Obstetric Ultrasound Scan

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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/lmage 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

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

Scanning or transducer frequency

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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.**

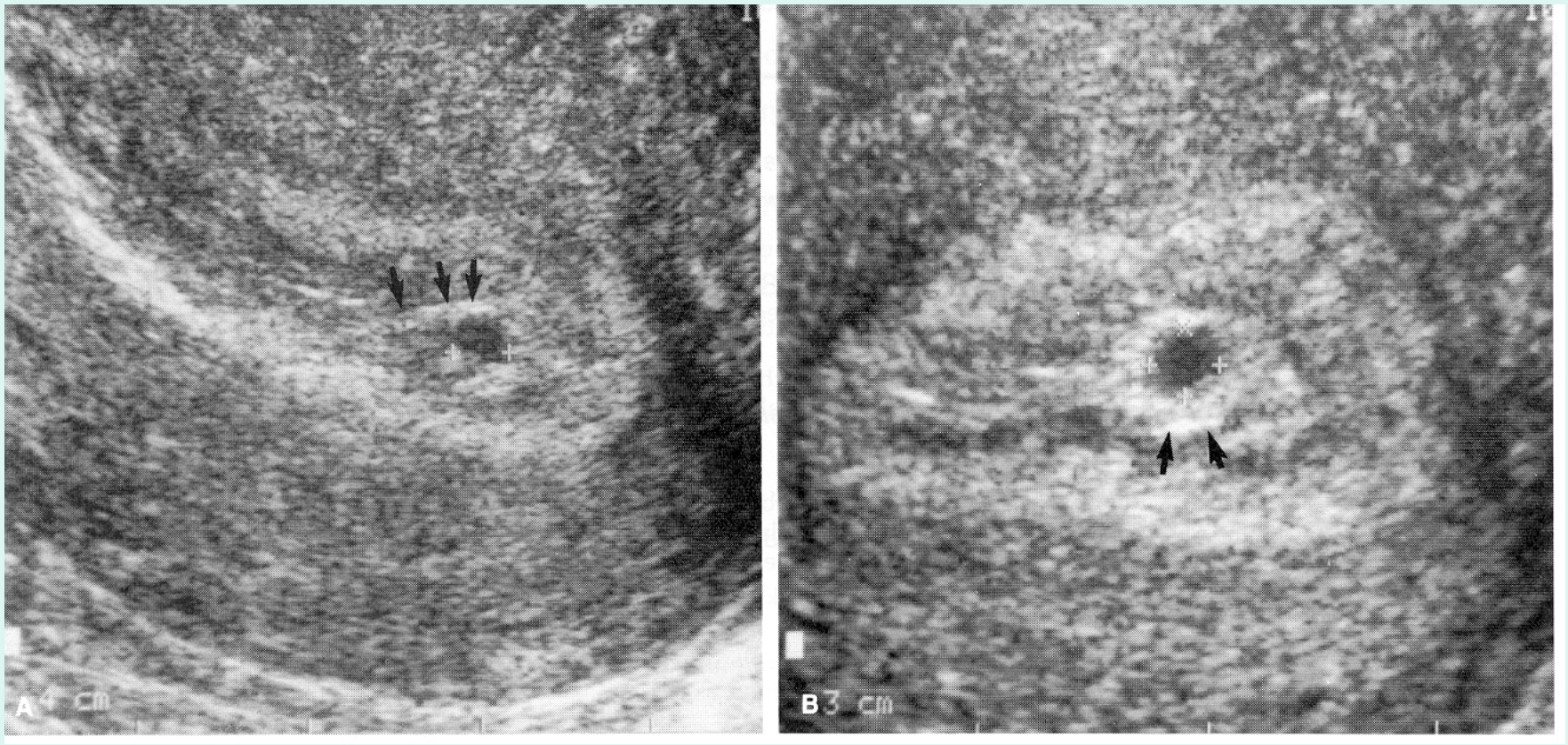
- **Transvaginal and transabdominal should be obtained.**

First trimester ultrasound indications

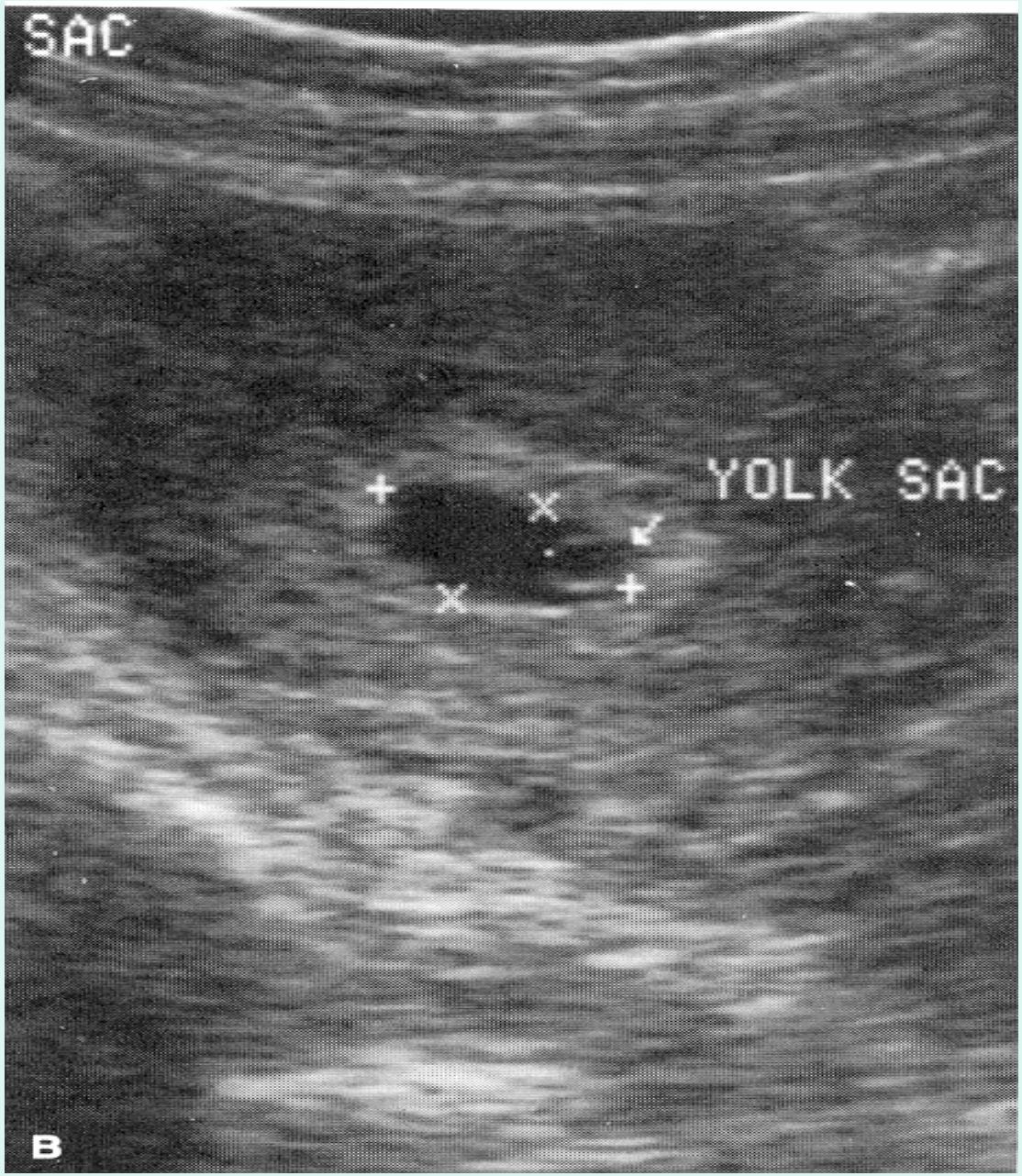
- Suspected miscarriage.
- Vaginal bleeding.
- Gestational age (if uncertain, or size/date discrepancy).
- Aadjunct to procesures (e.g. CVS).
- Suspected multiple gestation.
- Suspected hydatidiform mole.
- IUD localization.
- Suspected uterine abnormality.
- Evaluation of maternal pelvic masses.

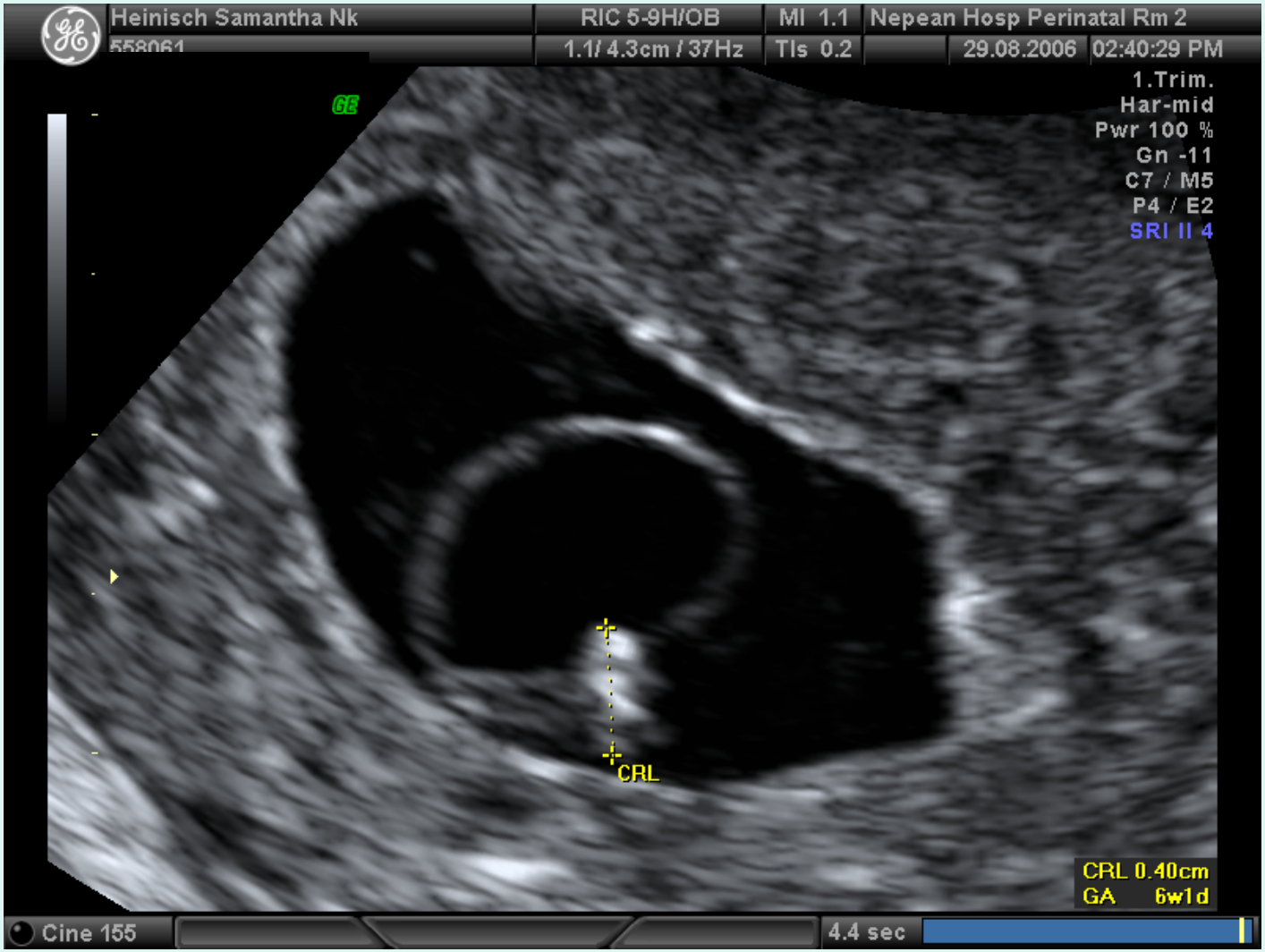
1st trimester scan

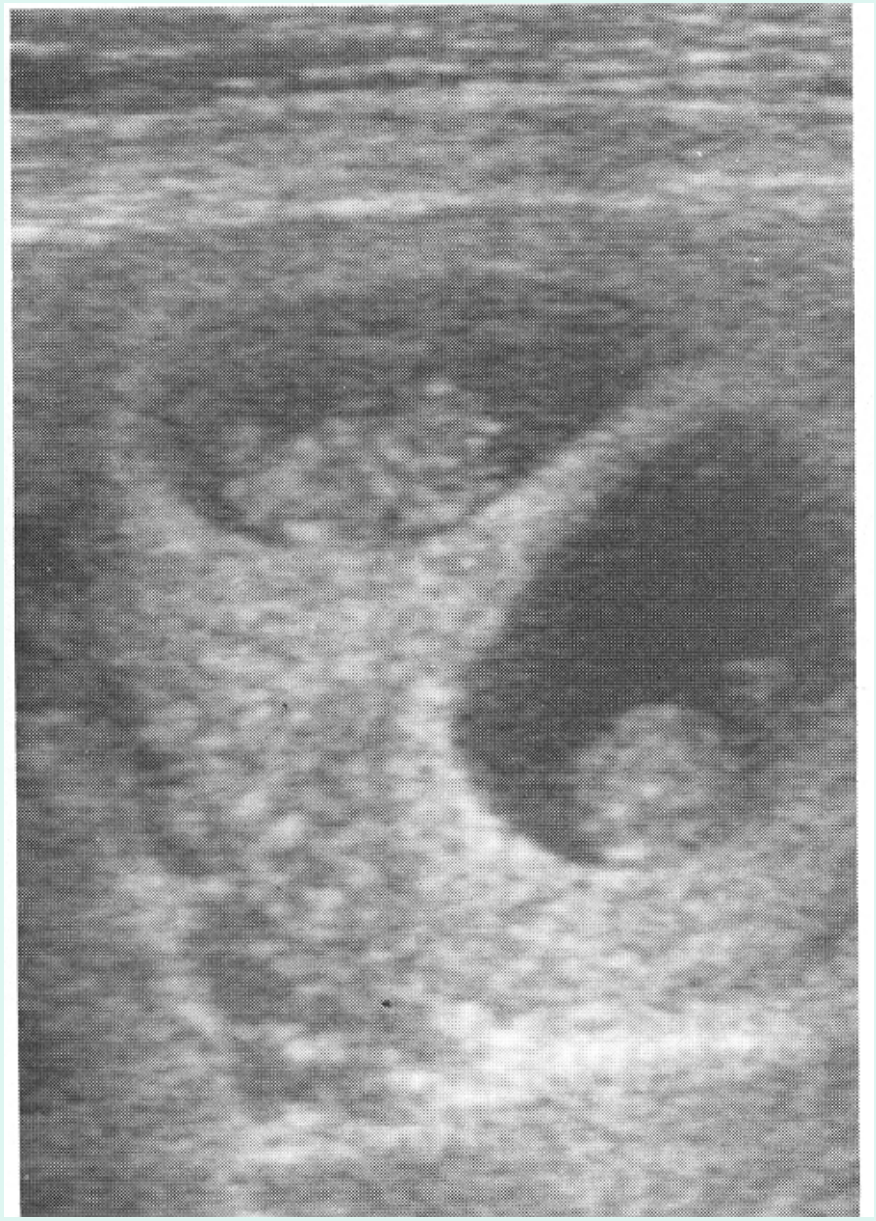
Intrauterine Gestational sac for **b**HCG > 1000-1500 IU/L

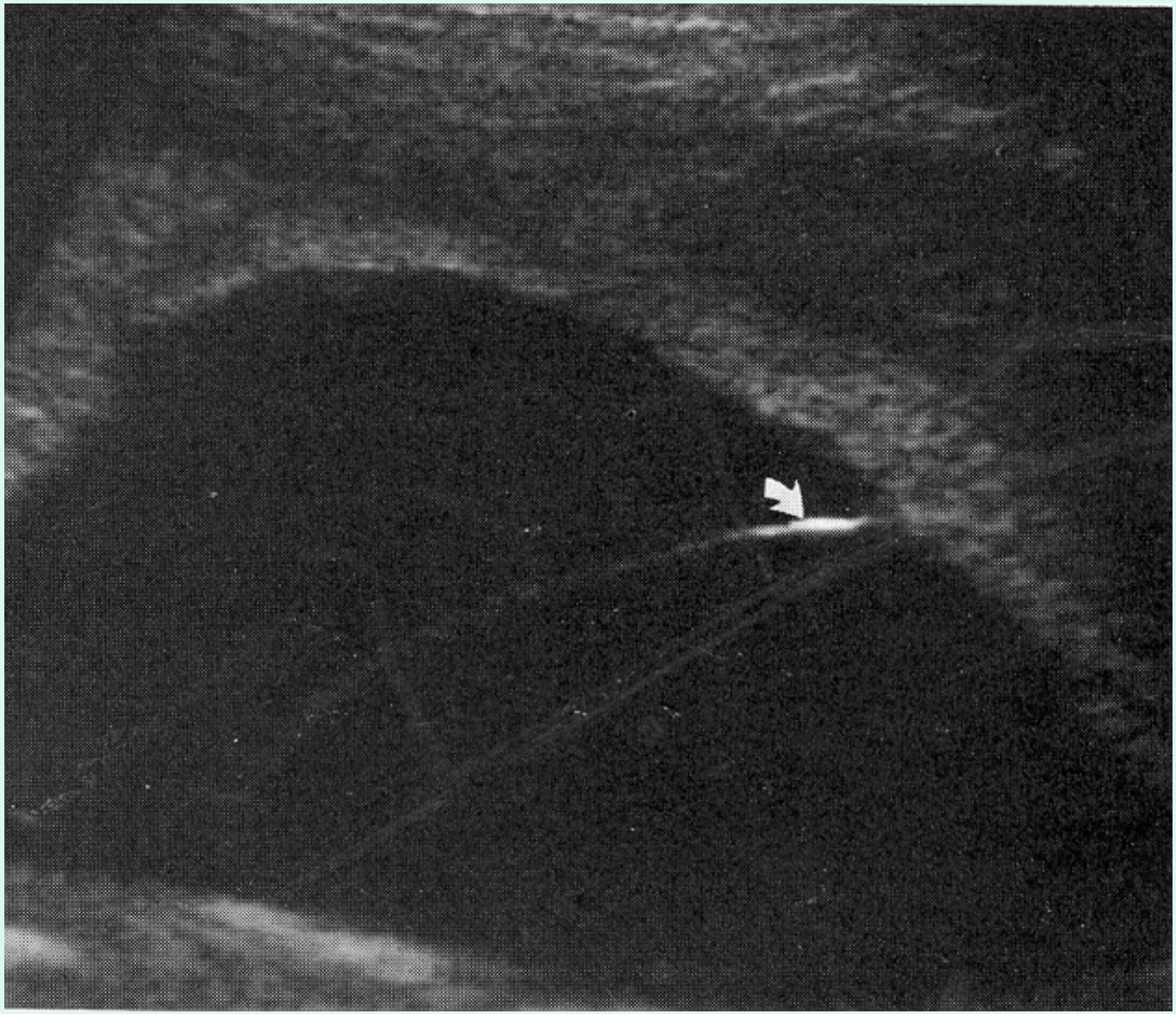


Early implantation

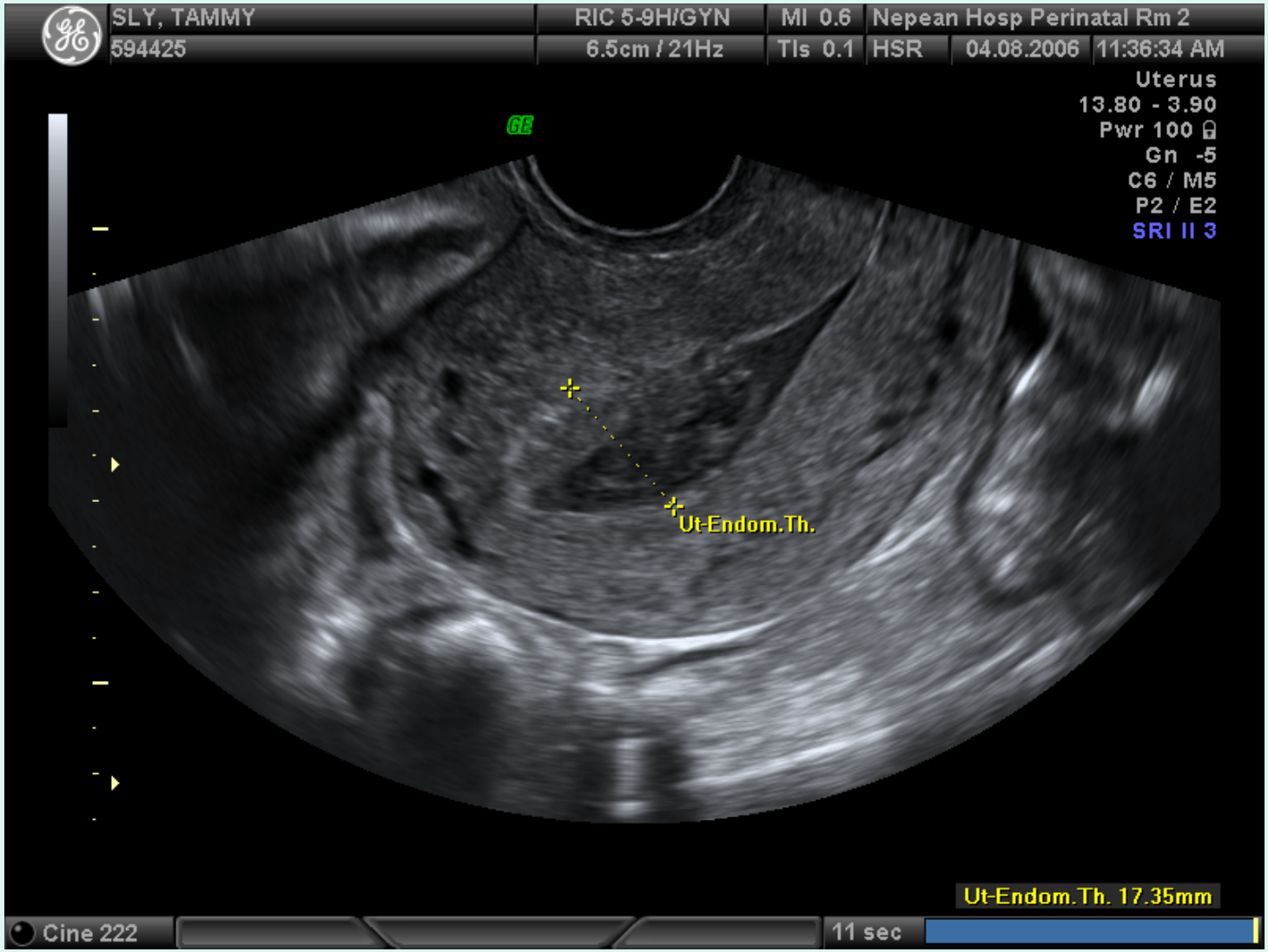

SAC
YOLK SAC
B


Heinisch Samantha Nk
RIC 5-9H/OB
MI 1.1
Nepean Hosp Perinatal Rm 2
1.1/ 4.3cm / 37Hz
TIs 0.2
29.08.2006
02:40:29 PM
1.Trim.
Har-mid
Pwr 100 %
Gn -11
C7 / M5
P4 / E2
SRI II 4
CRL
CRL 0.40cm
GA 6w1d
Cine 155
4.4 sec





Products of Conception?



Dating the Pregnancy

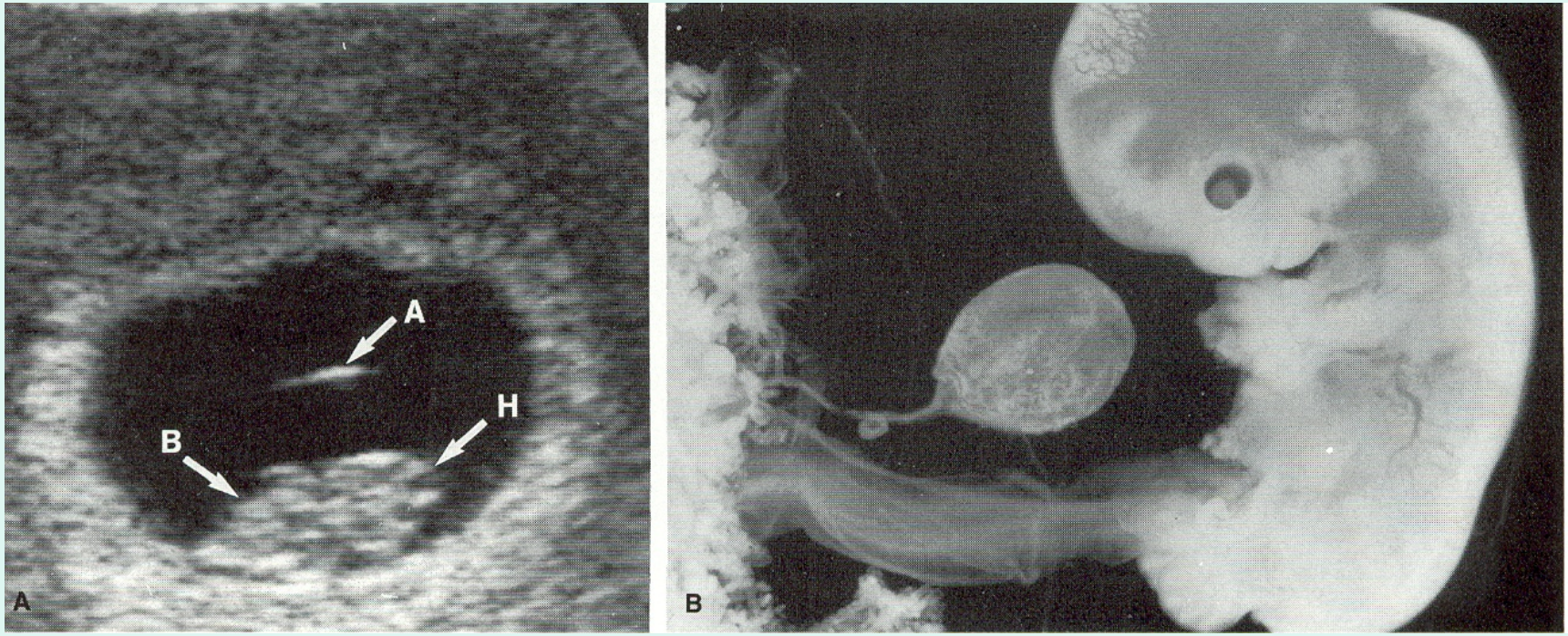
There are three possible methods for dating a pregnancy by ultrasound, depending on the size of the fetus or embryo.

The Mean Sac Diameter Measurement (MSD)

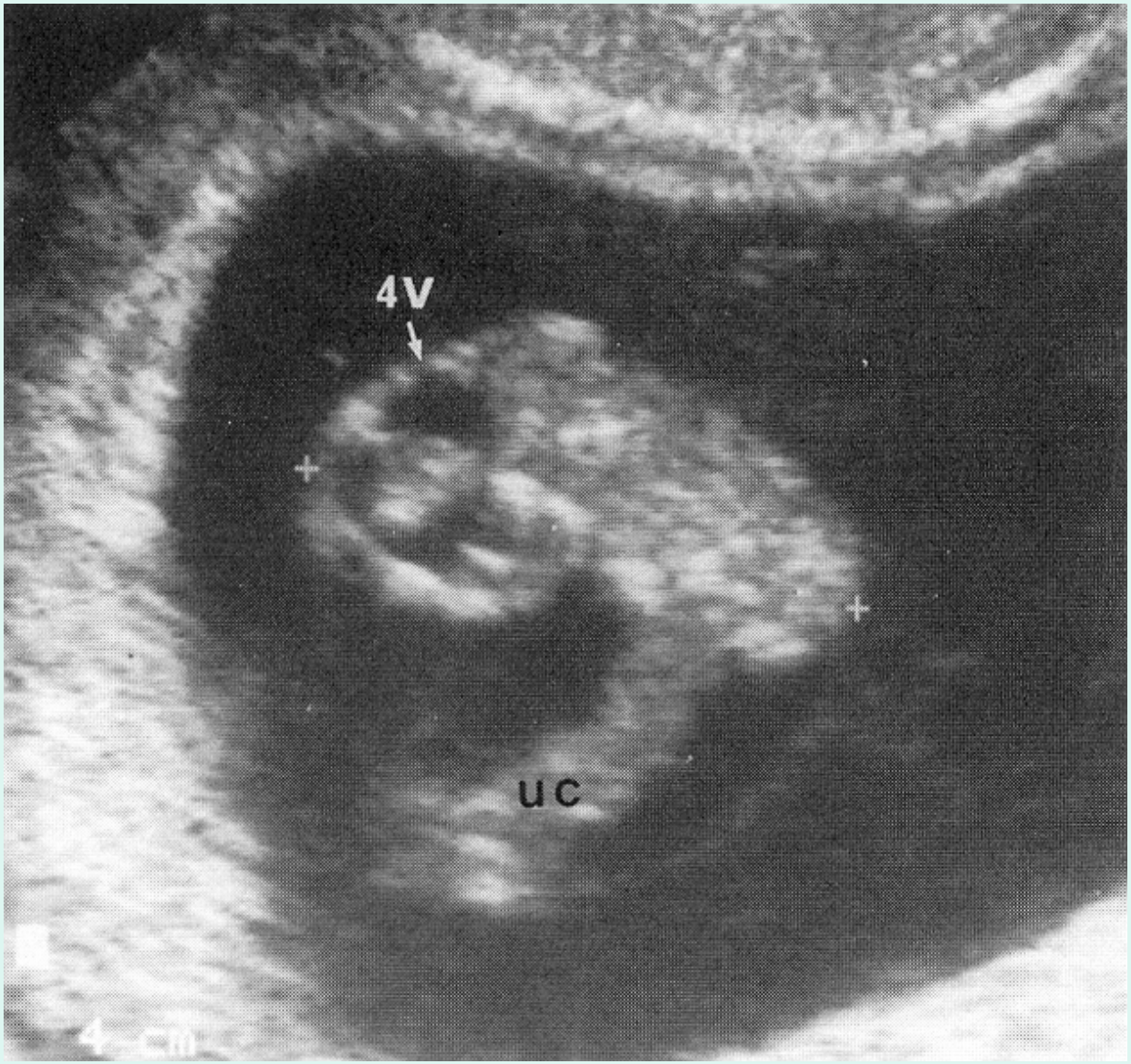
This is used when there is no fetal pole visible, just a gestational sac. The gestational sac is measured in its three dimensions and the average of these three measurements is calculated by the ultrasound machine. The ultrasound machine will determine the corresponding gestational age.

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
AB 2-7/Obstetric
MI 1.1
FARAH HOSP. DR. ASMA BASHA
B4743 GA=13w3d
2.9/10.0cm / 33Hz
28-07-2005
10:34:53 AM
Routine
Har-mid
Pwr 97 %
Gn -3
C6 / M5
P5 / E1
CRL 7.71cm
CGA 13w6d 89%
EDD 27-01-2006

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.

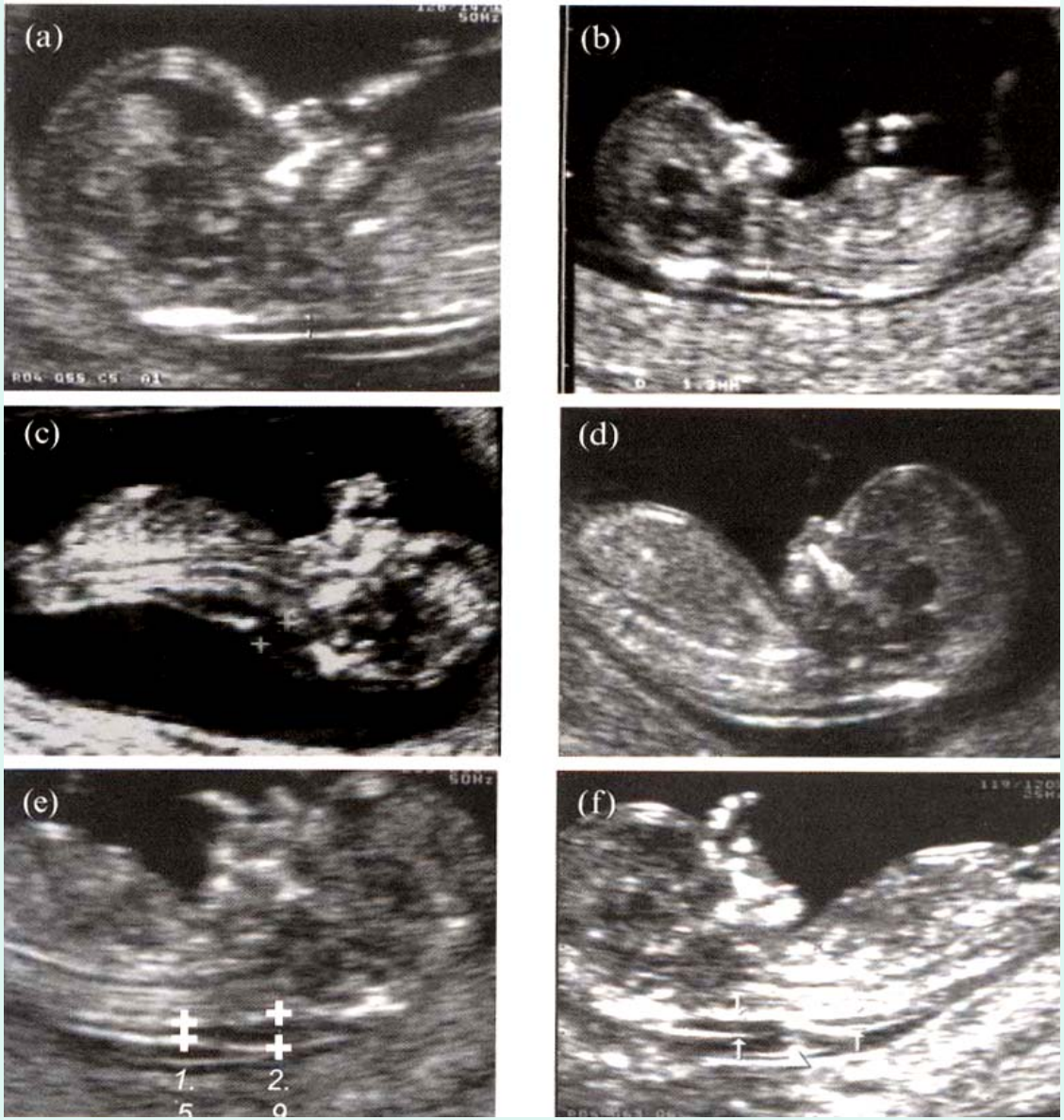
Nuchal translucency - measurement

- 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
AB 2-7/Obstetric
MI 1.1
FARAH HOSP. DR. ASMA BASHA
B4743 GA=13w3d
3.2/11.0cm / 53Hz
28-07-2005
10:33:59 AM
Routine
Har-mid
Pwr 97 %
Gn -4
C6 / M5
P5 / E1
D1 0.147cm
D2 0.199cm
D1/D2 74%

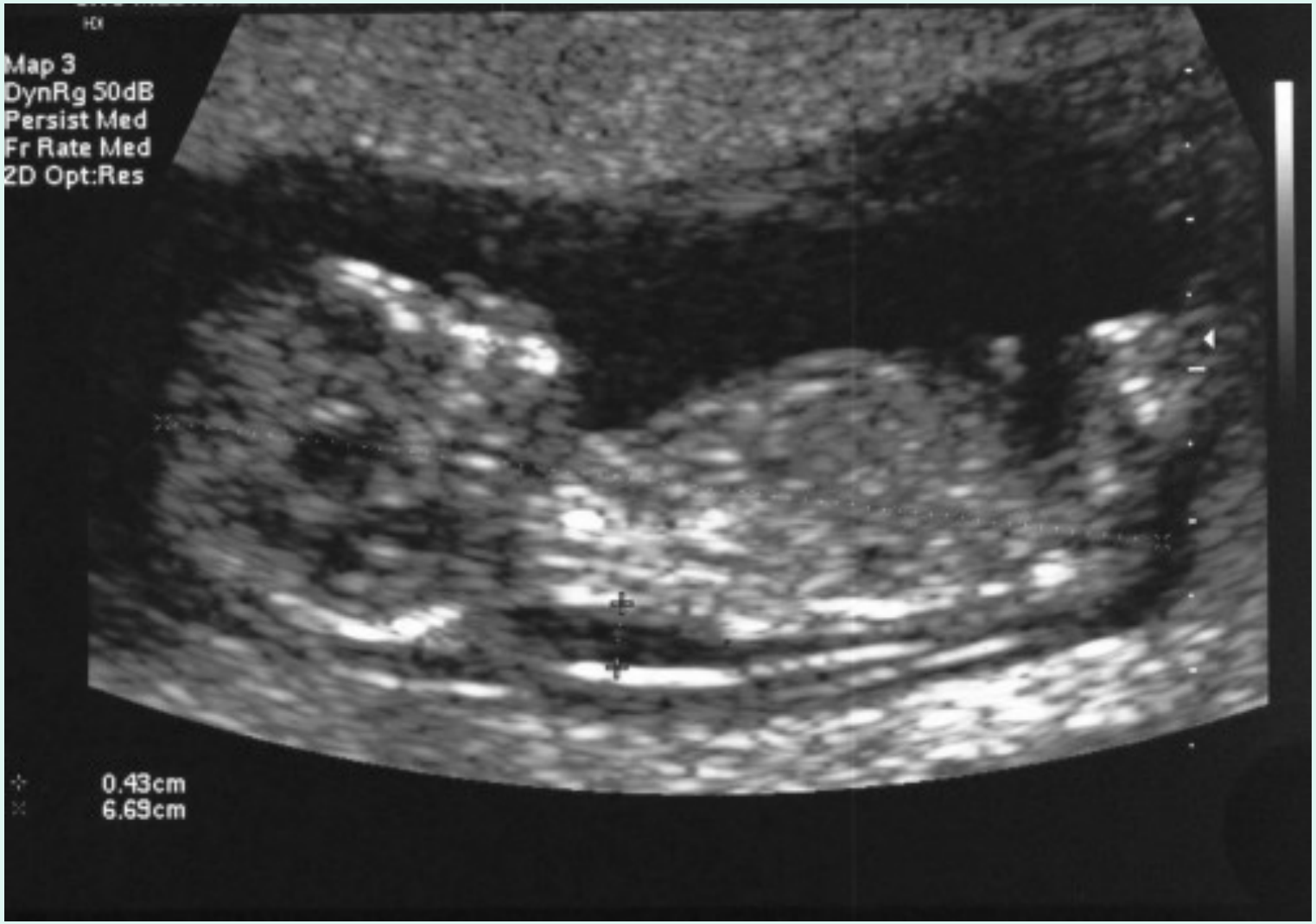

(a)
(b)
(c)
(d)
(e)
1.
2.
(f)

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


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

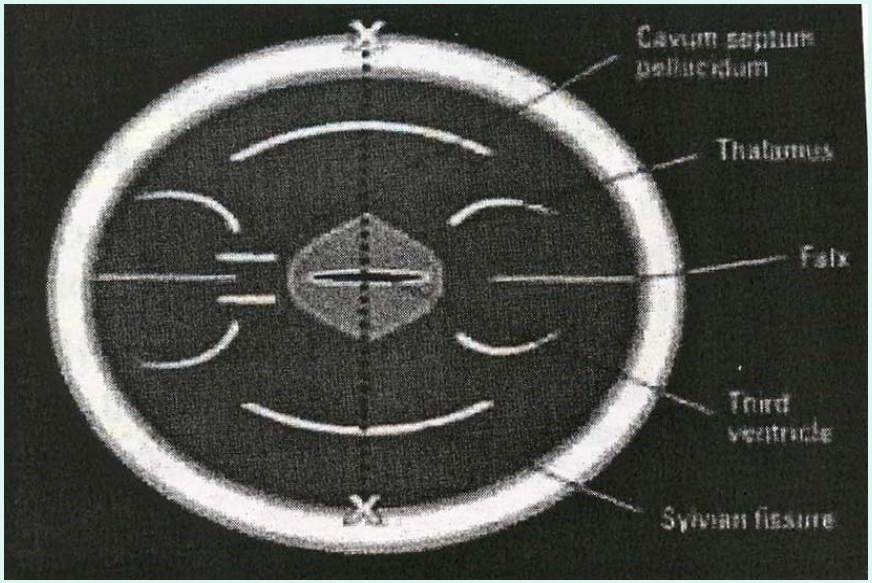
- Head
- Face
- Diaphragm
- Heart
- Great vessels
- Abdomen
- Spine
- Extremities
- Umbilical cord

Biparietal Diameter (BPD)

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

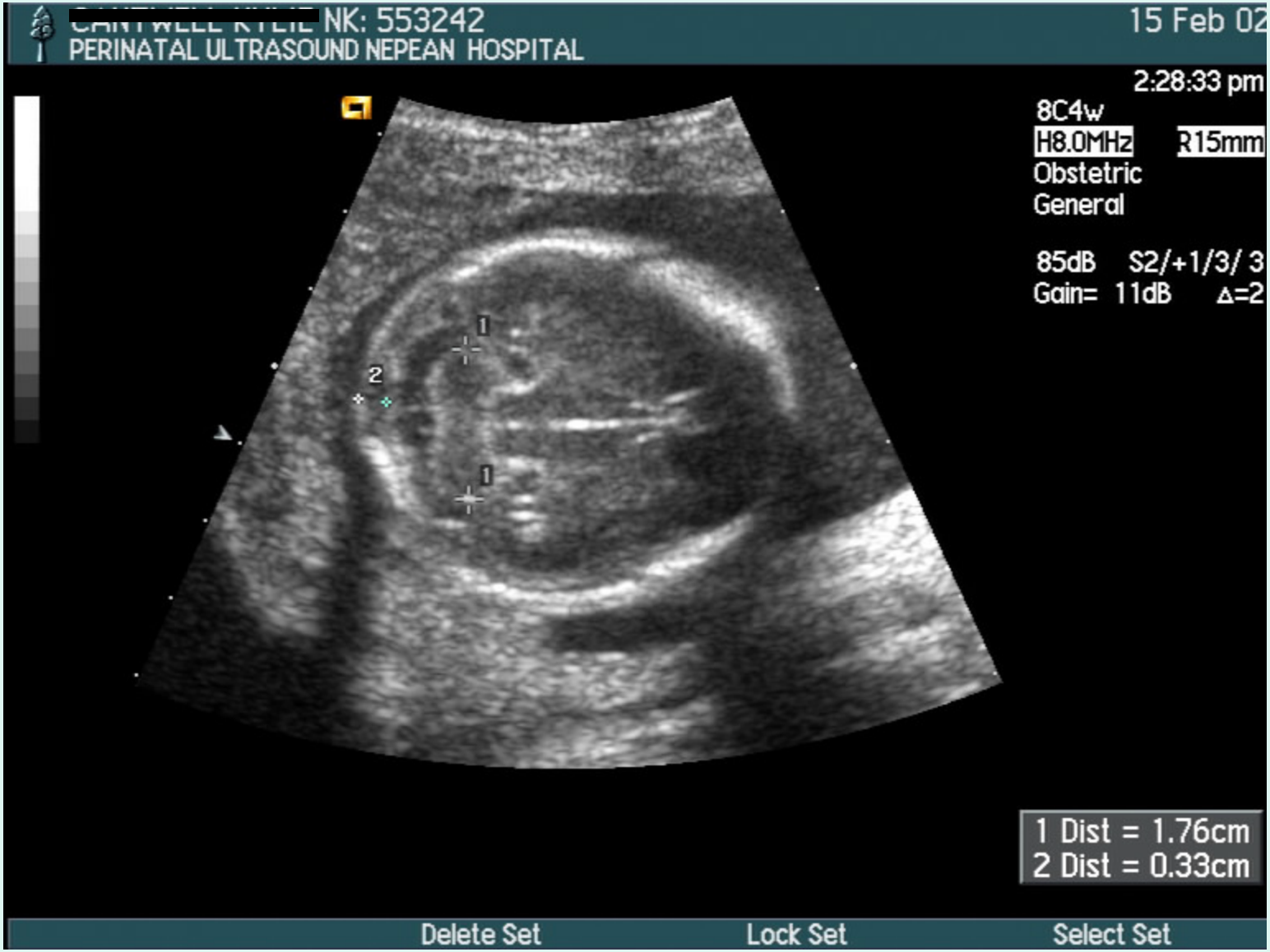
- To ensure that the measurements is obtained in the correct plane the following anatomy of the brain should be demonstrated:
- The falx cerebri.
- The cavum septum pellucidum.
- The thalamus .
- It is important that the cerebellum is not demonstrated. This would indicate that the plane has been taken 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.**




ATL
[redacted] 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


[redacted] NK: 553242
15 Feb 02
PERINATAL ULTRASOUND NEPEAN HOSPITAL
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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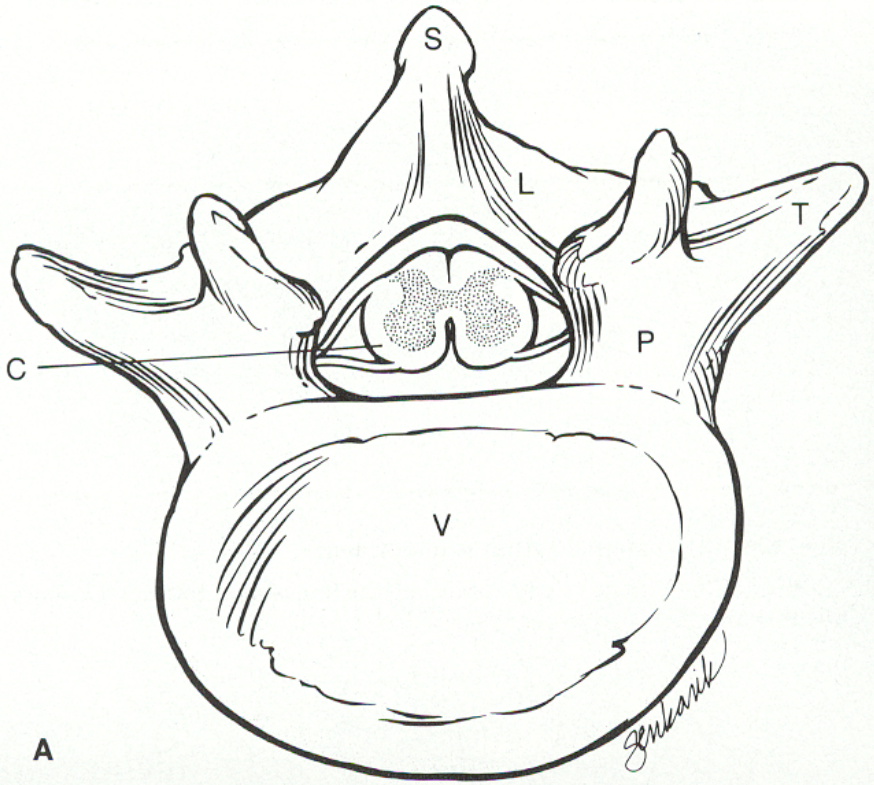
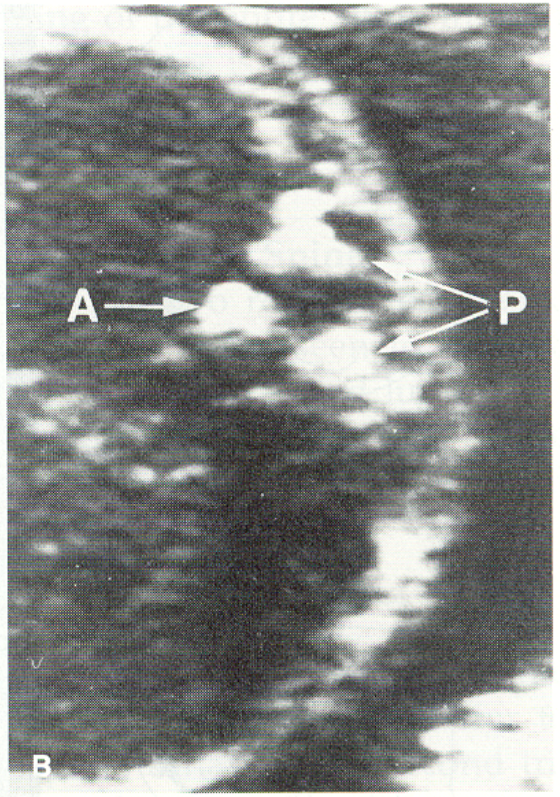
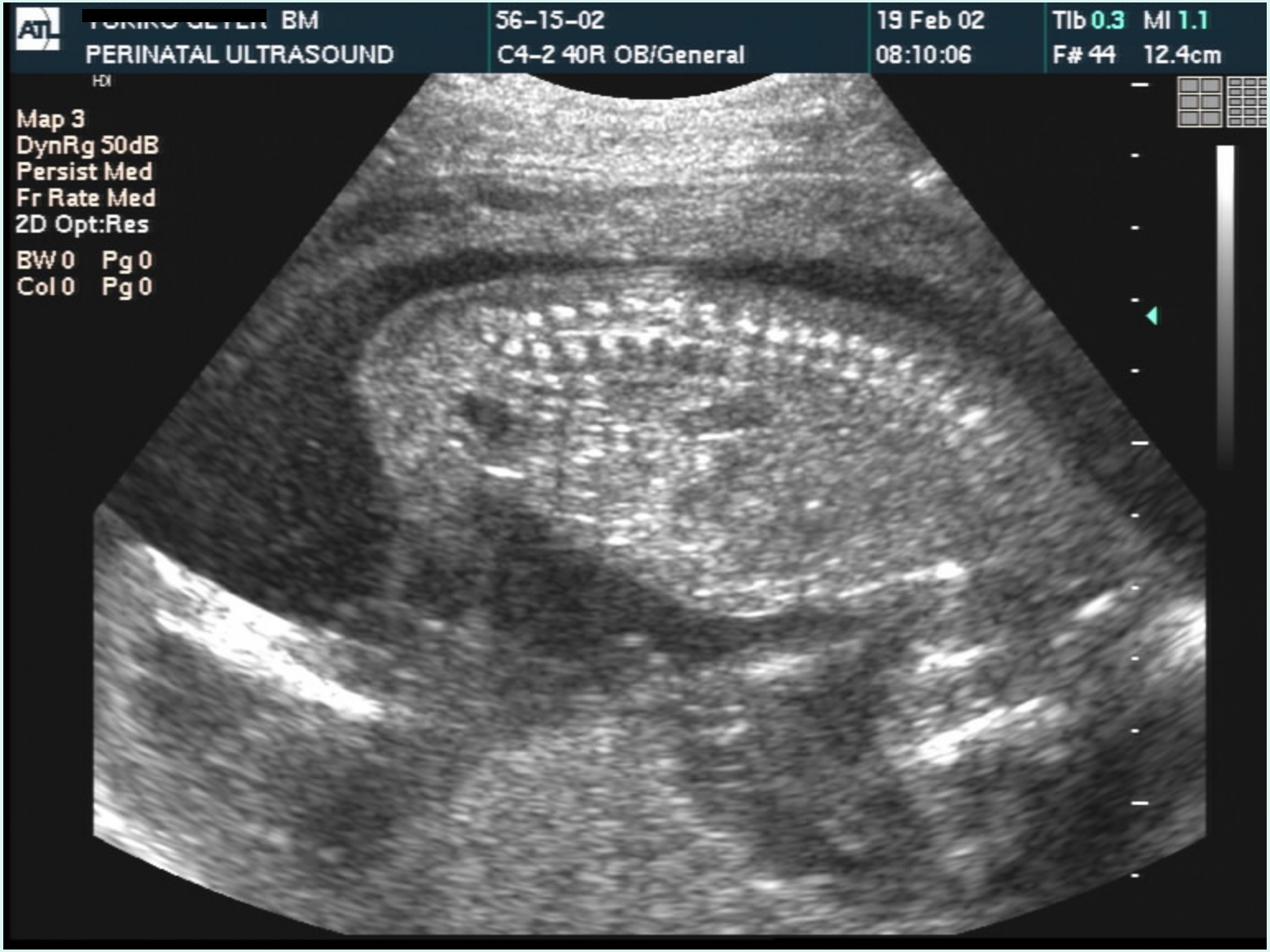
15 Feb 02
PERINATAL ULTRASOUND NEPEAN HOSPITAL
2:28:33 pm
8C4w
H8.0MHz
R15mm
Obstetric
General
85dB S2/+1/3/ 3
Gain= 11dB Δ=2
1
2
1
1 Dist = 1.76cm
2 Dist = 0.33cm
Delete Set
Lock Set
Select Set


S
L
T
C
P
V
A


A
P
B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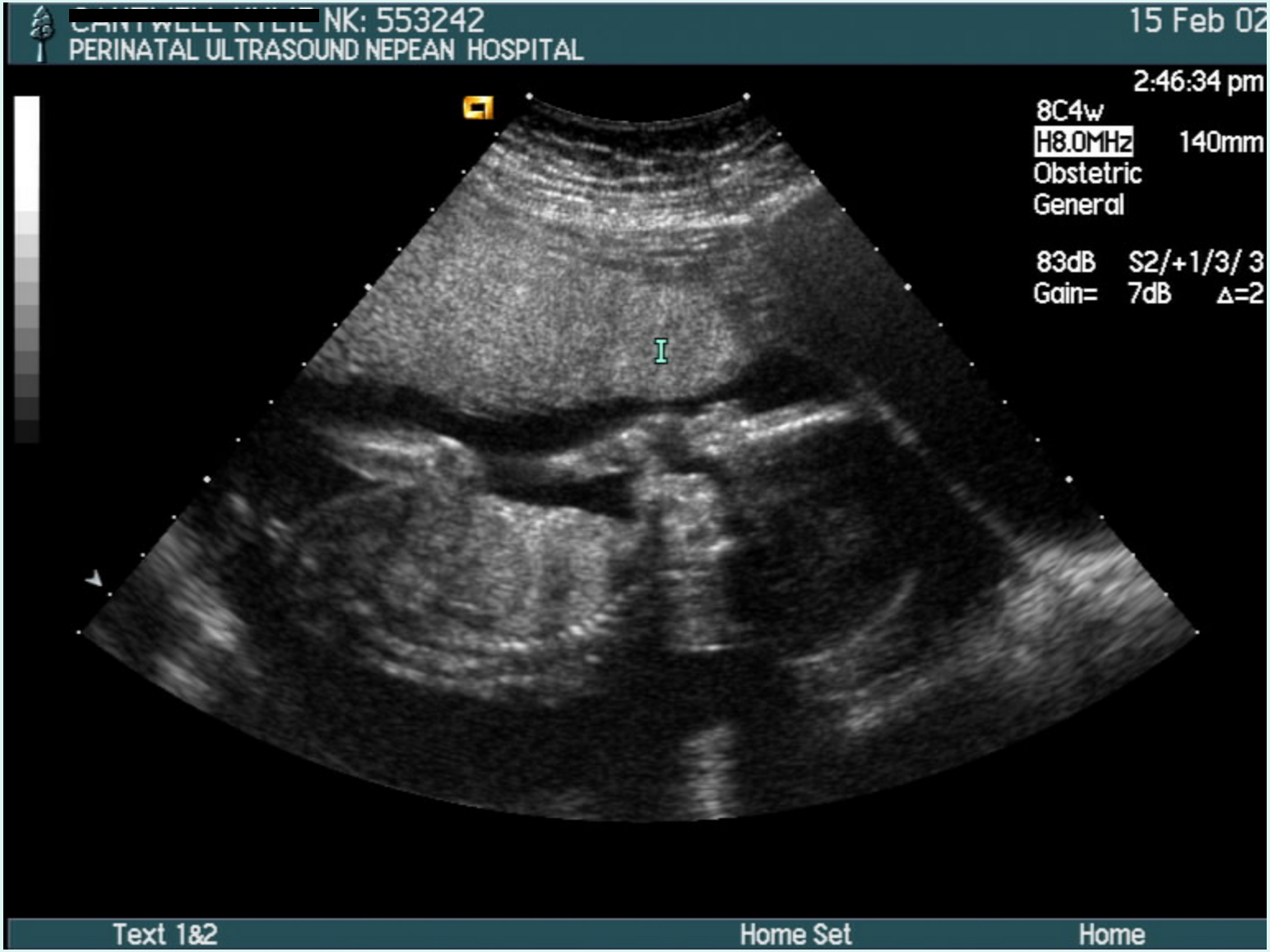
56-15-02
C4-2 40R OB/General
19 Feb 02
08:10:06
TIb 0.3 MI 1.1
F# 44 12.4cm
HDI
Map 3
DynRg 50dB
Persist Med
Fr Rate Med
2D Opt:Res
BW 0 Pg 0
Col 0 Pg 0


[redacted] NK: 553242
15 Feb 02
PERINATAL ULTRASOUND NEPEAN HOSPITAL
2:30:14 pm
8C4w
H8.0MHz
R0mm
Obstetric
General
85dB
S2/+1/3/ 3
Gain= 4dB
Δ=2
Dist = 2.87cm
Delete Set
Lock Set


[redacted] 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)


[redacted] NK: 553242
15 Feb 02
PERINATAL ULTRASOUND NEPEAN HOSPITAL
2:30:26 pm
8C4w
H8.0MHz
R0mm
Obstetric
General
85dB
S2/+1/3/ 3
Gain=
4dB
Δ=2
LIPS
Text 1&2
Delete Word
Home Set
Home


PT:
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R
SPTA 9.0 MI 0.9
50DB C6 E2
HDI
19 FEB 02
8:56
CINELOOP (R) REVIEW
4.0
5.0
6.0
7.0
8.0
9.0
32
2D CINE


NK: 553242
15 Feb 02
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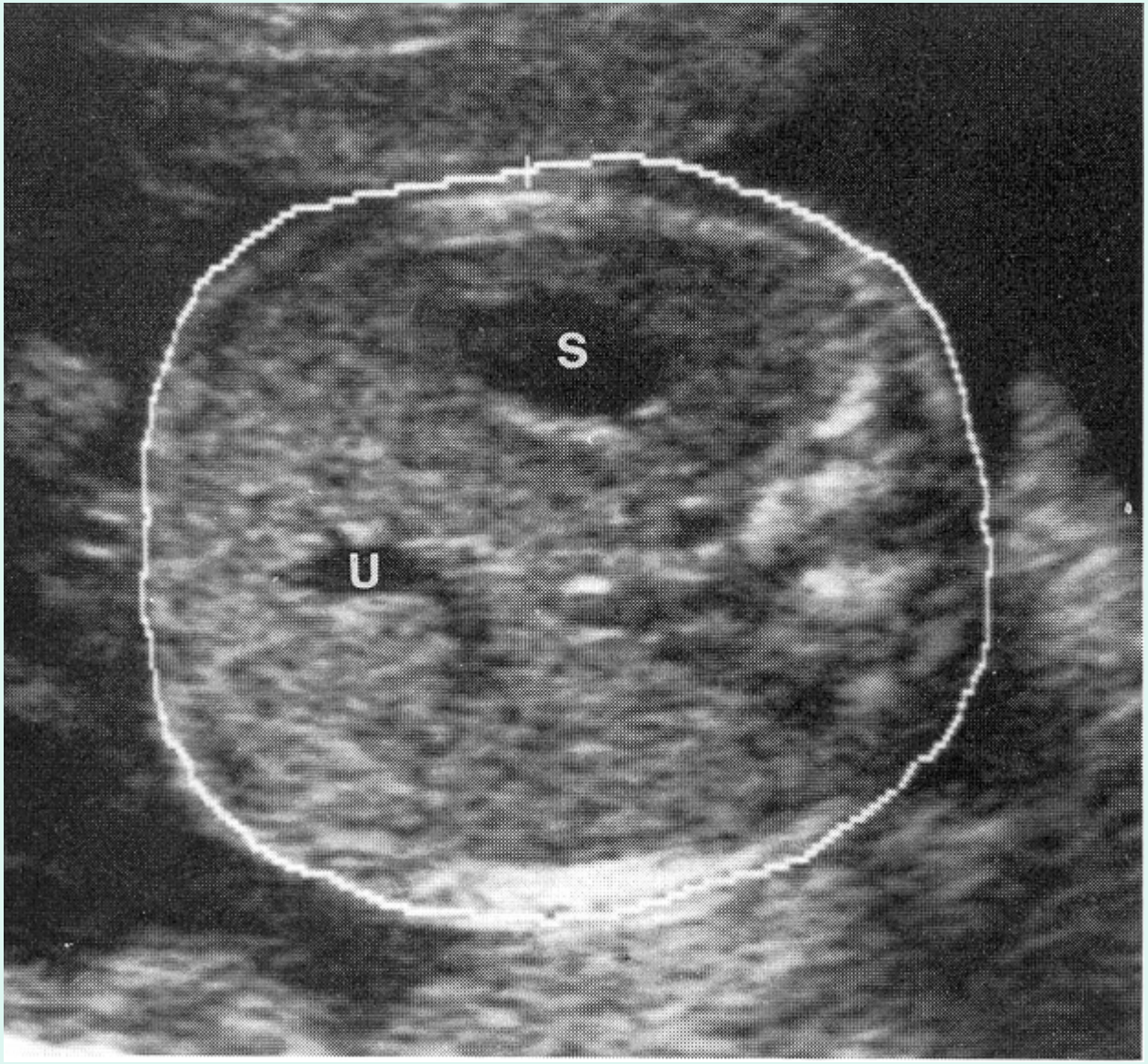
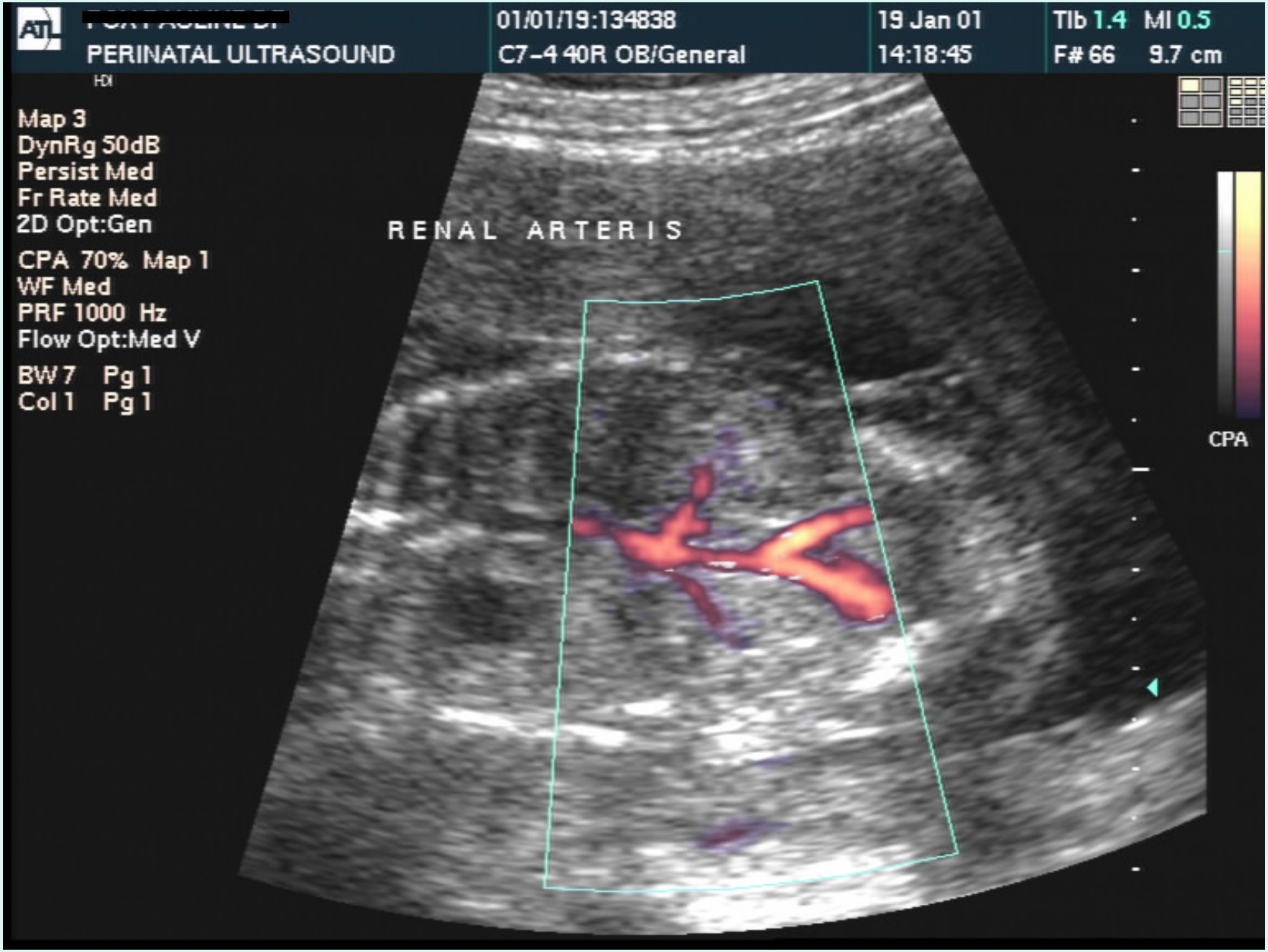
2:46:34 pm
8C4w
H8.0MHz
140mm
Obstetric
General
83dB
S2/+1/3/ 3
Gain=
7dB
Δ=2
Text 1&2
Home Set
Home

Normal cardiac size


PT:
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R
SPTAd 15 MI 0.9
50DB C6 E2
HDI
19 FEB 02
8:43
CINELOOP (R) REVIEW
2.0
3.0
4.0
5.0
6.0
7.0
AO ARCH
ANNOTATE


S
U


PT: [redacted]
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R λ
SPTAd 14 MI 0.8
50DB C6 E2
HDI
19 FEB 02 FETAL
8:39 BIOMETRY
CINELOOP (R) REVIE
GEST SAC
CRL
3.0
BPD
4.36 cm
19w 1d
4.0
OFD
HC
16.05 cm
18w 5d
5.0
FL
2.82 cm
18w 2d
6.0
TAD
APD
7.0
AC
8.0
MA (LMP)
1
COR KIDNEYS
1. 1.96 cm
2. 1.65 cm
SET to activate alternate cursor.
ANALYSIS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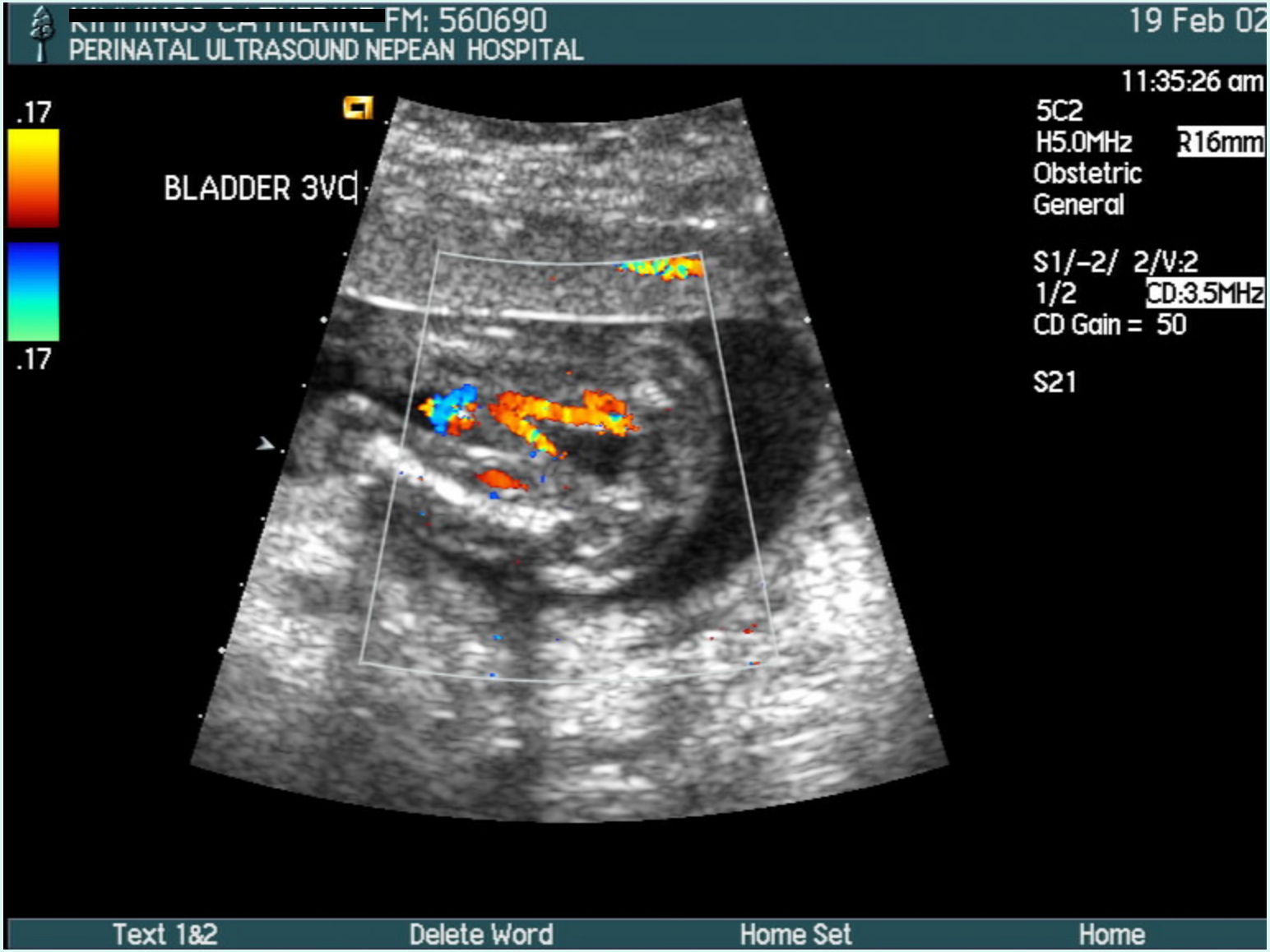
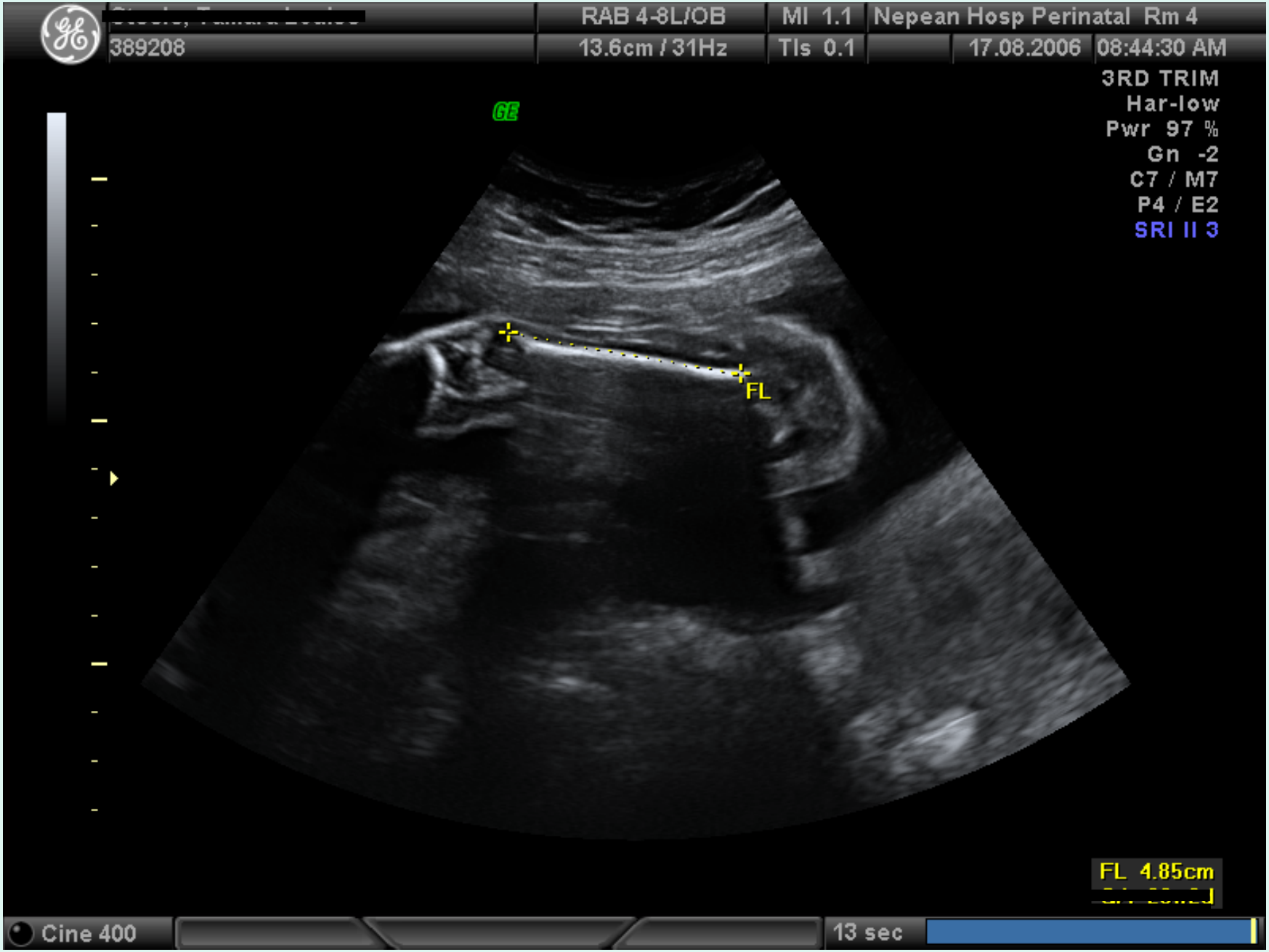
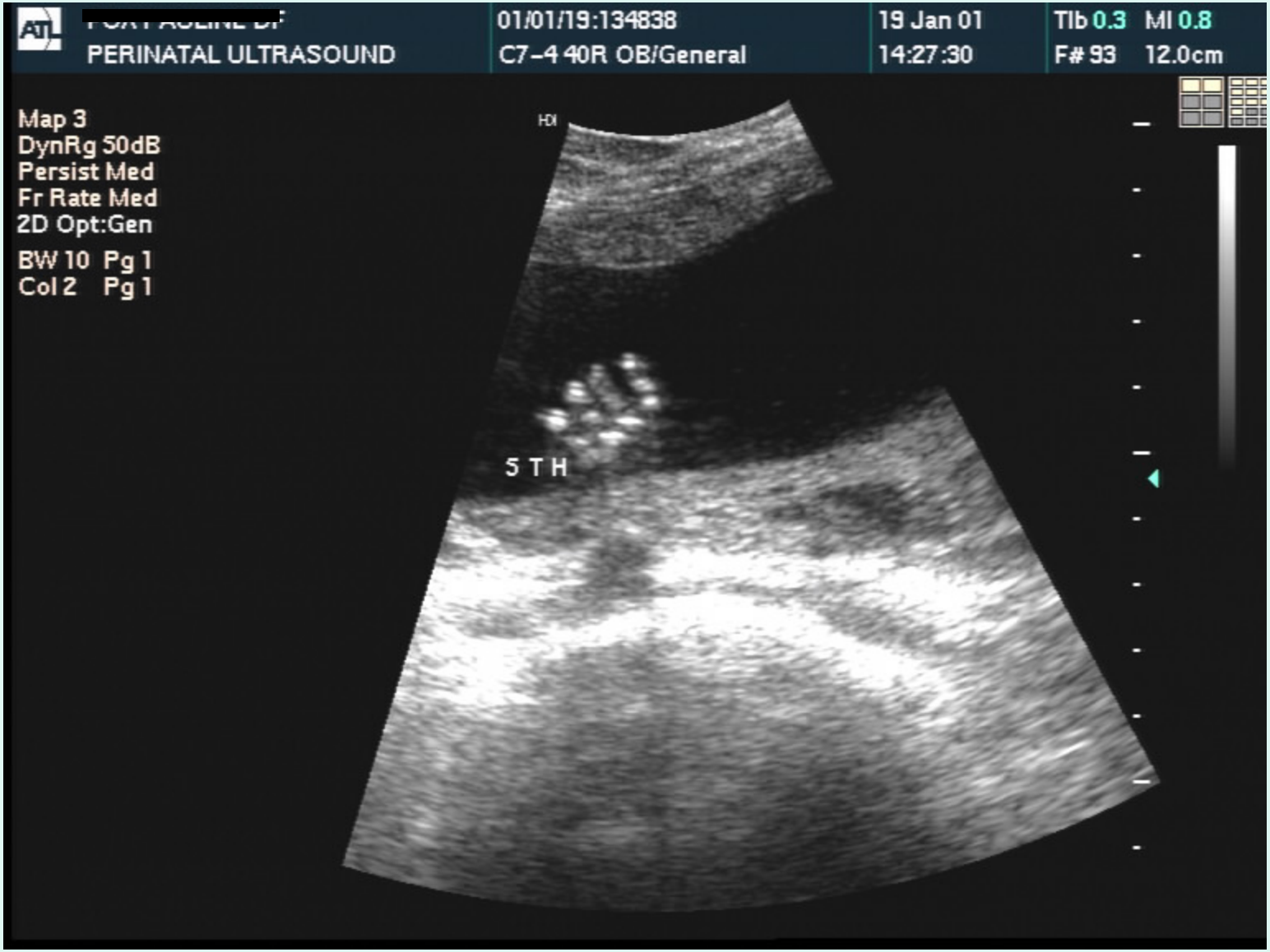
01/01/19:134838
C7-4 40R OB/General
19 Jan 01
14:18:45
TIb 1.4 MI 0.5
F# 66 9.7 cm
Map 3
DynRg 50dB
Persist Med
Fr Rate Med
2D Opt:Gen
CPA 70% Map 1
WF Med
PRF 1000 Hz
Flow Opt:Med V
BW 7 Pg 1
Col 1 Pg 1
RENAL ARTERIS
CPA


[redacted] FM: 560690
19 Feb 02
PERINATAL ULTRASOUND NEPEAN HOSPITAL
11:35:26 am
.17
.17
BLADDER 3VC
5C2
H5.0MHz
R16mm
Obstetric
General
S1/-2/ 2/V:2
1/2
CD:3.5MHz
CD Gain = 50
S21
Text 1&2
Delete Word
Home Set
Home


RAB 4-8L/OB
MI 1.1
Nepean Hosp Perinatal Rm 4
389208
13.6cm / 31Hz
TIs 0.1
17.08.2006
08:44:30 AM
3RD TRIM
Har-low
Pwr 97 %
Gn -2
C7 / M7
P4 / E2
SRI II 3
GE
FL
FL 4.85cm
Cine 400
13 sec


[redacted]
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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
HDI
5 T H


PT:
ID: 60-89-84 AW
NEPEAN HOSPITAL
C4-2 40R
SPTA 14 MI 0.8
50DB C6 E2
HDI
19 FEB 02 FETAL
8:37 BIOMETRY
CINELOOP (R) REVIE
GEST SAC
CRL
BPD
3.0
4.36 cm
19w 1d
OFD
4.0
HC
16.05 cm
18w 5d
FL
5.0
2.82 cm
18w 2d
TAD
6.0
APD
AC
7.0
MA (LMP)
8.0
FOOT
ANNOTATE

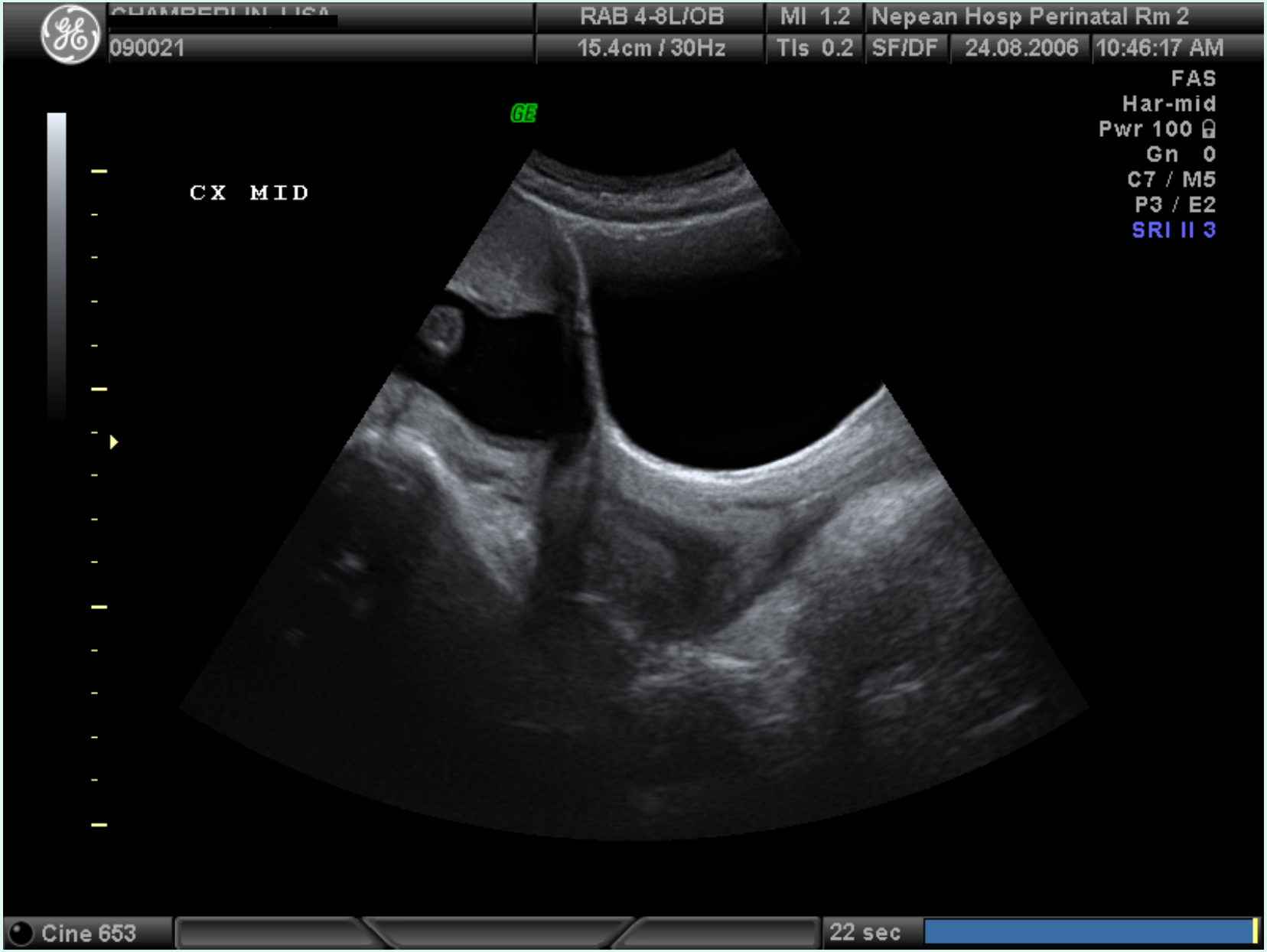
Cervix

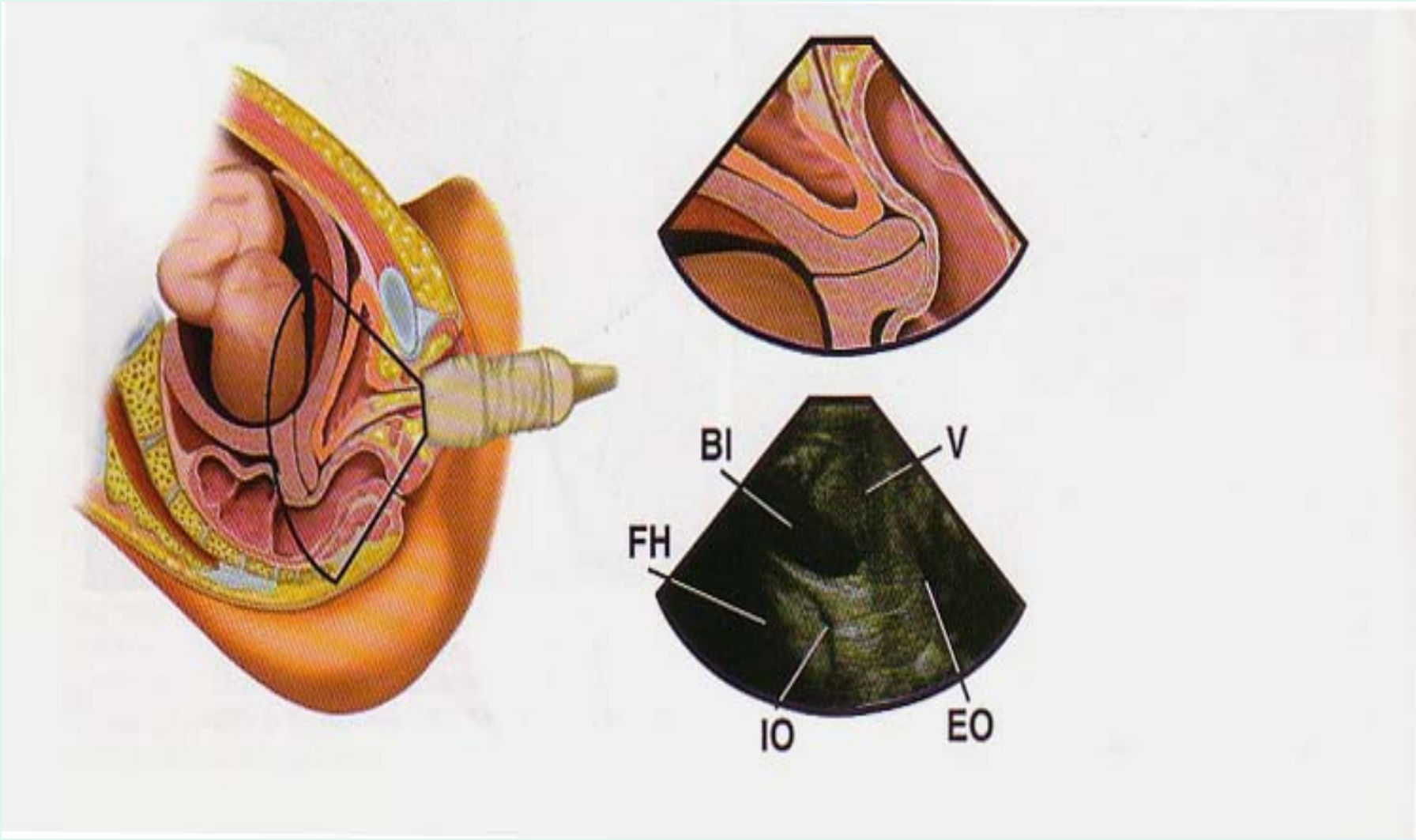
Closed length should be > 2.5cms

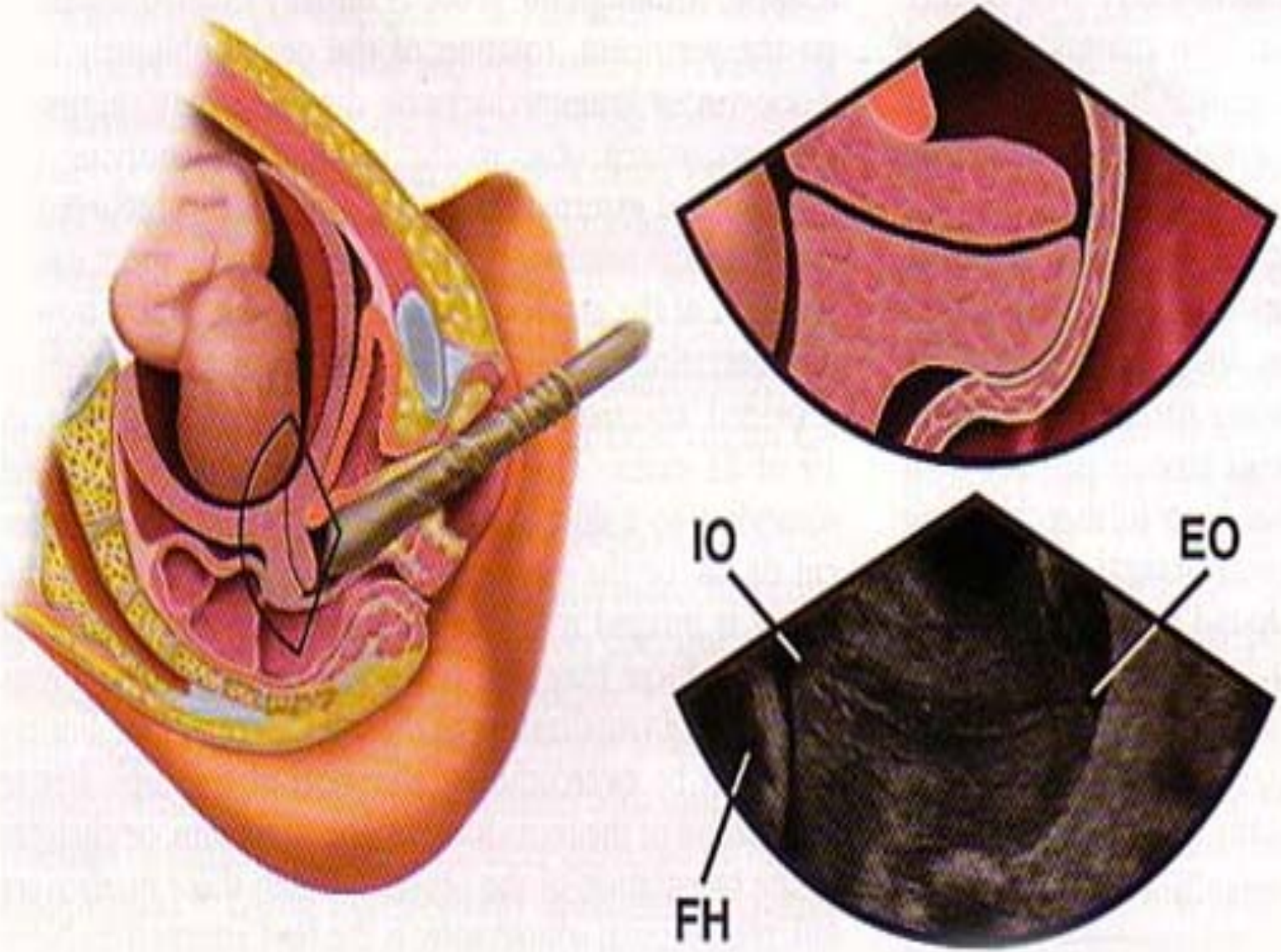
Technique

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

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


RAB 4-8L/OB
MI 1.2
Nepean Hosp Perinatal Rm 2
090021
15.4cm / 30Hz
TIs 0.2
SF/DF
24.08.2006
10:46:17 AM
FAS
Har-mid
Pwr 100
Gn 0
C7 / M5
P3 / E2
SRI II 3
CX MID
Cine 653
22 sec


BI
V
FH
IO
EO


IO
EO
FH

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

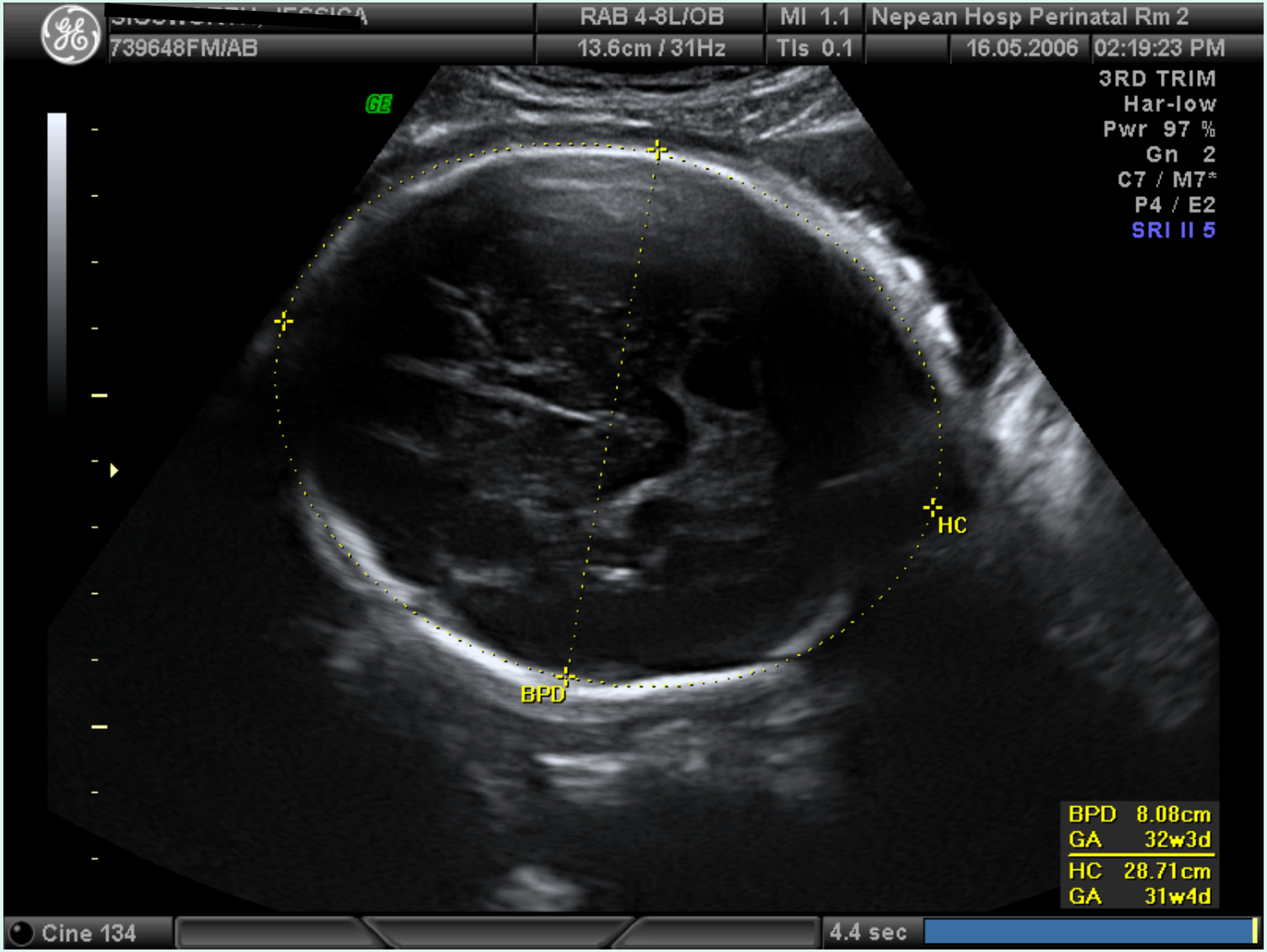
- Also check anatomy
- The fetal anomalies that may present in the third trimester
  - Polycystic kidneys
  - Hydronephrosis
  - Skeletal dysplasias
  - Manifestations of neuromuscular disorders

Indications for a 3rd trimester scan include:

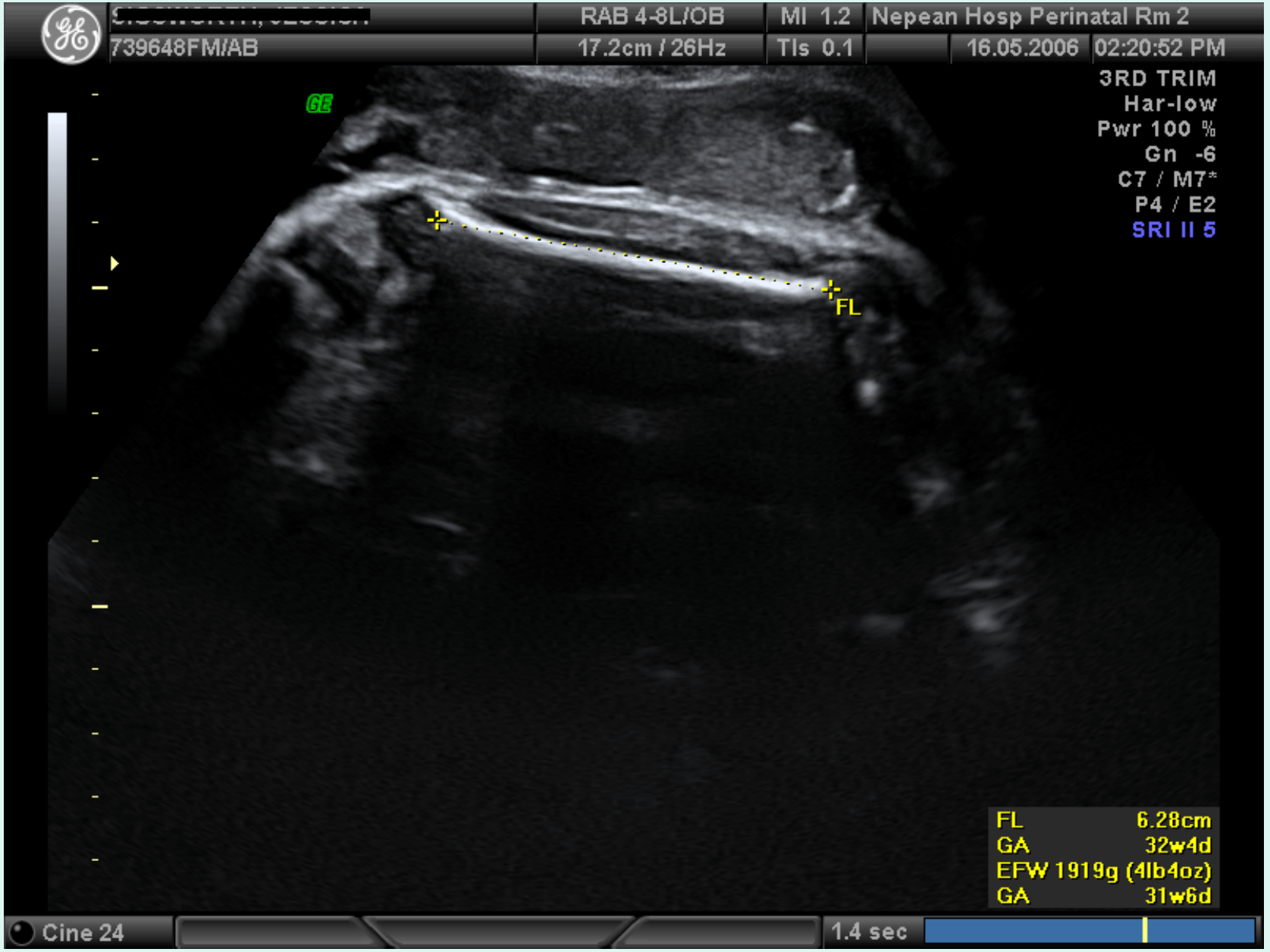
- **Intrauterine growth retardation (IUGR).**
- **Macrosomia.**
- **Polyhydramnios.**
- **Oligohydramnios.**
- **Decreased Fetal movements.**
- **Antepartum haemorrhage.**
- **Pregnancy induced hypertension (P.I.H).**
- **Previous bad obstetric history.**
- **Gestational diabetes**

Third trimester scanning

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


[redacted] RAB 4-8L/OB MI 1.1 Nepean Hosp Perinatal Rm 2
739648FM/AB 13.6cm / 31Hz TIs 0.1 16.05.2006 02:19:23 PM
3RD TRIM
Har-low
Pwr 97 %
Gn 2
C7 / M7*
P4 / E2
SRI II 5
GE
HC
BPD
BPD 8.08cm
GA 32w3d
HC 28.71cm
GA 31w4d
Cine 134
4.4 sec


RAB 4-8L/OB
MI 0.9
Nepean Hosp Perinatal Rm 2
739648FM/AB
17.2cm / 26Hz
TIs 0.1
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

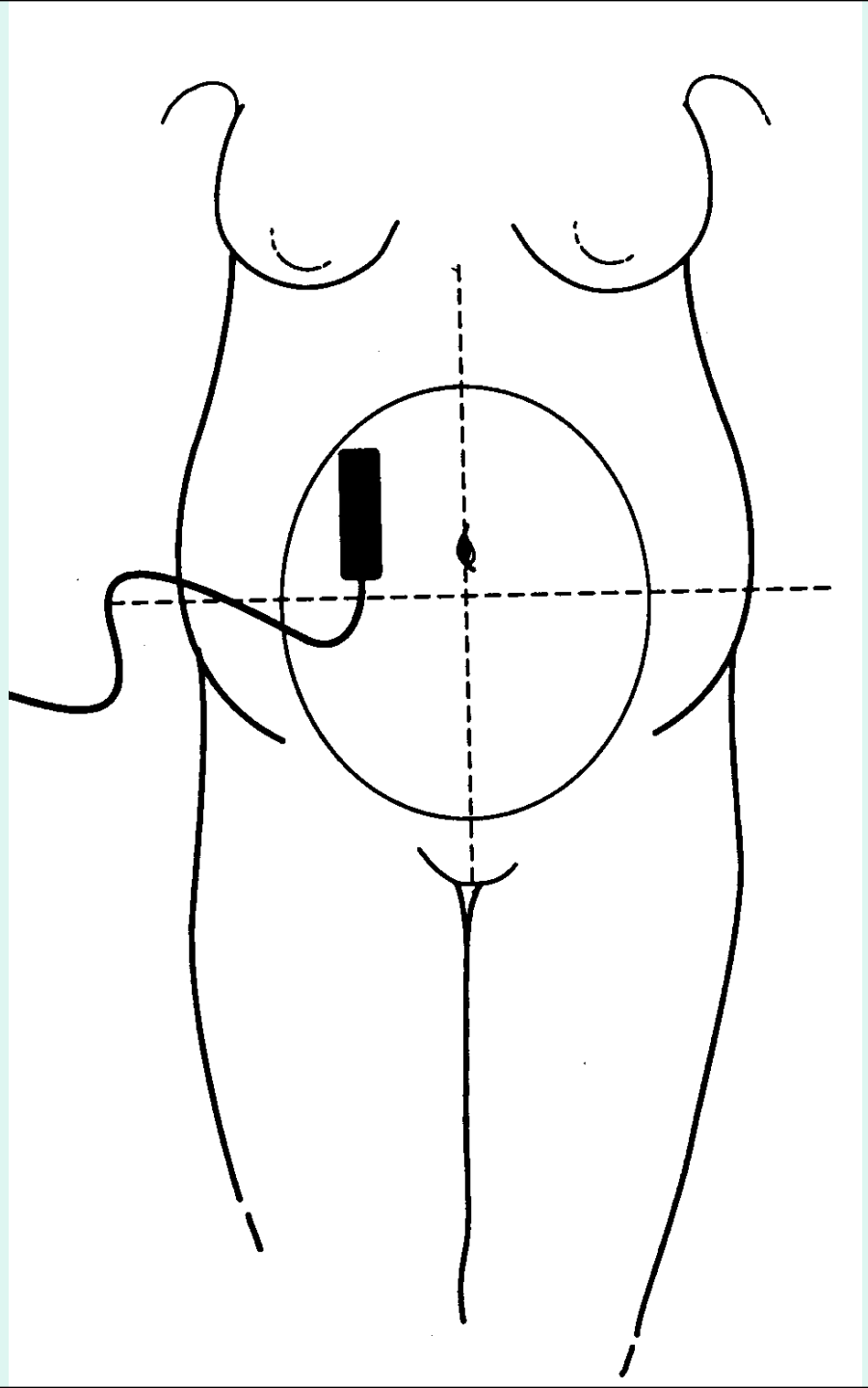

RAB 4-8L/OB
MI 1.2
Nepean Hosp Perinatal Rm 2
739648FM/AB
17.2cm / 26Hz
TIs 0.1
16.05.2006
02:20:52 PM
3RD TRIM
Har-low
Pwr 100 %
Gn -6
C7 / M7*
P4 / E2
SRI II 5
GE
FL
FL 6.28cm
GA 32w4d
EFW 1919g (4lb4oz)
GA 31w6d
Cine 24
1.4 sec

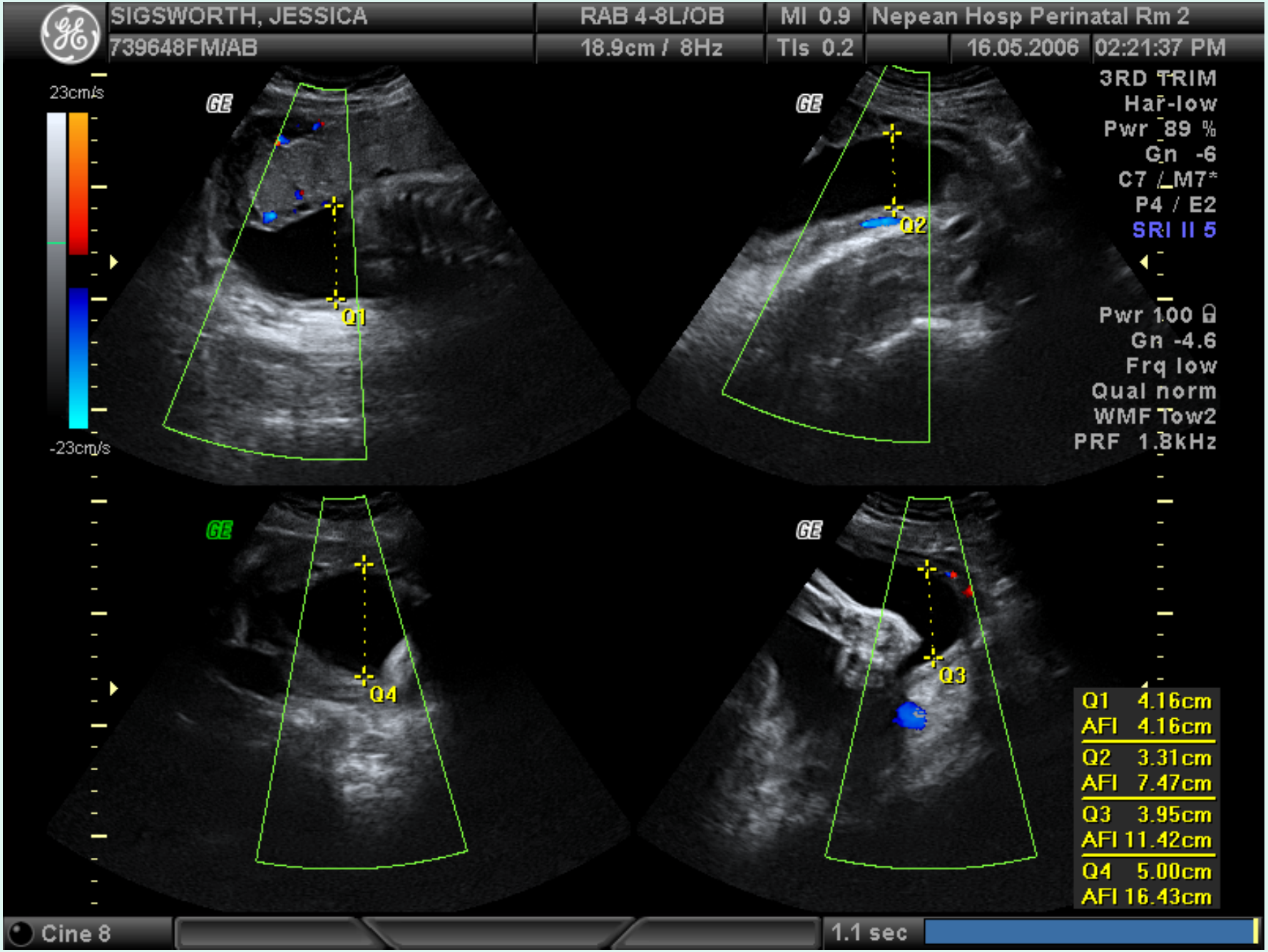
Assessing amniotic fluid volume:

- 1. Subjective assessment : With experience, it is possible to classify amniotic fluid volume into the broad categories absent, low, normal, increased and excessive.

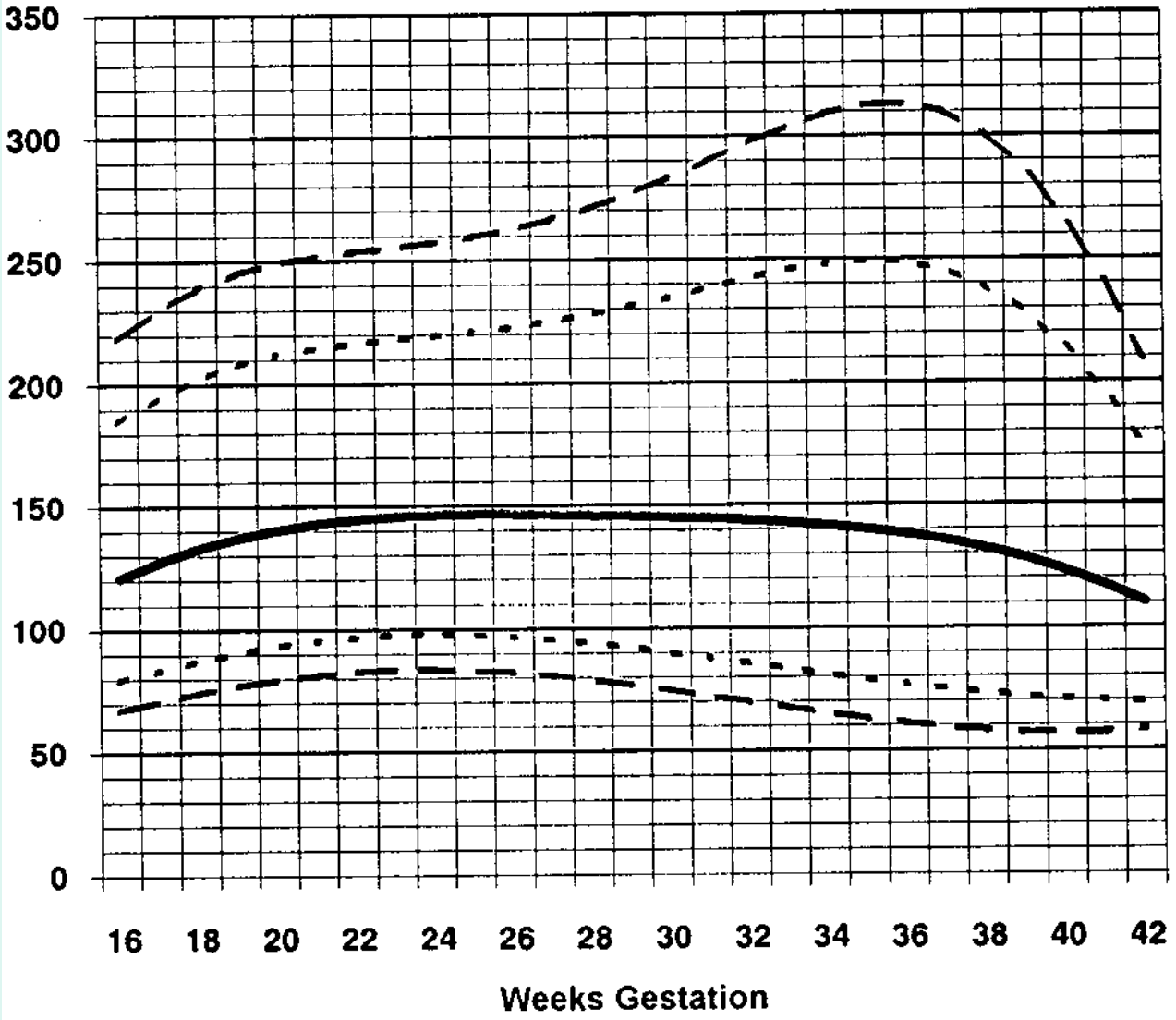
- 2. Single deepest pool – The size of the deepest, cord- free pool of amniotic fluid is assessed with the ultrasound probe perpendicular to the maternal abdomen a minimum depth (less than 2 cm ;oligohydramnios, more than 8 cm: polyhydramnios).

- 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.

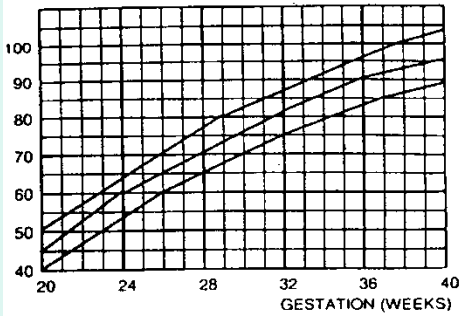



SIGSWORTH, JESSICA
739648FM/AB
RAB 4-8L/OB
18.9cm / 8Hz
MI 0.9
TIs 0.2
Nepean Hosp Perinatal Rm 2
16.05.2006
02:21:37 PM
23cm/s
-23cm/s
3RD TRIM
Har-low
Pwr 89 %
Gn -6
C7 /M7*
P4 / E2
SRI II 5
Pwr 100
Gn -4.6
Frq low
Qual norm
WMF Tow2
PRF 1.8kHz
Q1
Q2
Q3
Q4
Q1 4.16cm
AFI 4.16cm
Q2 3.31cm
AFI 7.47cm
Q3 3.95cm
AFI 11.42cm
Q4 5.00cm
AFI 16.43cm
Cine 8
1.1 sec

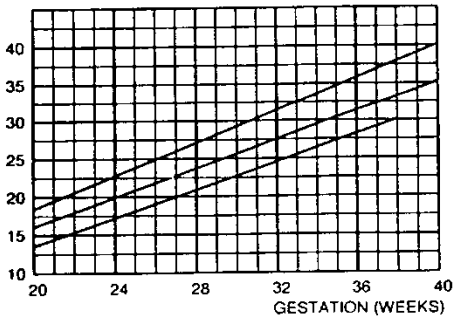
Amniotic Fluid Index



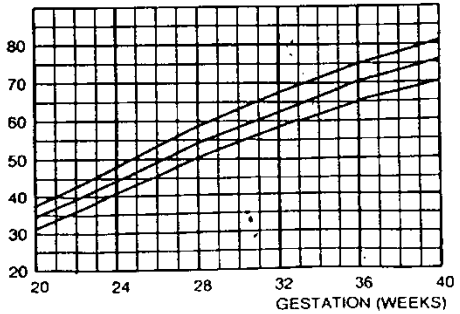
BPD (mm) ASUM



ABDO CIRCUM (mm)

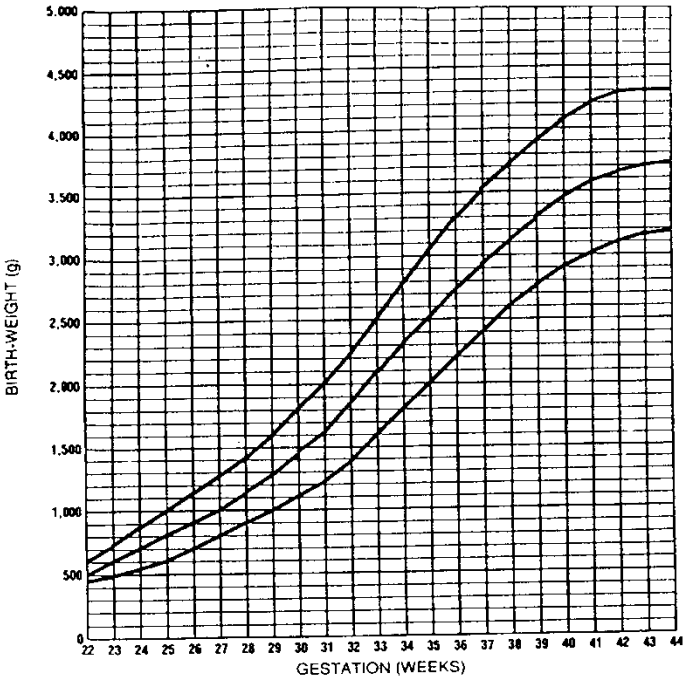


FEMUR LENGTH (mm)

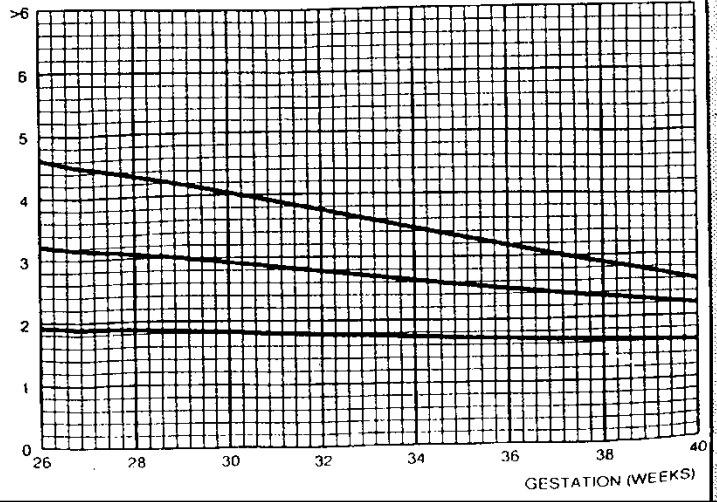


FETAL WEIGHT (KGM)

R.L. Guaran et al 1994

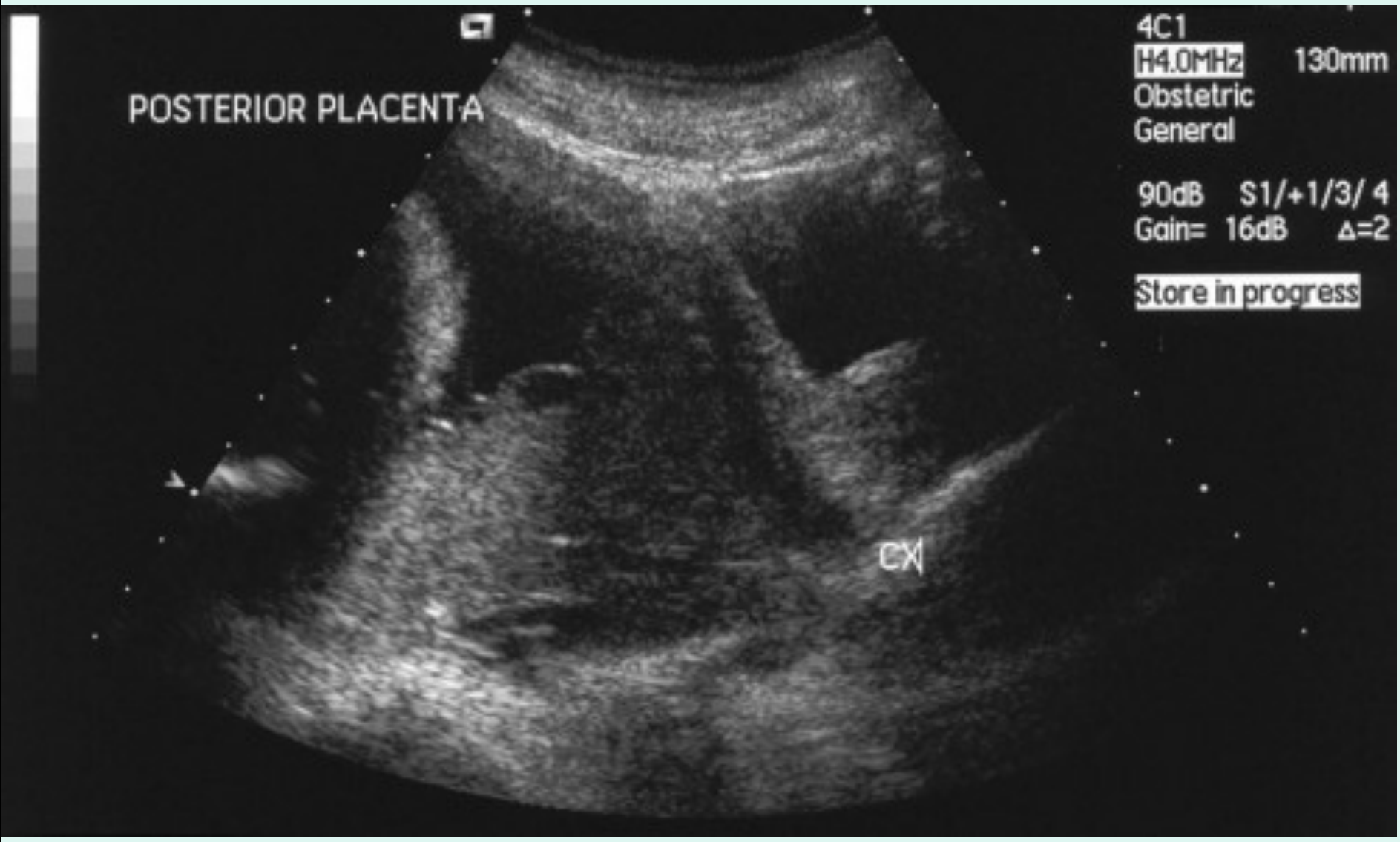


A:B RATIO

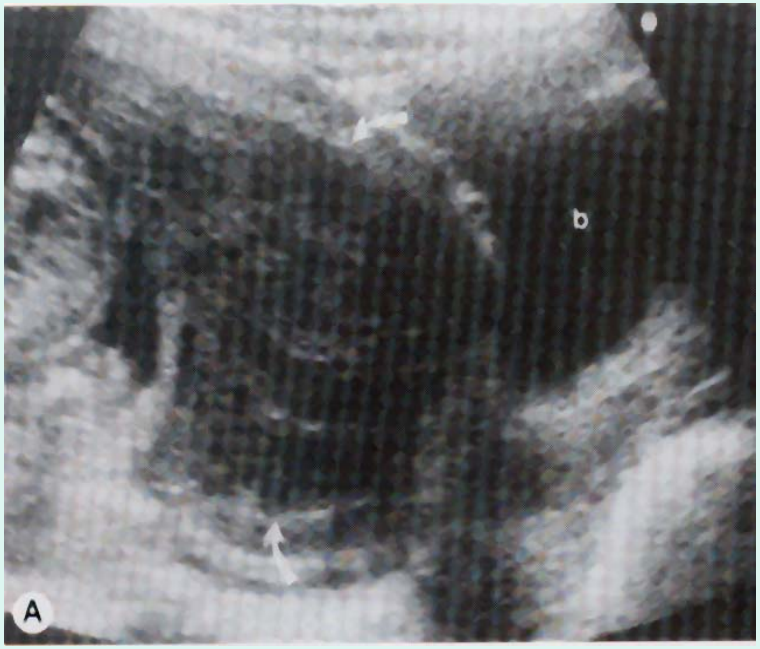


Third trimester scanning

- 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


HDI
P
I
H
A

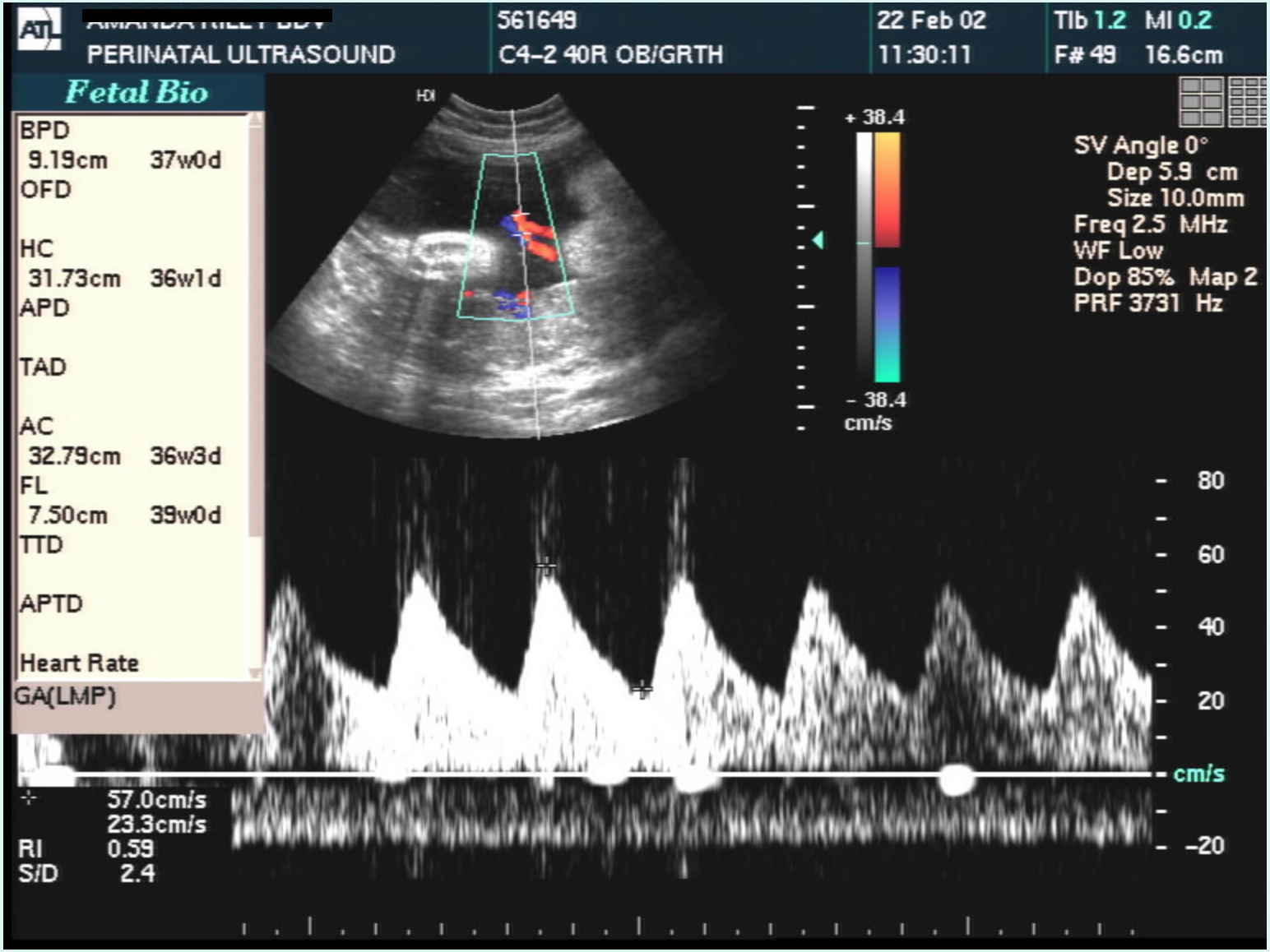

b
A

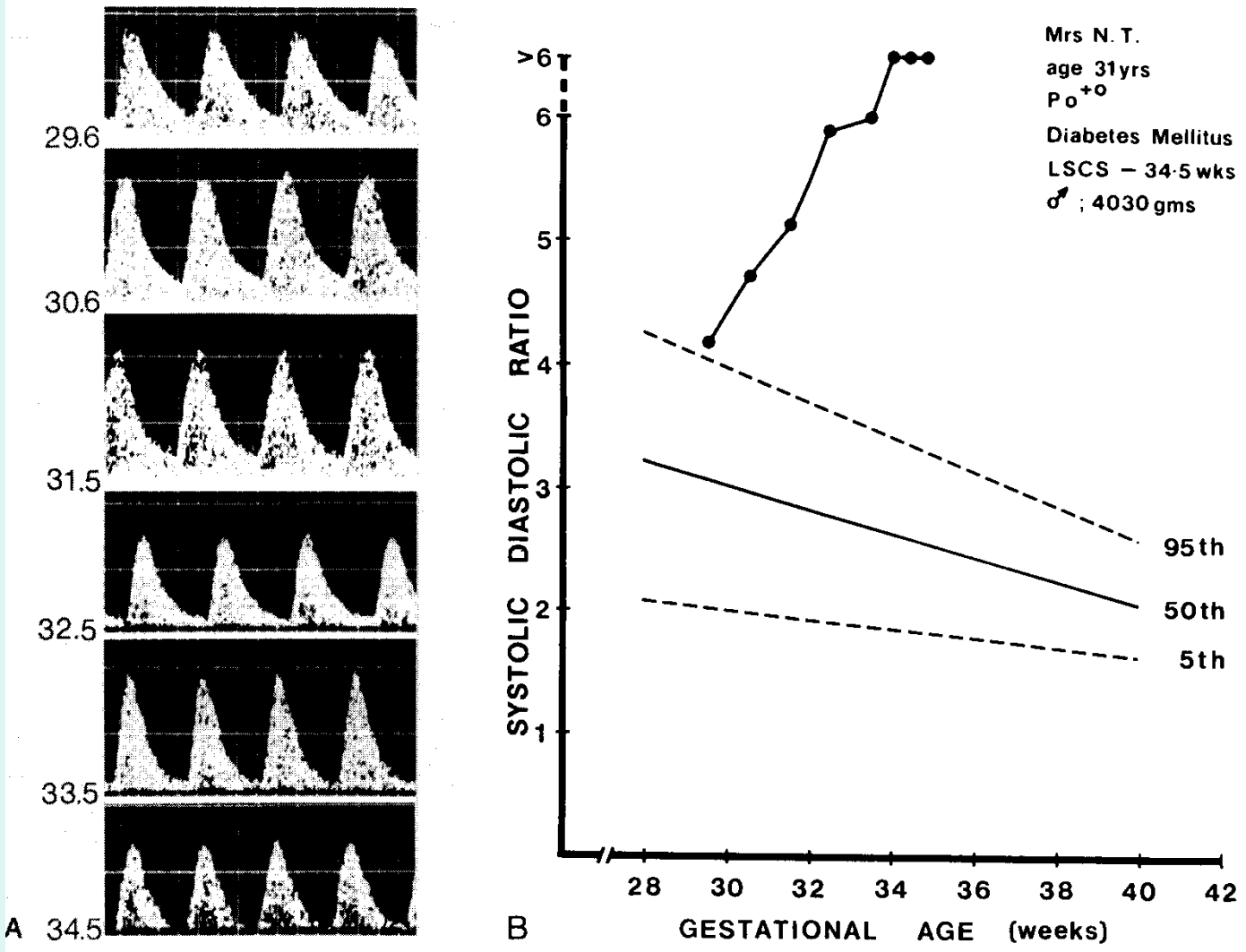
Third trimester scanning

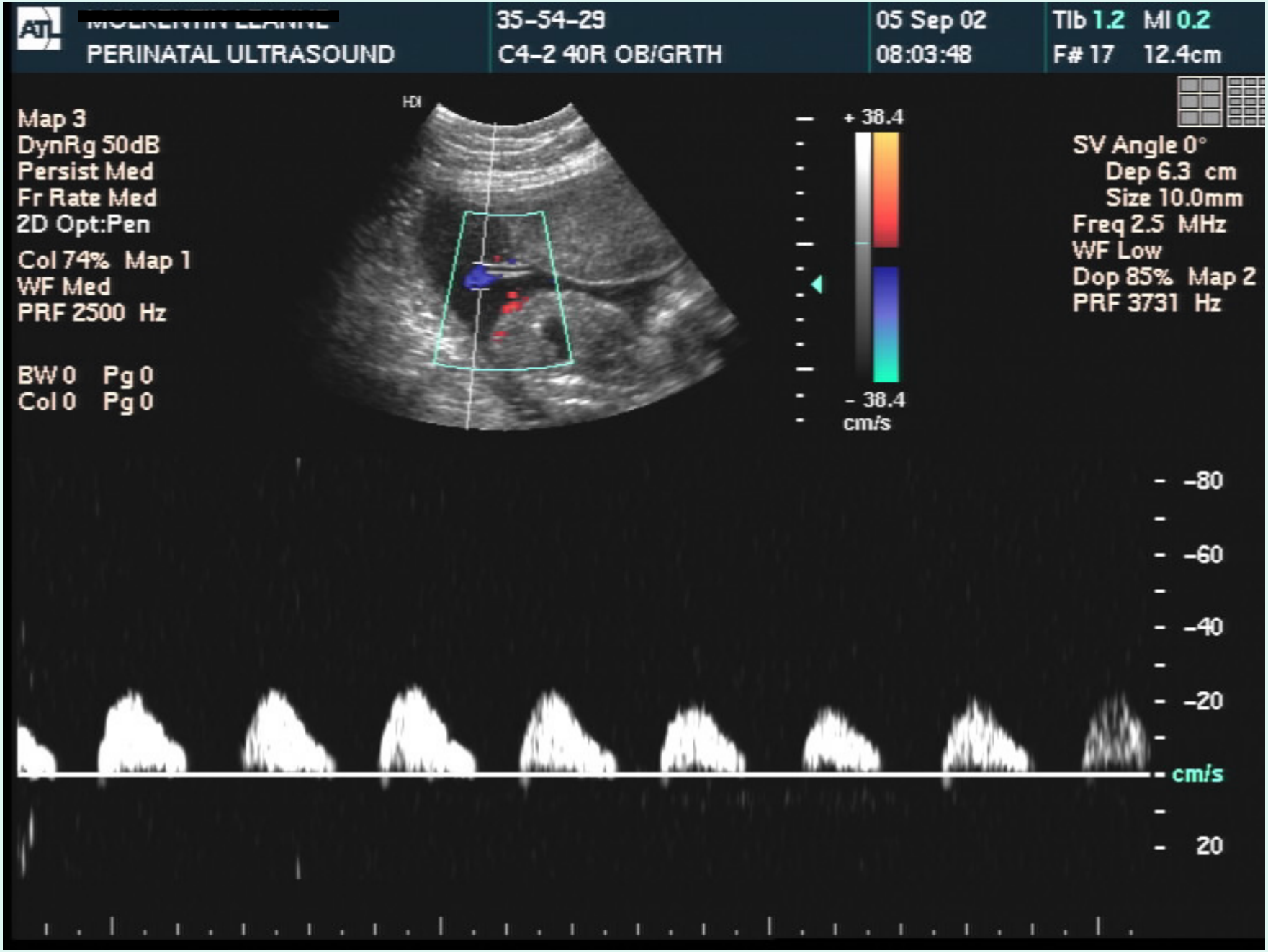
- Welfare assessment should be part of all third trimester scanning
  - BPP
  - Doppler studies

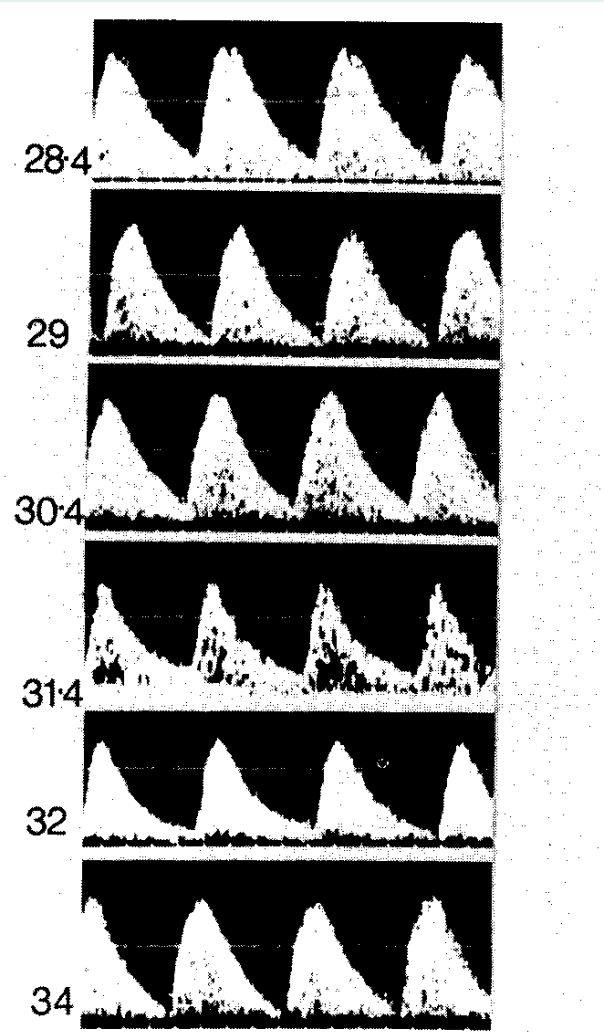
Doppler flows

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


[redacted]
561649
22 Feb 02
TIb 1.2 MI 0.2
PERINATAL ULTRASOUND
C4-2 40R OB/GRTH
11:30:11
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)
HDI
+ 38.4
- 38.4
cm/s
SV Angle 0°
Dep 5.9 cm
Size 10.0mm
Freq 2.5 MHz
WF Low
Dop 85% Map 2
PRF 3731 Hz
80
60
40
20
cm/s
-20
57.0cm/s
23.3cm/s
RI 0.59
S/D 2.4


29.6
30.6
31.5
32.5
33.5
34.5
A
B
Mrs N. T.
age 31yrs
P o+o
Diabetes Mellitus
LSCS – 34·5 wks
♂ ; 4030 gms
SYSTOLIC DIASTOLIC RATIO
>6
6
5
4
3
2
1
95th
50th
5th
28
30
32
34
36
38
40
42
GESTATIONAL AGE (weeks)


PERINATAL ULTRASOUND
35-54-29
C4-2 40R OB/GRTH
05 Sep 02
08:03:48
TIb 1.2 MI 0.2
F# 17 12.4cm
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
HDI
+ 38.4
- 38.4
cm/s
SV Angle 0°
Dep 6.3 cm
Size 10.0mm
Freq 2.5 MHz
WF Low
Dop 85% Map 2
PRF 3731 Hz
-80
-60
-40
-20
cm/s
20



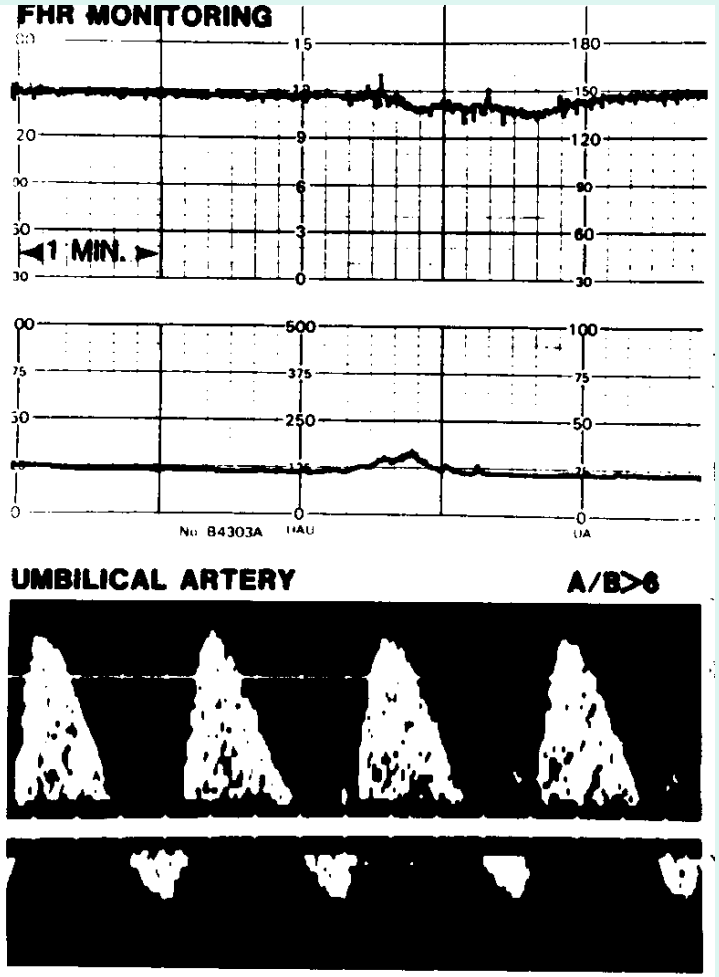
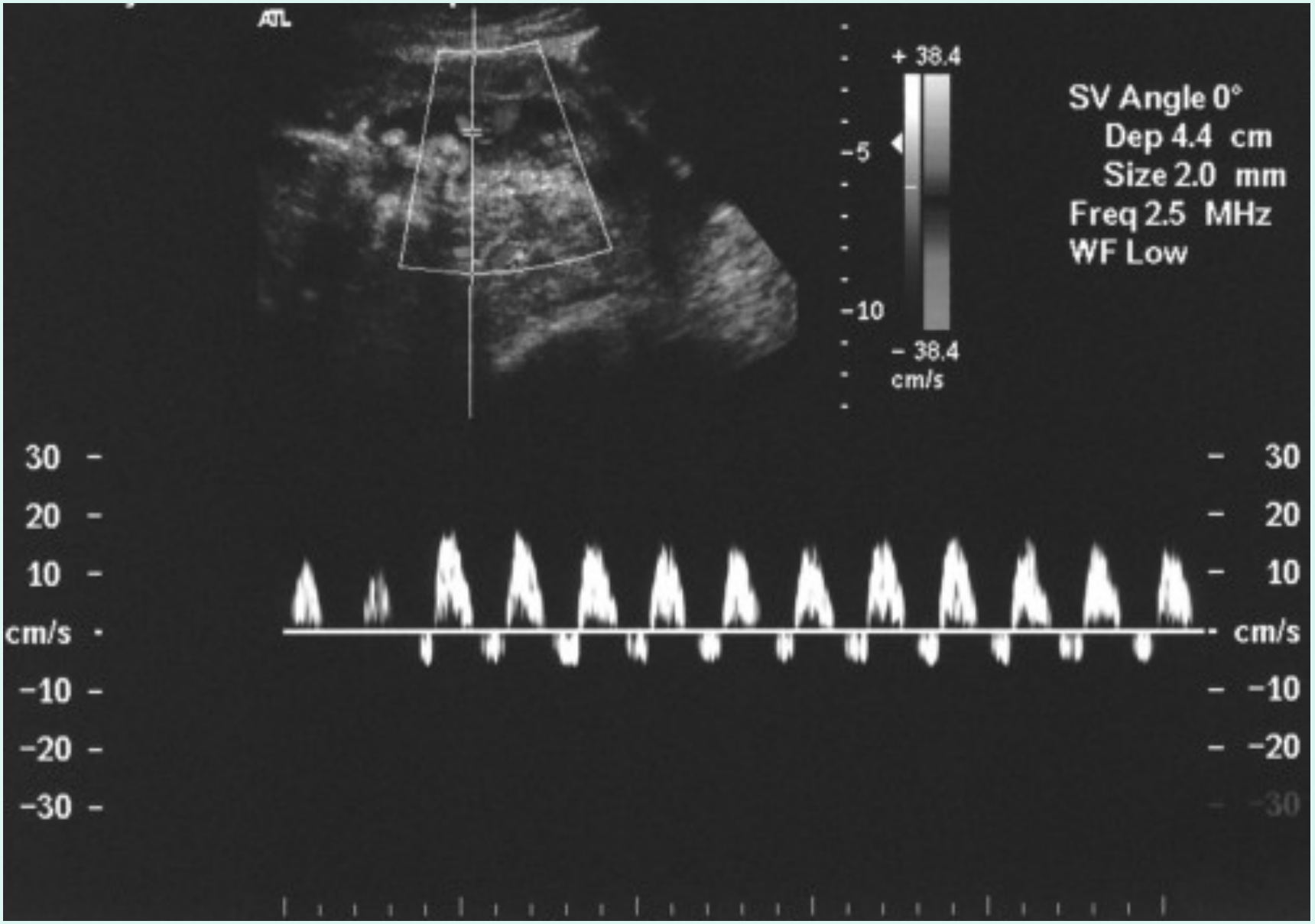
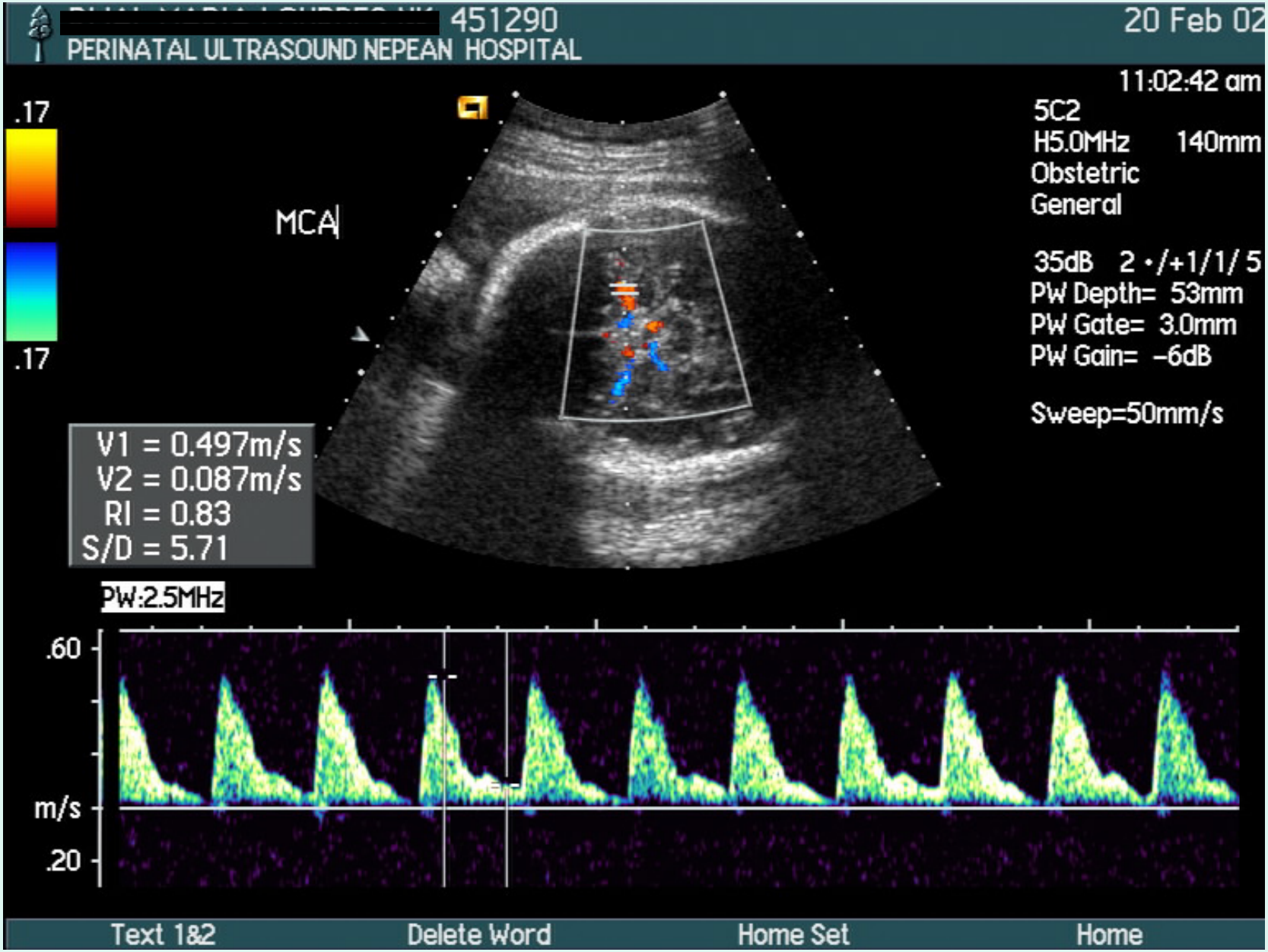
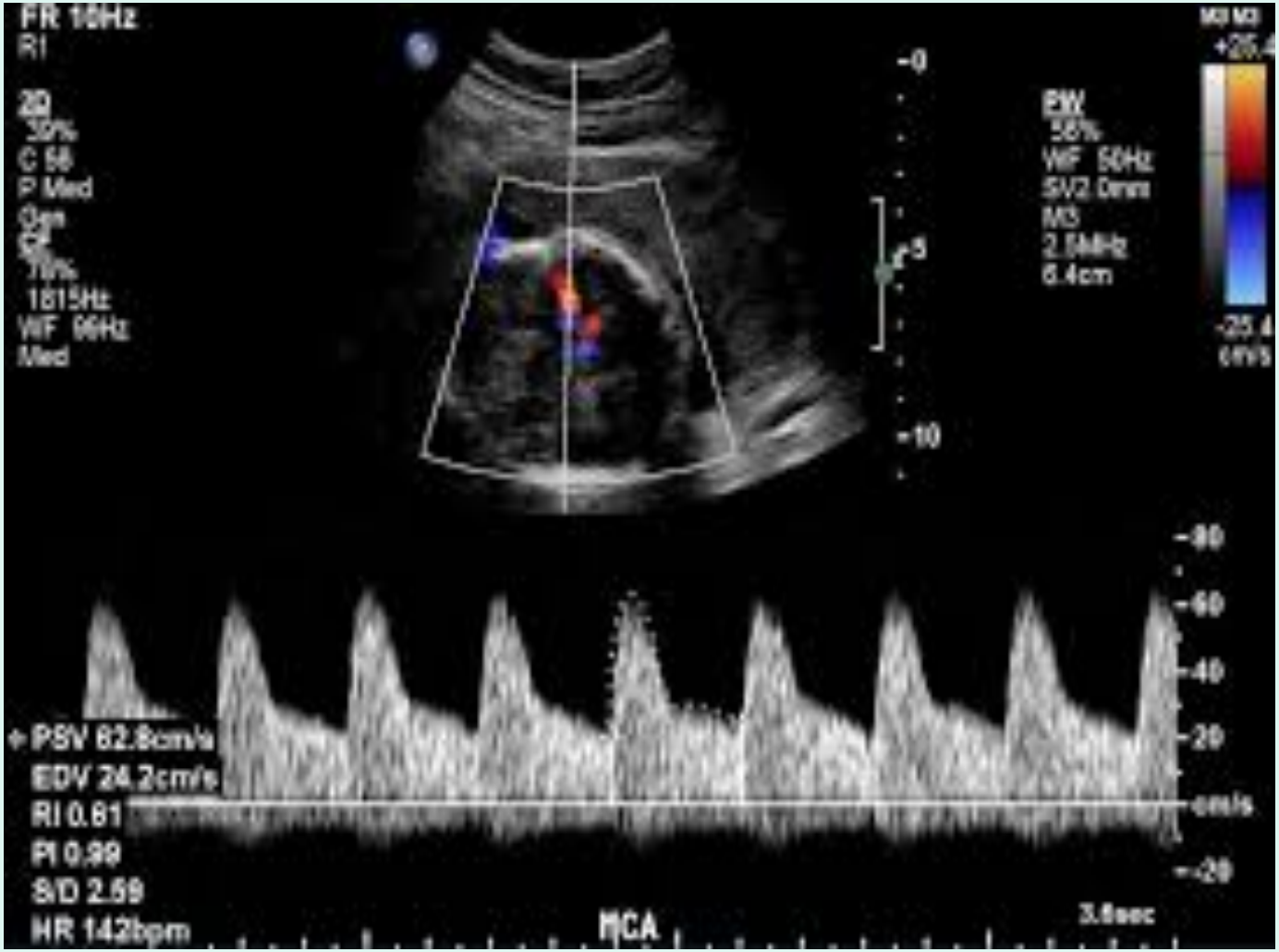


FIGURE 16–6. An umbilical artery flow velocity wav
in which umbilical placental impedance is so high th


ATL
+ 38.4
-5
-10
- 38.4
cm/s
SV Angle 0°
Dep 4.4 cm
Size 2.0 mm
Freq 2.5 MHz
WF Low
30
20
10
cm/s
-10
-20
-30
30
20
10
cm/s
-10
-20
-30


[redacted] 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
.60
m/s
.20
Text 1&2
Delete Word
Home Set
Home

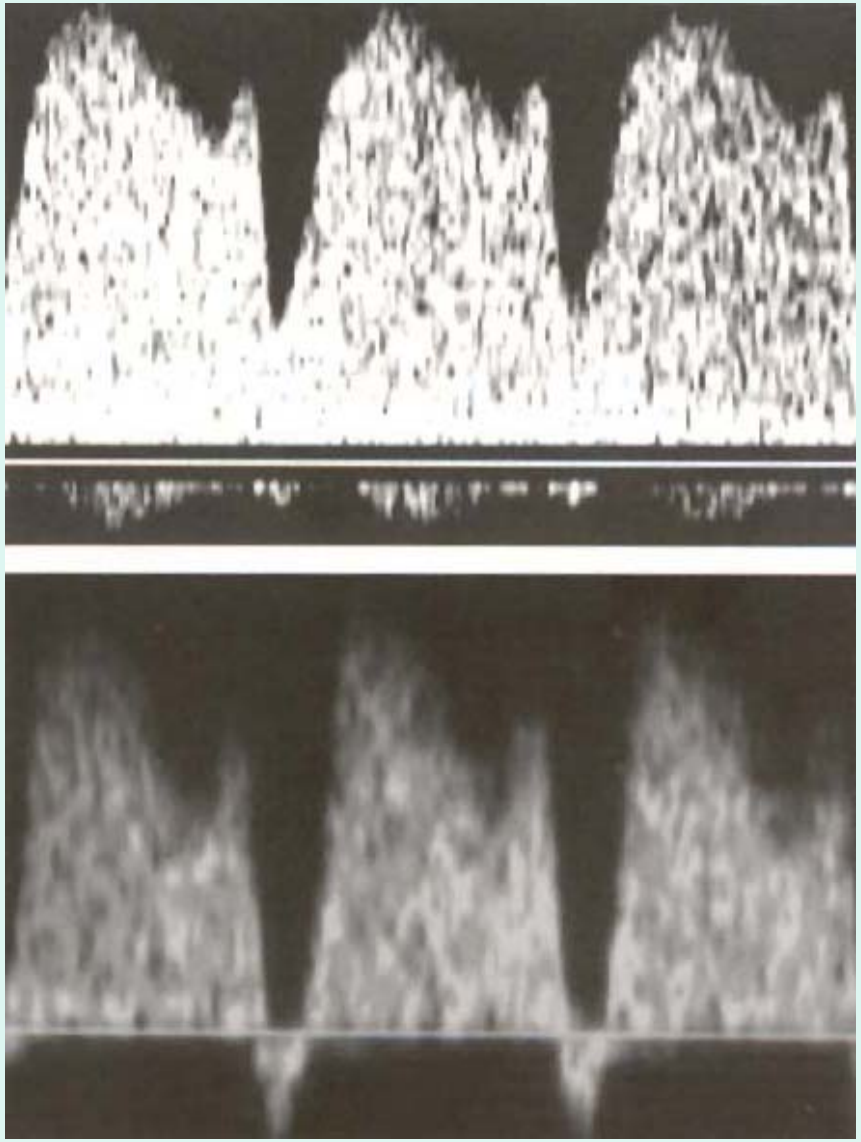

FR 18Hz
RI
PSV 82.8cm/s
EDV 24.2cm/s
RI 0.61
PI 0.99
S/D 2.59
HR 142bpm
MCA
3.8sec

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.

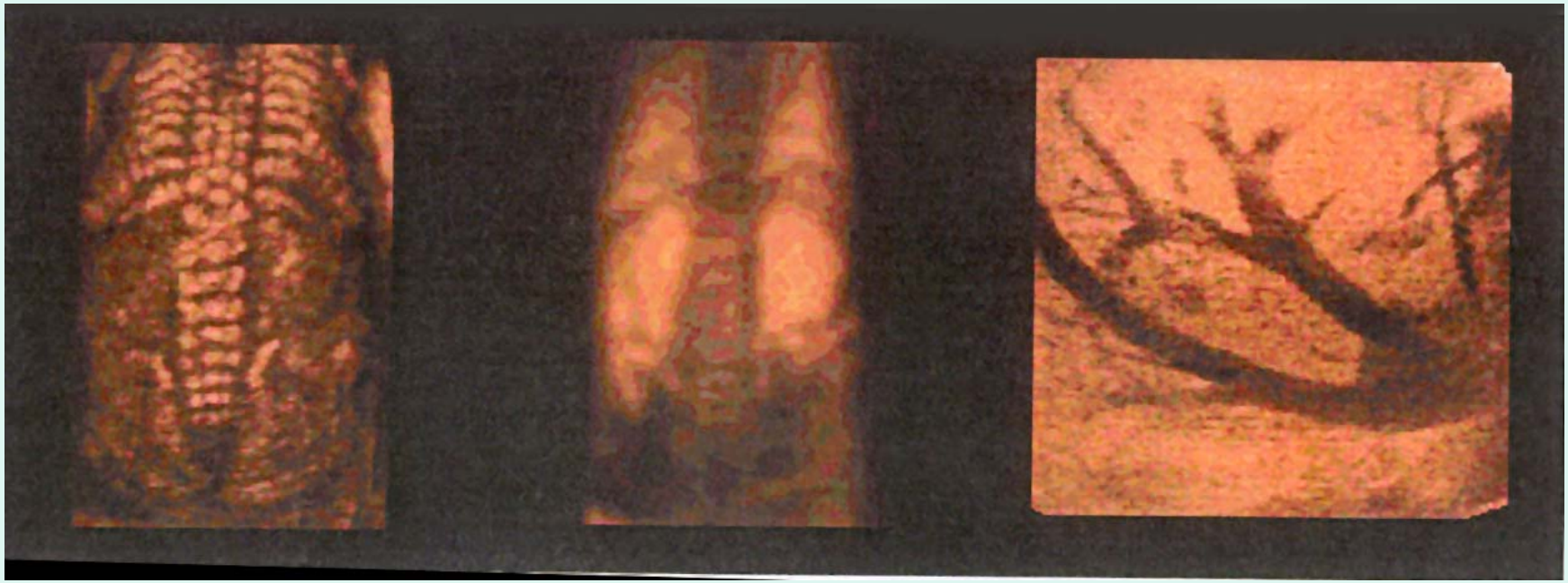
Many modes

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

2. Transparent modes:

A. Max.: bony structures.

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



Maximum X-Ray Minimum

Glass-Body render mode algorithm

Color and Power-Doppler Rendering

Thanks