

# How to perform Routine Anomaly Scan 2008

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# Ultrasound Screening

## *RCOG Working Party 2000*

The twenty week anomaly scan is to reassure the woman that her baby appears to have no obvious structural abnormalities. Lack of explicitness about which structures have been examined may lead to confusion. The literature provides a range of detection rates and therefore individual units should provide their own figures to inform women undergoing the "20 week" scan.

The value of identifying fetal abnormalities at this stage is that it offers parents options. Some, probably the majority, for serious lesions, will elect to terminate the pregnancy. Those couples who choose to continue the pregnancy have the opportunity to prepare themselves through discussions with health care personnel and self-help groups, whilst attendants can ensure appropriate care during pregnancy and following delivery.

# **Ultrasound Screening**

## ***RCOG Working Party 2000***

**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus**

**Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)**

**Thorax at level of 4 chamber cardiac view**

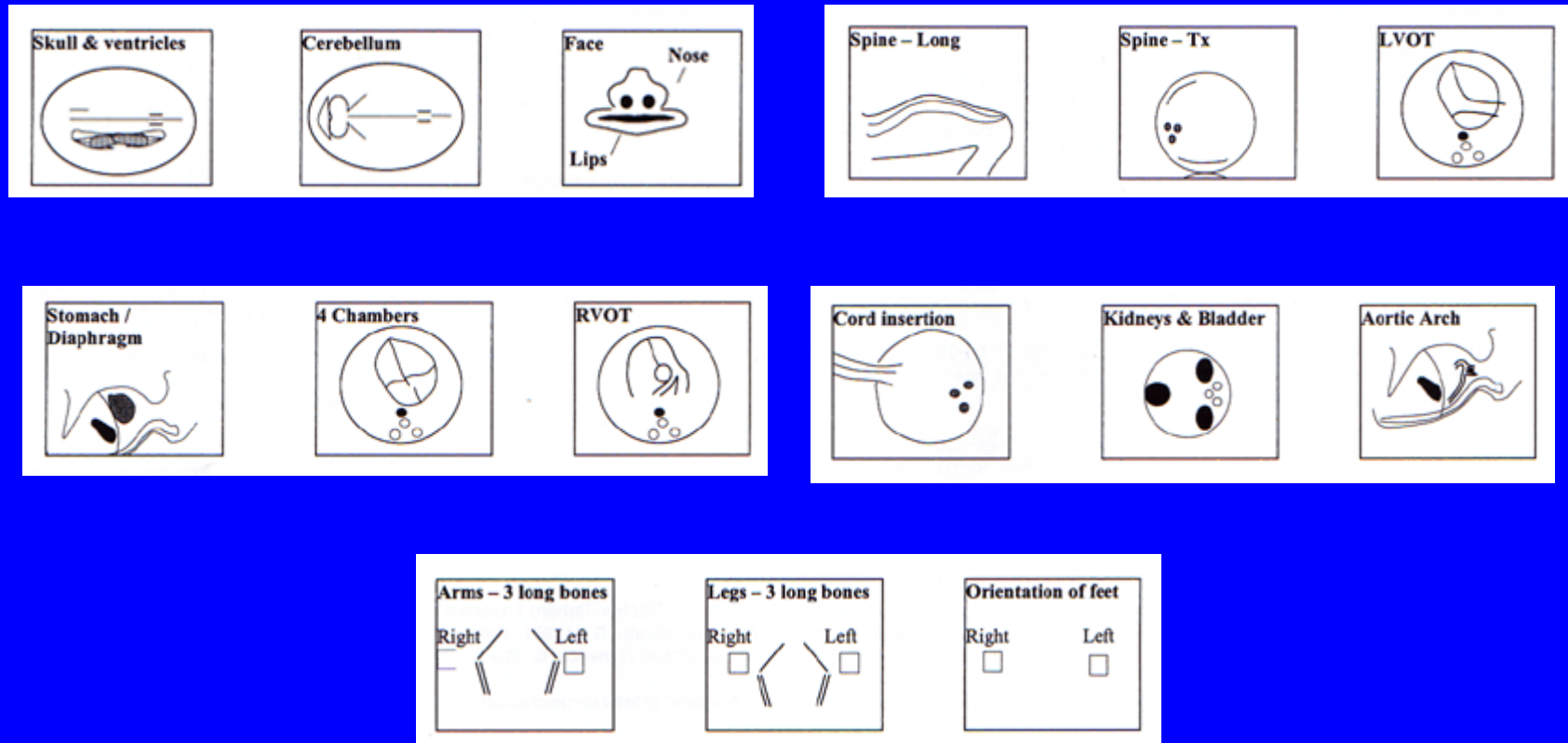
**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

# Ultrasound Screening

## *RCOG Working Party 2000*



# Ultrasound Screening

*RCOG Working Party 2000*

<b>Fetal anomalies</b>	<b>Chance of being detected by USG</b>
<b>Spina bifida</b>	<b>90%</b>
<b>Anencephaly</b>	<b>99%</b>
<b>Hydrocephalus</b>	<b>60%</b>
<b>Major congenital heart problems</b>	<b>25%</b>
<b>Diaphragmatic hernia</b>	<b>60%</b>
<b>Exomphalos/ Gastroschisis</b>	<b>90%</b>
<b>Major kidney problems</b>	<b>85%</b>
<b>Major limb abnormalities</b>	<b>90%</b>
<b>Cerebral palsy</b>	<b>0%</b>
<b>Autism</b>	<b>0%</b>
<b>Down syndrome</b>	<b>40%</b>

**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

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(diaphragm/bladder)**

**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

Voluson



E8

MFM 0810947G

AB2-7-D/OB

MI 0.9

7.2cm / 1.3 / 47Hz

TIs 0.1

12.08.2008

12:41:45 PM

Routine

Har-low

Pwr 89 %

Gn -1

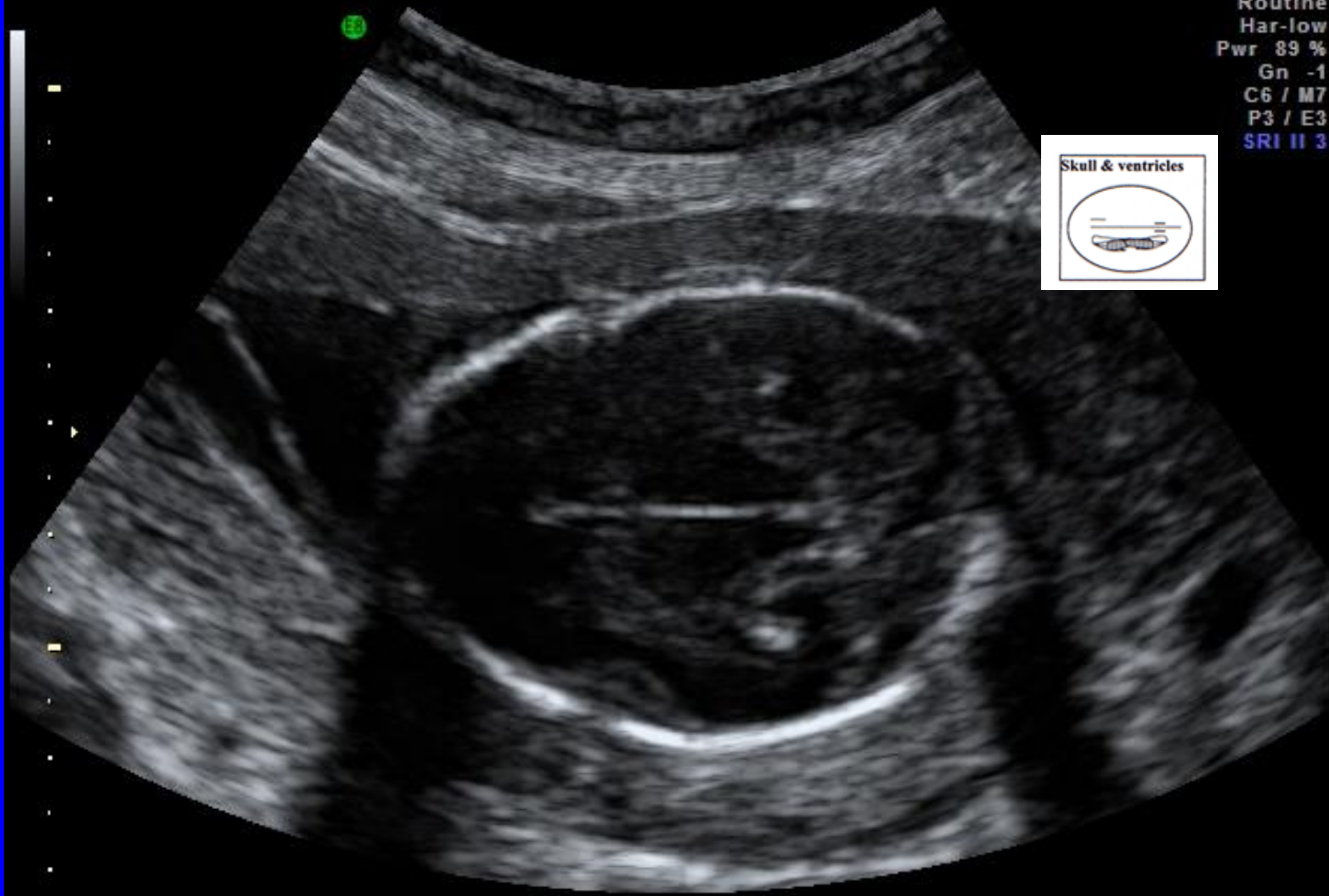
C6 / M7

P3 / E3

SRI II 3

E3

Skull & ventricles



Voluson



E8

MFM 0810947G

AB2-7-D/OB

MI 0.9

7.2cm / 1.3 / 47Hz

Tls 0.1

12.08.2008

12:40:12 PM

Routine  
Har-low  
Pwr 89 %  
Gn -4  
C6 / M7  
P3 / E3  
SRI II 3

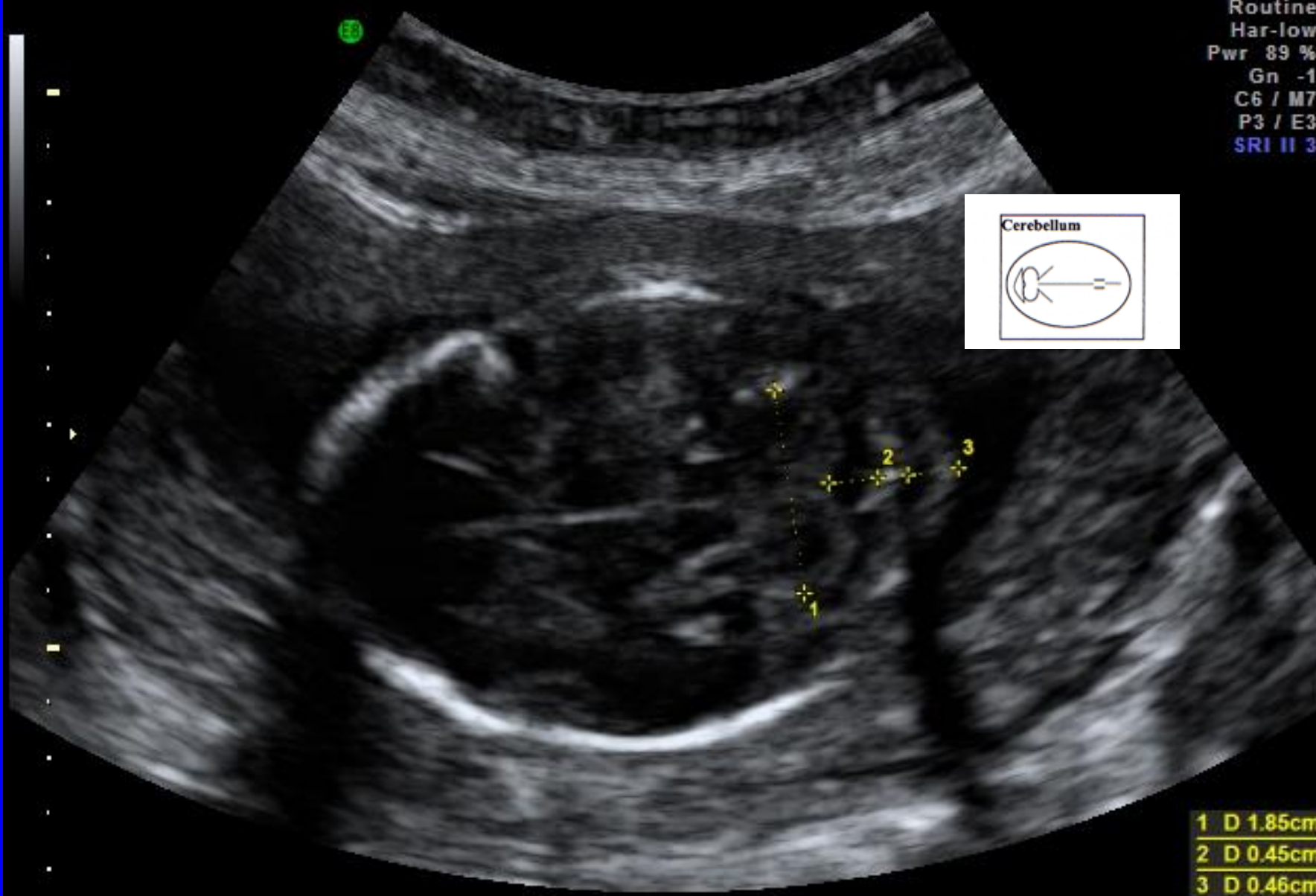
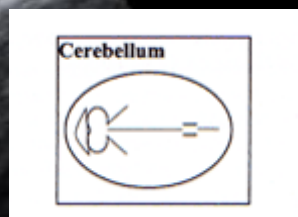
Skull & ventricles



1 D 0.68cm



Routine  
Har-low  
Pwr 89 %  
Gn -1  
C6 / M7  
P3 / E3  
SRI II 3



1 D 1.85cm  
2 D 0.45cm  
3 D 0.46cm

**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)**

**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

Voluson



E8

MFM-0610898H

AB2-7-D/OB

MI 0.9

8.8cm / 1.6 / 58Hz

TIs 0.1

14.08.2008 03:14:38 PM

Routine

Har-low

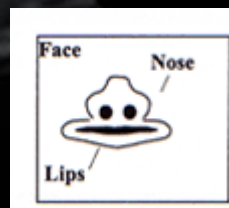
Pwr 92 %

Gn 4

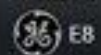
C6 / M7

E3

SRI II 3 / CRI 1



Voluson



AB2-7-D/OB

MI 0.9

MFM0811016P

8.8cm / 1.5 / 42Hz

Tls 0.1

12.08.2008 01:23:41 PM

Routine  
Har-low  
Pwr 92 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3



Voluson



E8

MFM0811170F

AB2-7-D/OB

MI 0.9

10.4cm / 1.7 / 53Hz

TIs 0.1

14.08.2008 04:44:32 PM

Routine

Har-low

Pwr 92 %

Gn 4

C6 / M7

E3

SRI II 3 / CRI 1

13

1 D 0.71cm



Voluson



EB

MFM0810902G

RAB4-8-D/OB

MI 1.1

9.9cm / 1.0 / 2.1Hz

TIs 0.2

13.08.2008 04:00:25 PM

Default

Th30/Qual high2

B50°/V65°

Mix50/50

SRI II 3

4D Real Time



A | 3D

Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)

Face & lips

**Spine: longitudinal and transverse**

Abdominal shape and content at level of stomach

Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)

Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)

Thorax at level of 4 chamber cardiac view

Cardiac outflow tracts

Arms - three bones and hand (not counting fingers)

Legs - three bones and foot (not counting toes)

Routine  
Har-low  
Pwr 92 %  
Gn 4  
C6 / M7  
E3  
SRI II 3 / CRI 1

Spine - Long





Voluson



E8

MFM-0610898H

AB2-7-D/OB

MI 0.9

8.8cm / 1.6 / 58Hz

TIs 0.1

14.08.2008

03:05:50 PM

Routine

Har-low

Pwr 92 %

Gn 4

C6 / M7

E3

SRI II 3 / CRI 1

E3



Voluson  
E8

AB2-7-D/OB

MI 0.9

MFM0810983N

7.2cm / 1.4 / 47Hz

TIs 0.1

12.08.2008 01:39:55 PM

Routine  
Har-low  
Pwr 89 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

Spine - Tx



**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)**

**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

Voluson  
EB

AB2-7-D/OB

MI 0.9

MFM 0810947G

10.4cm / 1.8 / 38Hz

TIs 0.1

12.08.2008

12:52:04 PM

Routine  
Har-low  
Pwr 92 %  
Gn -4  
C6 / M7  
P3 / E3  
SRI II 3



AC 13.87cm  
GA 19w2d  
EFW 277g (10oz)  
GA 19w0d

**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)**

**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**



Voluson



E8

MFM0811016P

AB2-7-D/OB

MI 0.9

8.3cm / 1.1 / 47Hz

TIs 0.2

12.08.2008

01:20:32 PM

Routine  
Har-low  
Pwr 94 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

Cord insertion



Voluson  
E8

AB2-7-D/OB

MI 0.9

MFM0810983N

7.2cm / 1.4 / 47Hz

TIs 0.1

12.08.2008 01:39:55 PM

Routine  
Har-low  
Pwr 89 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

Kidneys & Bladder



Voluson



AB2-7-D/OB

MI 0.9

MFM 0811274P

8.8cm / 1.6 / 42Hz

TIs 0.1

13.08.2008 03:10:01 PM

Routine  
Har-low  
Pwr 92 %  
Gn -1  
C6 / M7  
P3 / E3  
SRI II 3





**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)**

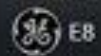
**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

Voluson



E8

MFM0811016P

AB2-7-D/OB

MI 0.9

8.8cm / 1.5 / 42Hz

TIs 0.1

12.08.2008 01:23:07 PM

Routine  
Har-low  
Pwr 92 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

Stomach /  
Diaphragm



Voluson



EB

AB2-7-D/OB

MI 0.9

MFM0810458K

7.2cm / 1.4 / 65Hz

TIs 0.1

13.08.2008 03:38:15 PM

Routine

Har-low

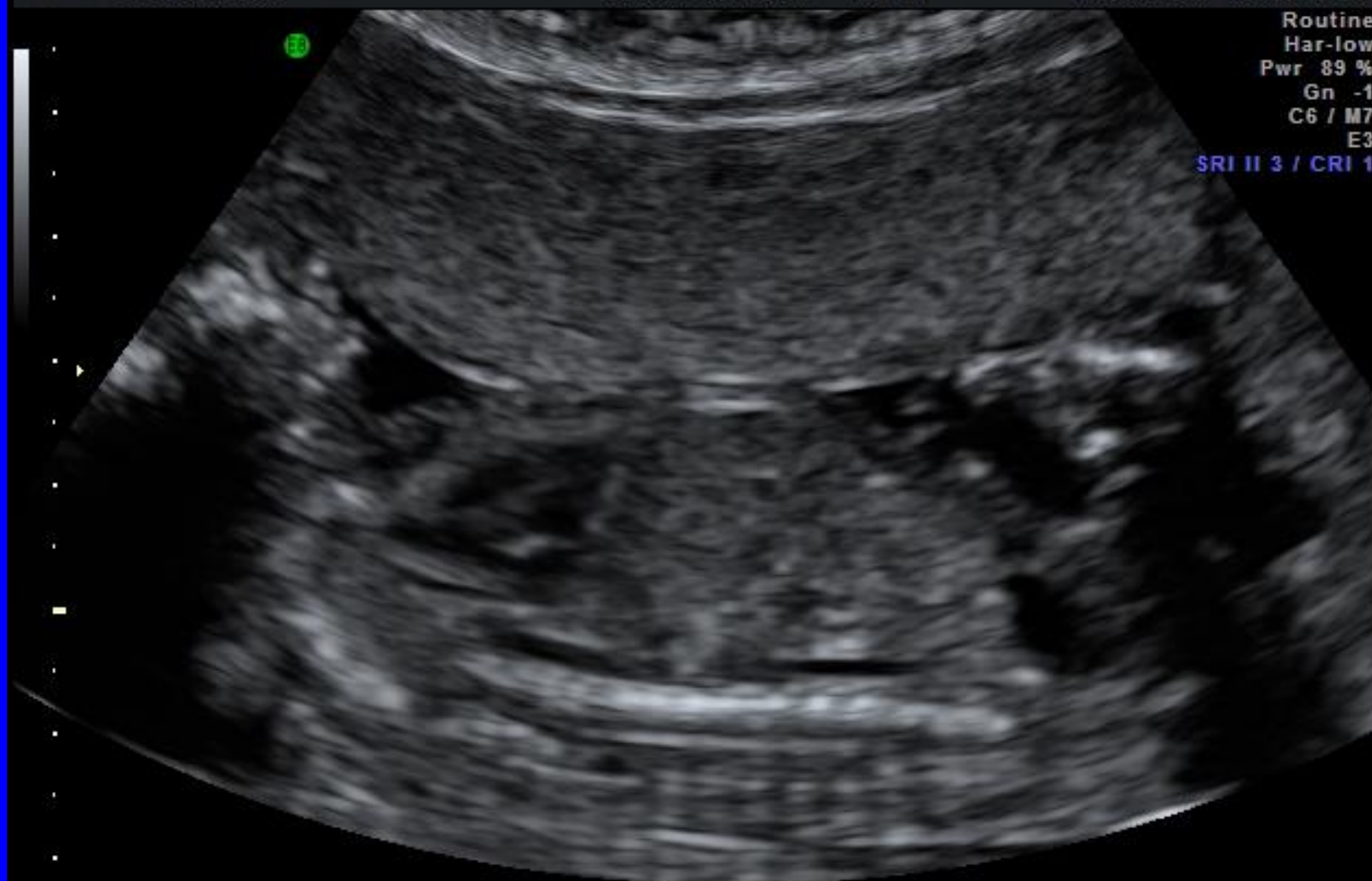
Pwr 89 %

Gn -1

C6 / M7

E3

SRI II 3 / CRI 1



Voluson  
E8

MFM0811016P

AB2-7-D/OB

MI 0.7

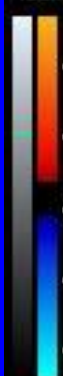
8.8cm / 1.5 / 15Hz

TIs 0.5

12.08.2008

01:22:22 PM

15cm/s

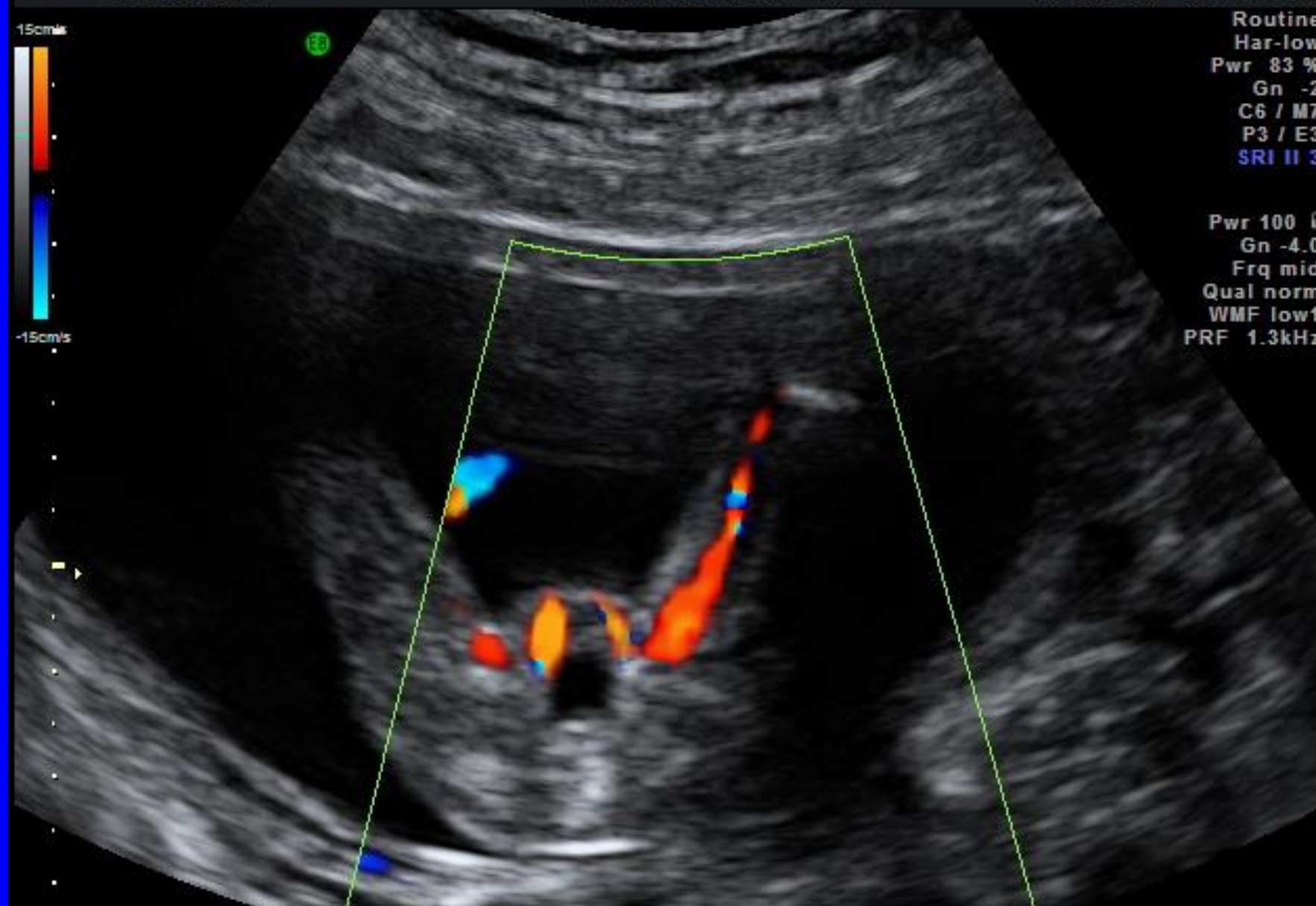


-15cm/s

Routine  
Har-low  
Pwr 83 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

Pwr 100 %  
Gn -4.0  
Frq mid  
Qual norm  
WMF low1  
PRF 1.3kHz

E8





Voluson



E8

MFM0811016P

AB2-7-D/OB

MI 0.9

8.8cm / 1.5 / 42Hz

TIs 0.1

12.08.2008

01:22:05 PM

Routine  
Har-low  
Pwr 92 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

E8



**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
(diaphragm/bladder)**

**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

Voluson



E8

MFM0810983N

AB2-7-D/OB

MI 1.0

7.1cm / 1.4 / 98Hz

Tls 0.3

12.08.2008 01:43:23 PM

Fet. Cardio

Har-high

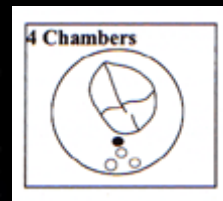
Pwr 100 %

Gn -5

C8 / M6

E2

SRI II 3 / CRI 1



Voluson



E8

k3759210

AB2-7-D/OB

MI 0.9

7.8cm / 1.0 / 114Hz

TIs 0.2

14.08.2008 10:12:39 AM

Fet. Cardio

Har-low

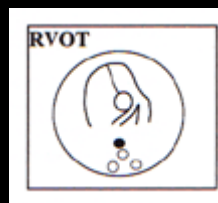
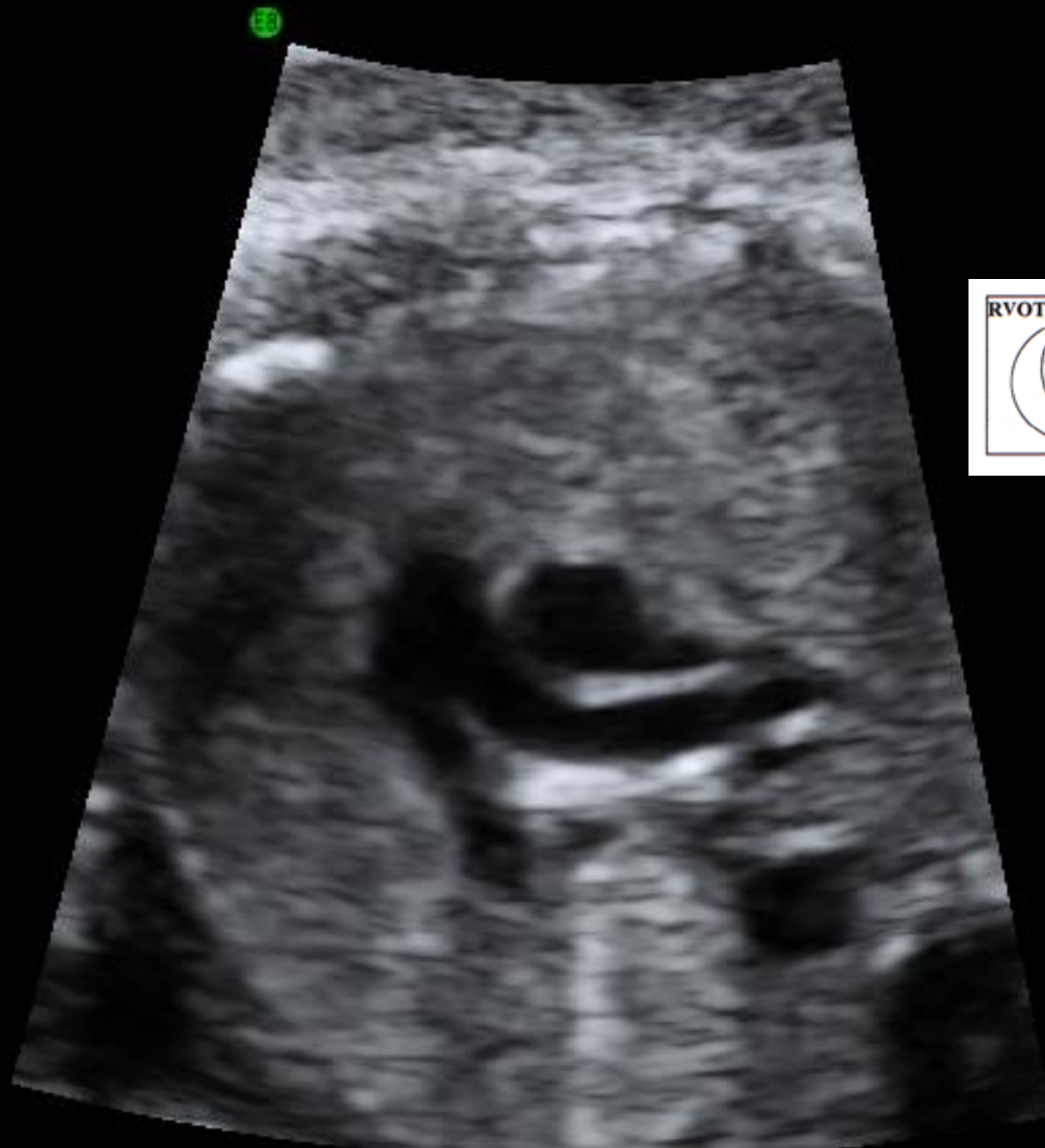
Pwr 100 %

Gn 3

C8 / M4

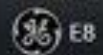
E2

SRI II 2 / CRI 1





Voluson



EB

k3759210

AB2-7-D/OB

MI 0.9

7.8cm / 1.0 / 114Hz

TIs 0.2

14.08.2008 10:11:22 AM

Fet.Cardio

Har-low

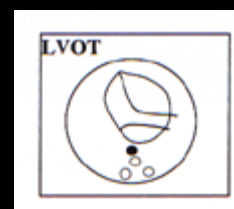
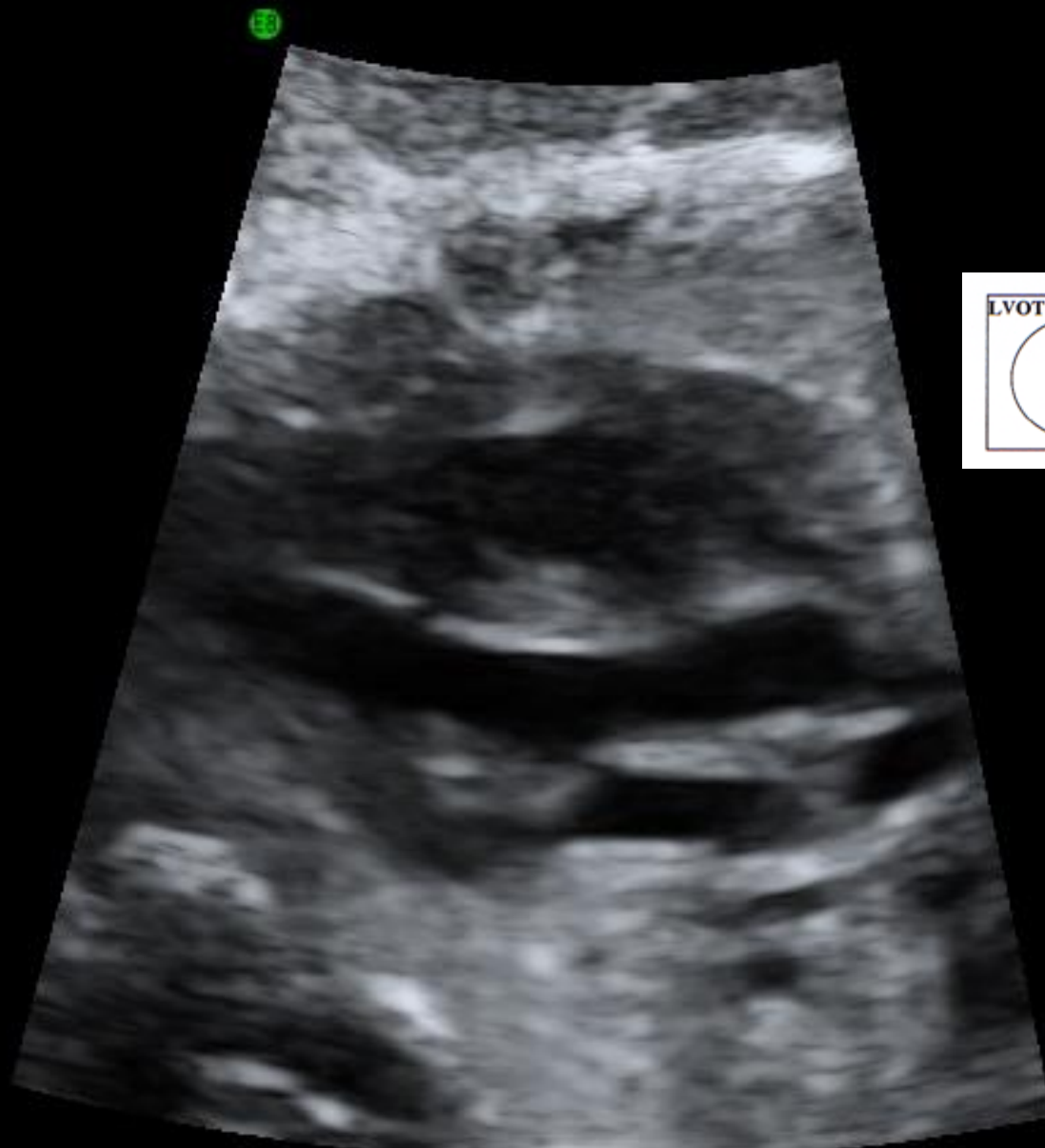
Pwr 100 %

Gn 3

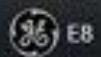
C8 / M4

E2

SRI II 2 / CRI 1



Voluson



E8

k3759210

AB2-7-D/OB

MI 0.9

7.8cm / 1.0 / 114Hz

TIs 0.2

14.08.2008

10:12:58 AM

Fet. Cardio

Har-low

Pwr 100 %

Gn 3

C8 / M4

E2

SRI II 2 / CRI 1



Voluson



E8

k3759210

AB2-7-D/OB

MI 1.0

10.4cm / 1.7 / 90Hz

TIs 0.2

14.08.2008 10:15:32 AM

Fet. Cardio

Har-low

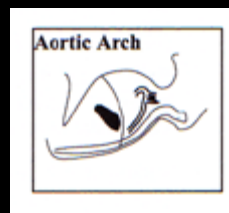
Pwr 100 %

Gn 0

C7 / M4

E2

SRI II 2 / CRI 1



**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
Renal pelvis (<5 mm AP measurement)**

**Longitudinal axis - abdominal-thoracic appearance  
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**Thorax at level of 4 chamber cardiac view**

**Cardiac outflow tracts**

**Arms - three bones and hand (not counting fingers)**

**Legs - three bones and foot (not counting toes)**

Voluson



E8

MFM0811016P

AB2-7-D/OB

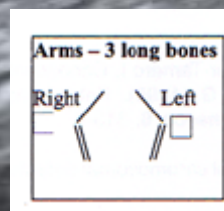
MI 0.9

8.8cm / 1.5 / 42Hz

Tls 0.1

12.08.2008 01:26:09 PM

Routine  
Har-low  
Pwr 92 %  
Gn 7  
C6 / M7  
P3 / E3  
SRI II 3





Voluson



E8

AB2-7-D/OB

MI 0.9

MFM 0810947G

10.4cm / 1.8 / 38Hz

TIs 0.1

12.08.2008

12:49:55 PM

Routine

Har-low

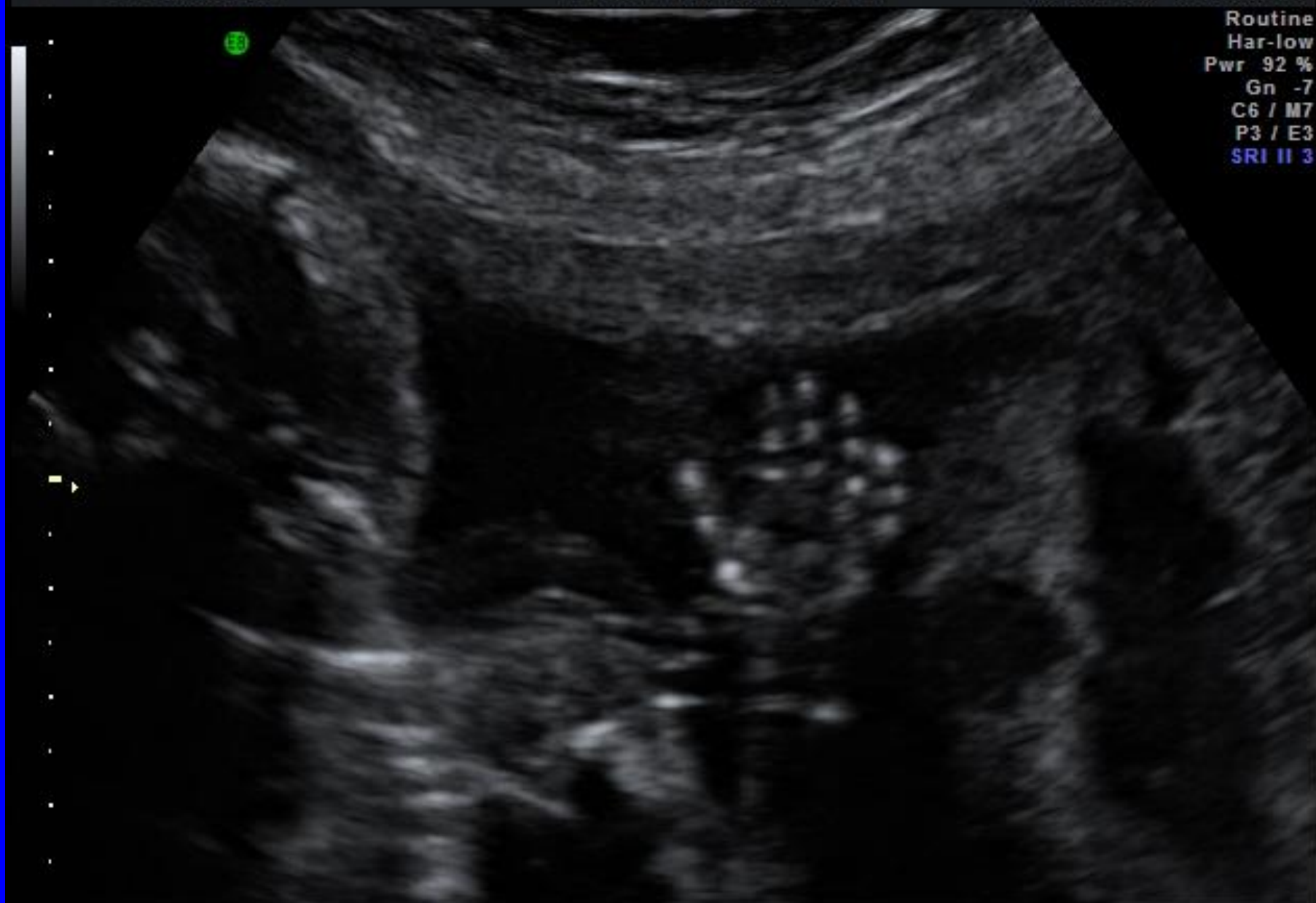
Pwr 92 %

Gn -7

C6 / M7

P3 / E3

SRI II 3



**Head shape + internal structures, cavum pellucidum, cerebellum, ventricular size at atrium (<10 mm)**

**Face & lips**

**Spine: longitudinal and transverse**

**Abdominal shape and content at level of stomach**

**Abdominal shape and content at level of kidneys and umbilicus  
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Voluson



E8

MFM 0810947G

AB2-7-D/OB

MI 0.9

7.2cm / 1.3 / 47Hz

TIs 0.1

12.08.2008

12:43:11 PM

Routine  
Har-low  
Pwr 89 %  
Gn -5  
C6 / M7  
P3 / E3  
SRI II 3

Legs - 3 long bones

Right



Left





Voluson  
E8

AB2-7-D/OB

MI 0.9

MFM0810983N

10.4cm / 1.8 / 38Hz

TIs 0.1

12.08.2008 01:41:56 PM

Routine  
Har-low  
Pwr 92 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3

Legs - 3 long bones

Right



Left



Voluson



MFM0811016P

AB2-7-D/OB

MI 0.9

8.8cm / 1.5 / 42Hz

TIs 0.1

12.08.2008 01:27:11 PM

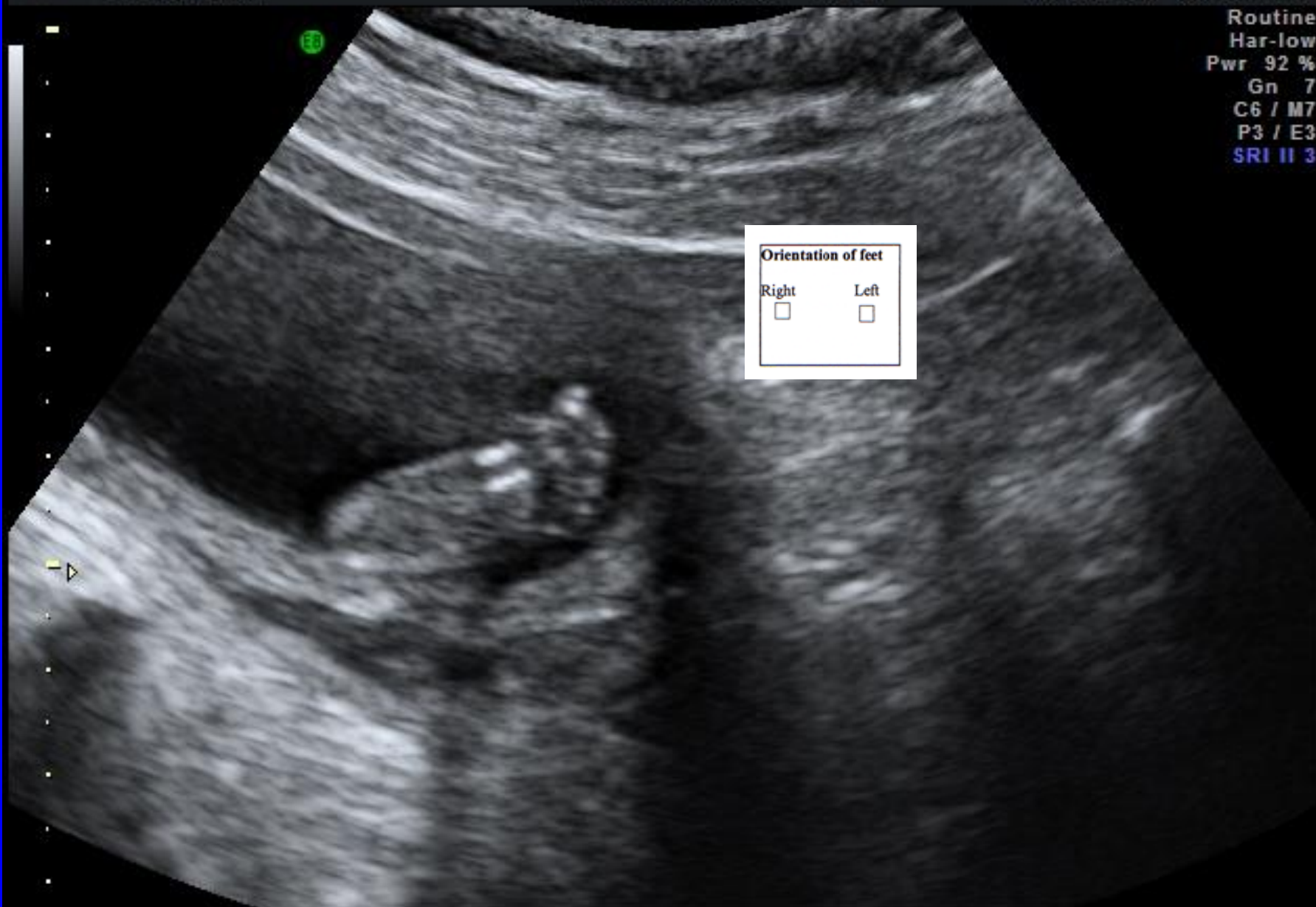
Routine  
Har-low  
Pwr 92 %  
Gn 7  
C6 / M7  
P3 / E3  
SRI II 3

Orientation of feet

Right



Left



Routine  
Har-low  
Pwr 92 %  
Gn -2  
C6 / M7  
P3 / E3  
SRI II 3



# Sonographic "markers" for aneuploidy

Choroid plexus cyst

**Ventriculomegaly (> 10 mm at the atrium)**

Echogenic bowel (equivalent to bone density)

Head shape

Nuchal pad (> 5 mm at 20 weeks)

Cysterna magna

Echogenic foci in heart

**Dilated renal pelvis (> 5 mm AP)**

Short femur/humerus

Talipes

Sandal gap

Clinodactyly

Clenched hand

**Two vessel cord**

# Evaluation of Routine Obstetric Ultrasound Examination in detecting Fetal Structural Abnormalities in Low Risk Pregnancies

WC Leung, CP Lee, MHY Tang

*Department of Obstetrics & Gynaecology, Tsan Yuk Hospital, The University of Hong Kong, Hong Kong, China*

## Objective:

To evaluate routine obstetric ultrasound examination in detecting fetal structural abnormalities in low risk pregnancies.

## Method:

A prospective study of the results of routine obstetric ultrasound examination during the first 19 months after the introduction of this service in a local teaching hospital was performed.

## Results:

3288 women had routine ultrasound examination. Pregnancy outcome could be traced in 3187 women. Fetal ultrasound abnormalities were suspected in 73 cases (2.3%). Follow-up scans showed the same abnormalities in 26 cases (0.8%). These were confirmed after delivery or abortion in 21 cases (0.7%). The most common fetal abnormality detected by routine ultrasound was **dilated renal pelvis** (10/21 = 47.6%). Major abnormalities detected included: hydrocephalus (2), encephalocele (1), holoprosencephaly with complex congenital heart disease (1), cystic hygroma (1), truncus arteriosus (1), hypoplastic right heart (1) and diaphragmatic hernia (1). Fetal structural abnormalities were missed by routine ultrasound in 45 cases (1.4%). Majority were cardiac abnormalities (19/45 = 42.2%).

## Conclusion:

The sensitivity of routine ultrasound in detecting fetal structural abnormalities was 31.8%. The specificity was 99.8%. 47 women (1.5%) were potentially subjected to unnecessary anxiety because of suspected fetal abnormalities which were not confirmed or were assessed as insignificant on subsequent scan.

(HKJGOM 2000; 1:28-32)

# Evaluation of Routine Obstetric Ultrasound Examination in detecting Fetal Structural Abnormalities in Low Risk Pregnancies

WC Leung, CP Lee, MHY Tang

*Department of Obstetrics & Gynaecology, Tsan Yuk Hospital, The University of Hong Kong, Hong Kong, China*

## Objective:

To evaluate routine obstetric ultrasound examination in detecting fetal structural abnormalities in low risk pregnancies.

## Method:

A prospective study was conducted in a tertiary obstetric hospital from January 1998 to December 1999, after the introduction of routine obstetric ultrasound examination at 19 months gestation.

## Results:

3288 women had obstetric ultrasound examination at 19 months gestation. 47 women (1.5%) had fetal structural abnormalities detected by routine ultrasound. The same abnormalities were confirmed by subsequent scan in 32 women (68.1%). The most common fetal abnormalities detected were cardiac abnormalities (10/47 = 21.3%). Major abnormalities detected included anencephaly (1), spina bifida (1), prosencephaly with complex congenital heart disease (1), diaphragmatic hernia (1), hypoplastic right heart (1) and diaphragmatic hernia (1). Fetal structural abnormalities were missed by routine ultrasound in 15 cases (31.9%). Majority were cardiac abnormalities (19/45 = 42.2%).

## Conclusion:

The sensitivity of routine ultrasound in detecting fetal structural abnormalities was 31.8%. The specificity was 99.8%. 47 women (1.5%) were potentially subjected to unnecessary anxiety because of suspected fetal abnormalities which were not confirmed or were assessed as insignificant on subsequent scan.

(HKJGOM 2000; 1:28-32)



Voluson



E8

MFM 0811172M

AB2-7-D/OB

MI 1.0

7.8cm / 1.2 / 22Hz

TIs 0.2

12.08.2008

12:30:16 PM

1. Trim.

Har-high

Pwr 95 %

Gn -4

C6 / M7

P3 / E3

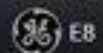
SRI II 3

CRL

CRL 6.06cm

GA 12w4d

Voluson



E8

MFM 0811172M

AB2-7-D/OB

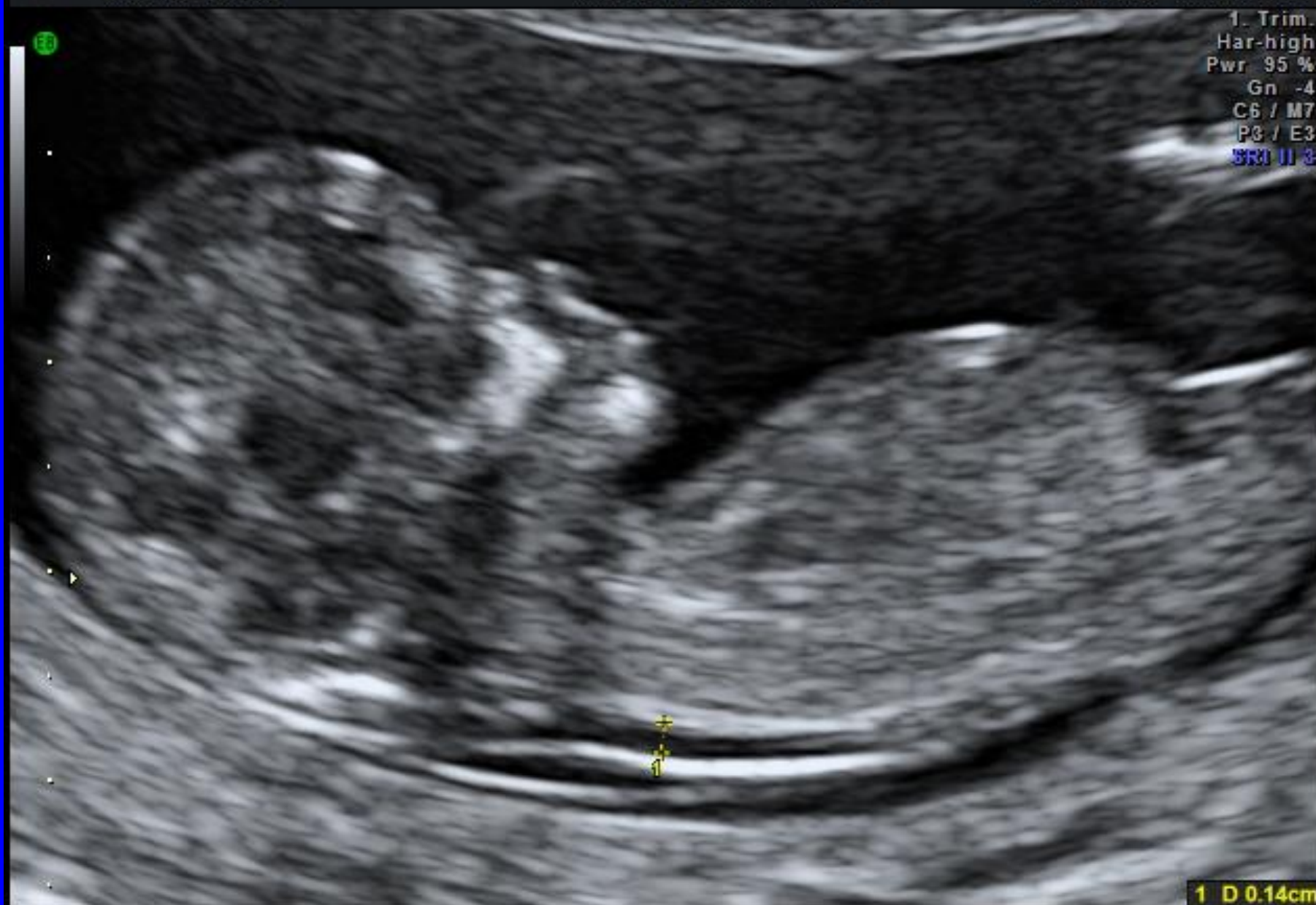
MI 1.0

7.8cm / 1.7 / 22Hz

TIs 0.2

12.08.2008 12:31:43 PM

1. Trim.  
Har-high  
Pwr 95 %  
Gn -4  
C6 / M7  
P8 / E3  
SRM II 3



Voluson



E8

MFM 0811151J

AB2-7-D/OB

MI 1.0

7.9cm / 1.6 / 26Hz

Tls 0.2

12.08.2008 01:10:52 PM

1. Trim.  
Har-high  
Pwr 95 %  
Gn -4  
C6 / M7  
P3 / E3  
SRI II 3



1 D 0.14cm  
2 D 0.18cm



# Comparison of nuchal and detailed morphology ultrasound examinations in early pregnancy for fetal structural abnormality screening: a randomized controlled trial

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**OBJECTIVE:** To compare the effectiveness of a nuchal scan at 10 to 14 + 6 weeks and a detailed morphology scan at 12 to 14 + 6 weeks in screening for fetal structural abnormalities.

**METHODS:** From March 2001 to November 2004, 8811 pregnant women were randomized into either the control group (10 to 14 + 6-week nuchal scan followed by routine 16-23-week scan) or the study group (10 to 14 + 6-week nuchal scan and 12 to 14 + 6-week detailed scan followed by routine 16-23-week scan).

**RESULTS:** We analyzed **7642** cases of singleton pregnancies with viable fetuses at first-trimester ultrasound examination and with known pregnancy outcome. In the control group, the detection rate of structural abnormalities in the first trimester was **32.8%** (21/64; 95% CI, 21.6-45.7%) and the overall detection rate was **64.1%** (41/64; 95% CI, 51.1-75.7%). In the study group, the detection rate in the first trimester was **47.6%** (30/63; 95% CI, 34.9-60.6) and the overall detection rate was **66.7%** (42/63; 95% CI, 53.7-78.0%). The overall detection rate in the control group did not differ significantly from that in the study group ( $P > 0.05$ ).

**CONCLUSIONS:** When the nuchal scan is offered, a basic anatomical survey can be done in conjunction with nuchal translucency thickness measurement. A detailed ultrasound examination at this early gestational age may not be superior to the nuchal scan in screening for fetal abnormalities in the low-risk population. Though a wide range of abnormalities can be detected at 10 to 14 + 6 weeks, the routine 16-23-week scan cannot be abandoned.

# **Expectation and knowledge of pregnant women undergoing first and second trimester ultrasound examination in a Chinese population**

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**Objective** To evaluate expectation and knowledge on obstetric ultrasound examination in the first and second trimester in a Chinese population.

**Method** A cross-sectional survey was conducted in a university obstetric clinic in Hong Kong. Chinese pregnant women who underwent the first trimester early scan sessions, or the second trimester anomaly scan sessions were invited to complete a self-administered questionnaire, which contained items on their knowledge, expectation, and sociodemographic characteristics.

**Results** In all 276 eligible pregnant women (117 in the first trimester and 159 in the second trimester) were recruited. Although 249 women (90.2%) claimed they understood the indication of the ultrasound examination, only 93 of them were correct (33.7%). The median perceived overall-detection rate for structural abnormalities was 66.5%. Living in Hong Kong for more than 7 years was significantly associated with higher knowledge level and expectation from ultrasound examination. Attaining tertiary education level was also significantly associated with higher knowledge level. Over 90% of the pregnant women studied wished to know the fetal gender from the anomaly scan examination.

**Conclusion** Knowledge of Chinese pregnant women on ultrasound was generally unsatisfactory. Understanding their limitation of knowledge and expectations helps to devise appropriate education in the local setting.

**Shall we talk  
during  
routine anomaly scan?**

**We only find what we look for.**

**We only look for what we know.**

**We only know what we understand.**