



HEALTH

KwaZulu-Natal



UNIVERSITY OF
KWAZULU-NATAL

(INYUVESI)
YAKWAZULU-NATALI



Nelson R Mandela
School of Medicine

Early (14-16 week) scan vs late (18 - 22 week) scan

Logie Govender

Maternal & Fetal Medicine

Lower Umfolozi District War Memorial Hospital, Empangeni

Nelson R Mandela School of Medicine

University of KwaZulu-Natal

SASUOG Cape Town
1-4 September 2011

Introduction

- **11-13 week scan**
 - most effective method of early screening for aneuploidy
 - identify women at risk for wide range of pregnancy complications
 - Assess prognosis of such pregnancies at early gestation
- **Other benefits**
 - accurate dating of the pregnancy
 - early diagnosis of many major structural fetal defects
 - diagnosis of multiple pregnancies / confirming chorionicity
 - early screening for severe preeclampsia

Introduction

- **Early screening:**
 - potential to reduce healthcare costs
 - offer early counseling, karyotyping,
 - termination of pregnancy, if needed.
- **Pitfall of 11-13 weeks scan**
 - cannot rule out certain significant structural anomalies that appear or develop later in pregnancy
 - \therefore mid-trimester fetal anatomy scan crucial to compliment the late first-trimester scan
- Delay screening to 14 weeks – high proportion of fetuses destined to miscarry would have already done so

To avoid diagnostic pitfalls – must know USG features of normal fetal development during pregnancy

Early vs late scan

Three groups of major fetal abnormalities

- *Always be detected*

- Anencephaly

- *Never detected*

- Microcephaly

- *Potentially detectable depending on*

- objectives set for such scan

- the time allocated for the fetal examination
- the expertise of the sonographer
- the quality of the equipment used

- presence of easily detectable marker for underlying abnormality

- evolution in phenotypic expression of abnormality with gestation

Syngelaki et al., Prenat Diagn 2011; 31: 90–102

14-16 weeks scan

Limited role

- If no first trimester scan done
- Follow up scan for uncertainty in earlier scan
- **Dating**
 - Less accurate compared to first trimester scan
 - More accurate compared to midtrimester scan
- **Screening for aneuploidy**
 - late for NT and other 1st trimester markers risk assessment
 - ? early for midtrimester risk assessment
- **Fetal sex determination**
- **Diagnostic tests**
 - Late CVS
 - Early amniocentesis - controversial ?

What can be done at 14-16 weeks?

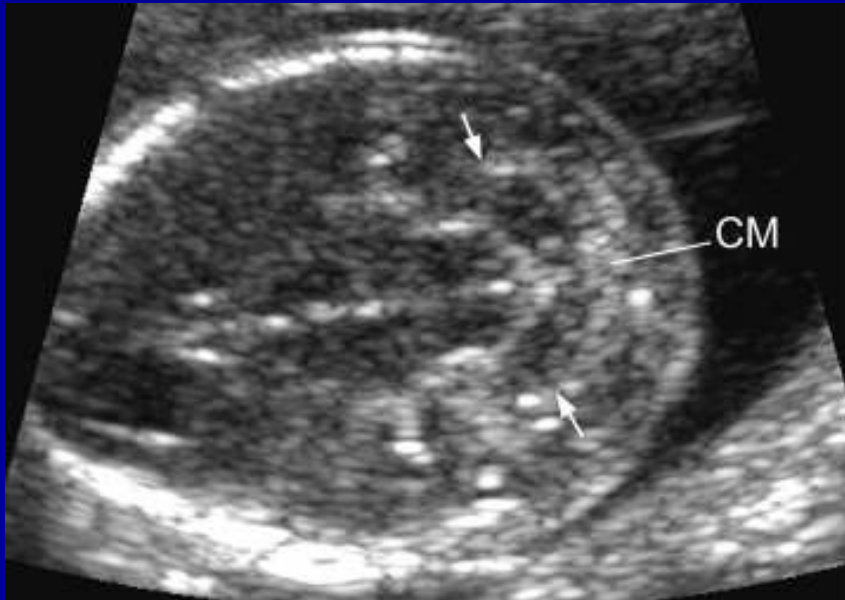
Routine

- **Missed 1st trimester scan**
- Pregnancy dating
- Higher order gestation
- Chorionicity in twins
- Markers of aneuploidy
- **Major structural defects**
 - CNS
 - Heart
 - Anterior abdominal wall
 - Urinary tract
 - Bladder length >16mm
 - Skeleton / Limbs

Selective

- Doppler – Uterine Artery / DV - Preeclampsia
- Fetal sex – sex-linked d/o
- Cervical length - PTL
- **Interventions / Procedures**
 - Cervical cerclage
 - MFPR
 - Cord occlusion in MC twins discordant for severe fetal anomaly
 - Adnexal masses
- Other

Arnold-Chiari malformation at 14 weeks Banana sign and Meningomyelocele

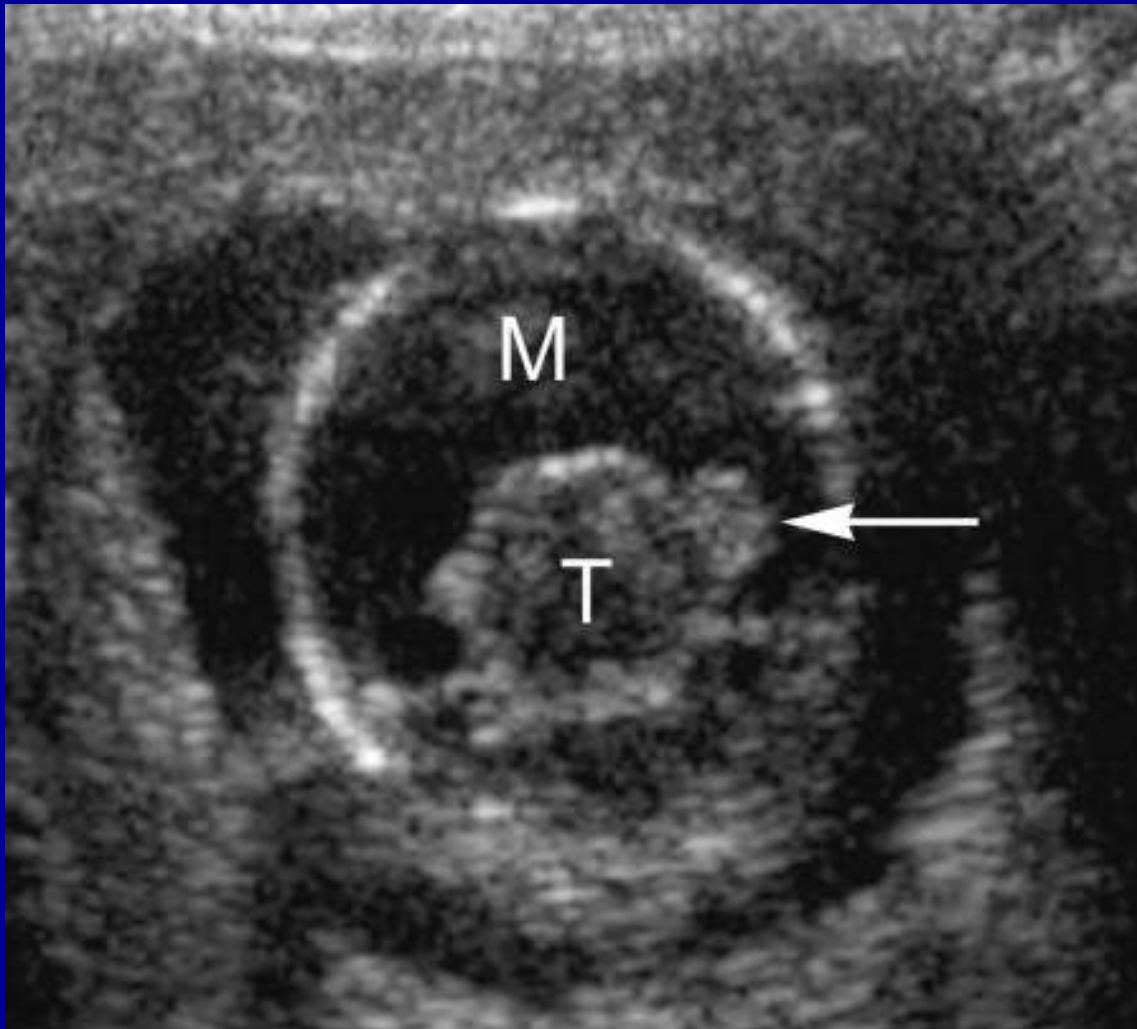


Head:banana-shaped cerebellum
(arrows)



Spine: lumbosacral region shows
a meningocele (arrow).

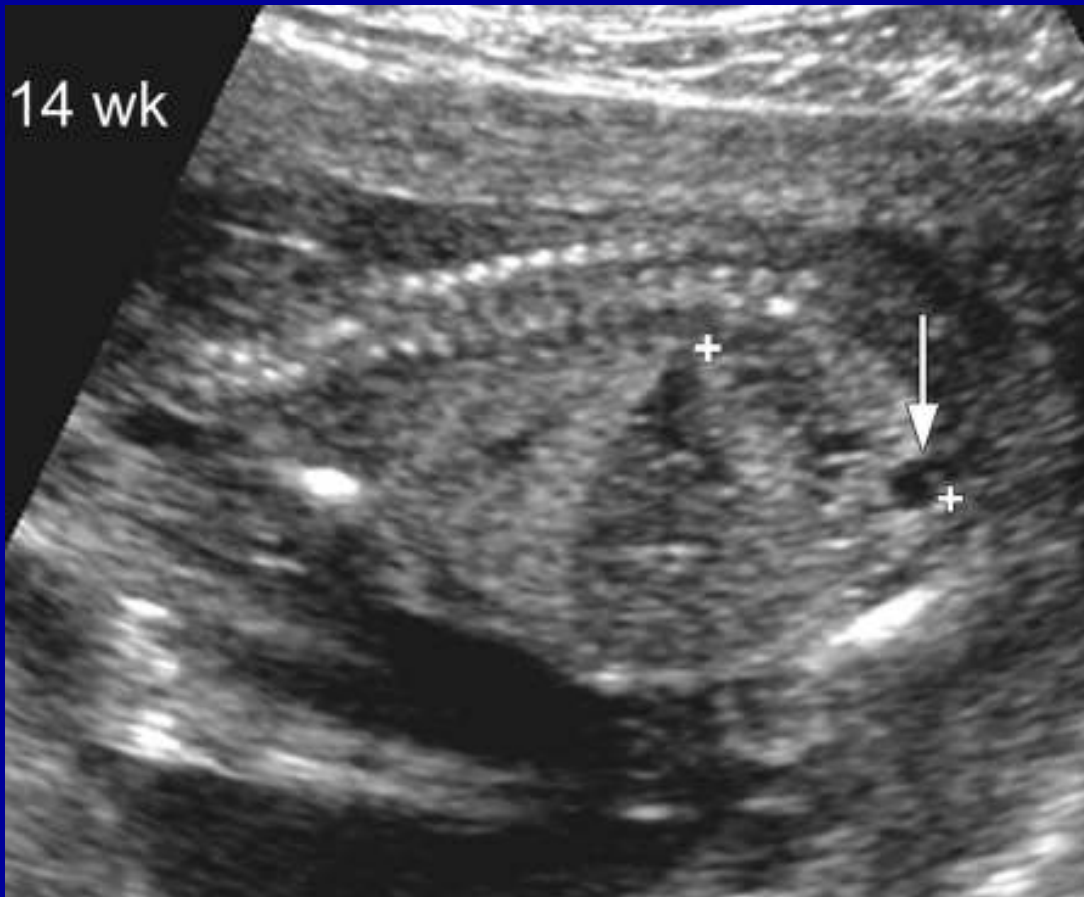
Holoprosencephaly at 14 weeks



Head:

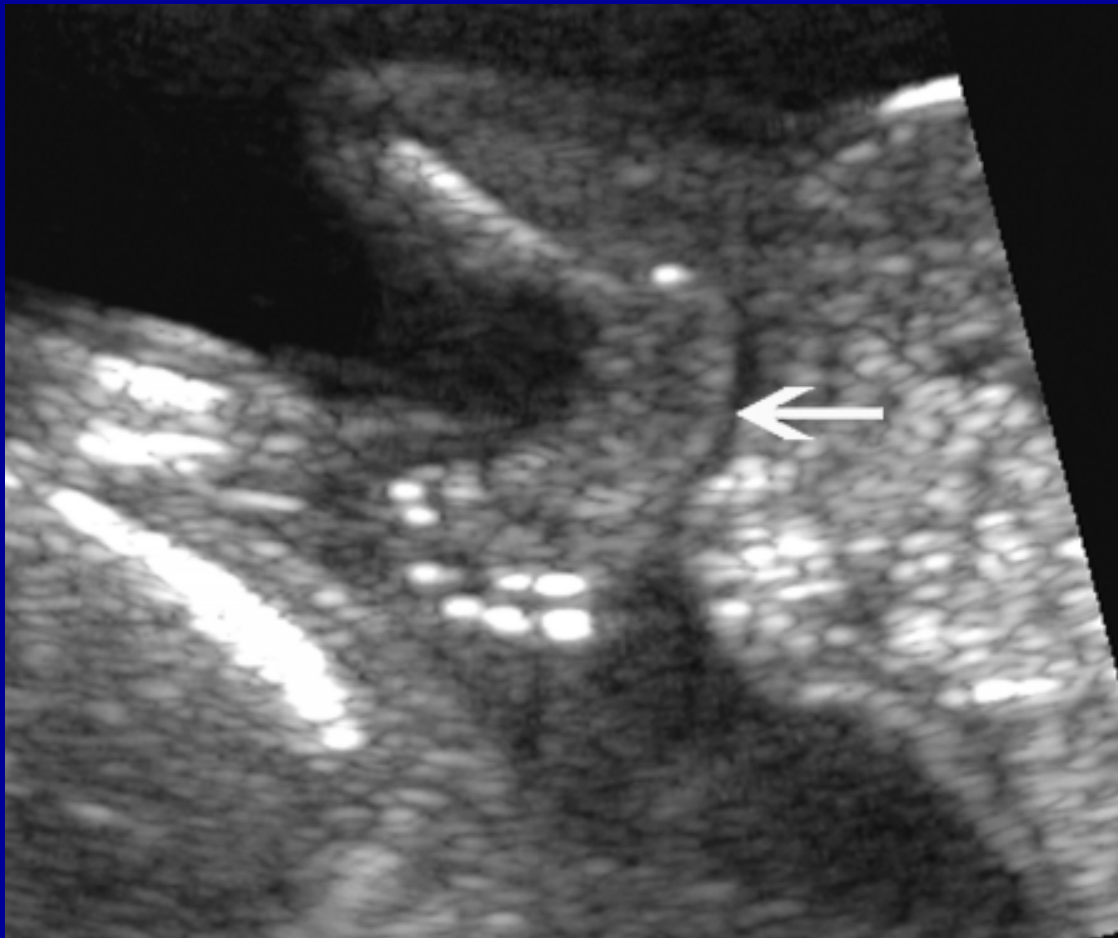
- fused thalami (*T*)
- monoventricle (*M*) with virtually no cerebral tissue
- absence of the interhemispheric fissure and falx
- small echogenic choroid plexuses (arrow) on either side of the fused thalami

Multicystic dysplastic kidney 14 weeks gestation



- Sagittal view of fetus**
- several cysts (arrow)
 - slightly enlarged kidney (cursors).

Clubfoot and polydactyly at 14 weeks



Foot:

- varus deformity (arrow)
- six toes

18-22 weeks

ISUOG Practise Guidelines:

- Recommend routine midtrimester fetal scan performed between 18-22 weeks
- Compromise period between:
 - dating (more accurate if done earlier)
 - detection of fetal structural anomalies
- **Main objective**
 - provide accurate diagnostic information to optimise antenatal care for best maternal and perinatal outcome

ISUOG Clinical Standards Committee:
Ultrasound Obstet Gynecol 2011; 37: 116–126

18-22 weeks

ISUOG Practise Guidelines –

- **Midtrimester estimated fetal weight:**
 - baseline parameter for detection of subsequent growth problems
- **Not recommended as routine in low risk pregnancies**
 - **Doppler ultrasonography**
 - insufficient evidence to support universal use of uterine or umbilical artery Doppler
 - **Biophysical profile**
 - **Cervical length measurements**
 - insufficient evidence to recommend as routine in an unselected population

18-22 weeks

ISUOG Practise Guidelines

- Incidental findings:
 - Uterine fibroids and maternal adnexal masses should be documented
- Woman /couple – counselled on the potential benefits and limitations of this routine scan:
 - Some malformation are progressive in nature
 - May not be detected at first and midtrimester scans

Beyond 24 weeks (usually 3rd T)

- Microcephaly
- Ventriculomegaly - 2^o haemorrhage or infection
- Fetal ovarian cysts
- Bowel obstruction
- Cerebral atrophy
- Upper urinary tract obstruction

Never seen

- Autism

Early vs Late 2nd Trimester scan Studies

- Two staged USG screening
What can be seen and what cannot?
- Fetal abdominal cysts
- Bladder length
- Cervical length

Two staged USG screening

What can be seen and what cannot?

- **4789 consecutive low risk pregnancies**
 - 4073 had both scans
 - Scans performed by specially trained midwives
- **Findings:**
 - **13-14 weeks** -good for detection of chromosomal abnormalities
 - **18-22 weeks** - detection of structural defects

Taipale et al., 2004; 83(12):1141-1146

Fetal abdominal cysts

- Assess clinical significance of fetal abdominal cysts
- **Study** : two staged screening
- **14–16 weeks** abdominal cyst was confirmed- 5 cases
 - No associated anomalies
- **18–22 weeks**
 - **3 cases showed complete resolution**
 - Uneventful antenatal course / Normal neonates
 - **2 cases**
 - Prenatal aspiration at 19 weeks - subsequently resolved
 - Remained stable in size and was managed conservatively
 - infant required surgery at the age of 7 weeks for a choledochal cyst obstruction
- **Abdominal cysts detected in early second trimester scan**
 - Usually have good outcome but must be followed up by midtrimester scan
 - Has prognostic implications

Bladder Length

- Study: 145 fetuses 10-14 weeks
- **Bladder length and risk of aneuploidy**
 - 7–15 mm - 25%
 - >15mm - 10%
- **Normal karyotype**
 - <16mm – 90% spontaneous resolution
 - >16mm – progressive obstructive uropathy
- **Findings:**
 - Bladder length in euploid fetuses at 14 weeks can be used to prognosticate outcome

Cervical length study

- Prospective study 529 unselected pregnant population
- **11-14 weeks** [mean 42.4mm]
 - Delivered preterm (40.6mm)
 - Delivered at term (42.1mm) *p=NS*
- **20-22 weeks** [mean 38.6mm]
 - Delivered preterm (26.7mm)
 - Delivered term (39.3mm) *p=0.0001*

Cervical assessment in unselected- useful tool for prediction of PTL at 20-22weeks than 11-14weeks

Carvalho et al., UOG 2003, 21:135-139

- **Similar results:** Ozdemir et al., EJOGRB, 2007;130(2):176-179

Invasive Diagnostic Tests

- **Early Amniocentesis** (< 15 weeks)
 - is known to be riskier to the pregnancy
 - higher fetal loss
 - talipes equinovarus
 - less reliable in terms of obtaining a fetal chromosome result
- **Midtrimester amniocentesis** [16-22weeks]
 - Relatively safe (numerous studies)
- **Ideal Timing**
 - CVS at 11-13 weeks
 - Amniocentesis at 16-18 weeks
 - 14-15 weeks “grey area”

For Earlier Diagnosis

14-16 weeks scan

- Higher order gestation
- Markers of aneuploidy

Structural Abnormalities

- Anencephaly / Acrania
- Alobar holoprosencephaly
- Body stalk anomaly
- Spina bifida
- Abdominal wall defects
- Acardiac twin
- Multicystic dysplastic kidneys
- Clubfeet / polydactyly
- Megacystis/ Fetal Hydrops / Sex

18-22 weeks scan

- MCA Doppler for fetal anaemia
- TTTS

Structural Abnormalities

- Hydrocephalus
- Skeletal dysplasia
- CCAM
- Agenesis corpus callosum
- Complex cardiac anomalies eg: TGA / HLHS/ Pulm. atresia
- Cerebellar / Vermian hypoplasia
- Ambiguous genitalia

For Earlier Prognosis

14-16 weeks scan

- Pregnancy dating
- Chorionicity in twins
- Doppler Uterine Artery / DV – Preeclampsia
- Bladder length >16mm

Interventions / Procedures

- Cervical cerclage
- MFPR
- Cord occlusion in MC twins
- Maternal surgical procedures eg: for large adnexal masses

18-22 weeks scan

- Subsequent growth problems
- Fetal anaemia - MCA Doppler
- Fetal cardiac failure - venous and cardiac Doppler [eg: DV & TR]
- PTL – cervical length
- Abdominal cysts
- Urinary tract obstruction
- Poly /Oligo-hydramnios

Interventions / Procedures

- Genetic amniocentesis
- Fetal shunts
- IUT

Summary

- **11-13 weeks** scan cannot rule out certain significant structural anomalies that appear later in pregnancy
- There may be a place for the **14-16 week scan**
 - did not have the benefit of the 11-13 week scan
 - as a follow up to uncertainties in the earlier scan
 - Interventions in management
- The mid-trimester fetal anatomy scan in our practice remains crucial to complement the late first-trimester scan
- Pregnancies at risk of maternal or fetal disease may be better identified during the **18-22 week scan** thus providing more individualized patient- and disease-specific approach to the further management of the pregnancy
- Some anomalies manifest beyond 24 weeks – missed at 18-22 weeks

Thank You

Beyond 22 weeks

Diagnosis - not made by direct visualization of defect

- **Duodenal atresia**

- polyhydramnios
- double-bubble appearance of stomach & proximal duodenum

- **Bowel obstruction**

- Distended loops of bowel proximal to the obstruction

These anomalies usually occur after 22 weeks

Diagnosis may be missed at 20 week scan

Beyond 22 weeks

Severe hydronephrosis due to ureteric stenosis / VUR

- are not apparent until the second or third trimesters
 - *megacystis from urethral obstruction present in 1st trimester*
- most likely explanation for this delayed diagnosis
 - early pregnancy the rate of fetal urine production is too low to result in retention within the upper urinary tract

Diagnosis may be missed at 20 week scan