The 18 – 20 week obstetric scan protocol

Compiled for ASUM by:
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The fetal morphology scan:

- routinely performed between 18 & 20 weeks gestation
- assesses fetal size, fetal anatomy & uterine environment
- aims to detect fetal abnormalities so that appropriate pregnancy care can be offered
- must do thorough survey scan
  - remember ovaries & adnexa
- must follow a scanning protocol

*Ultrasound is 20% science & 80% art*

*Martin Necas*
Before You Begin

• establish correct dates - LMP / early scan
• check results of 1\textsuperscript{st} trimester NT scan / bloods - \textit{?} High risk
• look at previous images – especially those with measurements
• take a thorough obstetric history/family/medications etc
• a high BMI > risks
• explain that you need to concentrate so may not initially talk much
• suggest they ask any questions they have as you are scanning
• keep smiling – even if it is a very difficult scan
• if their children / family are distracting you – ask them to leave the room

THE KEY TO SUCCESS IS PATIENCE
Rule of Opportunity

Remember the fetus is mobile & may move at any time.

When you see an opportunity – take it!

• If it is lying spine up – image the spine immediately
  - sagittal, coronal, transverse

• If it is chest up – image the heart then face
Complete a Survey Scan

Ensure you scan the entire lower abdomen in transverse & sagittal

This should show you viability – heartbeat - amniotic fluid

Also fetal lie – spine anterior / posterior etc.

Then commence the anatomy scan
Cervix - optimise the Image

- **Optimise** prior to measuring
  - remember DFG
  → depth focus gain
The Cervix

- Normal cervical length 40mm
  - long & closed (mean 32mm at 12-22wks)

- Measure from internal to external os
  - where anterior & posterior cervical lips meet

- If bladder overfull is it will elongate the cervix
  → partially empty & rescan

- Measure distance from placental edge
  - if less than 20mm do TV scan

- ALWAYS use colour doppler between placental edge & cervix to rule out vasa previa
Transabdominal Cervix

- Affected by bladder volume
  - an overfull bladder can elongate the cervix
  - anterior cervical wall will be thinner than posterior wall
Placenta – sagittal and transverse

Ensure thorough survey scan
- look for congenital uterine anomalies, succenturiate, chorioangioma etc
Cord insertion - placental

- Document insertion in sagittal view – use colour if necessary:
  - should insert into central third of placental disc
  - if peripheral insertion – measure distance from edge? Battledore? velamentous
- Trace cord from placenta to fetal insertion to look for knots, cysts etc
Bladder / Fetal Cord Insertion

Image fetal cord insertion in grey scale & colour – track entire length
Bladder should empty every 60 – 90 minutes
BPD/OFD/HC

Optimise image – DFG, sector - look carefully at all structures

Measurements:
• Follow protocol of chart author - eg ASUM, Chitty etc.

• Transverse axial plane at level of falx cerebri, cavum septum pellucidum & choroid plexus in antrium of each lateral ventricle.

• BPD measured at widest point – outer to inner
  OFD – outer to outer
  HC trace around outer edge of skull.
Posterior Head

Measure:

- Cerebellum = GA
- cisterna magna < 10mm
- nuchal fold < 6mm

- incorrect scan plane can make CM & NF appear enlarged
Lateral Ventrices

• Measure perpendicular to the falx
  - inner to inner.
  - antrium of lateral ventricle
    – at choroid plexus glomus
• normal < 10mm
Profile / Nasal Bone

Assess shape & size
- should be able to draw a straight line through tip of nose, maxilla & symphysis menti.
- measure nasal bone
- compare with charts eg Sonek.
Face

Split screen – image maxilla & mandible

nose & lips
Orbits

When measuring orbits use the protocol of the author whose charts are used. Most common is Jeanty – left image.
Diaphragm

- diaphragmatic interface – hypoechoic line
- divides abdomen / stomach & thorax / heart
- image right & left sides
- must image aorta passing through diaphragm
- the clue to diaphragmatic hernia is presence of abdominal contents in the chest often leading to shift in cardiac axis.
Situs / Heart Size

Check that heart & stomach on left side
- look at size of heart & orientation
Heart Views

- Use fetal cardiac settings
- ENLARGE the view
- Image the heart when the fetus lies chest up

4 chambers
- Check size, position
Mitral/Tricuspid Valves

Observe offset of MV & TV – systole & diastole
valves move freely, meet at crux, tricuspid valve set more apically
Left / Right Atria

- Two atria of equal size
- Observe at least 2 pulmonary veins draining into left atrium
- Aorta posterior to LA
- Foramen ovale patent
  - 1/3 size of atrial septum
  - opens into LA
- Septum primum and secundum seen
LVOT

Arises from LV – check continuous with IVS & MV
RVOT - Main pulmonary artery

- Ensure that RVOT arises from right ventricle - continuous IVS
- Pulmonary trunk - branches into ductus arteriosus & right pulmonary artery
Three Vessel View

- Cephalad movement of transducer
- PA/Ao/SVC in a line
  - Ratio of PA/Ao 1.1:1
Arrow Head View

- Tilt Transducer cephalad from 3 vessel view
- Aorta & pulmonary artery similar size & CDI flow.
Crossover LVOT/RVOT

Ensure ventricular outflow crossover “on real-time imaging”
Aortic Arch – candy cane

Image: Jo Lennox - ULTRASOUND CARE
Ductal Arch – hockey stick
Fetal heart rate/rhythm

- Measure over a minimum of 2 cycles
Abdomen

Look closely at entire abdomen for cysts & other lesions

Measurement:
• Image plane – transverse cut at level of fetal liver & stomach, including left portal vein at umbilical region.

• Ensure true transverse
  - spinal processes
  - round aorta

• No heart/kidneys in view
• Adrenals OK
Adrenals

– Learn how to recognise but not a routine view
Kidneys

- Transverse bilateral kidneys – renal pelvis < 4mm
- Coronal bilateral
- Power doppler / colour for renal arteries
Bowel

• Significant if echogenicity > brightness than bone
• Turn down gain & compare with pelvic bone
• Associated with preterm delivery, IUGR – repeat scan at 30-32/40
Spine Skin Line

In sagittal view important to see skin line from cervical to sacral spine.

Less probe pressure may show a clearer view of skin line.
Spine

• Coronal view
  - look for 3 lines & sacral taper

• Transverse – split screen – look at skin line
  - at level of neck (cervical), heart, stomach, kidneys (thoracic), bladder (sacral)
Femur & Humerus

- Image plane perpendicular to beam - longest possible length of bone with both cartilaginous ends visualised.
- If FL, HL < 5\textsuperscript{th} % – measure tibia, fibula, radius, ulna.
Lower Limbs

Split screen – 3 images:

1. Right left femur
   - must be perpendicular
2. Right / left tibia/fibula
   - include foot angle
   - look for talipes / club foot
3. Right / left feet
   - count toes – sandal toe
Upper limbs

Image bones
- perpendicular to beam

Split screen – 3 images:
1. Right / left humerus
2. Right / left radius/ulna
3. Right / left hands
   - look at finger bones

Measure all bones if any appears too long or short.
Clavicles – look at mineralsation

Normal clavicles at 18 weeks
Under mineralised clavicles (cleido-cranial dysplasia)

Images: Brendan Mein
Amniotic Fluid
– look for a pocket > 3cms

• Important contributor to fetal well being
• Maintains intra-uterine temperature & acts as cushion
• Prevents amnion / embryo sticking
• Fetal anomalies may cause abnormal AF & visa versa
• Produced by cord, membranes, skin, lungs, kidneys
  - by 20 weeks most AF due to urine output ~ 500cc/day.
• Consumption of AF by fetal swallowing ~100cc/day, absorption from GI tract, fluid exchange in lungs ~200cc/day, fluid permeating across cord / membranes.

(Magann 2000)
Polyhydramnios

Prevalence: 1 in 200  Increased AF production  Decreased consumption

Single deepest pocket (SDP) > 8cm

Causes:
reduced swallowing, increased urination, cardiac anomalies.

Consequences:
increased risk premature labour, maternal hypertension.
Oligohydramnios

Prevalence: 1 in 500

SDP: < 2 cm  use colour

Causes:

• Impaired placentation - IUGR
• Ruptured membranes
• Renal defect
Fetal Sex?

Same fetus – different angle. Be careful calling a girl < 20 weeks
Conclusion

The Morphology Scan: - is **not just measurements**

- Be methodical - **look carefully**
- Take advantage of fetal lie
- Have a check list
- Follow a protocol
- Know your limitations
- Ask for a 2\(^{nd}\) opinion if unsure about anything
Remember ..... 
You only recognise what you look for ... 
You only look for what you know ..... 
You only know what you have learnt ..... 

Roger Gent