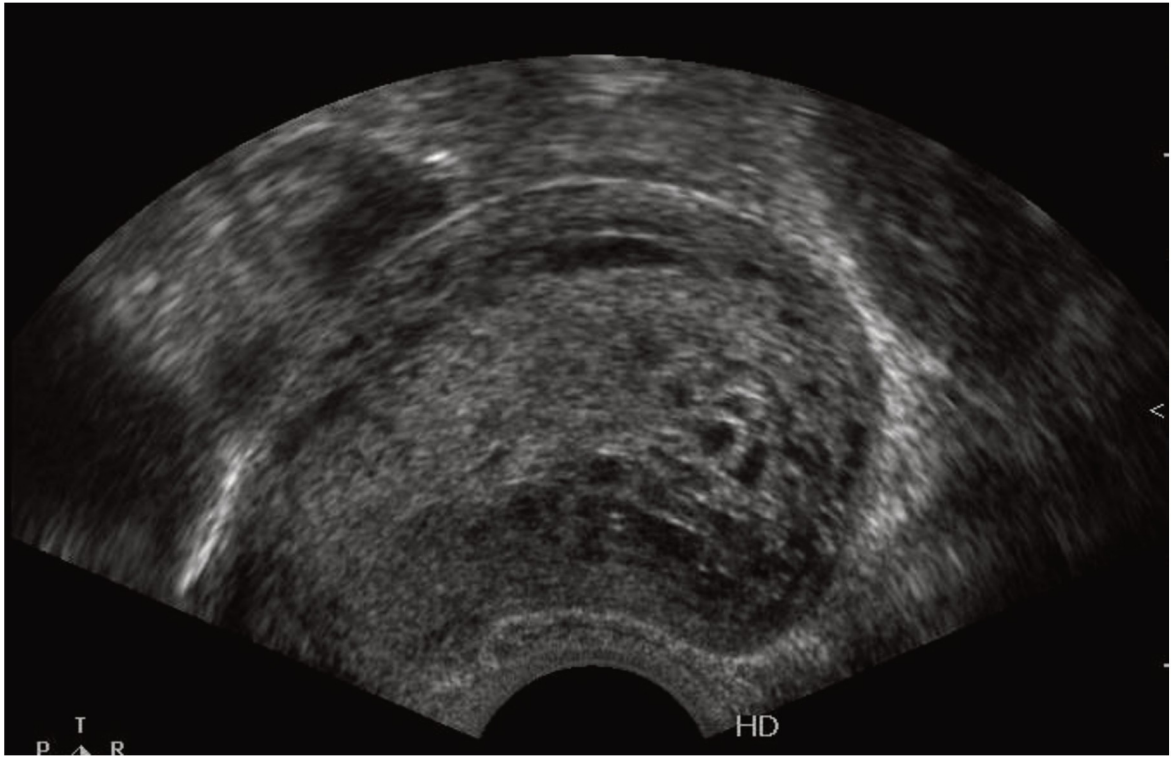




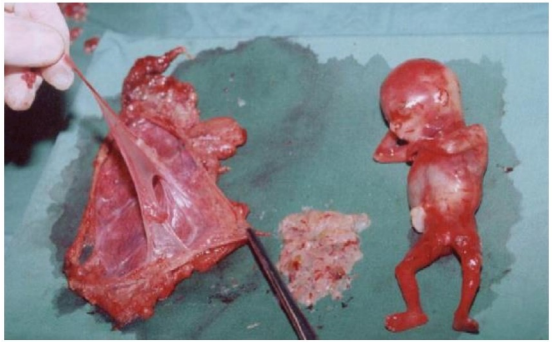
Complete
Prevalence 1:1500-2000
46, XX only paternal
Persisting throphoblast 15%

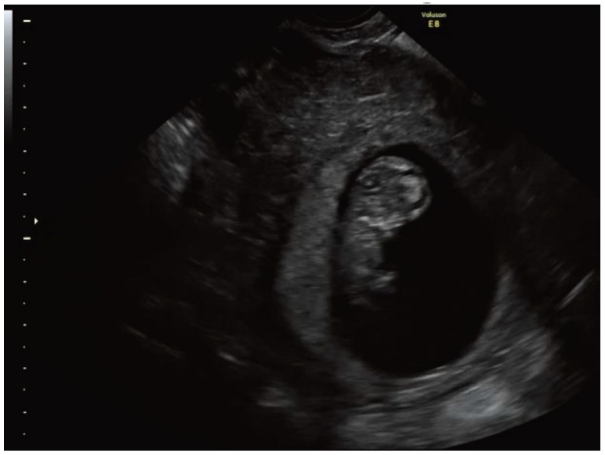
Partial
Prevalence 1:700
69 XXX of 69 XXY (triploidy), paternal and maternal
Persisting throphoblast 2%

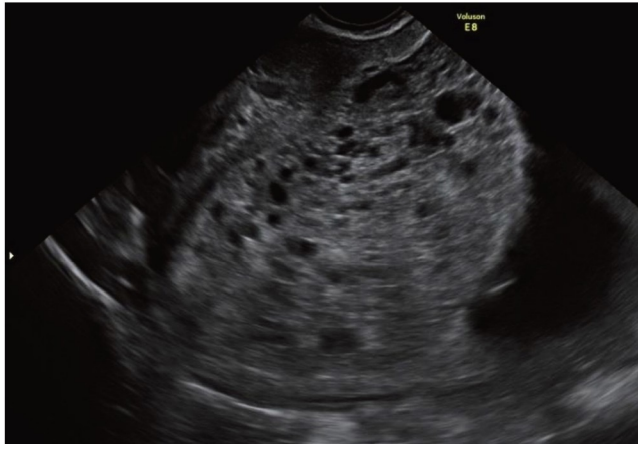
Hydatiforme mole



Hydatiforme mole in twin pregnancY







Prevalence 1:10.000-100.000

Conclusion

1. Aware of normal appearance and assessment GS, YS & embryo from 4 weeks gestational age onwards
2. Criteria and terminology of viable and nonviable pregnancy
3. In doubt about viable intrauterine pregnancy: repeat scan 1 w
4. Scan uterus and ovaries to recognize ectopics
5. Management of PUL and role hCG and progesteron
6. Molar pregnancy appearance and pitfalls
7. In doubt of location of pregnancy: repeat scan within 2 days