

*Obstetric
Ultrasound Scan*

*Dr. Asma Basha
Fetomaternal medicine*

General

Prerequisites

- Details of history, examination. and routine investigations for pregnancy completed and known.
- Relevant risk factors to be identified.
- Relevant serology and genetic concerns are specified.
- Pre scan interview, discussions and counseling.

Preparation

- High resolution real-time gray-scale US machine.
- Experienced physician or sonographer.
- Semirecumbent comfortable mother.
- Screen visible to mother and physician.

Documentation (varies)

Written report

Hard Copy Video/Image capture system to preserve image

Scanning or transducer frequency

Mechanical vibrations at frequencies above 20 kHz are defined as ultrasound.

A transducer is the device that both generates the ultrasound and detects the returning echoes.

Higher frequency transducers produce improved resolution but have shallower depth of view.

Scanning or transducer frequency

-

Transabdominal scan often with frequencies of 2 - 5 MHz (to allow for a range of patients from obese to slender).



Scanning or transducer frequency

-

The frequency for transvaginal scan ranges from 5.0 to 9.0 MHz.



SonoScape

First Trimester Ultrasound

- Scanning : often used as primary tool in evaluating first trimester complications.

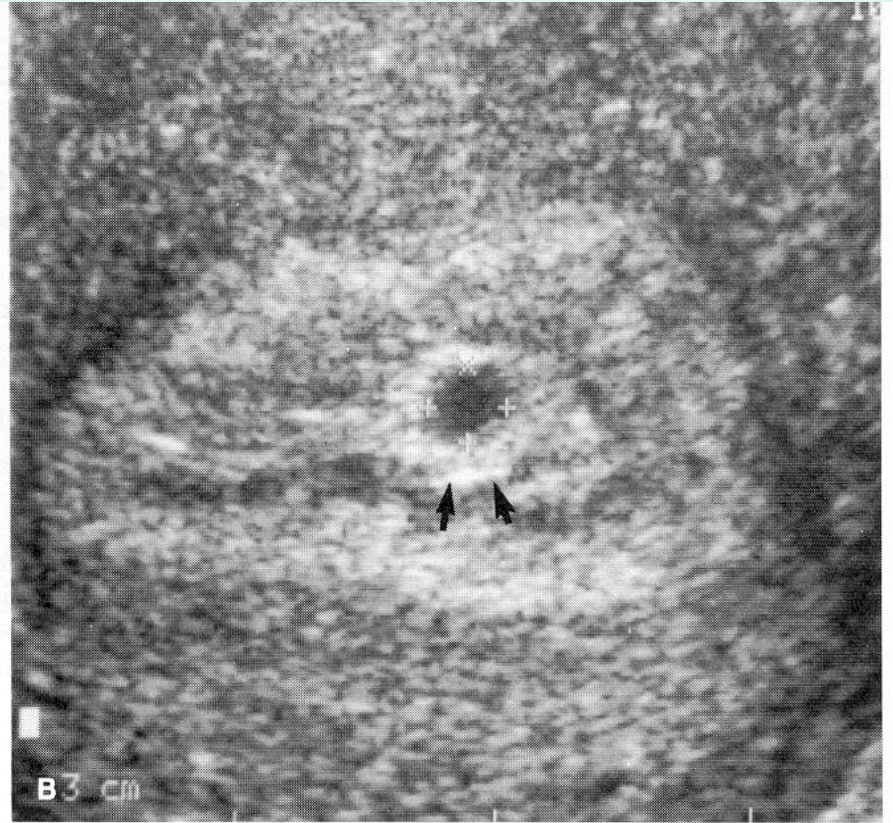
- Transvaginal and transabdominal should be obtained.

First trimester ultrasound indications

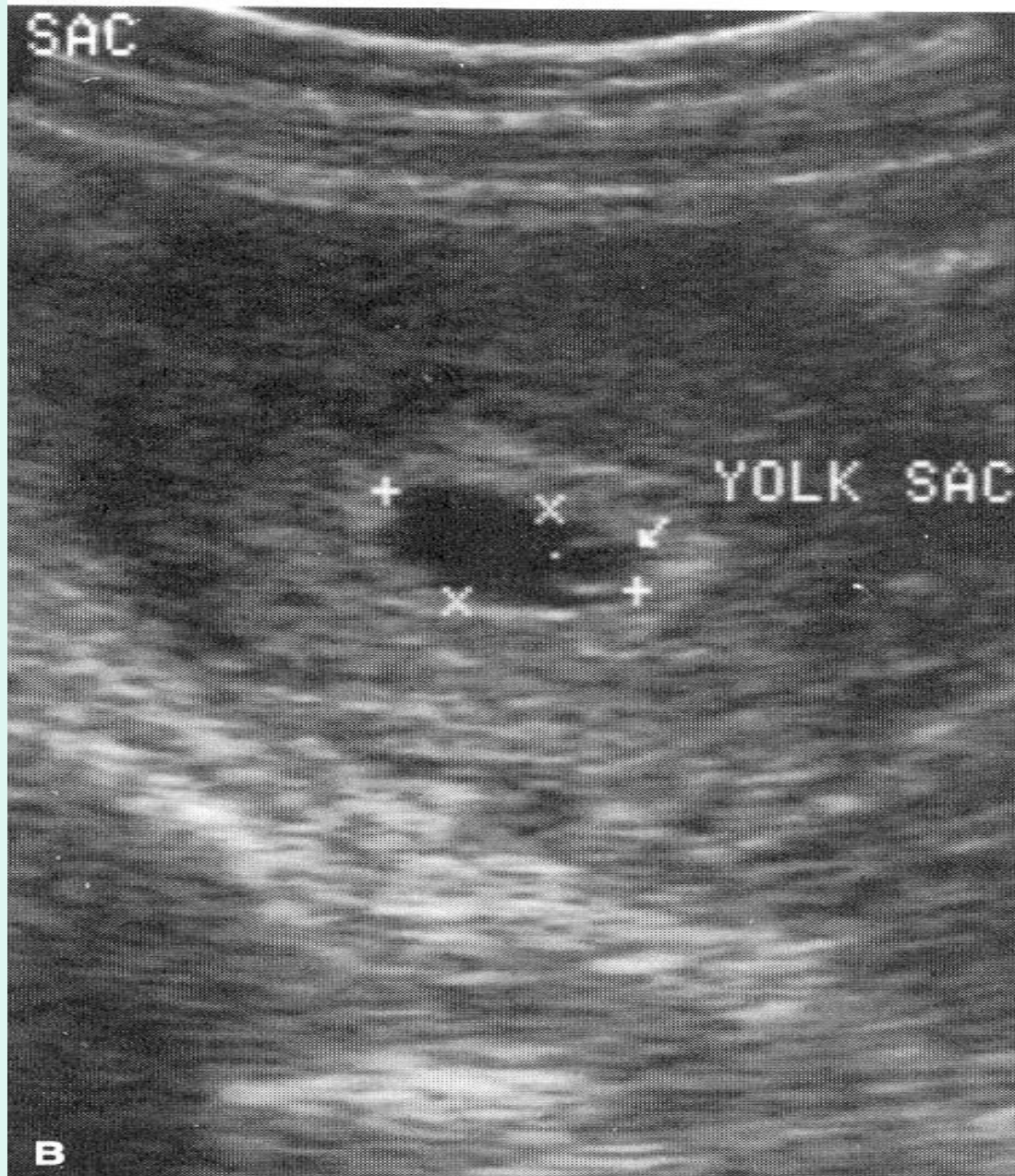
- Suspected miscarriage.
- Vaginal bleeding.
- Gestational age (if uncertain, or size/date discrepancy).
- Adjunct to procedures (e.g. CVS).
- Suspected multiple gestation.
- Suspected hydatidiform mole.
- IUD localization.
- Suspected uterine abnormality.
- Evaluation of maternal pelvic masses.

1st trimester scan

Intrauterine Gestational sac for **bHCG** >
1000-1500 IU/L



Early implantation





Heinisch Samantha Nk
552061

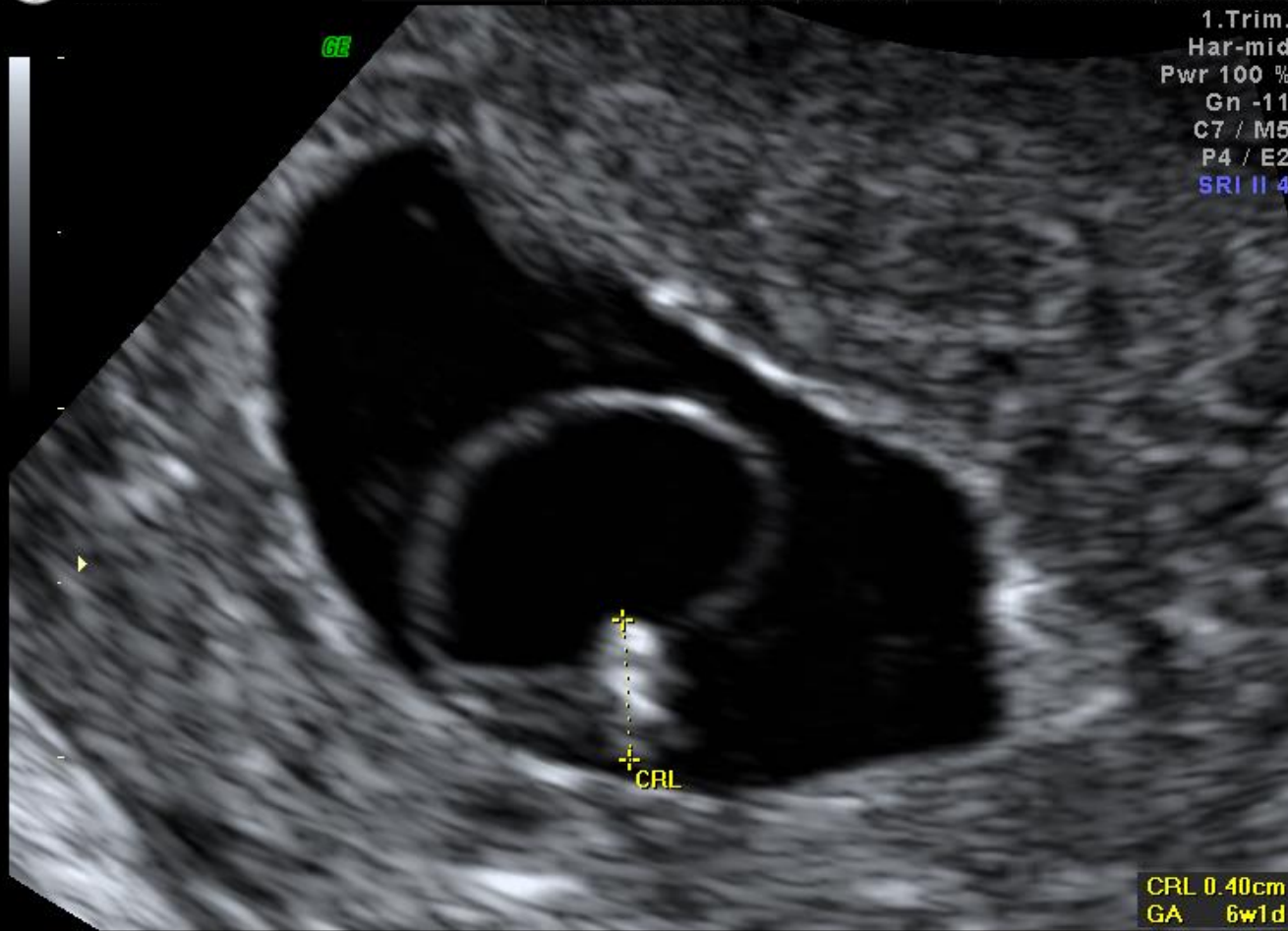
RIC 5-9H/OB
1.1 / 4.3cm / 37Hz

MI 1.1
TIs 0.2

Nepean Hosp Perinatal Rm 2

29.08.2006 02:40:29 PM

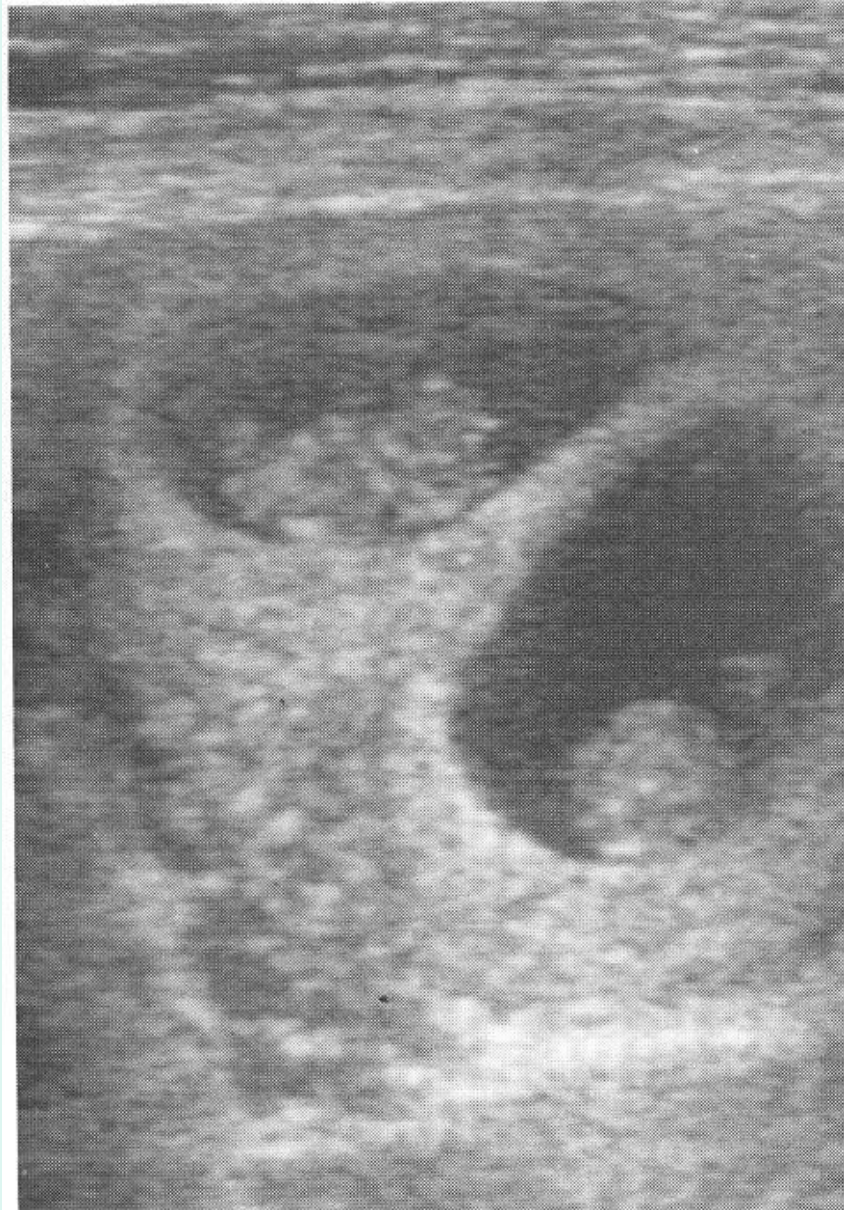
1.Trim.
Har-mid
Pwr 100 %
Gn -11
C7 / M5
P4 / E2
SRI II 4

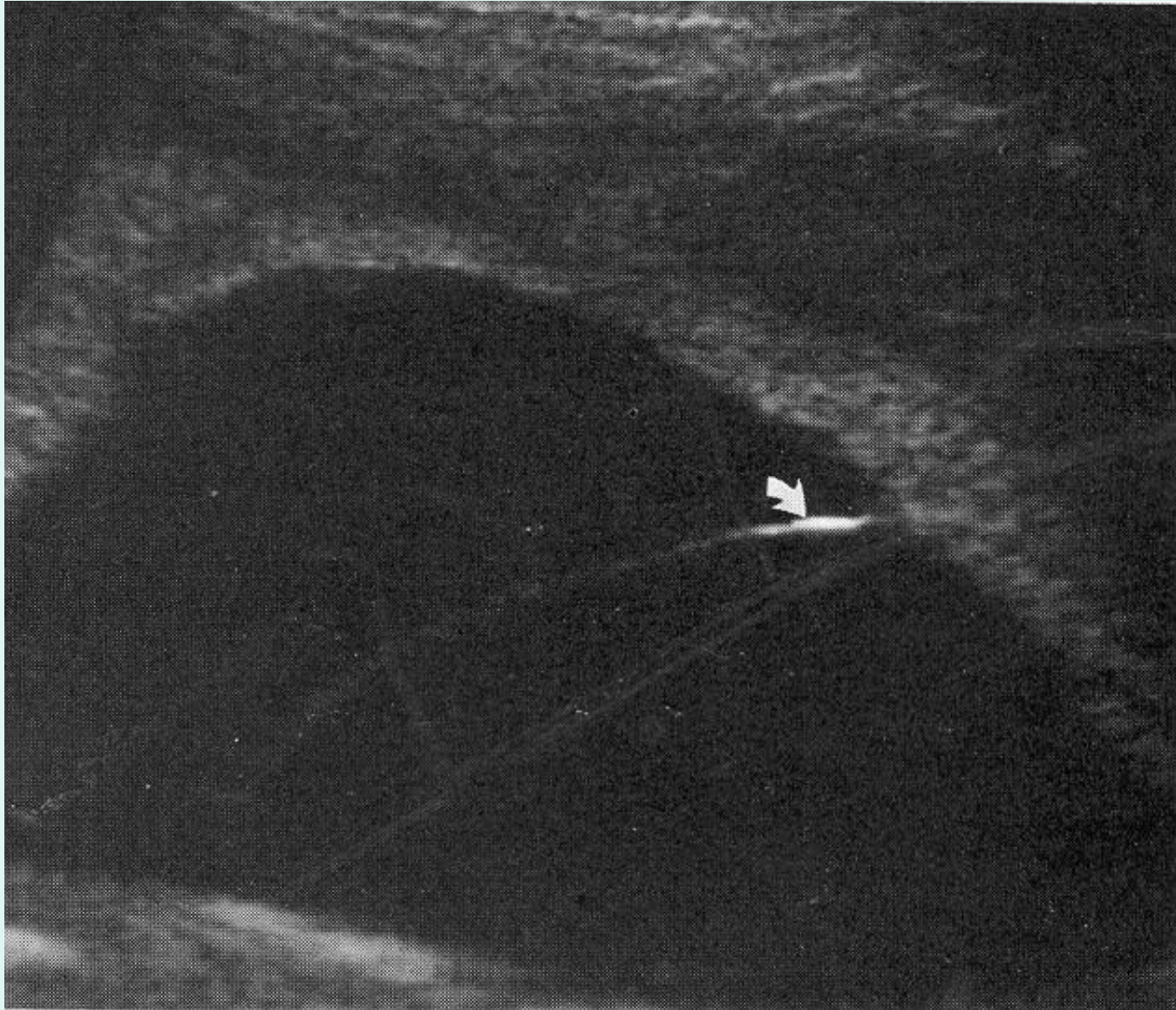


CRL 0.40cm
GA 6w1d

Cine 155

4.4 sec





Products of Conception?



Dating the Pregnancy

There are three possible methods for dating a pregnancy by ultrasound, depending on the size of the fetus or embryo.

The Mean Sac Diameter Measurement (MSD)

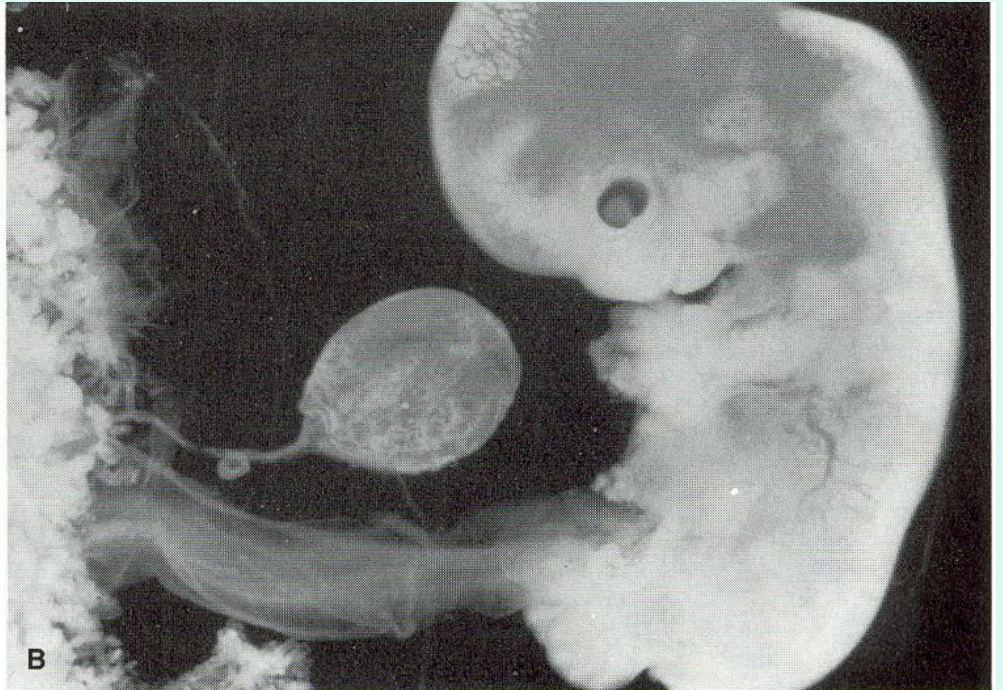
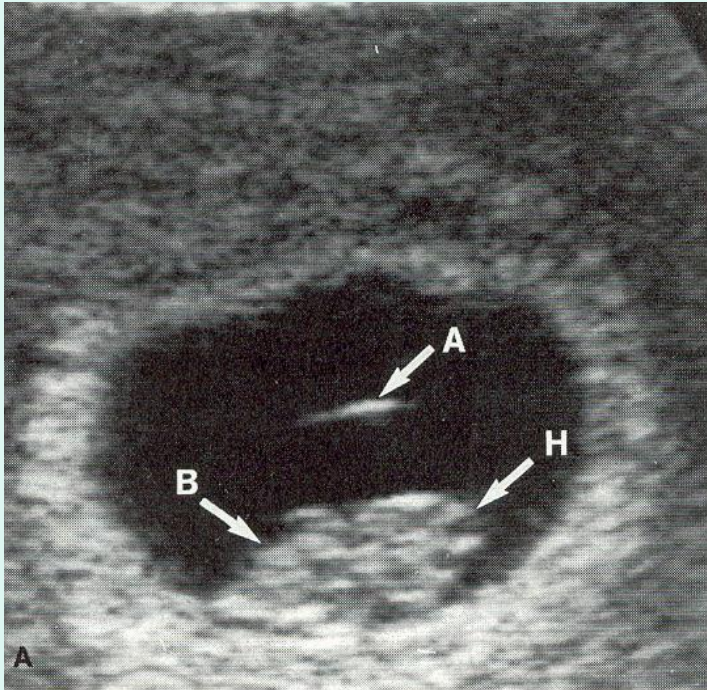
This is used when there is no fetal pole visible, just a gestational sac. The gestational sac is measured in its three dimensions and the average of these three measurements is calculated by the ultrasound machine. The ultrasound machine will determine the corresponding gestational age.

The Crown Rump Length (CRL)

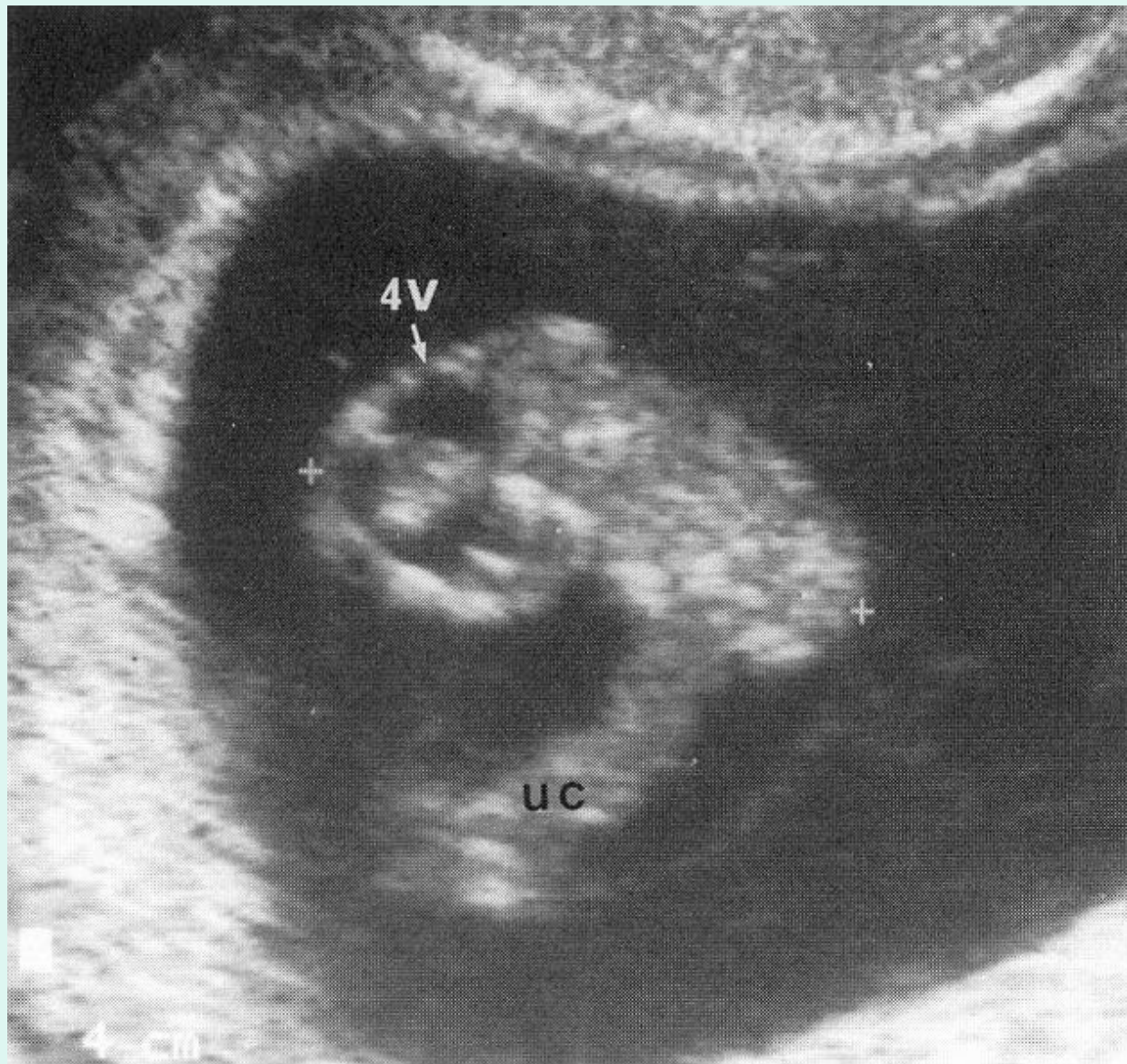
The CRL is used from the time a fetal pole can be identified, right up until about 14 weeks.

A longitudinal image is captured of the fetus (if possible, a sagittal image) and callipers measure the distance between the top of the head and the rump.

The ultrasound machine will determine the corresponding gestational age.



8 weeks



9 weeks



SAHER

B4743 GA=13w3d

AB 2-7/Obstetric

2.9/10.0cm / 33Hz

MI 1.1

FARAH HOSP. DR. ASMA BASHA

28-07-2005

10:34:53 AM

Routine
Har-mid
Pwr 97 %
Gn -3
C6 / M5
P5 / E1



The 11–14 week scan

- Fetal medicine foundation NT scan
 - Computer based assessment of risk of fetal aneuploidy
 - Assesses
 - Nuchal translucency
 - Fetal gestation
 - Maternal age
 - Maternal weight, smoking and history of previous aneuploidy
 - Maternal serum PAPP-A and free bHCG levels
 - Generates risk for fetal trisomy 21, 13/18, (and XO)

Nuchal translucency – definition

- Nuchal translucency is the sonographic appearance of subcutaneous accumulation of fluid behind the fetal neck in the first trimester of pregnancy.
- The term translucency is used, irrespective of whether it is septated or not and whether it is confined to the neck or envelopes the whole fetus.
- The incidence of chromosomal and other abnormalities is related to the size, rather than the appearance of NT.
- During the second trimester, the translucency usually resolves and, in a few cases, it evolves into either nuchal edema or cystic hygromas with or without generalized hydrops.

Nuchal translucency - measurement

- The gestation should be 11-13+6 weeks and the fetal crown rump length should be 45-84 mm.
- A mid-sagittal section of the fetus should be obtained and the NT should be measured with the fetus in the neutral position.
- Only the fetal head and upper thorax should be included in the image.





SAHER
B4743 GA=13w3d

AB 2-7/Obstetric
3.2/11.0cm / 53Hz

MI 1.1

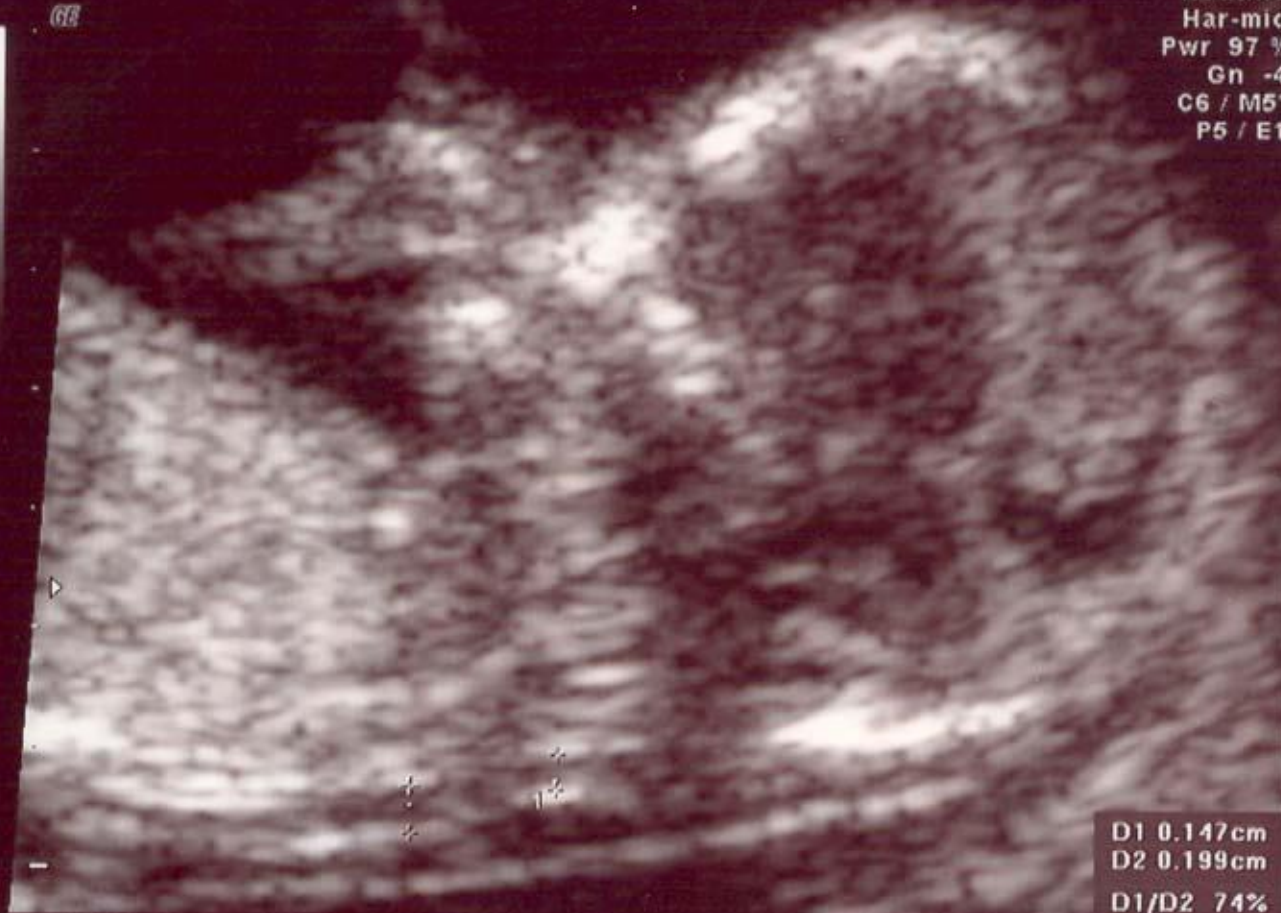
FARAH HOSP. DR. ASMA BASHA

28-07-2005

10:33:59 AM

Routine
Har-mid
Pwr 97 %
Gn -4
C6 / M5"
P5 / E1

68



D1 0.147cm
D2 0.199cm
D1/D2 74%



Examination of the nasal bone

In the image of the nose there should be three distinct lines.

The top line represents the skin and the bottom one, which is thicker and more echogenic than the overlying skin, represents the nasal bone.

A third line, almost in continuity with the skin, but at a higher level, represents the tip of the nose.

B 2-7/Obstetric MI 1.1 FARAH HOSP. DR. ASMA BASHA

9/10.0cm / 33Hz 28-07-2005 10:34:53 AM

Routine
Har-mid
Pwr 97 %
Gn -3
C6 / M5
P5 / E1



CRL 7.82cm
CGA 13w6d 95%
EDD 27-01-2006



SIERRASON, CLAUDELLE SU

RAB 4-8L/OB

MI 0.5

Nepean Hosp Perinatal Rm 2

13-79-72

11.8cm / 19Hz

TIs 0.0

28.06.2006

11:14:52 AM

GE

1. Trim.
9.80 - 4.00
Pwr 90 %
Gn 1
C7 / M4
P3 / E3
SRI II 4



CRL 7.38cm
GA 13w4d

Cine 17

2.3 sec



Trisomy 21, no nasal bone

Abnormalities associated with increased NT

Central nervous system defect	Gastrointestinal defect	Fetal anemia
Acrania / anencephaly	Crohn's disease	Blackfan Diamond anaemia
Agenesis of the corpus callosum	Duodenal atresia	Congenital erythropoietic porphyria
Craniosynostosis	Esophageal atresia	Dyserythropoietic anaemia
Dandy Walker malformation	Small bowel obstruction	Fanconi anemia
Diastematomyelia		Parvovirus B19 infection
Encephalocele	Genitourinary defect	Thalassaemia- α
Fowler syndrome	Ambiguous genitalia	
Holoprosencephaly	Congenital adrenal hyperplasia	Neuromuscular defect
Hydroletharus syndrome	Congenital nephrotic syndrome	Fetal akinesia deformation sequence
Iniencephaly	Hydronephrosis	Myotonic dystrophy
Joubert syndrome	Hypospadias	Spinal muscular atrophy
Macrocephaly	Infantile polycystic kidneys	
Microcephaly	Meckel-Gruber syndrome	Metabolic defect
Spina bifida	Megacystis	Beckwith-Wiedemann syndrome
Trigonocephaly C	Multicystic dysplastic kidneys	GM1 gangliosidosis
Ventriculomegaly	Renal agenesis	Long-chain 3-hydroxyacyl-coenzyme A dehydrogenase deficiency
		Mucopolysaccharidosis type VII

Facial defect	Skeletal defect	Smith-Lemli-Opitz syndrome
Agnathia/micrognathia	Achondrogenesis	Vitamin D resistant rickets
Facial cleft	Achondroplasia	Zellweger syndrome
Microphthalmia	Asphyxiating thoracic dystrophy	
Treacher-Collins syndrome	Blomstrand osteochondrodysplasia	Other defect
	Campomelic dwarfism	Body stalk anomaly
Nuchal defect	Cleidocranial dysplasia	Brachmann-de Lange syndrome
Cystic hygroma	Hypochondroplasia	CHARGE association
Neck lipoma	Hypophosphatasia	Deficiency of the immune system
	Jarcho-Levin syndrome	Congenital lymphedema
Cardiac defect	Kyphoscoliosis	EEC syndrome
Di George syndrome	Limb reduction defect	Neonatal myoclonic encephalopathy
	Nance-Sweeney syndrome	Noonan syndrome
Pulmonary defect	Osteogenesis imperfecta	Perlman syndrome
Cystic adenomatoid malformation	Roberts syndrome	Stickler syndrome
Diaphragmatic hernia	Robinow syndrome	Unspecified syndrome
Fryn syndrome	Short-rib polydactyly syndrome	Severe developmental delay
	Sirenomelia	
Abdominal wall defect	Talipes equinovarus	
Cloacal exstrophy	Thanatophoric dwarfism	
Exomphalos	VACTER association	
Gastroschisis		

The 18-23 week scan

- Should be performed over a time for the fetus to change position to see all anatomy.
- Should involve both colour and gray scale imaging

18-23 weeks scan

Best compromise allowing for adequate maturation of the organ systems whilst allowing for intervention if there is an anomaly

The 18-23 week scan

- Fetal Number
- Fetal cardiac activity
- Gestational age
- Fetal anatomy
- Amniotic fluid
- Placental position
- Cervical length
- Maternal adenexal structures

Measurements, of the head and femur

These measurements are recorded from about 14 weeks onwards. The head measurements include:

- Head Circumference (HC).
- Biparietal Diameter (BPD).
- Femur Length (FL) is routinely recorded.

Fetal anatomy

- Head
- Face
- Diaphragm
- Heart
- Great vessels
- Abdomen
- Spine
- Extremities
- Umbilical cord

Biparietal Diameter (BPD)

A transverse image of the fetal skull and brain should be obtained

➤ To ensure that the measurements is obtained in the correct plane the following anatomy of the brain should be demonstrated:

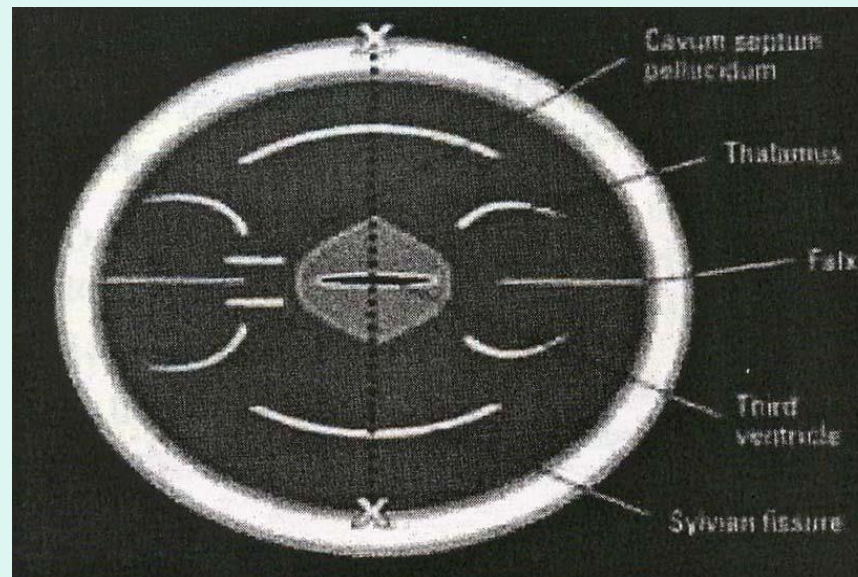
➤ The falx cerebri.

➤ The cavum septum pellucidum.

➤ The thalamus .

➤ It is important that the cerebellum is not demonstrated. This would indicate that the plane has been taken too low in the brain posteriorly.

- Similarly, the orbits should not be seen at the front of the skull or the plane has been taken too low anteriorly.
- The callipers are then placed across the widest portion of the skull, perpendicular to the falx cerebri.
- The callipers are placed from the leading edge of the skull on the near side to the leading edge of the skull on the far side. They are placed so that they do not include the skin line.





TORINO CENTER BM
PERINATAL ULTRASOUND

56-15-02
C4-2 40R OB/FET H

19 Feb 02
08:14:46

Tib 0.6 MI 1.1
F# 98 8.1 cm

Fetal Bio

BPD
4.78cm 20w3d
OFD

HC
16.92cm 20w0d
APD

TAD

AC
15.21cm 20w1d
FL
3.18cm 20w0d

TTD

APTd

Heart Rate
GA(LMP)

+ 4.78cm
× 16.92cm
21.99cm²





CANTWELL KYLE NK: 553242
PERINATAL ULTRASOUND NEPEAN HOSPITAL

15 Feb 02

2:28:59 pm

8C4w
H8.0MHz R15mm
Obstetric
General

85dB S2/+1/3/3
Gain= 11dB Δ=2



Dist = 0.72cm

Delete Set

Lock Set



8C4w
H8.0MHz R15mm
Obstetric
General

85dB S2/+1/3/3
Gain= 11dB Δ=2

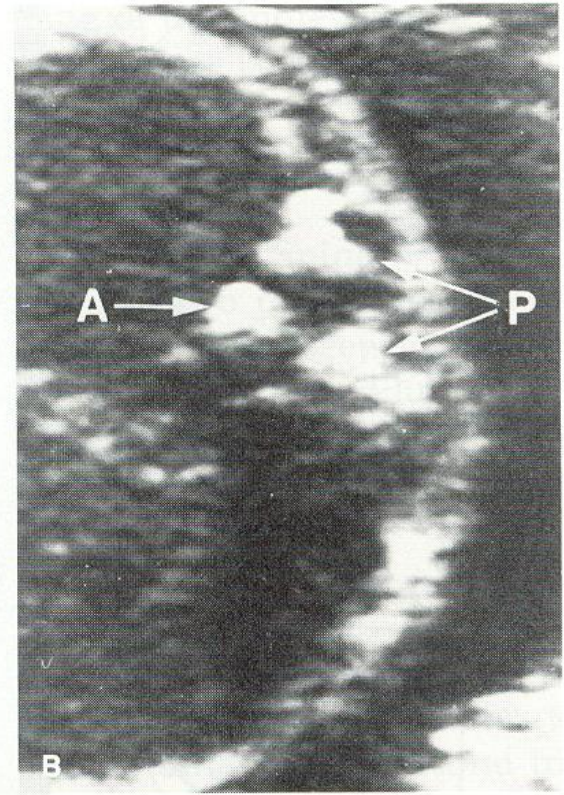
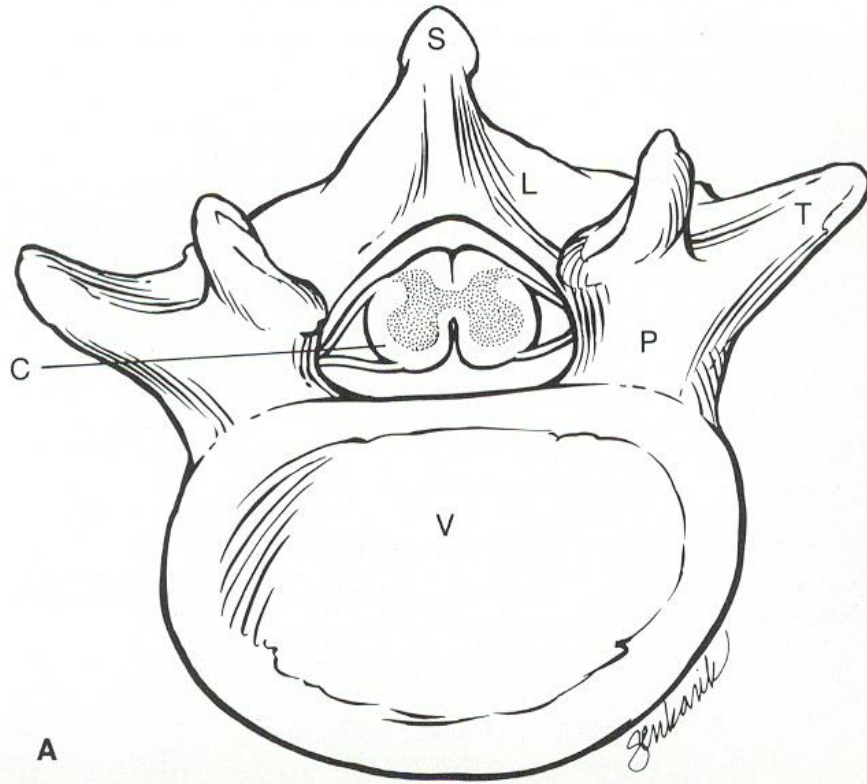


1 Dist = 1.76cm
2 Dist = 0.33cm

Delete Set

Lock Set

Select Set





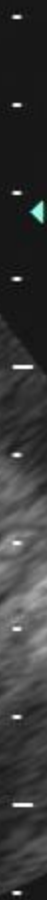
TORINO CLINIC BM
PERINATAL ULTRASOUND

56-15-02
C4-2 40R OB/General

19 Feb 02
08:10:06

Tib 0.3 MI 1.1
F# 44 12.4cm

HDI
Map 3
DynRg 50dB
Persist Med
Fr Rate Med
2D Opt:Res
BW 0 Pg 0
Col 0 Pg 0





8C4w
H8.0MHz 20mm
Obstetric
General

85dB S2/+1/3/3
Gain= 4dB Δ=2



Dist = 2.87cm

Delete Set

Lock Set



TORINO CENTER BM
PERINATAL ULTRASOUND

56-15-02
C4-2 40R OB/FET H

19 Feb 02
08:15:34

Tib 0.4 MI 1.0
F# 79 8.1 cm

Fetal Bio

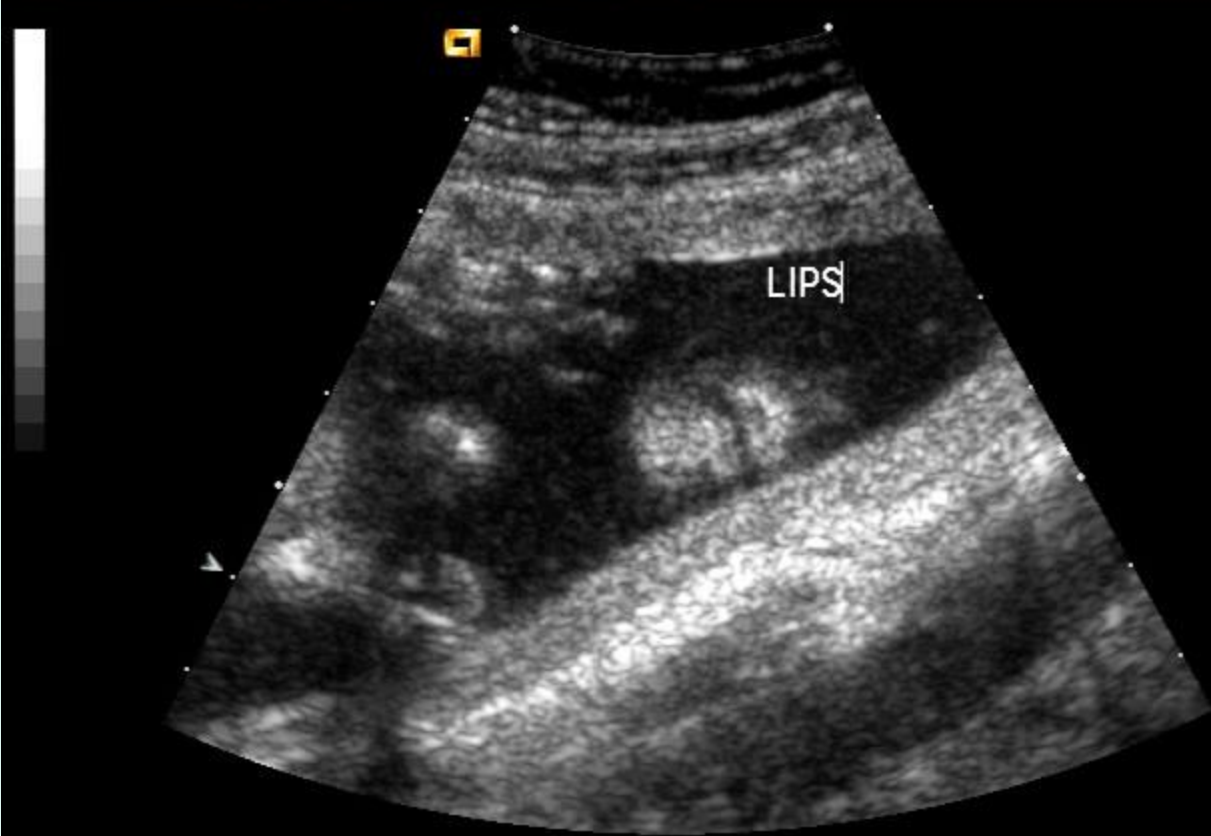
BPD
4.78cm 20w3d
OFD
HC
16.92cm 20w0d
APD
TAD
AC
15.21cm 20w1d
FL
3.18cm 20w0d
TTD
APTD
Heart Rate
GA(LMP)





8C4w
H8.0MHz R0mm
Obstetric
General

85dB S2/+1/3/3
Gain= 4dB Δ=2



PT:
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R λ
SPTAd 2.0MI 0.9
50DB C6 E2
HDI

ATL 19 FEB 02
8:56
CINELoop (R) REVIEW



4.0-
5.0-
6.0-
7.0-
8.0-
9.0-

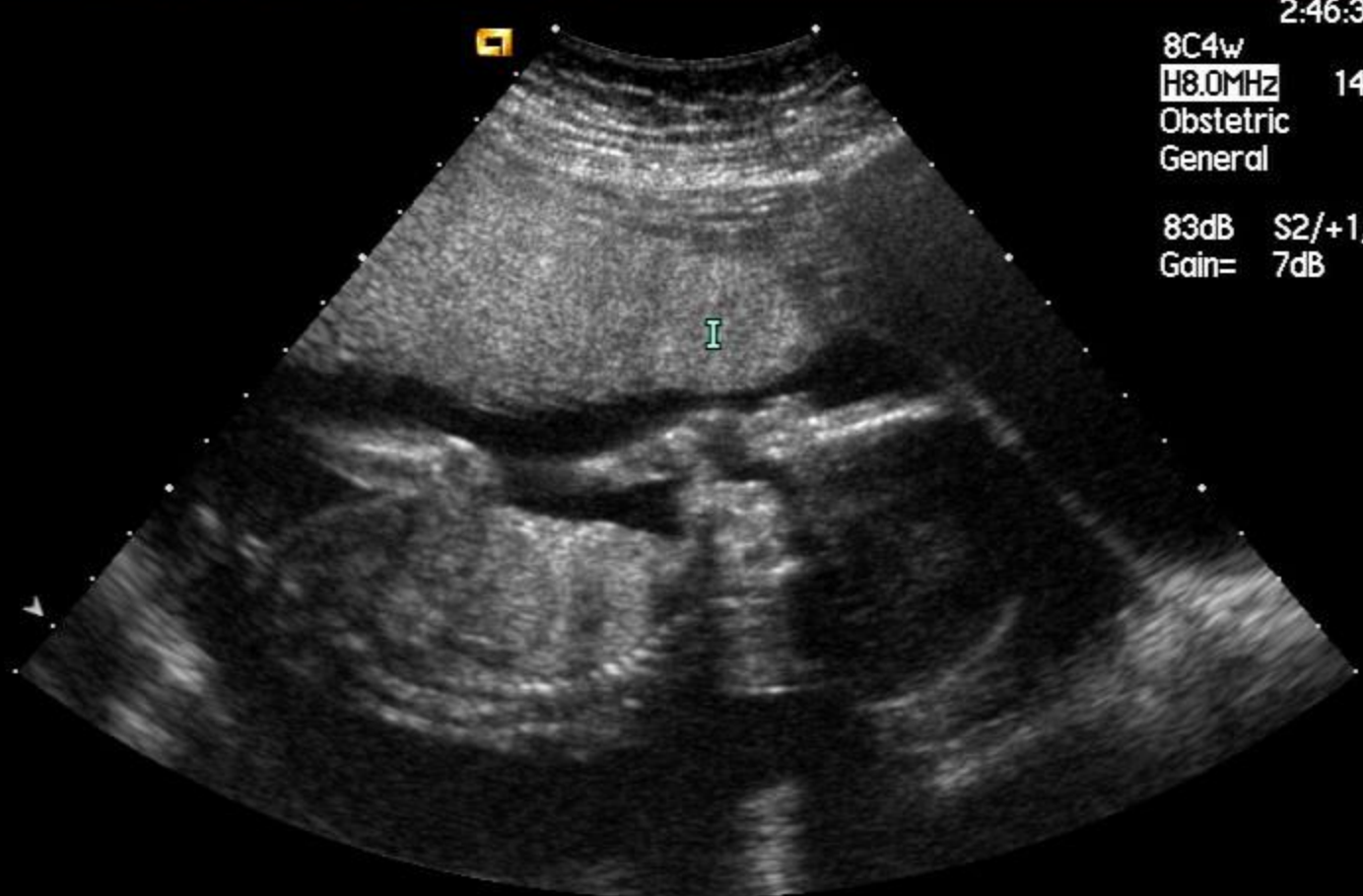
32

2D CINE



8C4w
H8.0MHz 140mm
Obstetric
General

83dB S2/+1/3/3
Gain= 7dB Δ=2





8C4w
H8.0MHz R32mm
Obstetric
Fetal Heart

75dB T1/+1/1/ 4
Gain= 10dB Δ=2



Normal cardiac size

PT: _____
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R λ
SPTAd 15MI0.9
50DB C6 E2
HDI

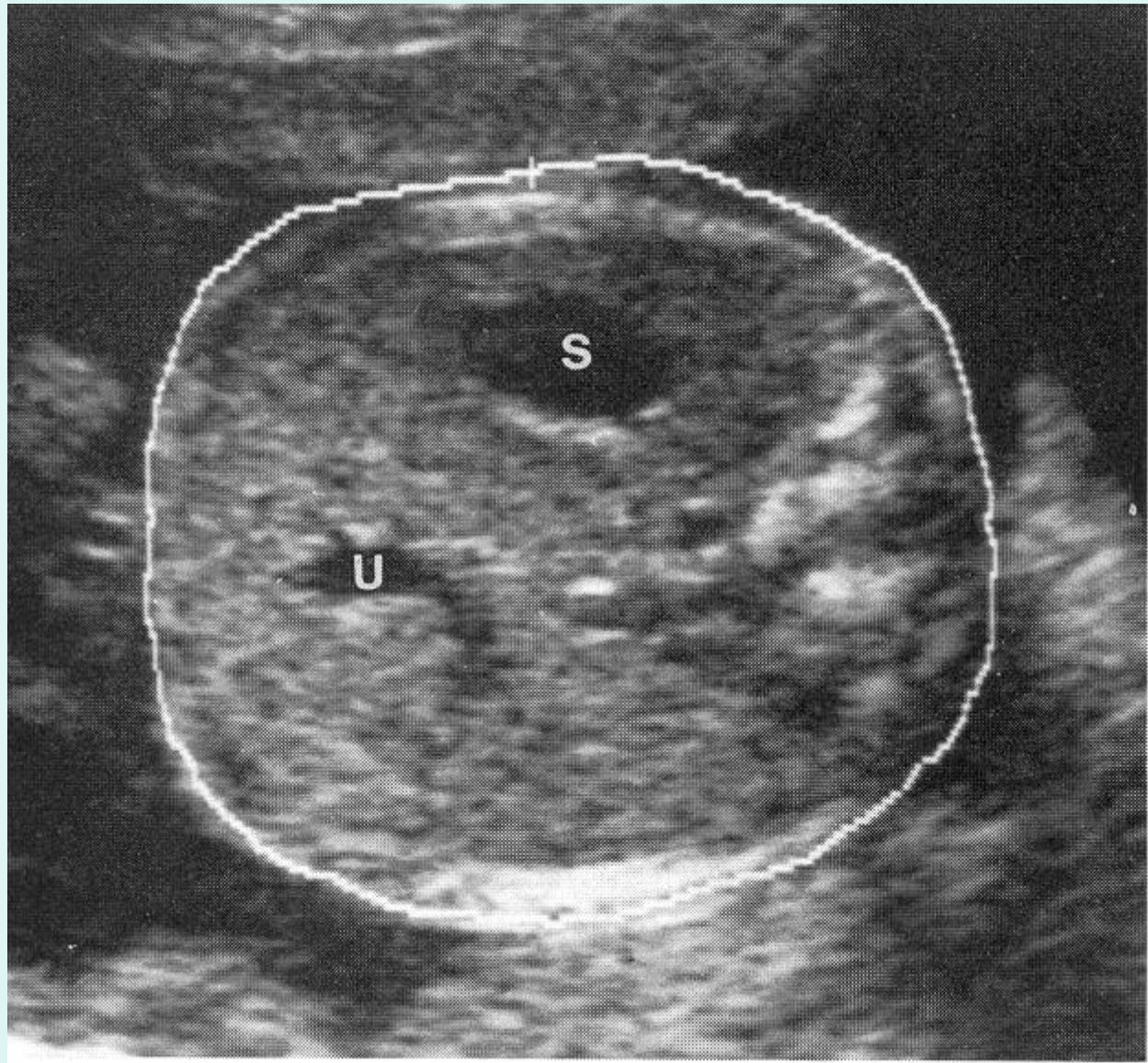
ATL 19 FEB 02 8:43
CINELoop (R) REVIEW



—
—
2.0—
—
3.0—
—
4.0—
—
5.0—
—
6.0—
—
7.0—

52

ANNOTATE



PT: M.
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R λ
SPTAd 14MI0.8
50DB C6 E2
HDI

ATL 19 FEB 02 FETAL
8:39 BIOMETRY
CINELoop (R) REVIEW



GEST SAC
-CRL
3.0
BPD 4.36 cm
19w 1d
4.0 OFD
-HC 16.05 cm
5.0 18w 5d
-FL 2.82 cm
6.0 18w 2d
-TAD
-APD
7.0
-AC
8.0
-MA (LMP)

1. 1.96 cm
2. 1.65 cm

SET to activate alternate cursor. ANALYSIS



FOOTSCROLL

PERINATAL ULTRASOUND

01/01/19:134838

C7-4 40R OB/General

19 Jan 01

14:18:45

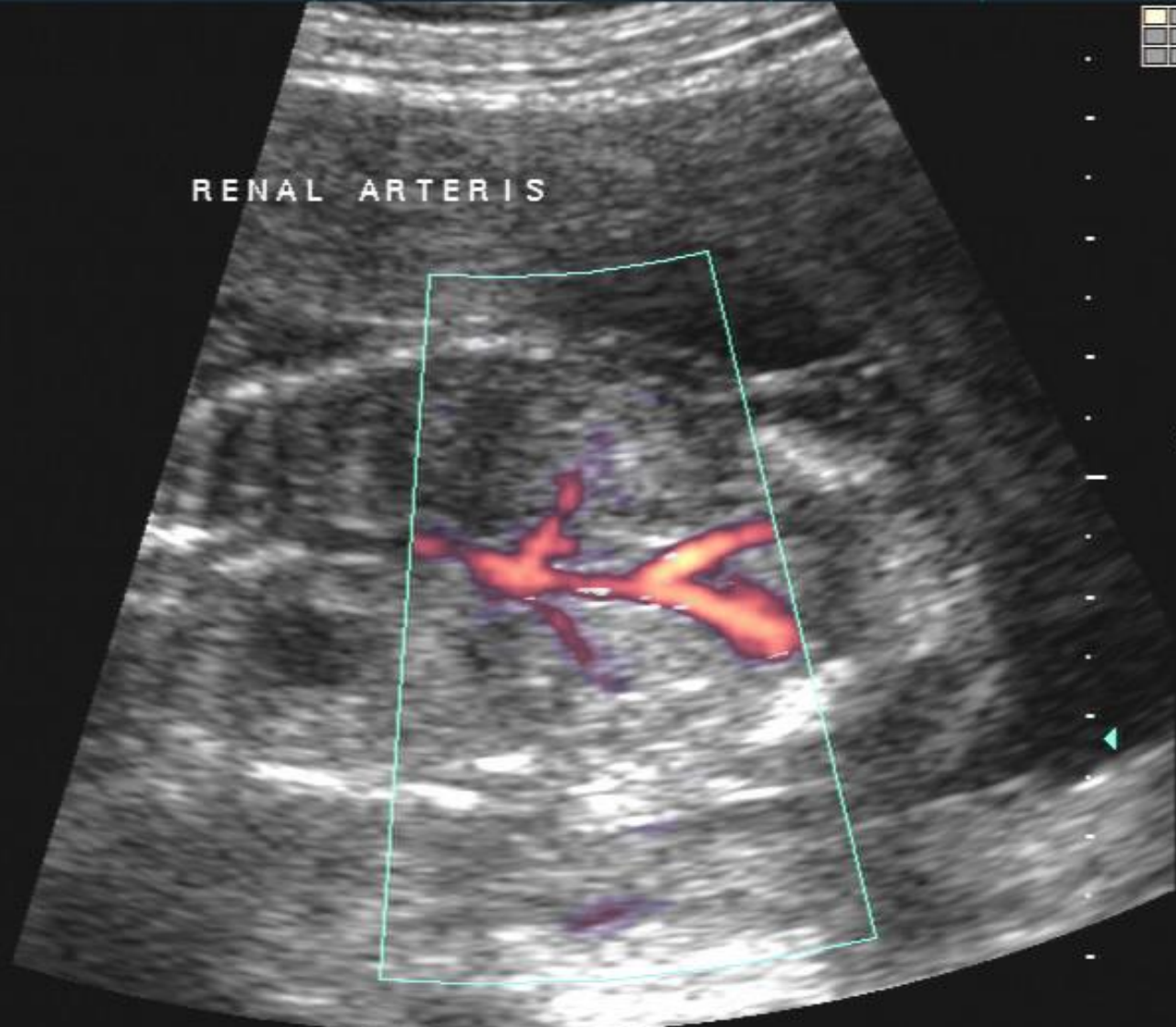
Tlb 1.4 MI 0.5

F# 66 9.7 cm

FDI

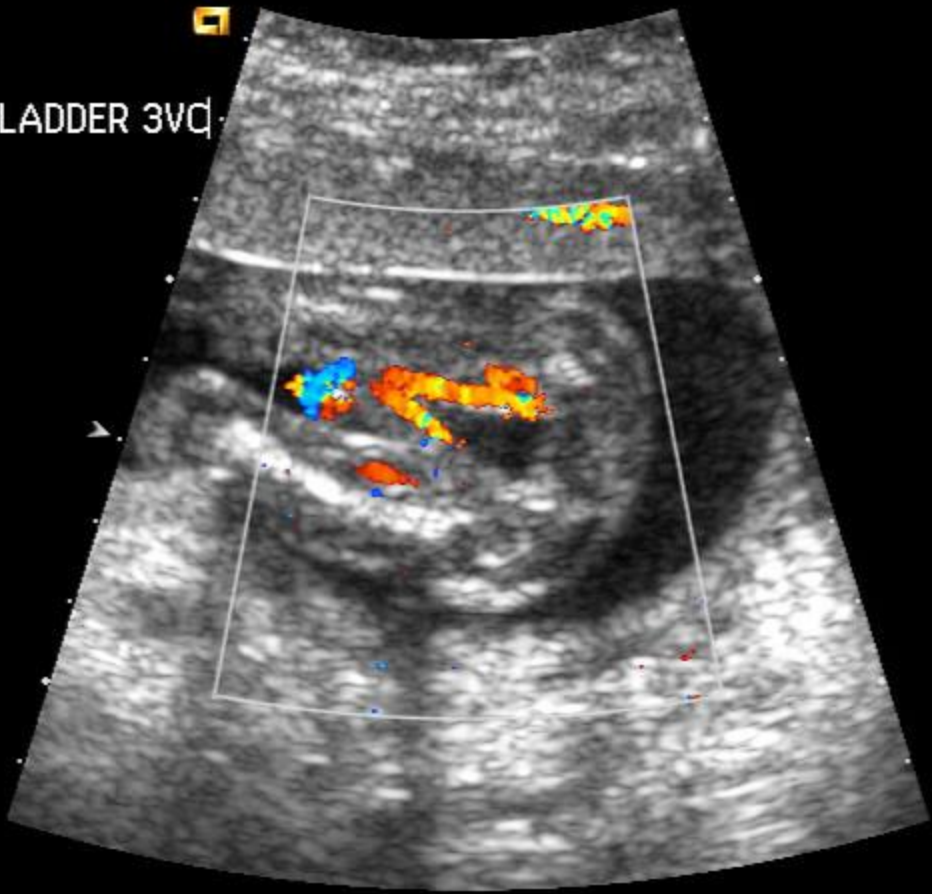
Map 3
DynRg 50dB
Persist Med
Fr Rate Med
2D Opt:Gen
CPA 70% Map 1
WF Med
PRF 1000 Hz
Flow Opt:Med V
BW7 Pg 1
Col 1 Pg 1

RENAL ARTERIS





BLADDER 3VQ



11:35:26 am

5C2
H5.0MHz **R16mm**
Obstetric
General

S1/-2/ 2/V:2
1/2 **CD:3.5MHz**
CD Gain = 50

S21



389208

RAB 4-8L/OB

13.6cm / 31Hz

MI 1.1

TIs 0.1

Nepean Hosp Perinatal Rm 4

17.08.2006 08:44:30 AM

3RD TRIM

Har-low

Pwr 97 %

Gn -2

C7 / M7

P4 / E2

SRI II 3

GE



FL 4.85cm

Cine 400

13 sec



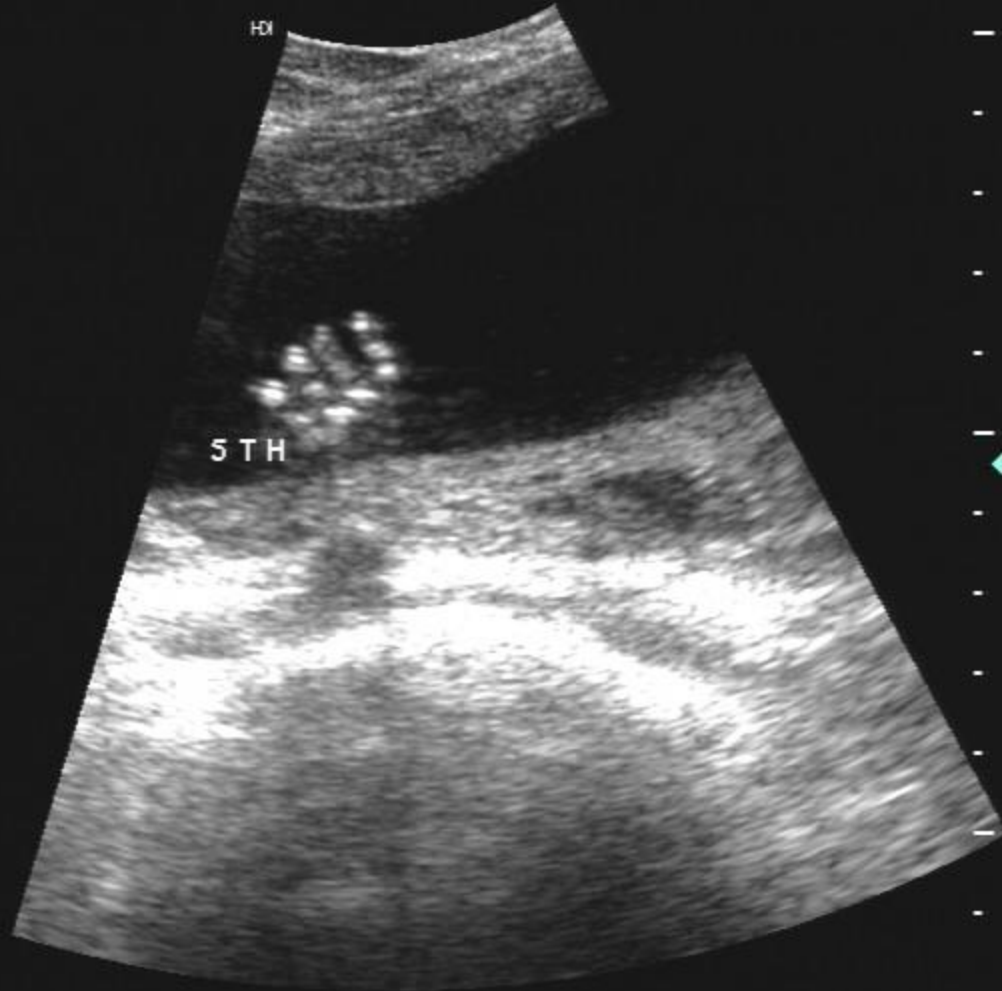
PERINATAL ULTRASOUND

01/01/19:134838
C7-4 40R OB/General

19 Jan 01
14:27:30

Tib 0.3 MI 0.8
F# 93 12.0cm

Map 3
DynRg 50dB
Persist Med
Fr Rate Med
2D Opt:Gen
BW 10 Pg 1
Col 2 Pg 1



PT:
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R λ
SPTAd 14MI 0.8
50DB C6 E2
HDI

19 FEB 02 FETAL
8:37 BIOMETRY
CINELoop (R) REVIE



GEST SAC
CRL
BPD 4.36 cm
19w 1d
OFD
4.0 HC 16.05 cm
18w 5d
5.0 FL 2.82 cm
18w 2d
TAD
6.0 APD
7.0 AC
8.0 MA (LMP)

ANNOTATE

Purpose	Publication	Range (postmenstrual weeks)
Dating by CRL	Papageorghiou et al. UOG 2014	9-13 weeks
Dating by BPD	Selbing et al. Acta Obstet Gynecol Scand 1985	11-24 weeks
BPD, HC, AC, FL	Papageorghiou et al. Lancet 2014	14-42 weeks
EFW calculation	Hadlock et al. AJOG 1985	
EFW centile calculation	<i>derived from</i> Yudkin et al. Early Hum Dev 1987	24-42 weeks
Thoracic circumference	Laudy et al. UOG 2000	20-40 weeks
Tibia, fibula, humerus, ulna, radius	Chitty et al. BJOG 1994	12-42 weeks

Cervix

Closed length should be $> 2.5\text{cms}$

Technique

There are three ways to view the uterine cervix by sonography:

1. Transabdominal.
2. Transvaginal.
3. Translabial.



QUAMPER, USA

090021

RAB 4-8L/OB

15.4cm / 30Hz

MI 1.2

TIs 0.2

Nepean Hosp Perinatal Rm 2

SF/DF

24.08.2006

10:46:17 AM

FAS

Har-mid

Pwr 100

Gn 0

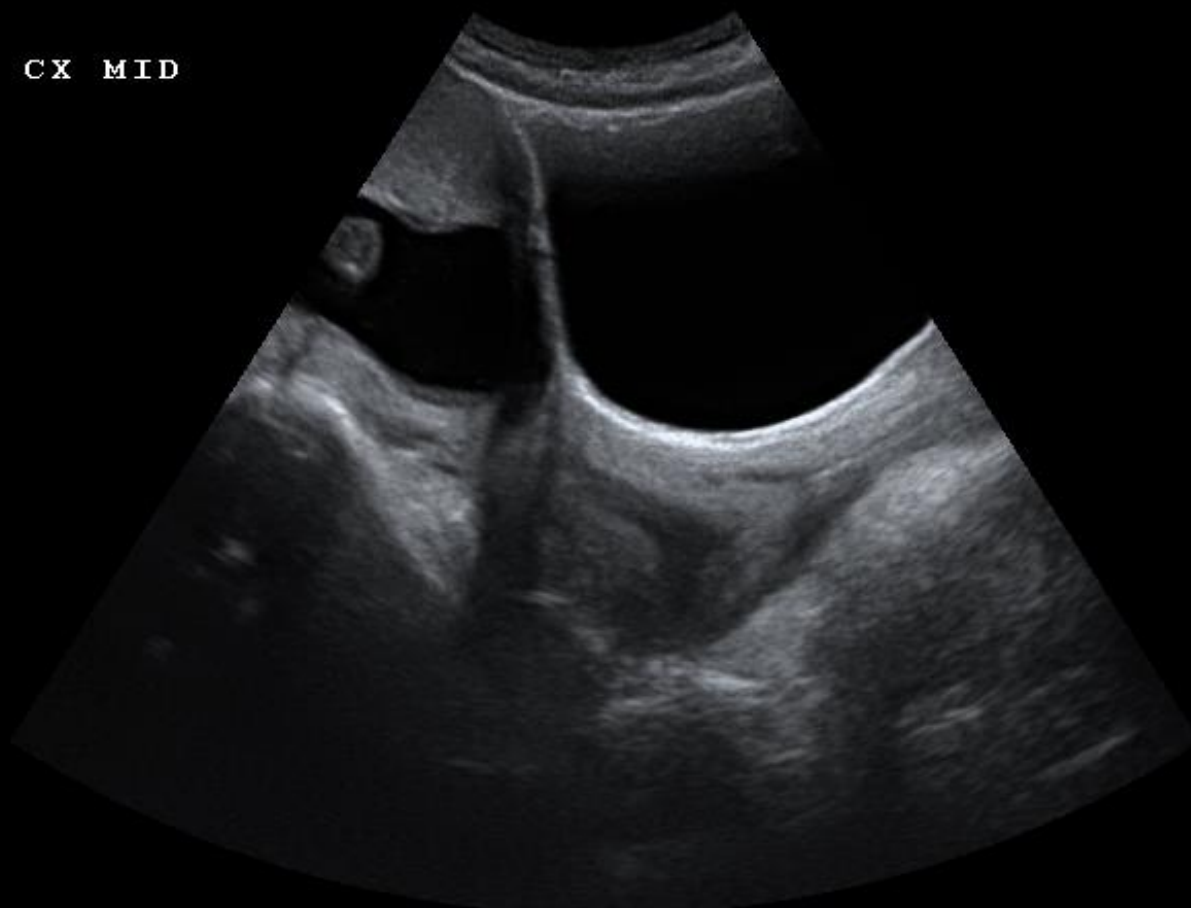
C7 / M5

P3 / E2

SRI II 3

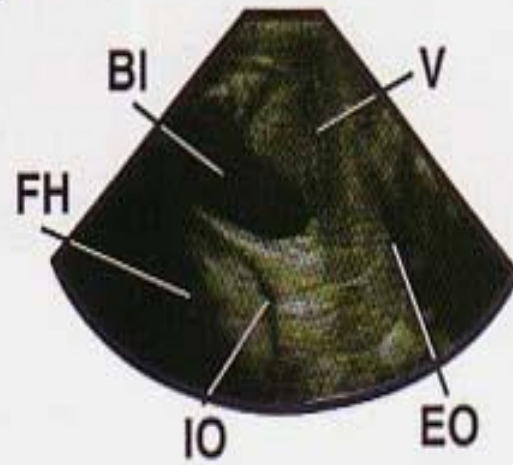
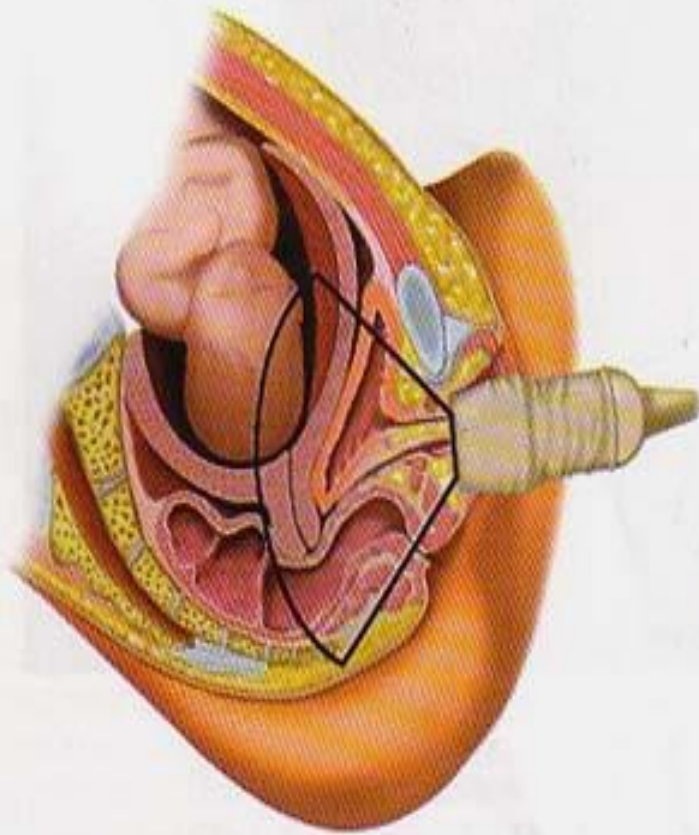
6E

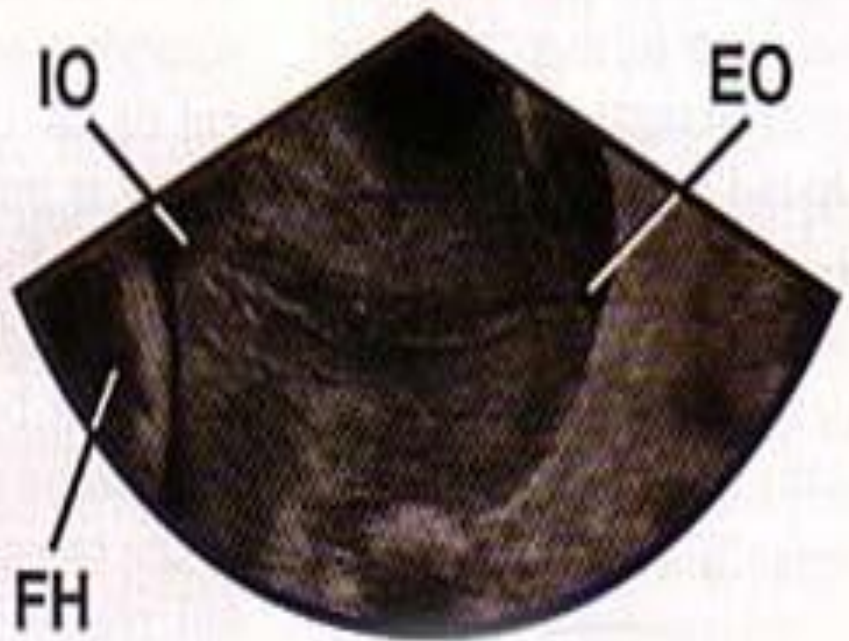
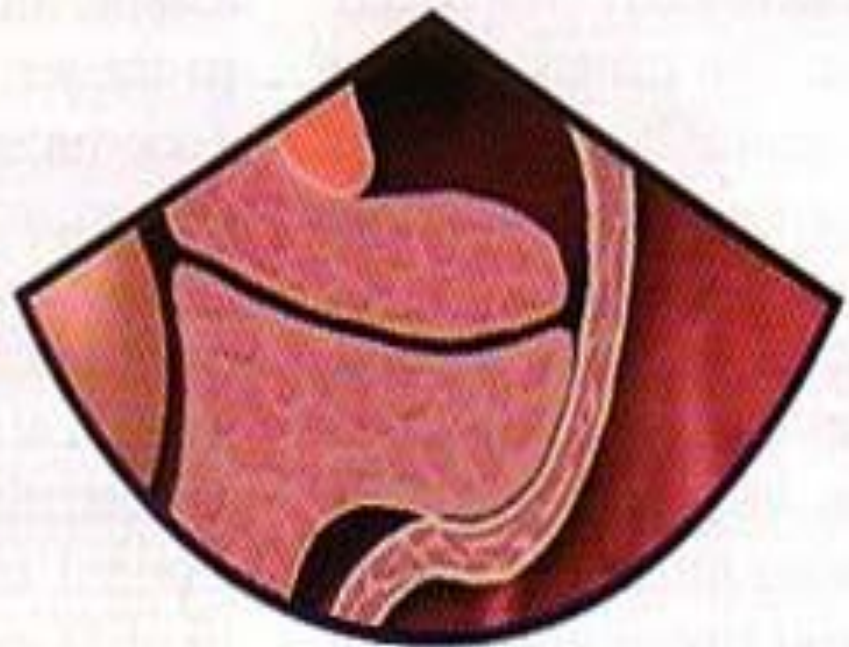
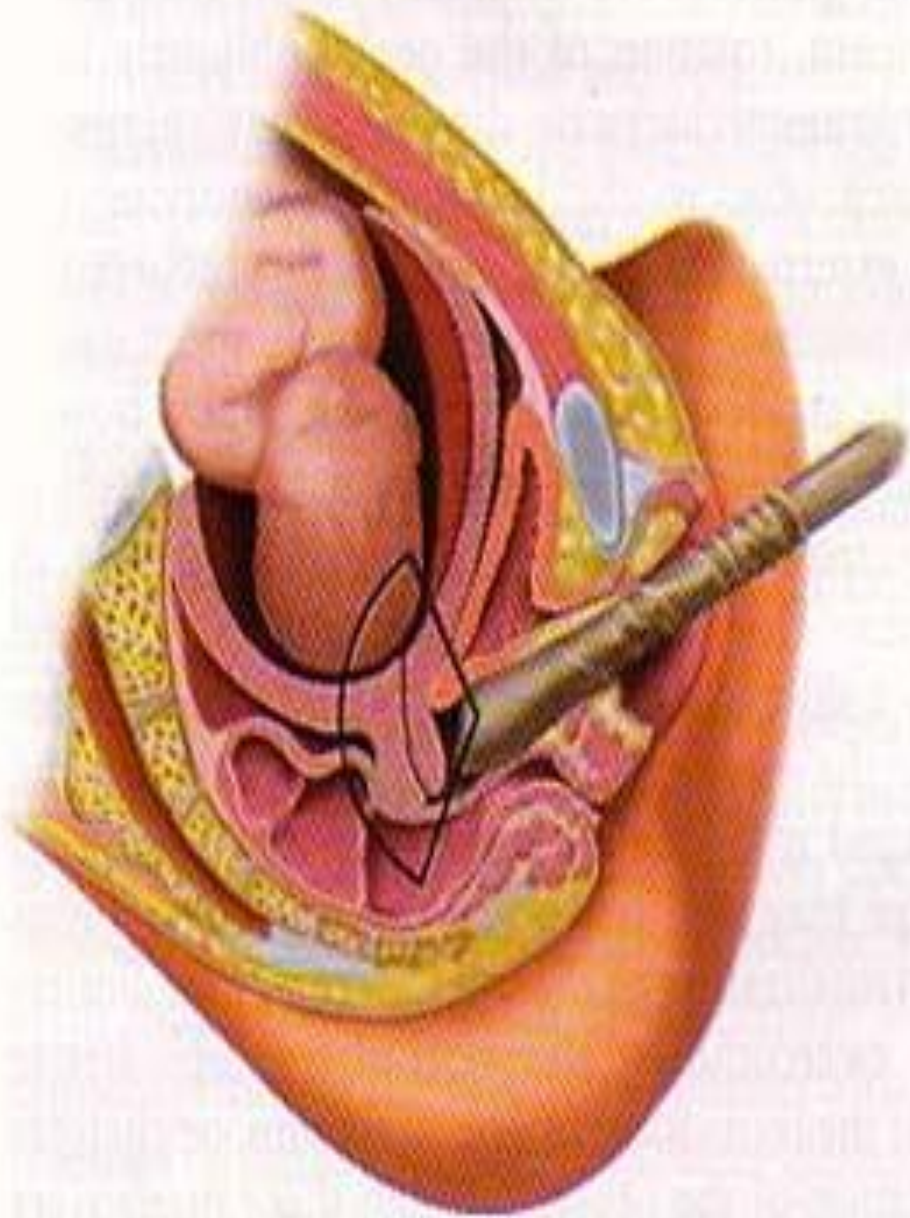
CX MID

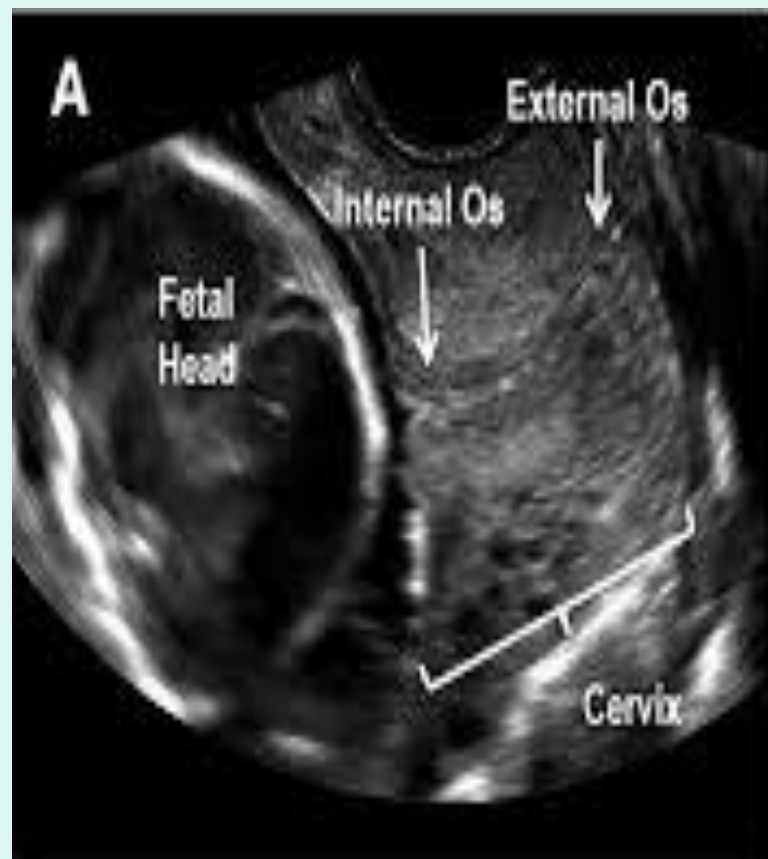


Cine 653

22 sec







Liquor

- Objective assessment necessary
- Hard at 18 weeks
- Is there a pool of at least 4cm x 4cms?

Is it safe?

There is no evidence in the ongoing follow up of large non-randomized populations or smaller randomized trials, of cavitation, sister chromatid exchanges, free radical generation, membrane interface motion, intrauterine heating or cell death, from intrauterine ultrasound exposure, producing detectable neonatal or pediatric injury.

Why?

1. Total sound exposure is low.
2. The tiny fraction of time sound is actually being sent “duty cycle” during a total transducer cycle.
3. Distance of the fetus from the energy source.
4. Low energy emission in the first place.
5. Organogenesis is complete.
6. Fetal movement in and out of the scan
7. insonation of individual structures for short periods of time.

Third trimester scanning

- Fetal number, presentation and size
- Fetal cardiac activity
- Measurements of fetal size
- Placental localization
- Amniotic fluid volume
- Detection of maternal masses
- Fetal well-being
- Fetal anomalies

Third trimester scanning

- Also check anatomy
- The fetal anomalies that may present in the third trimester
 - Polycystic kidneys
 - Hydronephrosis
 - Skeletal dysplasias
 - Manifestations of neuromuscular disorders

Indications for a 3rd trimester scan include:

- **Intrauterine growth retardation (IUGR).**
- **Macrosomia.**
- **Polyhydramnios.**
- **Oligohydramnios.**
- **Decreased Fetal movements.**
- **Antepartum haemorrhage.**
- **Pregnancy induced hypertension (P.I.H).**
- **Previous bad obstetric history.**
- **Gestational diabetes**

Third trimester scanning

- Growth
 - Measure
 - BPD, HC, AC, FL .
 - Amniotic fluid index.
 - Placental position.
 - Doppler exam.



739648FM/AB

RAB 4-8L/OB
13.6cm / 31Hz

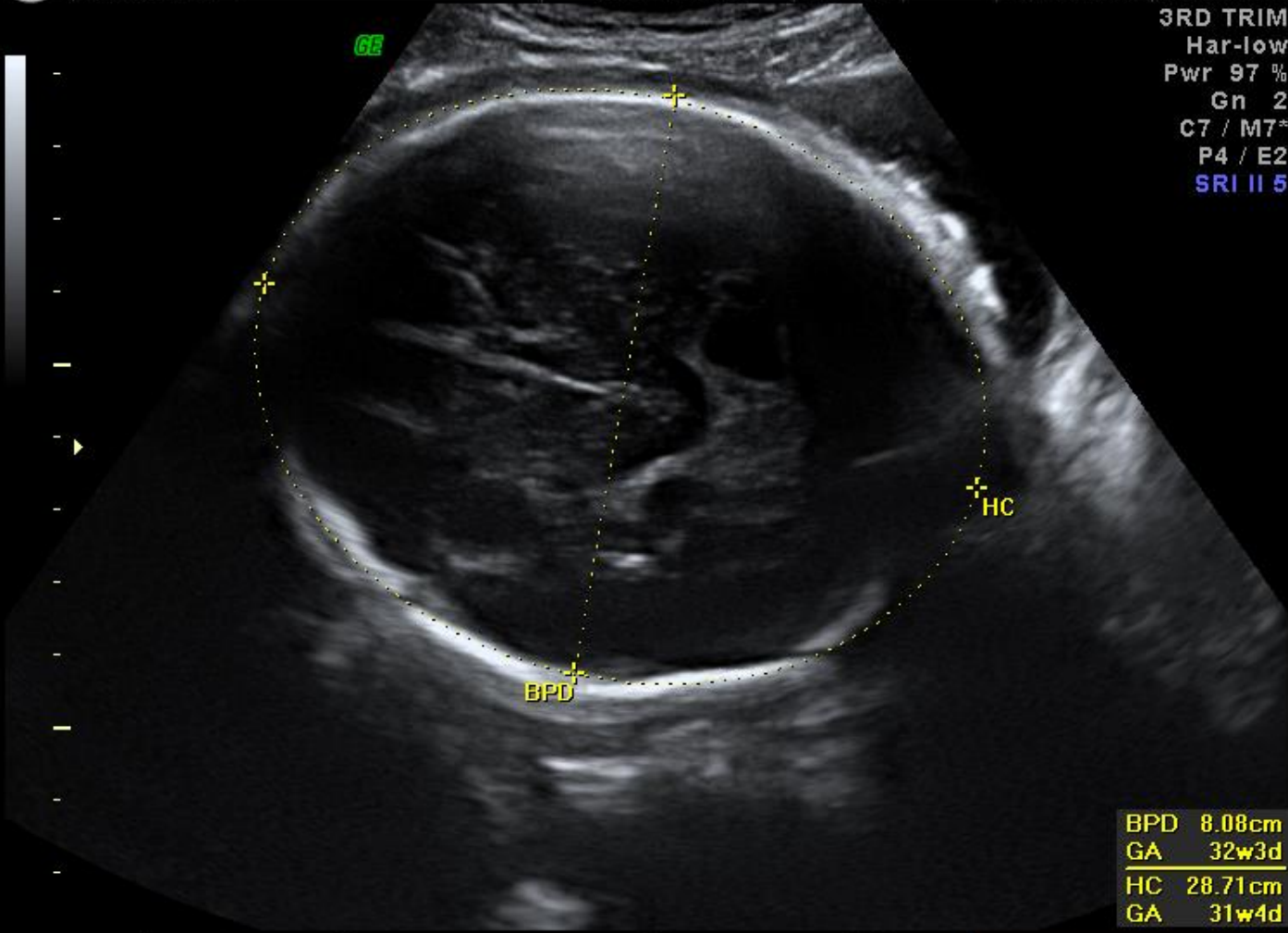
MI 1.1
TIs 0.1

Nepean Hosp Perinatal Rm 2

16.05.2006 02:19:23 PM

3RD TRIM
Har-low
Pwr 97 %
Gn 2
C7 / M7*
P4 / E2
SRI II 5

GE



BPD 8.08cm
GA 32w3d
HC 28.71cm
GA 31w4d

Cine 134

4.4 sec



739648FM/AB

RAB 4-8L/OB
17.2cm / 26Hz

MI 0.9
TIs 0.1

Nepean Hosp Perinatal Rm 2

16.05.2006 02:20:07 PM

3RD TRIM
Har-low
Pwr 95 %
Gn -6
C7 / M7*
P4 / E2
SRI II 5

GE

AC

AC 28.02cm
GA 32w0d

Cine 318

12 sec



739648FM/AB

RAB 4-8L/OB

MI 1.2

Nepean Hosp Perinatal Rm 2

17.2cm / 26Hz

TIs 0.1

16.05.2006 02:20:52 PM

3RD TRIM

Har-low

Pwr 100 %

Gn -6

C7 / M7*

P4 / E2

SRI II 5

GE

+

FL

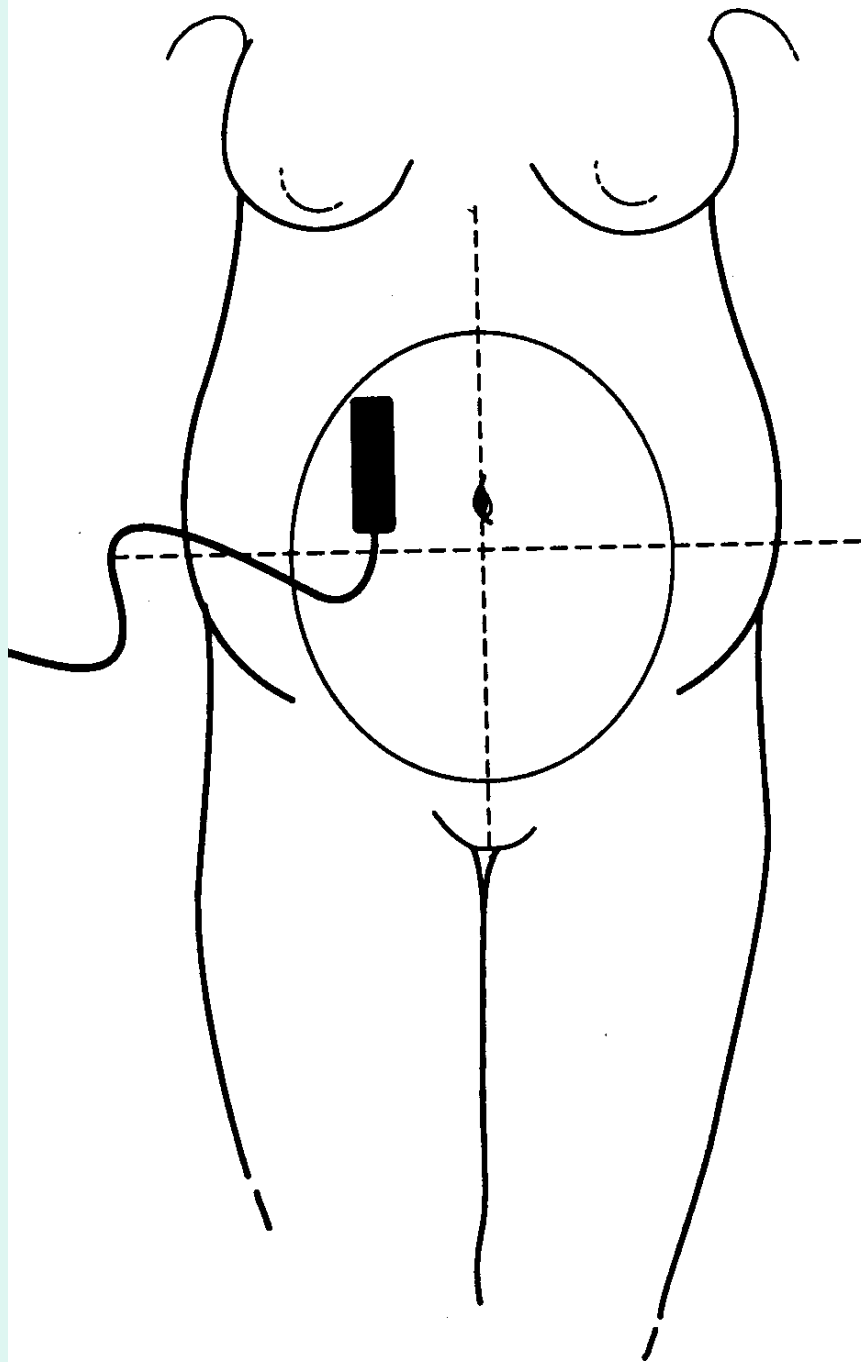
FL 6.28cm
GA 32w4d
EFW 1919g (4lb4oz)
GA 31w6d

Cine 24

1.4 sec

Assessing amniotic fluid volume:

- 1. Subjective assessment : With experience, it is possible to classify amniotic fluid volume into the broad categories absent, low, normal, increased and excessive.
- 2. Single deepest pool – The size of the deepest, cord- free pool of amniotic fluid is assessed with the ultrasound probe perpendicular to the maternal abdomen a minimum depth (less than 2 cm ;oligohydramnios, more than 8 cm: polyhydramnios).
- 3. AFI (5-25 cm). Even though this method is accepted as superior to the single deepest pool technique, considerable intra- and interobserver variation exists.





SIGSWORTH, JESSICA

739648FM/AB

RAB 4-8L/OB

18.9cm / 8Hz

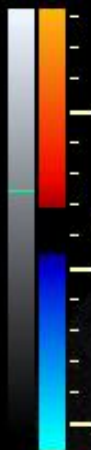
MI 0.9

TIs 0.2

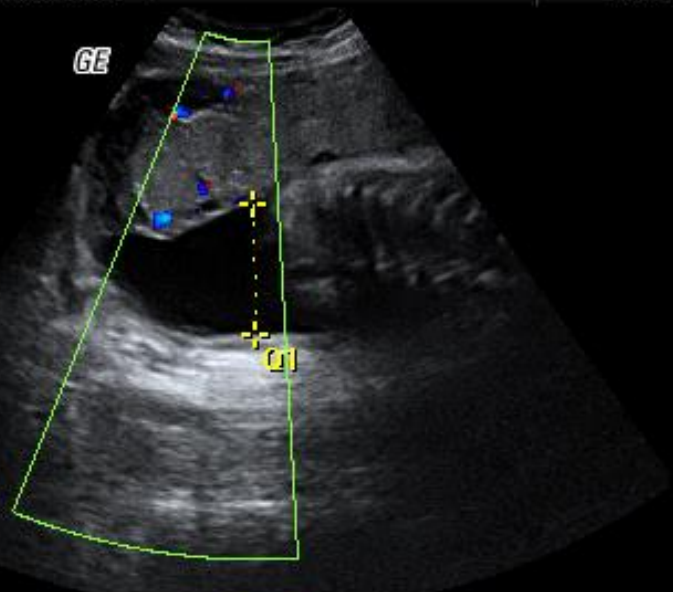
Nepean Hosp Perinatal Rm 2

16.05.2006 02:21:37 PM

23cm/s

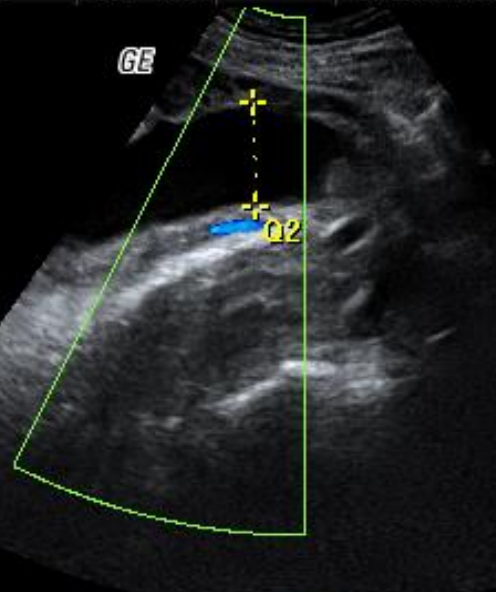


-23cm/s



GE

Q1



GE

Q2

3RD TRIM

HaF low

Pwr 89 %

Gn -6

C7 / M7*

P4 / E2

SRI II 5

Pwr 100 dB

Gn -4.6

Frq low

Qual norm

WMF Tow2

PRF 1.8kHz

GE

Q4

GE

Q3

Q1 4.16cm

AFI 4.16cm

Q2 3.31cm

AFI 7.47cm

Q3 3.95cm

AFI 11.42cm

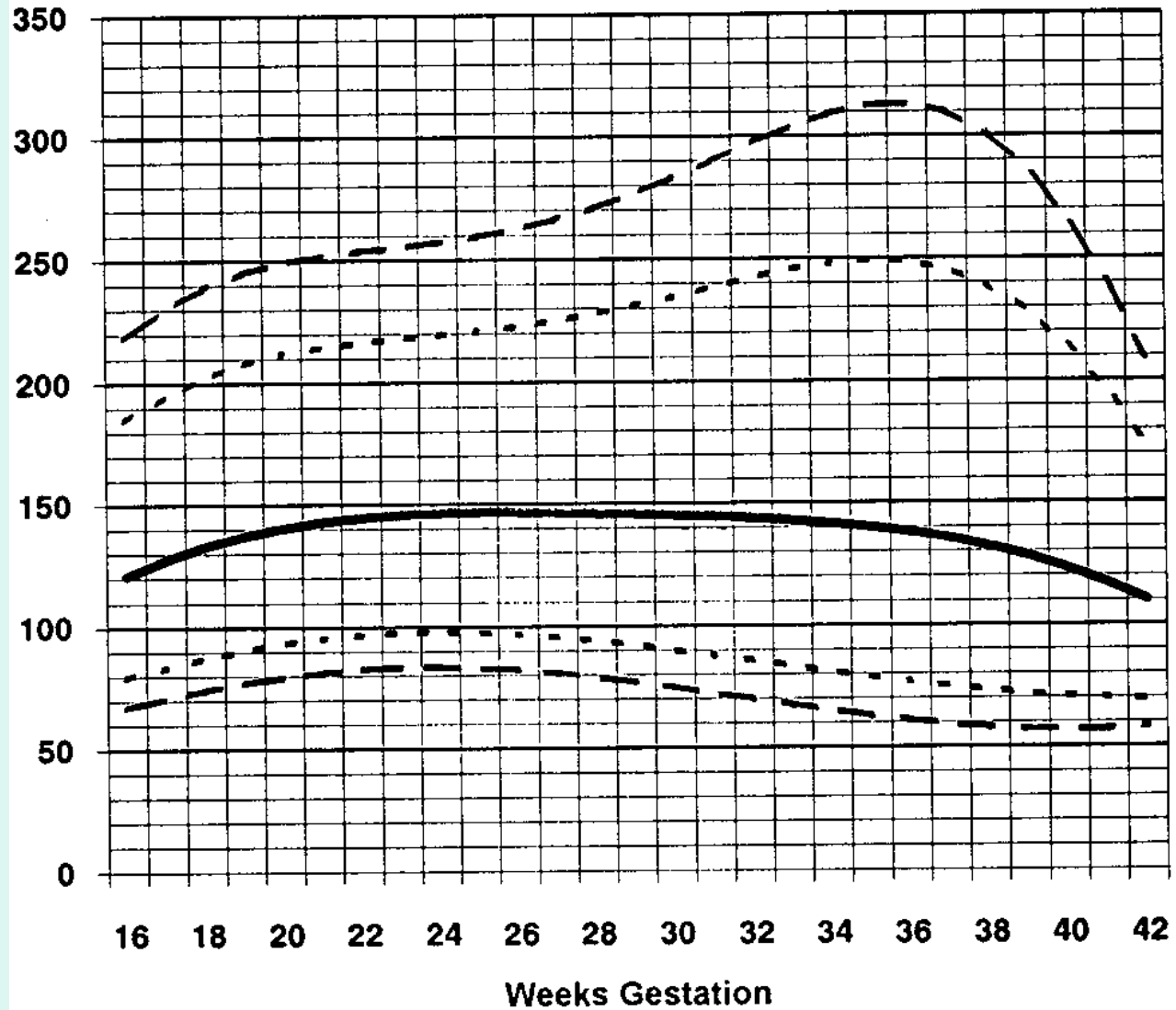
Q4 5.00cm

AFI 16.43cm

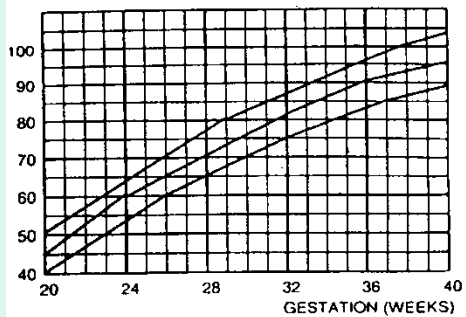
Cine 8

1.1 sec

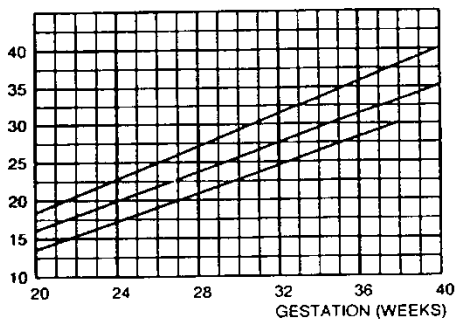
Amniotic Fluid Index



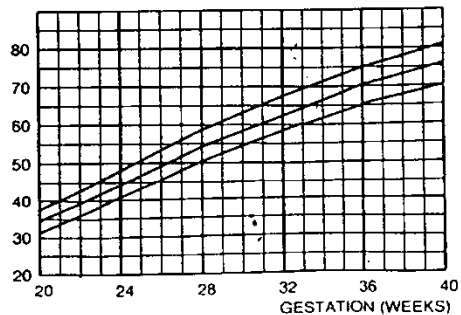
BPD (mm) ASUM



ABDO CIRCUM (mm)

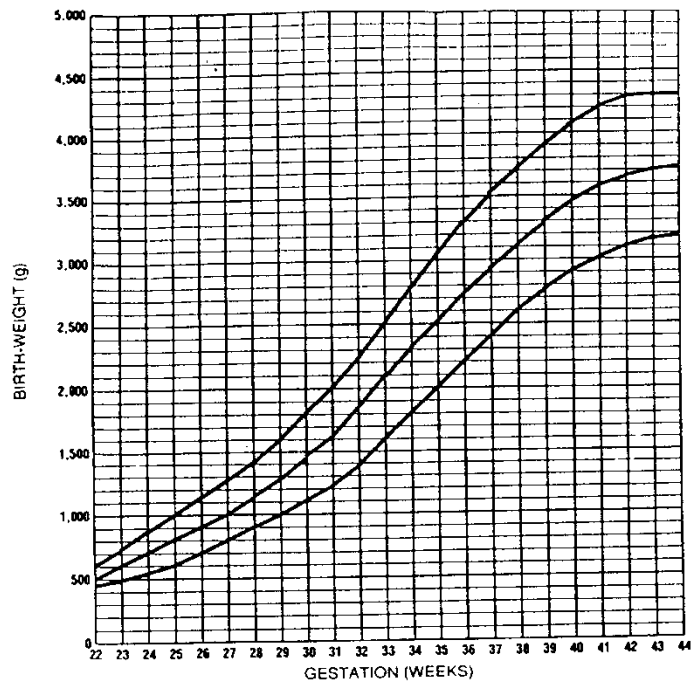


FEMUR LENGTH (mm)



FETAL WEIGHT (KGM)

R.L. Guaran et al 1994



A:B RATIO



Third trimester scanning

- Placental localization
 - where is the head in relation to the lower edge of the placenta.
 - watch the lateral aspect of the placenta
 - a low posterior placenta has more clinical significance than an anterior one.
 - In the presence of a Caesarean section scar, the possibility of placenta increta must be looked for.

POSTERIOR PLACENTA

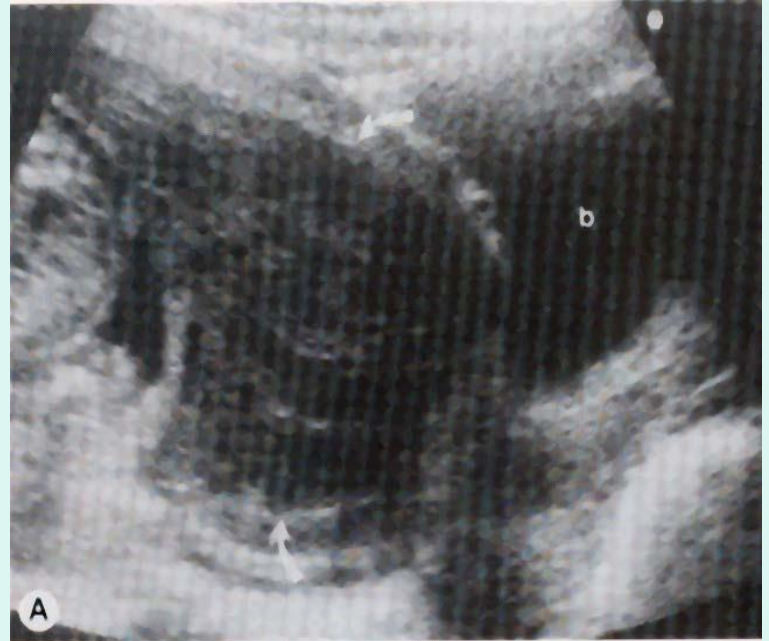
4C1
H4.0MHz 130mm
Obstetric
General

90dB S1/+1/3/4
Gain= 16dB Δ=2

Store in progress

CX





Third trimester scanning

- Welfare assessment should be part of all third trimester scanning
 - BPP
 - Doppler studies

Doppler flows

- Taken in association with growth, liquor, and heart rate monitoring
- Possible sites:-
 - Umbilical vessels
 - MCA
 - Ductus venosus



AMANDA HILL BSc
PERINATAL ULTRASOUND

561648
C4-2 40R OB/GRTH

22 Feb 02
11:30:11

Tib 1.2 MI 0.2
F# 49 16.6cm

Fetal Bio

BPD
9.19cm 37w0d

OFD

HC
31.73cm 36w1d

APD

TAD

AC
32.79cm 36w3d

FL

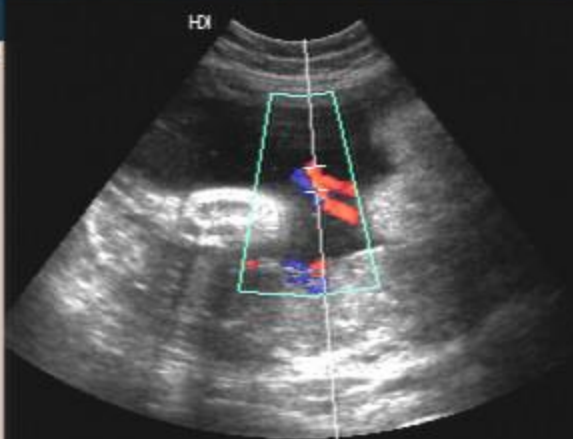
7.50cm 39w0d

TTD

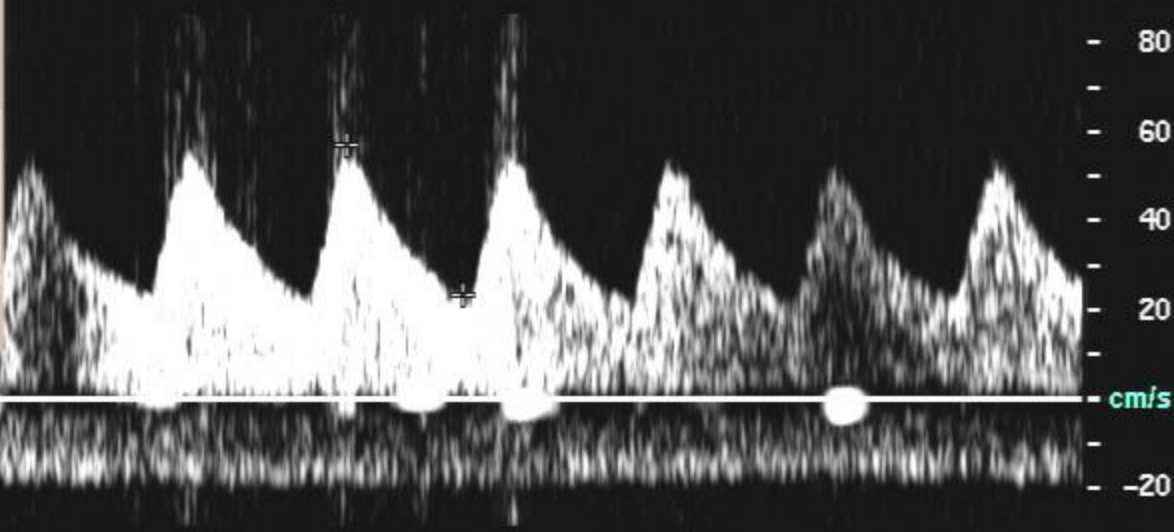
APTD

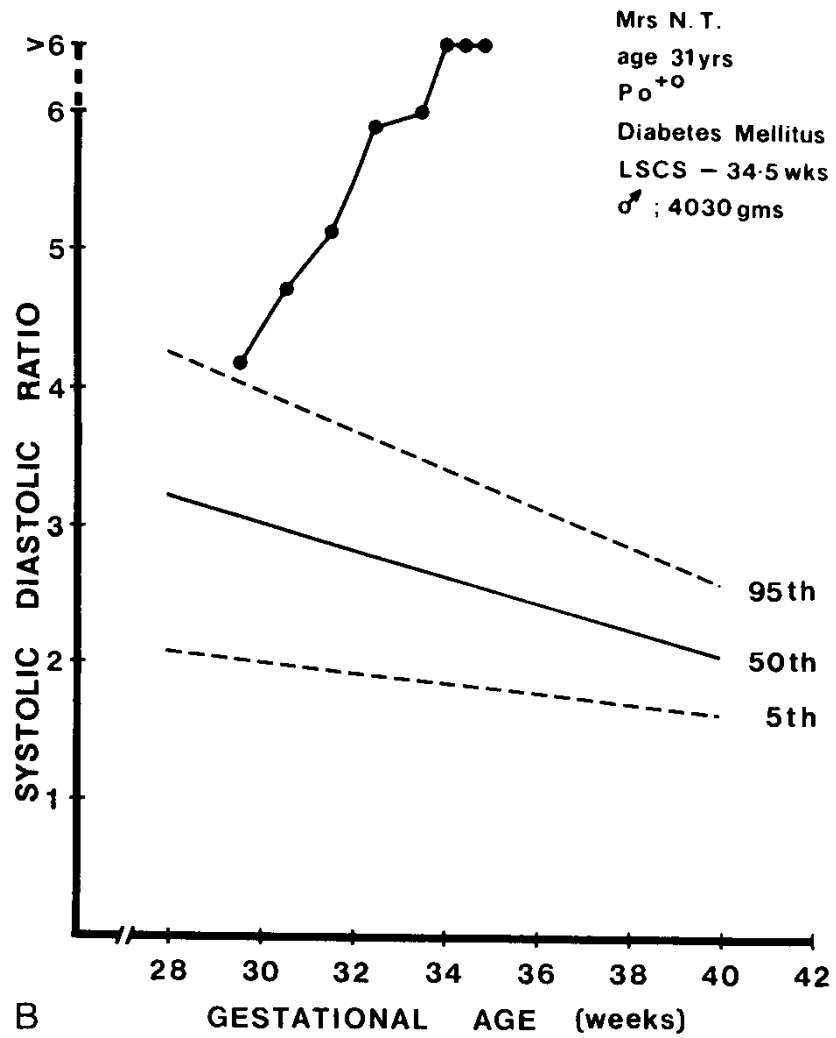
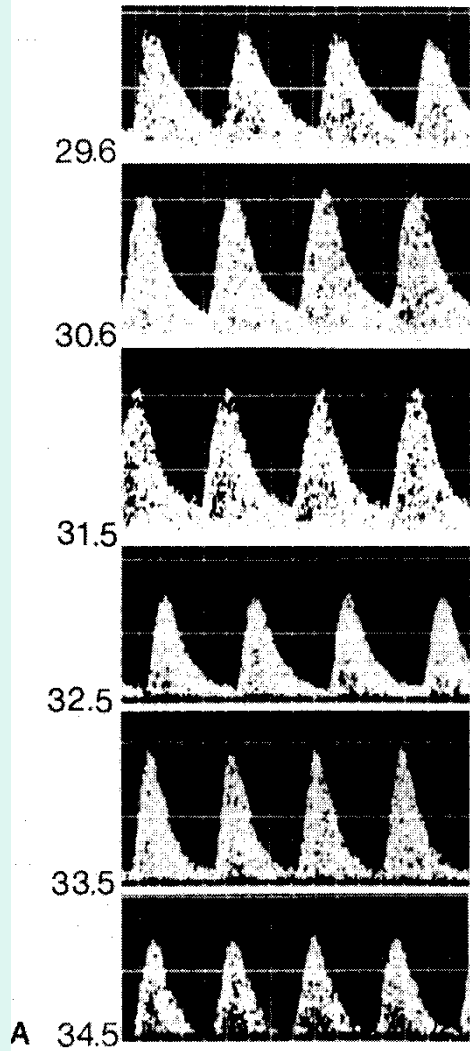
Heart Rate

GA(LMP)



SV Angle 0°
Dep 5.9 cm
Size 10.0mm
Freq 2.5 MHz
WF Low
Dop 85% Map 2
PRF 3731 Hz

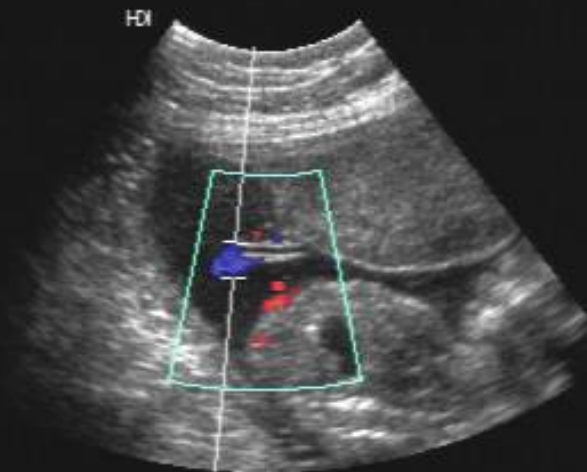




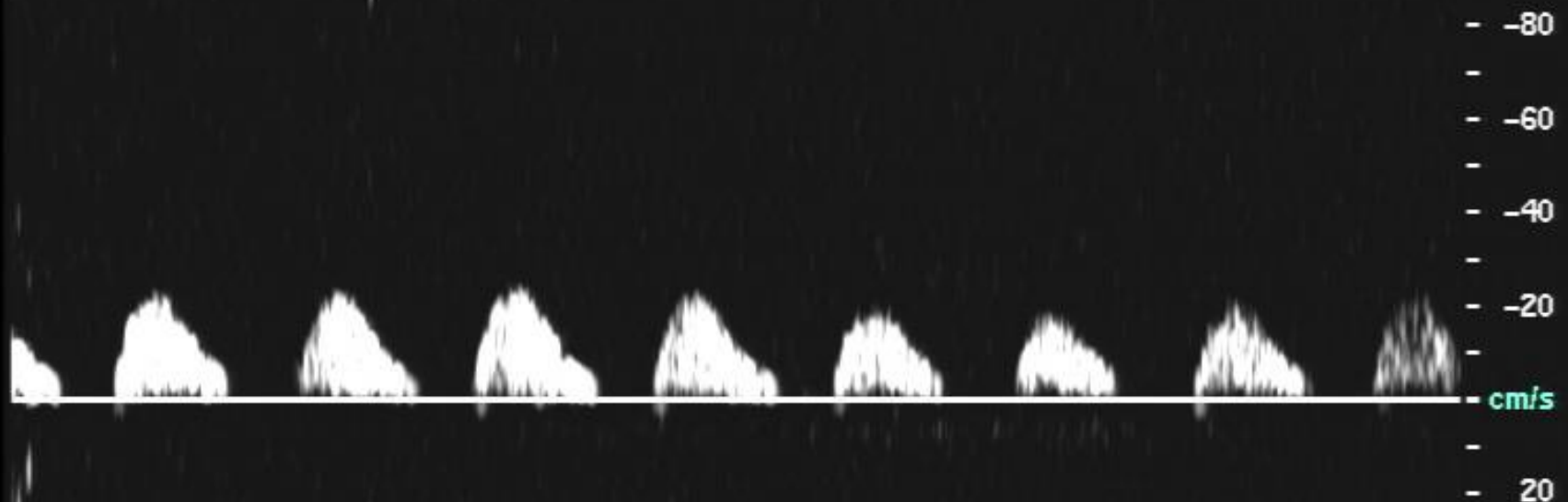


Map 3
 DynRg 50dB
 Persist Med
 Fr Rate Med
 2D Opt:Pen
 Col 74% Map 1
 WF Med
 PRF 2500 Hz

BW 0 Pg 0
 Col 0 Pg 0



SV Angle 0°
 Dep 6.3 cm
 Size 10.0mm
 Freq 2.5 MHz
 WF Low
 Dop 85% Map 2
 PRF 3731 Hz



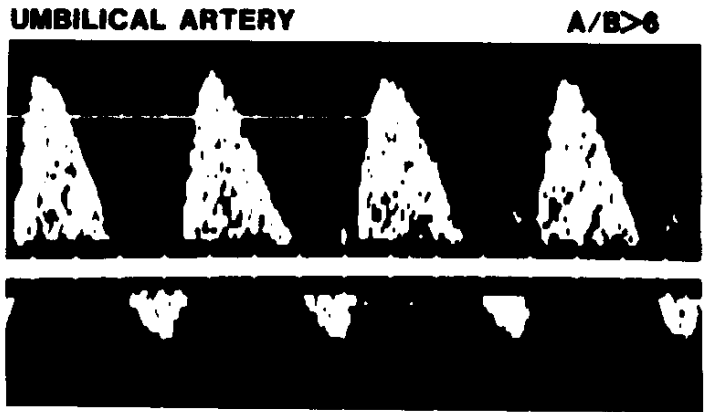
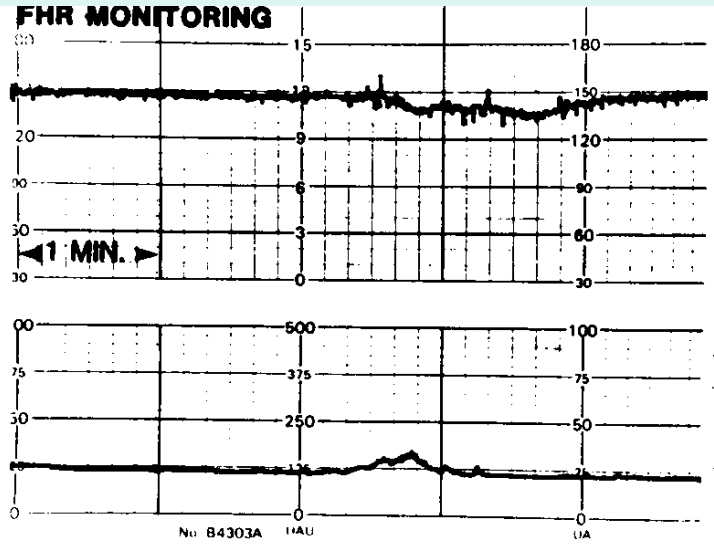
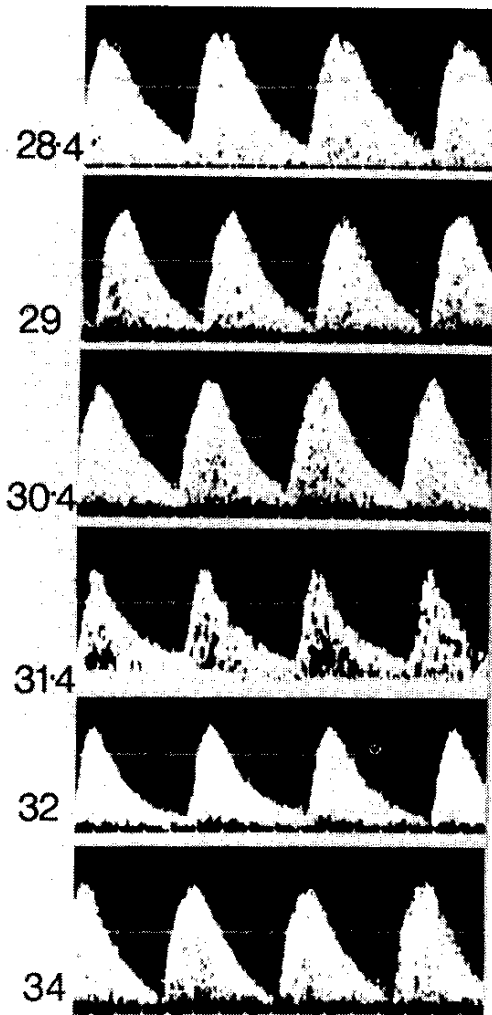
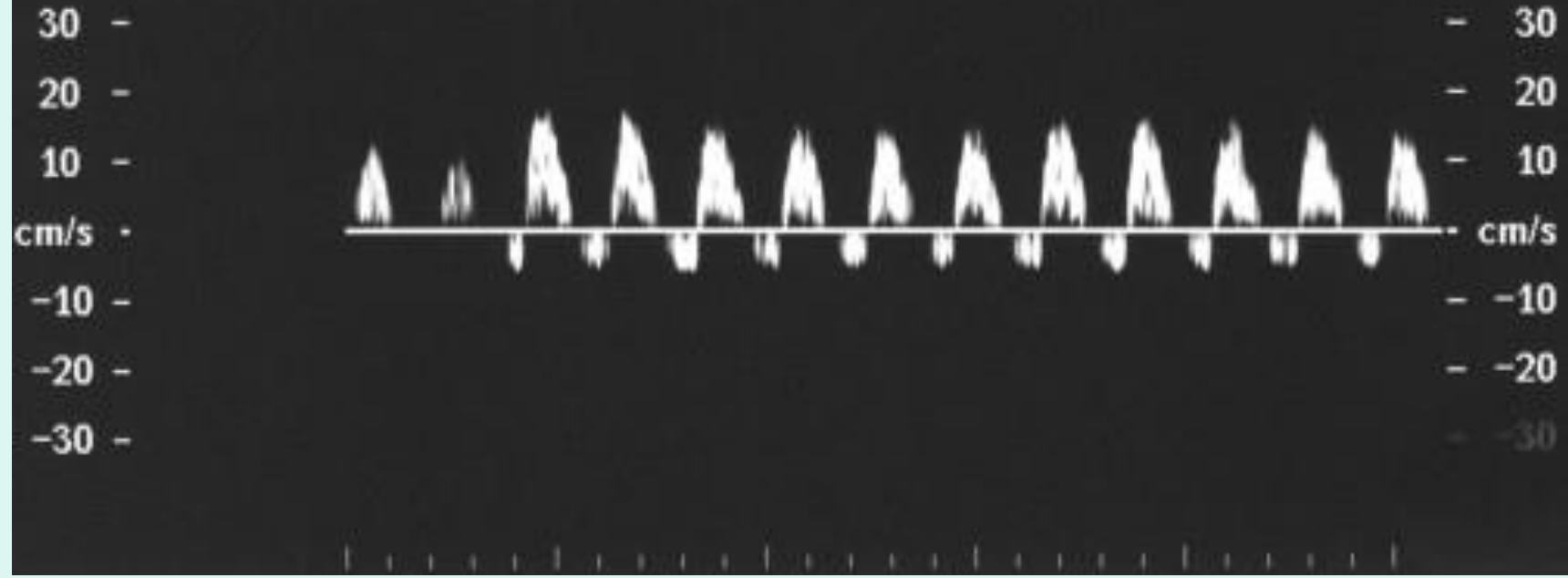


FIGURE 16-6. An umbilical artery flow velocity wave in which umbilical placental impedance is so high th

ATL



SV Angle 0°
Dep 4.4 cm
Size 2.0 mm
Freq 2.5 MHz
WF Low



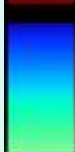
451290

20 Feb 02

PERINATAL ULTRASOUND NEPEAN HOSPITAL

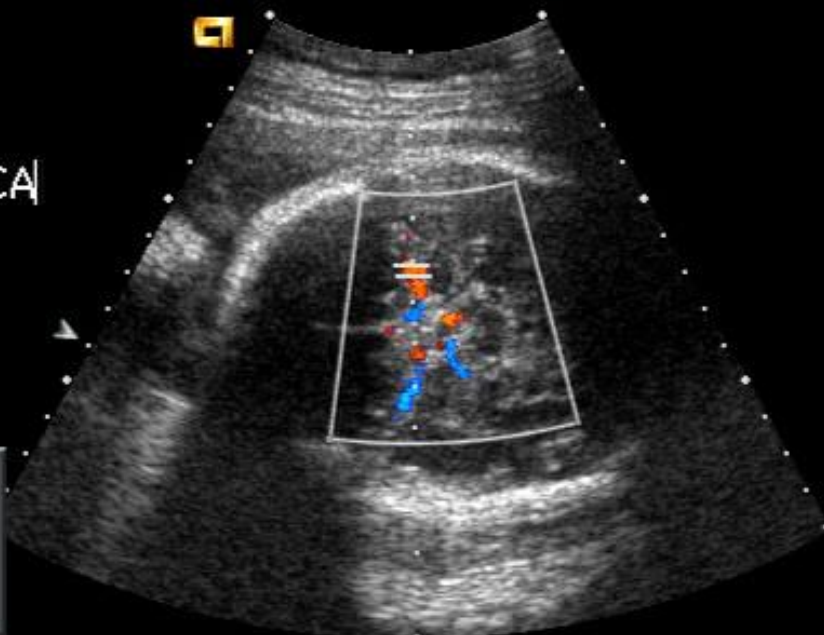
11:02:42 am

.17



.17

MCA



5C2

H5.0MHz 140mm

Obstetric

General

35dB 2 · /+1/1/ 5

PW Depth= 53mm

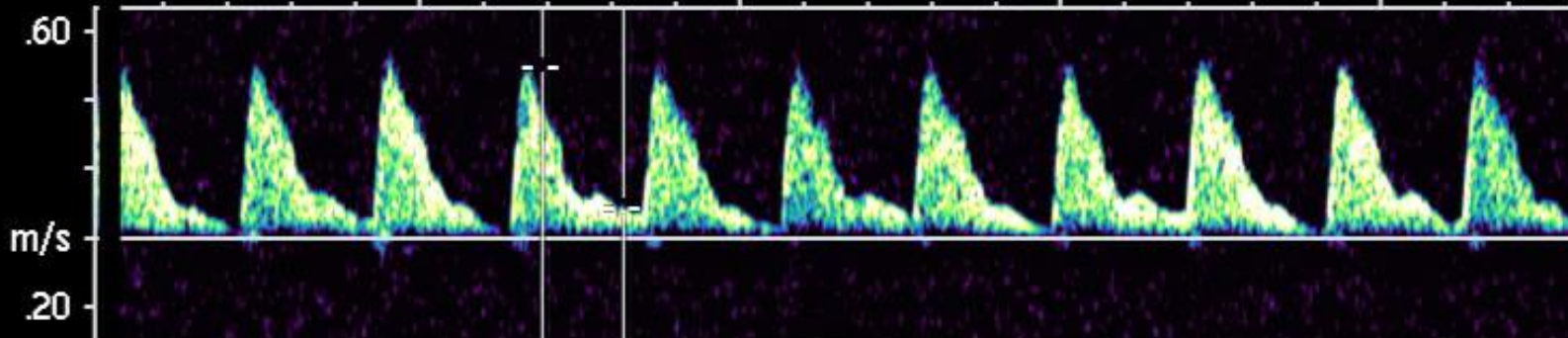
PW Gate= 3.0mm

PW Gain= -6dB

Sweep=50mm/s

V1 = 0.497m/s
 V2 = 0.087m/s
 RI = 0.83
 S/D = 5.71

PW:2.5MHz



Text 1&2

Delete Word

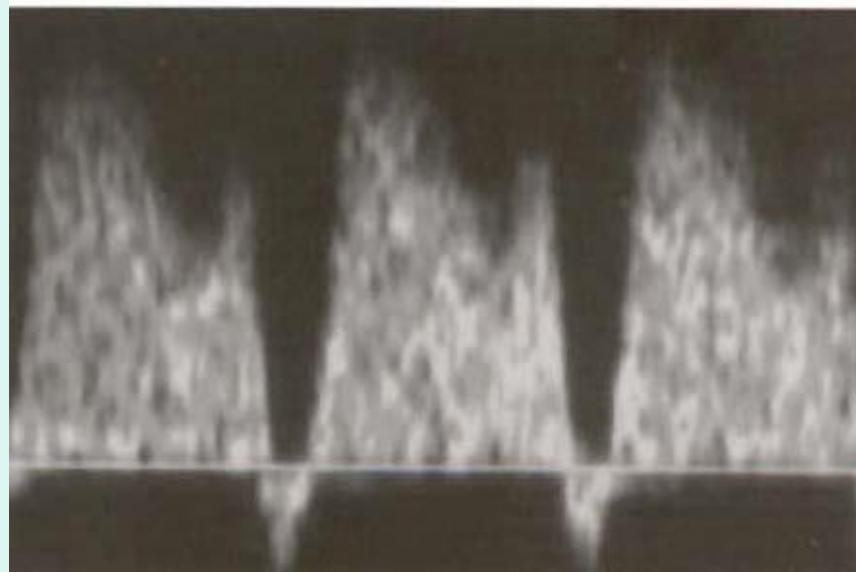
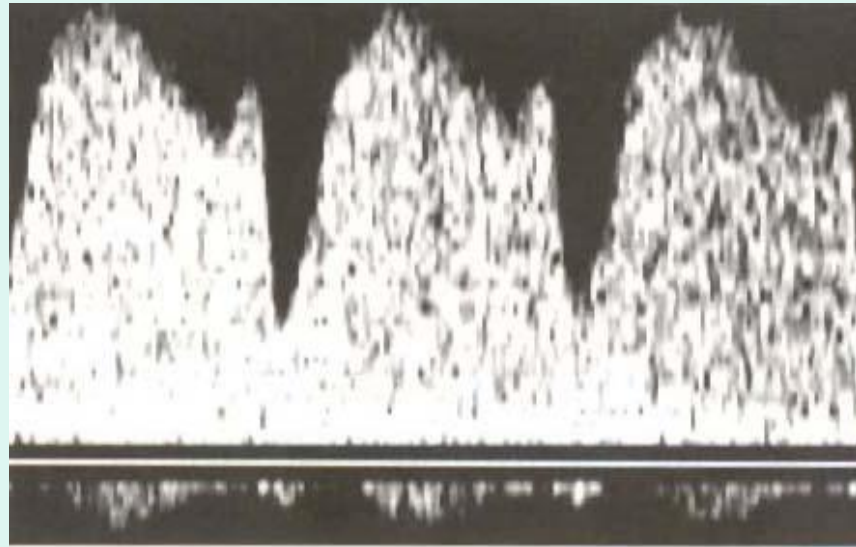
Home Set

Home



Ductus venosus

- Ductus venosus connects the left hepatic vein to the inferior vena cava.
- Visualised in the transverse plane using colour by following the umbilical vein until the ductus divides from the hepatic vein.
- Under normal conditions, flow in the ductus is antegrade. With hypoxemia, the dilation of the ductus will result in reverse flow in arterial systole.



3D and 4D techniques

3D: static

4D real time

In order to get a good 3D or 4D picture we need a good 2D picture.

Many modes

1. surface modes , (fetal face, limbs...).

2. Transparent modes:

A. Max.: bony structures.

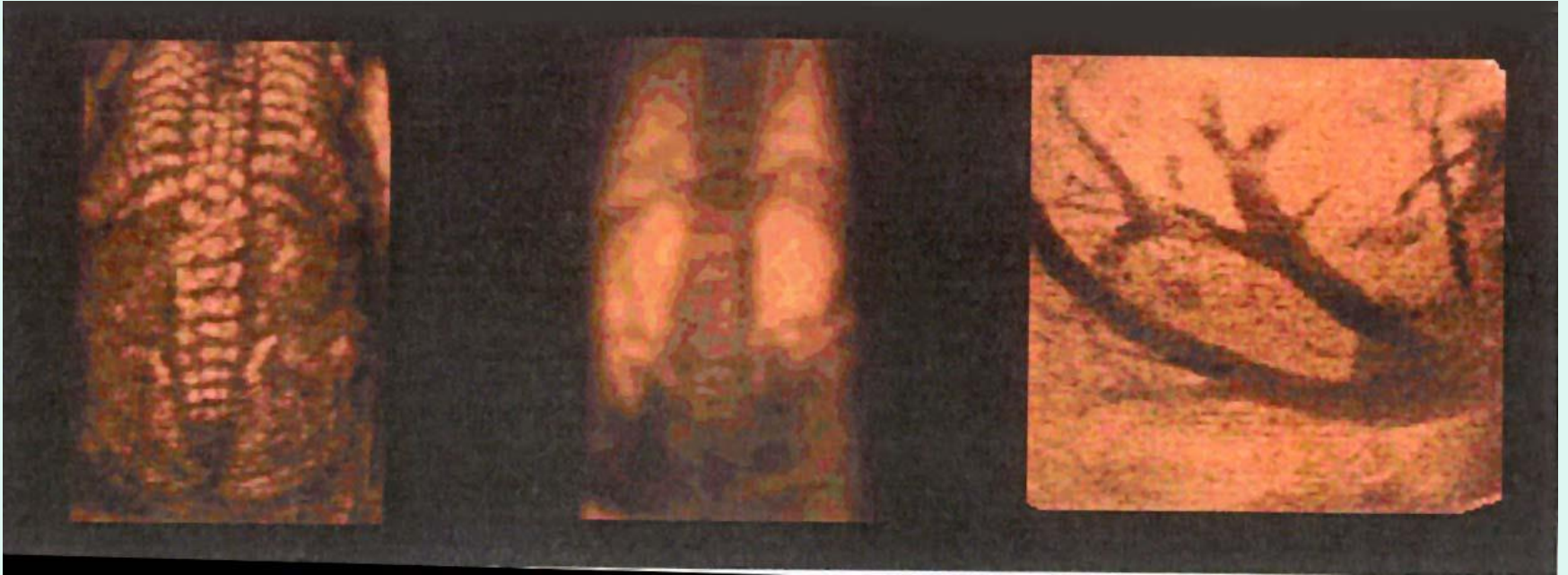
B. Min: vessels, cystic structures and inner parenchyma skeleton.







3D scan of an unborn baby



Maximum

X-Ray

Minimum



**Glass-Body render
mode algorithm**



**Color and Power-
Doppler Rendering**

Thanks