Prenatal Care

Clerkship Week 1 Seminar
Department of Obstetrics and Gynecology
University of Western Ontario

Objectives

Discuss the sequence of prenatal care, prenatal screening and diagnostic tests (IPS, Quad screen, amniocentesis, CVS) and fetal ultrasound (NT, morphology).

First Prenatal Visit

- Dating the pregnancy
  - Last menstrual period – Regular? Certain?
  - Naegele's rule – add 1 week, subtract 3 months
  - Avg length of gestation ~ 280 days
  - Confirm with ultrasound

Determination of gestational age

Determination of gestational age

- CRL up to ~14 weeks: ± 5-7 days
- >16 weeks
  - Biparietal diameter (BPD)
  - Head circumference (HC)
  - Abdominal circumference (AC)
  - Femur length (FL)
- Measurements >16 weeks: ± 10 days weeks

The Dating Game…

Scenario 1

- 24 yo woman, 1st pregnancy, LMP = Dec 1st, regular cycles q 28 days, Usd Feb 20th , CRL = 12 weeks 2 days.

Her due date is

a) Sept 7th
b) Aug 24th
c) Sept 2nd
d) When ever the baby decides to come

The Dating Game…

Scenario 2

- 24 yo woman, 1st pregnancy, LMP = Dec 1st, forgot 2 Alesse tablets, Usd April 5th , biometry 20 weeks

Her due date is

a) Sept 7th
b) Aug 24th
c) Sept 2nd
d) When ever the baby decides to come

The Dating Game…

Scenario 3

- 24 yo woman, 1st pregnancy, LMP = Dec 1st, regular cycles every 35 days, no Usd yet.

Her due date is

a) Sept 7th
b) Sept 14th
c) Sept 2nd
d) When ever the baby decides to come

Antenatal Visits

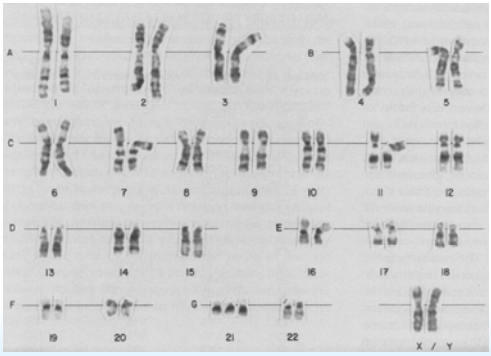
- Frequency
  - Initial assessment < 12 wks
  - Q 4-6 wks to 28 wks / Q2 wks to 36 wks / weekly to delivery

First and Second Trimester

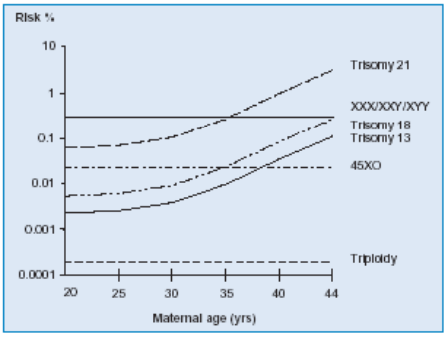
Special considerations:

- Prenatal screening for anueploidy and NTD (FTS, IPS, MSS)
- Prenatal investigations
- Fetal Ultrasound

Down syndrome



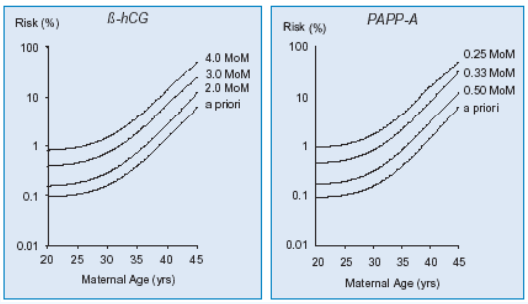
Risk for chromosomal abnormalities



Screening methods for chromosomal abnormalities

Method of screening	DR (%)
Maternal age (MA)	30
MA and maternal serum biochemistry at 15–18 weeks	50–70
MA and fetal nuchal translucency (NT) at 11–13+6 wks	70–80
MA and fetal NT and maternal serum free β-hCG and PAPP-A at 11–13+6 wks	85–90
MA and fetal NT and fetal nasal bone (NB) at 11–13+6 wks	90
MA and fetal NT and NB and maternal serum free β-hCG and PAPP-A at 11–13+6 wks	95

1st trimester serum screening



Nuchal translucency

normal ↓

←T21

Integrated screening - summary

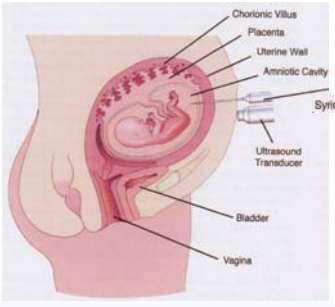
- Offered to all pregnant women
- Screening test, **NOT** a diagnostic test

- Integrated screening
  - Maternal serum PAPP-A and βHCG at 11-14 weeks
  - Nuchal translucency at 11-14 weeks
  - uEstradiol, αFP and βHCG at 15-16 weeks

Detection of ~90-95% of T21

Offer amniocentesis when risk > 1:200

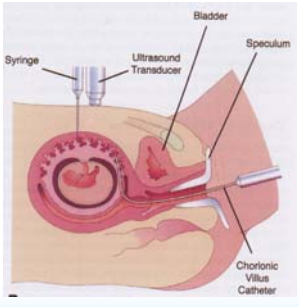
Amniocentesis



- Genetic Counseling
- GA 16 weeks
- Ultrasonic visualization
- 20 cc amniotic fluid
- Culture fetal fibroblasts
- Result 2-3 weeks

- 0.5% risk pregnancy loss (1:200)

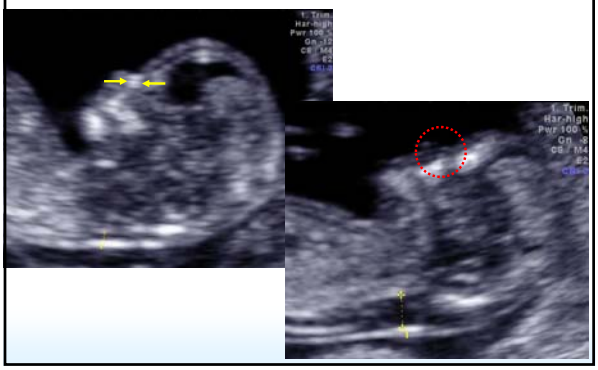
Chorion villus biopsy



- Genetic Counseling
- 10-12 weeks
- Transabdominal or transcervical
- Karyotype result in 2-3 weeks

- 0.8% risk pregnancy loss (1:100 – 1:150)

Nasal bone



First and Second Trimester

Special considerations:

- Prenatal screening for anueploidy and NTD (FTS, IPS, MSS)
- Prenatal investigations
- Fetal Ultrasound

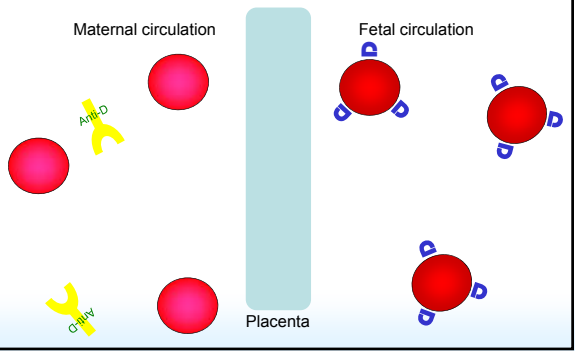
'Routine' tests in pregnancy
I. First diagnosis of pregnancy

- Hgb
- Blood group and antibody screen
- Urine dip for protein, infection
- VDRL
- Rubella titre
- HBsAg
- STD screen if indicated
- Discuss and offer HIV testing
- Ultrasound

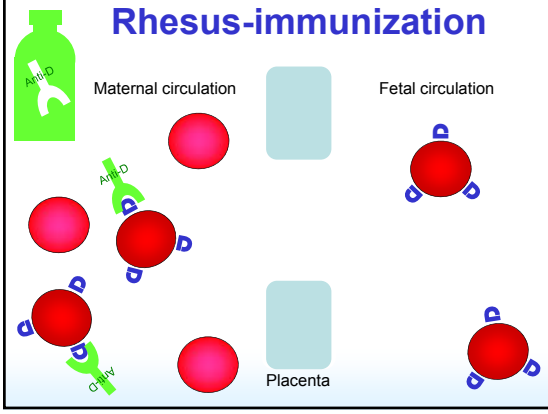
Rhesus-immunization

- Rhesus negative pregnant women
- Sensitization either through previous pregnancy or transfusion
- IgG crosses placenta, coated erythrocytes destroyed in fetal RES
- Fetal anemia → hydrops

Rhesus-immunization



Rhesus-immunization

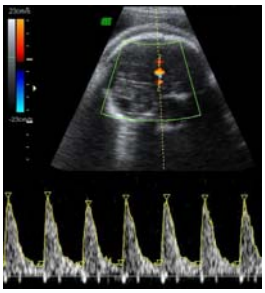


Hydrops foetalis (30 weeks)

Rhesus-immunization

Management
- Bilirubin (Liley index)
- Vmax arteria cerebri media
- Intra-uterine transfusions

Prevention:
- anti-D at 28-32 weeks and after birth



Prevention of HIV transmission

- Transmission of HIV dependent on viral load at delivery:
  - 10% at 1000 copies/mL
  - 17% at 1000-10,000 copies/mL
  - 33% at >10,000 copies/mL
  - 0.6-2% with HAART
- Monitoring: Viral load & CD4 count
- Management:
  - HAART if >1000 copies/mL
  - Caesarean section if >1000 copies/mL
  - Intrapartum zidovudine

First and Second Trimester

Special considerations:

- Prenatal screening for anueploidy and NTD (FTS, IPS, MSS)
- Prenatal investigations
- Fetal Ultrasound

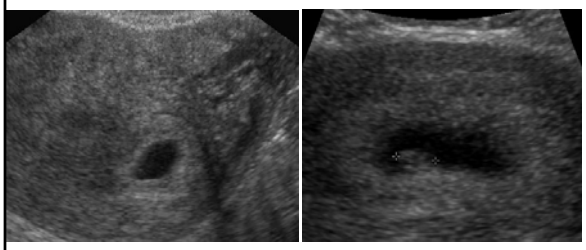
Ultrasound in obstetrics 1st trimester (0-12 weeks)

- Diagnosis of pregnancy
- Assessment of viability
- Gestational age
- Uterine and extra-uterine abnormalities
- Trophoblastic disease
- Ectopic pregnancy
- Risk assessment for chromosomal abnormalities
- Multiple pregnancy - chorionicity

Ultrasound in obstetrics 2nd trimester (13-24 weeks)

- Diagnosis of fetal life
- Multiple pregnancy
- Gestational age
- Structural defects
- Assisting invasive procedures
- Placental localization
- Assessment of the cervix
- Amniotic fluid volume

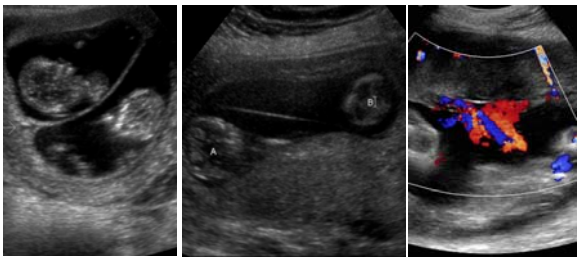
Diagnosis of pregnancy



Gestational sac
4-5 weeks

Fetal heart rate
6 weeks

Chorionicity in multiple pregnancies

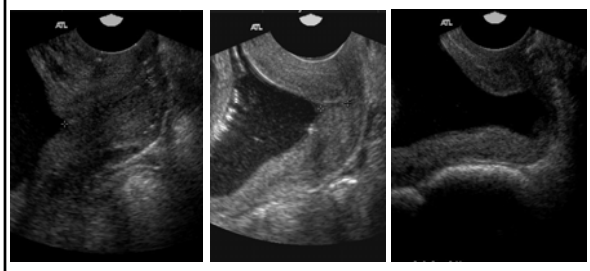


Lambda-sign (λ)
Dichorionic

Thin membrane
Monochorionic

No membrane
Monoamniotic

Assessment of cervix



Placental localization

Amniotic fluid production

- <16 weeks: membranes, fetal skin
- > 16 weeks:
  - mainly fetal urine
  - small contribution of fetal lung fluid and membranes
- Consumption by fetal swallowing

Diagnosis of fetal anomalies

- Assessment of fetal growth, placenta, umbilical cord and amniotic fluid
- Detailed survey of skeletal structures, brain, face, thorax, heart, diaphragm, abdomen, urogenital system, etc
- Best at 18-20 weeks:
  - Before 18 weeks: some structures not fully developed
  - After 24 weeks: legal termination issues and increased ossification

Third Trimester

Objectives:

- Determine gestational age
- Assess maternal health/ wellbeing
- Assess fetal health/wellbeing

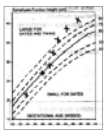
  - Specific history questions
  - Maternal weight, BP, urine dip
  - SFH (in cm) should equal GA after 20 wks
  - Plot growth on curve on A/N II
  - Leopold's maneuvers to determine lie

36 yo woman, first pregnancy, BMI 41. Fasting blood glusose 6.0 at 28 weeks

32 yo woman, first pregnancy, pre pregnancy weight 110 lbs, weight gain 25 lbs

18 yo woman, first pregnancy, smoker, poor nutrition

Match the history to the plot of SF heights



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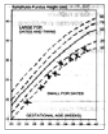

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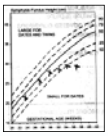

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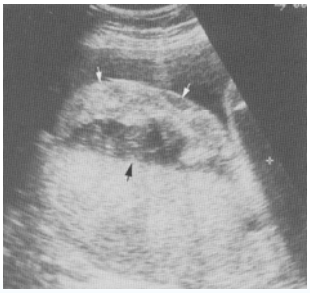
Ultrasound in obstetrics 3rd trimester (25-40 weeks)

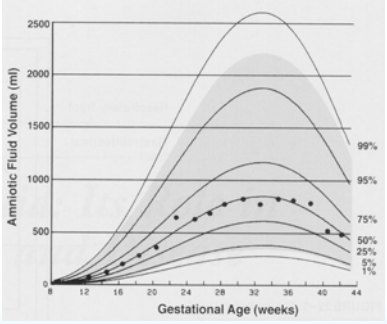
- Diagnosis of fetal life
- Placental localization
- Placental abruption
- Amniotic fluid volume
- Fetal well-being

Placental abruption or hemorrhage

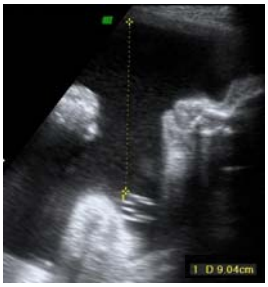


Amniotic fluid volume

- 12 weeks: 35ml
- 18 weeks: 250ml
- 36 weeks: 1000ml
- 40 weeks: 750ml



Ultrasound and amniotic fluid estimation



Largest vertical pocket >8 cm
Polyhydramnios

Largest vertical pocket <2 cm
Oligo- or anhydramnios

Third Trimester

Special Considerations

- 26-28 weeks – GDM screening
- 28 weeks – Rh Ig if Rh negativeSpecific history questions
- 35-37 weeks – Vag/rectal swab for GBS

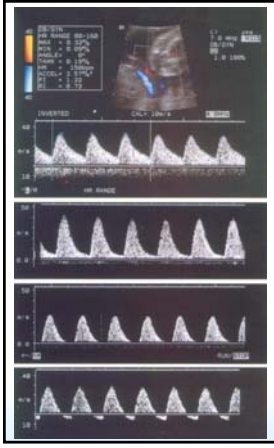
Assessment of fetal well-being

Assessment of fetal wellbeing
- Biophysical profile
- Non-stress test (Cardiotocography)

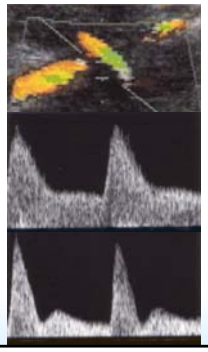
Testing for causative factors:ie placental function
- Doppler ultrasound of umbilical circulation

Assessment of fetal well-being: BIOPHYSICAL PROFILE

	Normal (2)	Abnormal (0)
Fetal breathing	>30 sec in 30 min	<30 secs in 30 min
Fetal movements	≥3 gross body movements in 30 min	<3 movements in 30 min
Fetal tone	Limb movement from flexion to extension, return to flexion	Fetus in position with limbs extended or no fetal movements
Amniotic fluid	One pocket > 2cm in two perpendicular planes	Largest pocket <2cm
Non-stress test	≥2 accelerations in 40 min	<2 accelerations



Doppler assessment of placental function



Reference Slides

Risk for chromosomal abnormalities

Maternal age (yrs)	Trisomy 21 Gestation (wks)				Trisomy 18 Gestation (wks)				Trisomy 13 Gestation (wks)			
	12	16	20	40	12	16	20	40	12	16	20	40
20	1068	1200	1295	1527	2484	3590	4897	18013	7826	11042	14656	42423
25	946	1062	1147	1352	2200	3179	4336	15951	6930	9778	12978	37567
30	626	703	759	895	1456	2103	2869	10554	4585	6470	8587	24856
31	543	610	658	776	1263	1825	2490	9160	3980	5615	7453	21573
32	461	518	559	659	1072	1549	2114	7775	3378	4766	6326	18311
33	383	430	464	547	891	1287	1755	6458	2806	3959	5254	15209
34	312	350	378	446	725	1047	1429	5256	2284	3222	4277	12380
35	249	280	302	356	580	837	1142	4202	1826	2576	3419	9876
36	196	220	238	280	456	659	899	3307	1437	2027	2691	7778
37	152	171	185	218	354	512	698	2569	1116	1575	2090	6050
38	117	131	142	167	272	393	537	1974	858	1210	1606	4650
39	89	100	108	128	208	300	409	1505	654	922	1224	3544
40	68	76	82	97	157	227	310	1139	495	698	927	2683
41	51	57	62	73	118	171	233	858	373	526	698	2020
42	38	43	46	55	89	128	175	644	280	395	524	1516

Congenital Syphilis

- Maternal to fetal transmission 50-80%
- Perinatal mortality 50%
- Non-immune hydrops foetalis:
  - Ascites
  - Scalp edema
  - Hepatosplenomegaly
  - Hyperechogenis or dilated bowel
  - Placentomegaly
  - Polyhydramnios
- Treatment: Penicillin G

Fetal Rubella Syndrome

- 50% fetal infection among exposed fetuses in 1st trimester, 20% in 2nd trimester
- Fetal Rubella syndrome
  - Deafness
  - Mental retardation
  - Congenital cataracts
  - Heart defects, mainly septal defects
- Vaccinate after pregnancy!!!

Prevention of Hepatitis B transmission

- Acute Hepatitis: 1-2:1000 pregnancies
- Vertical transmission without prevention:
  - 40% chronic carrier states
  - >1 million deaths per year
- CAVEATs:
  - Only 50% of HBsAg positive women are 'high-risk'
  - Only 1% of infected women develop fulminant disease
- Management:
  - Postexposure prophylaxis (HBIG) of the neonate
  - Vaccination
  - Breastfeeding can be considered

Oligohydramnios

- Fetal urinary tract anomalies
  - Renal agenesis;
    - Potter's sequence
      - Oligohydramnios
      - Musculoskeletal abnormalities
      - Pulmonary hypoplasia
  - Obstructive uropathies
- IUGR
- Post dates
- Rupture of membranes

Polyhydramnios

Maternal causes
- Diabetes → OGTT
- Isoimmunization → Bld group/antibody screen

Fetal causes
- Neural tube defects
- Disorders of fetal swallowing (eg oesophageal atresia, musculoskeletal diseases)
- Non-immune hydrops
- Twin-to-twin transfusion
- Infection (eg Parvo B19) → Level III ultrasound

Idiopathic

At risk for premature labour, abnormal presentations and cord prolapse, abruptio and fetal anomalies