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Effective December 1, 2015

While every attempt has been made to ensure that the information contained herein is clinically accurate and current, Perinatal Services BC acknowledges that many issues remain controversial, and therefore may be subject to practice interpretation.

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In September 2011, the BC Patient Safety and Quality Council produced a report entitled *Investigation into Medical Imaging, Credentialing and Quality Assurance*. The report reviewed the existing structure for the licensing and credentialing of physicians in BC’s health authorities, including the processes for quality assurance and peer review. Recommendation #32 in the report designated Perinatal Services BC (PSBC) to develop or adopt and promulgate standards for obstetrical ultrasound assessments in the first, second and third trimesters that are performed in community and tertiary facilities.

In December 2011, PSBC brought together a multidisciplinary committee to develop standards for the required minimum content of an obstetric ultrasound assessment. The committee included radiologists and sonographers from rural and urban areas of practice and both the public and private sector as well as perinatologists. Additional clinical consultation was provided by obstetricians, family physicians, and midwives. Representatives from the BC Radiology Society (BCRS), BC Ultrasonographers’ Society (BCUS), 2Lower Mainland Medical Imaging Integration and the Diagnostic Accreditation Program also provided information and consultation. Standards and clinical practice guidelines from the Canadian Association of Radiologists, the Society of Obstetricians and Gynaecologists of Canada and the International Society of Ultrasound in Obstetrics and Gynecology provided a framework for the BC standards.

In early 2015, the standards were reviewed through the same multidisciplinary process as above and updated to reflect feedback and new clinical practice guidelines published by the Society of Obstetricians and Gynaecologists of Canada and the International Society of Ultrasound in Obstetrics and Gynecology in 2013 and 2014.

It is the intention of these standards to ensure a consistent level of care throughout the province surrounding the provision of obstetrical ultrasound that is based on current clinical best practices. The standards provide a simple, single source of information regarding assessment criteria for physicians and sonographers involved in obstetric ultrasounds at diagnostic and screening sites around the province. This document is not intended to confine or limit ultrasound assessment parameters as individual diagnostic imaging sites may include additional ultrasound components dependent on available expertise, clinical indication, and health care provider requests.

In order to ensure that these provincial standards continue to align with best practices, they will be reviewed when new best practices and/or clinical practice guidelines are published. The review will be led by Perinatal Services BC and performed by a multidisciplinary group consisting of representation from different health care provider stakeholders, health authorities, and both public and private facilities.
1.0 Definitions, Licensure & Certification Requirements, Safety Consideration

Definitions

- Ultrasound Report – The document that provides the findings of the ultrasound assessment including all of the items listed in this document. It is signed by a qualified physician and is distributed to the ordering health care provider (HCP) and other HCPs as requested.

- Sonographer Worksheet – A document used by the sonographer during an obstetrical (OB) ultrasound assessment. Not considered to be an Ultrasound Report. Sample – Appendix 1

- Image documentation – Images which are assessed and retained. These images are stored by the diagnostic imaging site. A list of required images to be assessed and retained which support the required content for an OB ultrasound report is included. Appendix 2

- For the purposes of this document trimesters are defined as:
  - 1st – up to and including 14wks 0d
  - 2nd (mid trimester) – 14wks 1d – 26wks 6d
  - 3rd – after and including 27wks 0d

Licensure & Certification Requirements

- Individuals providing OB ultrasound reports and individuals performing OB ultrasounds are required to have the appropriate licensure and credentials as per the provincial regulatory authorities.

Safety Consideration

- While performing an ultrasound, exposure time and acoustic output should be kept to the lowest levels consistent with obtaining diagnostic information and limited to medically indicated procedures. Appendix 3

2.0 Abnormal or Unexpected Findings

Since the first identification of a clinically significant finding is often not anticipated by the referring care provider and may require immediate attention and case management decisions, **verbal communication with the referring care provider, in advance of the final written report, is strongly recommended.**

- When abnormal or unexpected findings are identified, the ultrasound examination must be expanded appropriately and all abnormal findings documented, measured (if appropriate) and reported.

- **When significant fetal growth and/or fluid volume abnormalities and/or structural malformations** are identified, recommendations given in the final report should include a referral to, or consultation with, the Fetal Diagnostic Service (FDS), the Provincial Medical Genetics Program, or other specialists. Appendix 4

- **When a fetal soft marker(s) is (are) identified, recommendations given in the final report may include** referral to, or consultation with, the Provincial Medical Genetics Program, or other specialists. The website for the BC Prenatal Genetic Screening Program (PGSP) also provides helpful information.

- **When a nuchal translucency (NT) measurement is above the established cut off,** recommendations given in the final report should include standard comments as determined by the BC Prenatal Genetic Screening Program. Appendix 5
3.0 Standardized Charts and Formulas

**CROWN RUMP LENGTH (CRL)**

The recommended reference chart (unpublished) for crown rump length (CRL) is from data obtained at the same time as the Lessoway et al, ultrasound fetal biometry charts for a North American Caucasian population study (referenced below) using the same methods and analysis. This chart is currently used by many of the diagnostic imaging sites in BC and the BC Prenatal Genetic Screening Program (PGSP). Appendix 6  www.perinatalservicesbc.ca/NR/rdonlyres/1AF7DA89-95D7-4195-9284-46B6CBADE3A4/0/CRLChart.pdf

**FETAL ANATOMIC MEASUREMENTS**

The recommended reference charts for measurement of head circumference (HC), femur length (FL), biparietal diameter (BPD), abdominal circumference (AC) and thorax circumference (TC) are:


**NEWBORN GROWTH PARAMETERS**

The newborn birth weight, length and head circumference charts used by the BC Perinatal Data Registry (PDR) are from the BC Ministry of Health–Vital Statistics Agency and are based on BC data (1981 to 2000).  www.perinatalservicesbc.ca/ForHealthcareProviders/Resources/BirthWeightCharts/default.htm

**AMNIOTIC FLUID VOLUME**

Amniotic fluid assessment should be performed using the Single Deepest Pocket (SDP) method. The modernized description for performing an amniotic fluid volume assessment using the Single Deepest Pocket method is based on:


**Modernized Description:** The largest pocket of fluid free of cord and fetal parts is identified and its depth (cm) measured as close to right angles as possible to the uterine contour. The pocket must be at least 1 cm in width (width being measured perpendicular to the depth axis) at its narrowest point so that it is at least 1 cm wide throughout the measured depth axis. To avoid over-estimation of pocket depth, the transducer should not be over-angled through the pocket relative to the depth axis.

* NOTE: A Working Group on biometric standards for assessing fetal growth was brought together to carefully consider the option of replacing the current, widely used, Lessoway standard with the new Intergrowth 21st standard. The Intergrowth 21st international standard was developed on the basis of recommendations from a WHO expert committee and the study was funded by the Bill and Melinda Gates Foundation. The Working Group carefully examined contemporary data from British Columbia, which included cohorts at risk for growth restriction and macrosomia as well as a low risk “normal” cohort. The analysis showed that adopting the Intergrowth standard would lead to a significant decrease in the frequency of small-for-gestational age diagnoses and a substantial increase in large-for-gestational age diagnoses. The Working Group found this concerning, especially since the under identification of small fetuses has the potential for increasing mortality and serious morbidity, while the excess number of large fetuses identified would drastically increase the need for clinical resources. The Working Group recommends that the Lessoway standard remain the provincial standard. For more details – see Appendix 7.
SINGLE DEEPEST POCKET (SDP) INTERPRETATION*

DEFINITIONS

Oligohydramnios: SDP < 2.0 cm
Normal: SDP between 2.0 and 8.0 cm
Polyhydramnios: SDP > 8.0 cm

Abnormalities of amniotic fluid using these simple cutoffs should occur less than 3% of time in a controlled population up to term.


Abnormal measurements should not be based on a single measure, but confirmed by repeated measurement.

UMBILICAL ARTERY DOPPLER

Umbilical artery Doppler is not a minimum assessment requirement and is only done when clinically indicated. The recommended reference for Systolic/Diastolic (S/D) ratio, Resistance Index and Pulsatility Index when performing umbilical artery Doppler in a free loop of the umbilical cord is:


BIOPHYSICAL PROFILE (BPP)

A biophysical profile (BPP) is not a minimum assessment requirement and is only done when clinically indicated. If a Biophysical Profile (BPP) is requested and facilities and expertise exist to perform this assessment, the ultrasound components should include:

1. Breathing movements
2. Movements
3. Tone
4. Amniotic Fluid Volume
5. Reactive Fetal Heart Rate


ESTIMATED FETAL WEIGHT (EFW)

Although the determination of Estimated Fetal Weight (EFW) is not considered to be a minimum assessment requirement for an OB ultrasound assessment, it is commonly performed and may be requested by the referring HCP to assist in clinical management. Although many formulas exist which predict EFW, there is limited evidence to support any particular formula as being a significantly better predictor of fetal weight.


* NOTE: For further information regarding amniotic fluid volume assessment and interpretation please see Appendix 8.
4.0 Minimum Required Content

4.1 ALL OB Ultrasound Reports

Final reports must include, but are not limited to, the following:

**DEMOGRAPHICS**
- Examination date
- Patient full name
- Second patient identifier (birth date, hospital identification number, health insurance number)
- Starting date of last menstrual period (LMP) if available
- Date of the first ultrasound after 7 weeks 0 days, the crown rump length (CRL) and the corresponding gestational age at that time
- Indication for ultrasound scan
- Name of requesting physician/caregiver (preferably with contact information)
- List of caregivers to receive copies
- Date of final report
- Name of interpreting/reporting physician

**GESTATIONAL AGE DETERMINATION**

In assigning the gestational age to interpret the current ultrasound scan the following rules are recommended. *Appendix 9*

1. If the pregnancy is a result of timed ovulation induction (ovulation induction, Invitro fertilization [IVF], etc) then determination of the current gestational age should be based on that information.
2. If a natural conception, the first ultrasound after 7 weeks 0 days gestation (crown rump length [CRL] equal to and greater than 10 mm) should be used to date the pregnancy.
3. *If the first ultrasound is in the 2nd trimester*, a composite mean of at least 3 standard biometric parameters (head circumference [HC], biparietal diameter [BPD], abdominal circumference [AC] and femur length [FL]) each converted to the 50th percentile gestation in weeks and days is used to estimate the gestational age.
4. If a multiple pregnancy, the gestational age of the largest fetus should be used as the gestational age for the pregnancy.

Once a gestational age is established, it should remain as such and be the basis for all further gestational age estimates, including the Estimated Date of Delivery (EDD), unless there is compelling clinical evidence to reassign the gestational age.

**REPORT SUMMARY**

The report summary/conclusion/comments should include:

- Estimate of the current gestational age based on the rules listed above.
- An assessment of the appropriateness of biometric measurements for the current gestational age.
- Results of the fetal anatomy assessment, if performed.
- Results of amniotic fluid assessment, if performed.
- Factors which limit the ultrasound assessment. E.g. fetal position, fetal size, fetal age, oligohydramnios, maternal body habitus.
- Fetal sex, if determined during the exam. *Appendix 10*
- Indication if an endovaginal scan was performed.
- Recommendations as appropriate:
Standards for Obstetrical Ultrasound Assessments

- When significant fetal growth and/or fluid volume abnormalities and/or structural malformations are identified, recommendations given in the final report should include a referral to, or consultation with, the Provincial Medical Genetics Program, the Fetal Diagnostic Service (FDS), or other specialists. Appendix 4

- When a fetal soft marker(s) is (are) identified, recommendations given in the final report may include referral to, or consultation with, the Provincial Medical Genetics Program, or other specialists. The website for the BC Prenatal Genetic Screening Program (PGSP) also provides helpful information.

- When a nuchal translucency (NT) measurement is above the established cut off, recommendations given in the final report should include standard comments as determined by the BC Prenatal Genetic Screening Program. Appendix 5

4.2 1st Trimester Ultrasound Report (up to and including 14wks 0d)

Must include the items listed in “ALL OB Ultrasound Reports” in addition to the following:

<table>
<thead>
<tr>
<th>Include for all 1st trimester (up to and including 14wks 0d):</th>
<th>If greater than 11wks 0d gestation, attempt to include:</th>
<th>With Nuchal Translucency (NT) measurement (performed only if CRL is between 45.0–84.0 mm), report to also include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence/absence of yolk sac or embryo</td>
<td>Head circumference (HC)</td>
<td>NT measurement in mm to 1 decimal point</td>
</tr>
<tr>
<td>Fetal number:</td>
<td>Biparietal diameter (BPD)</td>
<td>FMF# of person performing the NT measurement</td>
</tr>
<tr>
<td>▪ if multiple – chorionicity and amnionicity</td>
<td>Choroid plexus filled ventricles</td>
<td>Standard comments established by the BC Prenatal Genetic Screening Program (PGSP). Appendix 5</td>
</tr>
<tr>
<td>Location of gestational sac</td>
<td>Stomach</td>
<td></td>
</tr>
<tr>
<td>Cardiac activity:</td>
<td>Symmetrical lung fields</td>
<td></td>
</tr>
<tr>
<td>▪ Presence/absence</td>
<td>Presence of 4 limbs, each with 3 segments</td>
<td></td>
</tr>
<tr>
<td>Fetal Heart Rate (FHR)</td>
<td>Abdominal wall cord insertion</td>
<td></td>
</tr>
</tbody>
</table>
4.3 2nd Trimester Ultrasound Report (14wks 1d – 26wks 6d)

Must include the items listed in “ALL OB Ultrasound Reports” in addition to the following:

- Cardiac activity:
  - Presence/absence
  - Fetal Heart Rate (FHR)
- Cardiac axis
- Fetal number:
  - if multiple – chorionicity and amnionicity
- Head circumference (HC)
- Biparietal diameter (BPD)
- Abdominal circumference (AC)
- Femur length (FL)
- Lateral ventricles
- Choroid plexus
- Stomach
- Kidneys
- Presence of bladder
- Presence of 4 limbs, each with 3 segments
- Placental and abdominal cord insertion
- Number of umbilical cord vessels

- Amniotic Fluid volume:
  - 18wks 0d to 26wks 6d → if subjectively abnormal the report to include a Single Deepest Pocket (SDP) measurement of amniotic fluid
- Placenta:
  - Number – if multiple
  - Location
  - Relationship to the internal cervical os
- Cervix
- Fetal position (after 23wks 0d)
- Maternal pelvic anatomy:
  - Uterus

**Fetal Anatomy Ultrasound – 18wks 0d – 22wks 6d**

Detailed fetal anatomy is usually assessed between 18wks 0d and 22wks 6d gestation. The content below is considered to be the minimum requirements for the detailed assessment of fetal anatomy between 18wks 0d and 22wks 6d gestation.

<table>
<thead>
<tr>
<th>HEAD</th>
<th>FACE and NECK</th>
<th>CHEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebellum</td>
<td><strong>Choroid Plexus</strong></td>
<td>Cardiac outflow tracts (LVOT, RVOT) and/or Short Axis</td>
</tr>
<tr>
<td>Cisterna magna</td>
<td><strong>Cerebral lateral ventricles</strong></td>
<td></td>
</tr>
<tr>
<td>Cavum septi pellucidi</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Nuchal thickness (fold) or Nuchal Index</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lips</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Heart – 4 chamber view</strong></td>
</tr>
</tbody>
</table>
### Standards for Obstetrical Ultrasound Assessments

#### ABDOMEN

<table>
<thead>
<tr>
<th>Structure</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stomach</td>
<td>Abdominal umbilical cord insertion</td>
</tr>
<tr>
<td>Bladder</td>
<td><strong>Bowel</strong></td>
</tr>
<tr>
<td>Abdominal wall</td>
<td><strong>Number of umbilical cord vessels</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Kidneys</strong></td>
</tr>
</tbody>
</table>

#### SPINE

<table>
<thead>
<tr>
<th>Structure</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cervical, thoracic, lumbar and sacral spine</td>
<td></td>
</tr>
</tbody>
</table>

#### EXTREMITIES

<table>
<thead>
<tr>
<th>Structure</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presence/absence of 4 limbs (each with 3 segments)</td>
<td>Presence/absence of hands and feet</td>
</tr>
<tr>
<td>Genitalia</td>
<td></td>
</tr>
</tbody>
</table>

#### GENITALIA

- Genitalia

#### NOTES:

- **Fetal soft markers may be assessed during imaging of this part of the anatomy. Fetal soft markers can be assessed during the 18wks 0d – 22wks 6d ultrasound. Appendix 11**
- ^A reasonable attempt will be made to assess fetal genitalia as part of the fetal anatomy assessment, but the exam time should not be extended for the sole purpose of determining fetal sex. Repeat exams for the sole purpose of determining fetal sex should not be scheduled. Appendix 10
- **Umbilical Artery Doppler:**
  - Is **not a minimum assessment requirement** and is only done when clinically indicated.
  - As per SOGC guidelines (Fetal Health Surveillance: antepartum and intrapartum Consensus Guideline #197 – Sept 2007 – Appendix 12), umbilical artery Doppler:
    - **should not be done in low risk pregnancies as it has not been shown to be of value in this group of women.**
    - can be assessed if there is suspected fetal growth restriction, placental mediated complications, maternal hypertension or a complicated multiple pregnancy such as monochorionic/diamniotic twins.
    - If performed, a loop of cord not close to the fetal or placental cord insertion should be chosen.
    - At least 3 separate Systolic/Diastolic (S/D) ratios should be measured and the lowest one reported (most artifacts exaggerate S/D ratio).
    - If the free loop result is unexpected, umbilical artery Doppler on the placental end should be performed.
    - Appropriate reference ranges should be used according to the site on the umbilical cord where interrogation occurred.
    - Best umbilical artery Doppler assessments are serial and as end diastolic flow approaches zero, increased fetal surveillance is indicated.
    - Practice guidelines regarding how to perform Doppler ultrasonography of the fetoplacental circulation have been published by the International Society of Ultrasonography in Obstetrics and Gynecology (ISUOG). Appendix 13
- When performing ultrasound scans in the 2nd trimester at gestational ages other than 18wks 0d – 22wks 6d, every effort should be made to assess, document and report the structures listed in the 2nd Trimester Ultrasound Report – Minimum Required Content (14wks 1d – 26wks 6d).
### 4.0 Minimum Required Content, *cont’d*

#### 4.4 3rd Trimester Ultrasound Report (27wks 0d – term)

Must include items listed in “ALL OB Ultrasound Reports” in addition to the following:

<table>
<thead>
<tr>
<th>Cardiac activity:</th>
<th>Head circumference (HC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Presence/absence</td>
<td>▪ Biparietal diameter (BPD)</td>
</tr>
<tr>
<td>▪ Fetal Heart Rate (FHR)</td>
<td>▪ Abdominal circumference (AC)</td>
</tr>
<tr>
<td>Fetal number:</td>
<td>▪ Femur length (FL)</td>
</tr>
<tr>
<td>▪ If multiple–chorionicity and amnionicity</td>
<td>▪ Heart – 4 chamber view</td>
</tr>
<tr>
<td>Amniotic Fluid volume:</td>
<td>▪ Cardiac outflow tracts (LVOT, RVOT) and/or</td>
</tr>
<tr>
<td>▪ Single Deepest Pocket (SDP)</td>
<td>Short Axis</td>
</tr>
<tr>
<td>Fetal position</td>
<td>▪ Stomach</td>
</tr>
<tr>
<td>Placenta:</td>
<td>▪ Bladder</td>
</tr>
<tr>
<td>▪ Number – if multiple</td>
<td>▪ Kidneys</td>
</tr>
<tr>
<td>▪ Location</td>
<td></td>
</tr>
<tr>
<td>▪ Relationship to the internal cervical os</td>
<td></td>
</tr>
<tr>
<td>Cervix (if less than 32 wks 0d)</td>
<td></td>
</tr>
</tbody>
</table>

**NOTES:**

- When performing an ultrasound scan in the third trimester and a Fetal Anatomy Ultrasound in the 2nd trimester has not been performed, every effort should be made to assess and adequately document all structures listed in the minimum requirements for the detailed assessment of fetal anatomy between 18wks 0d and 22wks 6d.

- **Umbilical Artery Doppler:**
  - Is not a minimum assessment requirement and is only done when clinically indicated.
  - As per SOGC guidelines (Fetal Health Surveillance: antepartum and intrapartum Consensus Guideline #197 – Sept 2007 – Appendix 12, umbilical artery Doppler:
    - should not be done in low risk pregnancies as it has not been shown to be of value in this group of women.
    - can be assessed if there is suspected fetal growth restriction, placental mediated complications, maternal hypertension or a complicated multiple pregnancy such as monochorionic/diamniotic twins.
  - If performed, a loop of cord not close to the umbilicus or placental cord insertion should be chosen and a wide enough sample volume chosen to include the umbilical vein as well as the artery.
  - At least 3 separate Systolic/Diastolic (S/D) ratios should be measured and the lowest one reported (most artefacts exaggerate S/D ratio).
  - If the free loop result is unexpected, umbilical artery Doppler on the placental end should be performed.
  - Appropriate reference ranges should be used according to the site on the umbilical cord where interrogation occurred.
  - Best umbilical artery Doppler assessments are serial and as end diastolic flow approaches zero, increased fetal surveillance is indicated.
  - Practice guidelines regarding how to perform Doppler ultrasonography of the fetoplacental circulation have been published by the International Society of Ultrasonography in Obstetrics and Gynecology (ISUOG). Appendix 13

- Fetal growth assessments should not be performed at less than 14 day intervals as the amount of potential fetal growth falls within the range of ultrasound inter-observer error at periods of less than 14 days.
5.0 References

Determination of Gestational Age by Ultrasound
   SOGC Clinical Practice Guideline, No. 303, February 2014 – Appendix 9

Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline
   SOGC Clinical Practice Guideline, No. 197 (Replaces No. 90 and No. 112), September 2007 – Appendix 12

Practice guidelines: Use of Doppler ultrasonography in obstetrics
   International Society of Ultrasound in Obstetrics and Gynecology (ISUOG), 2013 – Appendix 13

CAR Standard for Performing Diagnostic Obstetric Ultrasound Examinations
   Canadian Association of Radiologists (CAR), September 25, 2010 – Appendix 14

CAR Standard for Communication of Diagnostic Imaging Findings
   Canadian Association of Radiologists (CAR), September 25, 2010 – Appendix 15

Content of a Complete Routine Second Trimester Obstetrical Ultrasound Examination and Report
   SOGC Clinical Practice Guideline, No. 223, March 2009 – Appendix 16

Fetal Soft Markers in Obstetric Ultrasound
   SOGC Clinical Practice Guideline, No. 162, June 2005 (reaffirmed June 2013) – Appendix 17

Practice Guidelines: Performance of first-trimester fetal ultrasound scan
   International Society of Ultrasound in Obstetrics and Gynecology (ISUOG), 2013

Practice guidelines for performance of the routine mid-trimester fetal ultrasound scan
   International Society of Ultrasound in Obstetrics and Gynecology (ISUOG), 2010

Practice Guideline for the Performance of Obstetric Ultrasound Examinations
   American Institute of Ultrasound in Medicine (AIUM), 2007

Diagnostic Imaging Accreditation Standards 2010
   Diagnostic Accreditation Program (DAP)
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The Development Committee would like to thank the radiologists, sonographers, obstetricians, family physicians and midwives who provided valuable comments and feedback.

This document has been endorsed by the BC Radiology Society and the BC Ultrasonographers’ Society and approved by the Provincial Medical Imaging Advisory Committee (MIAC).
### SONOGRAPHER WORKSHEET - SAMPLE

Sonographer Observations only.
This is NOT a diagnosis by a medical practitioner

Exam Date: __________ DD – MON – YY

Clinical Information: ____________________________________________

| LMP: DD-MON-YY | = | _____ wks | _____ days | ☐ Uncertain LMP | G | T | P | A | L |
| 1st US on: _______ DD-MON-YY | CRL = | _____ mm | _____ wks | _____ days | ☐ No previous scan |
| Gestational age today = | _____ wks | _____ days | Based on: | ☐ U/S | ☐ LMP | ☐ IVF conception | Last Scan Date: DD-MON-YY |

Number of Fetuses: ____
Membrane: _______
Chorionicity/Amnionicity: _______________________

☐ Fetus A ☐ Fetus B ☐ Fetus C

Fetal Position: ________________________________

Placenta: ________________________________
Previa: ☐ Yes ☐ No ____________________________

DVP: _______ cm
Cervix (less than 32 wk 0 d): _______ cm

NT: _______ mm
FMF #: ________________________________

<table>
<thead>
<tr>
<th>CRL</th>
<th>mm</th>
<th>=</th>
<th>50% for</th>
<th>_____ wks</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPD</td>
<td>mm</td>
<td>=</td>
<td>50% for</td>
<td>_____ wks</td>
</tr>
<tr>
<td>HC</td>
<td>mm</td>
<td>=</td>
<td>50% for</td>
<td>_____ wks</td>
</tr>
<tr>
<td>AC</td>
<td>mm</td>
<td>=</td>
<td>50% for</td>
<td>_____ wks</td>
</tr>
<tr>
<td>FL</td>
<td>mm</td>
<td>=</td>
<td>50% for</td>
<td>_____ wks</td>
</tr>
</tbody>
</table>

Today’s Est. Fetal age: _______ wks _______ days ± _______ wks
Est. Fetal Weight: _______ gm

Today’s Est. Fetal age based on: ☐ LMP ☐ 1st US ☐ IVF Conception ☐ Today’s Scan
EDD: DD-MON-YY

#### FETAL SOFT MARKERS

<table>
<thead>
<tr>
<th>Abnormality</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerebral Ventricles</td>
<td>Abd. Cord Ins.</td>
</tr>
<tr>
<td>Cisterna M./Cerebellum</td>
<td>Heart (axis) 4C</td>
</tr>
<tr>
<td>CSP</td>
<td>Heart (SAX and/or Outflows)</td>
</tr>
<tr>
<td>Choroid Plexus/Ventricles</td>
<td>Symmetrical Lung Fields</td>
</tr>
<tr>
<td>Face (Lips/Orbits)</td>
<td>Stomach</td>
</tr>
<tr>
<td>Spine</td>
<td>Kidneys</td>
</tr>
<tr>
<td>4 Limbs each with 3 segments</td>
<td>Bladder</td>
</tr>
<tr>
<td>Genitalia</td>
<td>☐ probably M ☐ probably F ☐ not determined</td>
</tr>
</tbody>
</table>

Expand the exam as required. Document and measure, if appropriate, abnormal findings and structures not well seen.

Comments: __________________________________________________________

__________________________________________________________

Date DD – MON – YY Sonographer Initials __________

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Standards for Obstetrical Ultrasound Assessments
## First trimester (up to and including 14wks 0d) ultrasound scan (minimum requirements)

<table>
<thead>
<tr>
<th>Item</th>
<th>Image Documentation required</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal number</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Gestational sac</td>
<td>Yes</td>
<td>Intrauterine or extrauterine</td>
</tr>
<tr>
<td>Yolk sac</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Placenta</td>
<td>Yes</td>
<td>Assess</td>
</tr>
<tr>
<td>Fetal heart rate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cervix</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Adnexa</td>
<td>-</td>
<td>Assess</td>
</tr>
<tr>
<td>Both maternal ovaries</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

### MEASUREMENTS

- **Crown rump length - CRL (three)**

### MULTIPLE GESTATION

- **Membrane**

**If over 11wks 0d gestation, attempt to include:**

- **Biparietal diameter - BPD (two)**
- **Head circumference - HC (two)**
- **Choroid plexus filled ventricles**
- **Cardiac situs**
- **Stomach**
- **Symmetrical lung fields**
- **Abdominal wall showing cord insertion**
- **4 limbs, each with 3 segments**
- **Placenta**

**Nuchal translucency (NT) scan to also include:**

- **Nuchal translucency - NT (three)**

(CRL must be between 45.0 – 84.0 mm)

Report to include widest of the three measurements to one decimal point.
Second trimester (14wks 1d – 26wks 6d) anatomic ultrasound scan (minimum requirements)

<table>
<thead>
<tr>
<th>Item</th>
<th>Image Documentation required</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FETAL HEAD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebellum</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cisterna magna</td>
<td>Yes</td>
<td>See Appendix 11 re: fetal soft markers</td>
</tr>
<tr>
<td>Cavum septi pellucidi</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Ventricles</td>
<td>-</td>
<td>Assess</td>
</tr>
<tr>
<td>Choroid plexus</td>
<td>Yes</td>
<td>See Appendix 11 re: fetal soft markers</td>
</tr>
<tr>
<td>Lips</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Orbits</td>
<td>Yes</td>
<td>Presence of two orbits</td>
</tr>
<tr>
<td><strong>FETAL CHEST</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fetal heart rate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>4 chamber heart</td>
<td>Yes</td>
<td>Assess axis, size, position</td>
</tr>
<tr>
<td>Short axis and/or outflow tracts (LVOT, RVOT)</td>
<td>Yes</td>
<td>See Appendix 11 re: fetal soft markers</td>
</tr>
<tr>
<td><strong>FETAL ABDOMEN</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stomach</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Bladder</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Kidneys</td>
<td>Yes</td>
<td>See Appendix 11 re: fetal soft markers</td>
</tr>
<tr>
<td>Abdominal wall showing cord insertion</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>3 vessel umbilical cord</td>
<td>Yes</td>
<td>See Appendix 11 re: fetal soft markers</td>
</tr>
<tr>
<td>Bowel</td>
<td>-</td>
<td>Assess. See Appendix 11 re: fetal soft markers</td>
</tr>
<tr>
<td><strong>FETAL SPINE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cervical, thoracic, lumbar and sacral</td>
<td>-</td>
<td>Assess and provide either written or image documentation of the assessment</td>
</tr>
<tr>
<td><strong>FETAL EXTREMITIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 limbs</td>
<td>-</td>
<td>Assess presence, absence of 12 long bones</td>
</tr>
<tr>
<td>Hands and feet</td>
<td>-</td>
<td>Assess presence, absence, alignment</td>
</tr>
<tr>
<td><strong>FETAL GENITALIA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genitalia</td>
<td>Yes</td>
<td>Exam is not extended, nor is a repeat exam performed for the sole purpose of determining fetal sex. See Appendix 10 re: fetal sex determination</td>
</tr>
<tr>
<td><strong>MEASUREMENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biparietal diameter - BPD (two)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Head circumference - HC (two)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Abdominal circumference - AC (two)</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
### Third trimester (27wks 0d – term) ultrasound scan (minimum requirements)

<table>
<thead>
<tr>
<th>Item</th>
<th>Image Documentation required</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fetal number</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Fetal heart rate</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Amniotic fluid volume</td>
<td>Yes</td>
<td>Single deepest pocket - SDP</td>
</tr>
<tr>
<td>Fetal position</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Placenta</td>
<td>Yes</td>
<td>Evaluate location, appearance, and relationship to internal cervical os</td>
</tr>
<tr>
<td>4 chamber heart</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Short axis or outflow tracts (LVOT, RVOT)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Fetal stomach</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Fetal bladder</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Fetal kidneys</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Cervix (if less than 32wks 0d)</td>
<td>Yes</td>
<td>Assess for internal os funneling and length</td>
</tr>
<tr>
<td><strong>MEASUREMENTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biparietal diameter - BPD (two)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Head circumference - HC (two)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Abdominal circumference - AC (two)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Femur length - FL (two)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>MULTIPLE GESTATION</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Membrane</td>
<td>Yes</td>
<td>Report to include chorionicity and amnionicity</td>
</tr>
</tbody>
</table>
Acoustic Output Levels in Obstetric Ultrasound Scans

1. Guideline Purpose

The purpose of this guideline is to assure that the ALARA\(^1\) Principle is being followed when obstetrical ultrasound scans are performed.

2. Guideline Statement

2.1. Exposure time and acoustic output should be kept to the lowest levels consistent with obtaining diagnostic information and limited to medically indicated procedures. (1)

3. Guideline Principles

The thermal index and mechanical index are not perfect indicators of the risks of thermal and non-thermal bioeffects but currently they are accepted as the most practical and understandable methods of estimating the potential of such risks. Spectral and color Doppler may produce high intensities and routine examination by this modality during the embryonic period is rarely indicated. In addition, because of high acoustic absorption by bone, the potential for heating adjacent tissues must also be kept in mind [in the second and third trimesters]. (2)

3.1. Pulsed Doppler ultrasound should not be used routinely within the fetus. (2,5)

3.2. Pulsed Doppler ultrasound should not be used solely for the purpose of allowing patients to listen to the fetal heart beat.

3.3. Pulsed Doppler ultrasound may be used:

3.3.1. to examine blood flow dynamics in the umbilical arteries

3.3.2. to examine fetal blood vessels in high-risk situations

3.3.3. for certain clinical indications such as to refine risks for trisomies

3.3.4. during fetal echocardiography

3.3.5. to examine maternal uterine vessels

3.4. When performing Doppler ultrasound, the thermal index should be ≤1.0 and the exposure time should be kept as short as possible. (2,4,5)

3.5. When attempting to obtain the fetal heart rate, the AIUM recommends using M-mode first because the time averaged acoustic intensity delivered to the fetus is lower with M-mode than with spectral Doppler. If this is unsuccessful, spectral Doppler ultrasound may be used with the following guidelines:

3.5.1. use spectral Doppler only briefly (4-5 heart beats) (4)

3.5.2. keep the thermal index (TIS for soft tissues in the first trimester and TIB for bones in the second and third trimesters) as low as possible, preferably ≤1.0. (4)

\(^1\) As Low As Reasonably Achievable
Acoustic Output Levels in Obstetric Ultrasound Scans

4. Guideline Scope

This guideline is applicable to all Ultrasound departments.

5. Exceptions

This is a clinical guideline and not a policy. Exceptions may be made at the discretion of the supervising radiologist or obstetrician.

6. References

1. EFSUMB\(^2\) - Statement on the Safe use of Doppler Ultrasound During Scans at 11-14 Weeks (or Earlier in Pregnancy) 2013

2. ISUOG\(^3\) - Statement on the safe use of Doppler in the 11 to 13+6 week fetal ultrasound examination


4. AIUM\(^4\) - Statement on Measurement of Fetal Heart Rate
   http://www.aium.org/officialStatements/43

5. AIUM – Statement on the Safe Use of Doppler Ultrasound During 11-14 week scans
   http://www.aium.org/officialStatements/42

Issued by:

Brent Barton, RPL         September 12, 2014
Dr. Simon Bicknell, MPL   September 12, 2014

Approved by:

Medical Imaging Executive Committee   September 12, 2014

---

\(^2\) European federation of Societies for Ultrasound in Medicine and Biology
\(^3\) International Society of Ultrasound in Obstetrics and Gynecology
\(^4\) American Institute of Ultrasound in Medicine

This Regional Guideline was developed by the Lower Mainland Medical Imaging group which has representation from Fraser Health (FHA), Vancouver Coastal Health (VCH), Providence Health Care (PHC) and the Provincial Health Services Authority (PHSA). Approval for inclusion into the Provincial Obstetrical Ultrasound Assessment Standards has been obtained from the Provincial Medical Imaging Executive Committee.
Appendix 4 – Contact Information and FDS Referral Criteria

Provincial Medical Genetics Program
Vancouver ........................................................................................................ 604.875.2157
Victoria: ........................................................................................................ 250.727.4461

Maternal Fetal Medicine (MFM) Clinic
BC Women’s Hospital .................................................................................. 604.875.2162
Fax 604.875.3255
Jim Pattison Outpatient Care and Surgery Centre (Surrey) ......................... 604.582.4558
Fax 604.582.3798
Royal Columbian Hospital ............................................................................ 604.520.4132
Fax 604.520.4140
Victoria General Hospital ............................................................................ 250.727.4266
Fax 250.727.4441

Fetal Diagnosis Service (FDS) ........................................................................ 604.875.2848
Toll free 1.888.663.3887
Fax 604.875.3484

FDS Referral Criteria

- abdominal wall defect:
  - omphalocele, gastroschisis, Pentalogy of Cantrell, bladder extrophy
- amniotic bands
- CNS malformation
- congenital heart defect
- cystic hygroma at greater than 17 weeks
  - less than 17 weeks gestation should be referred to Medical Genetics
- diaphragmatic hernia
- facial abnormalities
  - cleft lip and/or palate
- fluid collection in fetus:
  - ascites, pleural effusion, or pericardial effusions (greater than 2 mm),
  - hydrops at greater than 17 weeks
  - hydrops at less than 17 weeks should be referred to Medical Genetics
- GI anomalies:
  - obstruction such as duodenal atresia
  - other GI obstructions presenting with dilated bowel loops
- intrauterine growth restriction (IUGR) at less than 26 weeks (defined as AC less than 5%ile or any other two growth parameters less than 5%ile)
- limb anomalies:
  - reduction defects
  - shortening of long bones (less than 1%tile)
  - clubfoot
- lung pathology such as CCAM or pulmonary sequestration
- microcephaly (HC less than 3%)
- fetal body masses
  - neck, face, back, such as sacroccocygeal teratomas
  - neural tube defect (except anencephaly à to be referred to Medical Genetics)
- obstructive uropathy:
  - hydronephrosis greater than 10mm
  - bilateral hydroureters
  - megacystis
- oligohydramnios detected before 26 weeks gestation
- polyhydramnios (if confirmed at BCWH)
- renal anomalies:
  - dysplastic
  - multicystic
  - agenesis
- skeletal dysplasia
- ventriculomegaly (10 mm or greater)

Prenatal Biochemistry Laboratory (part of the Prenatal Genetic Screening Program – PGSP) ....................................................................................... 604.875.2331
Fax 604.875.3008

Prenatal Genetic Screening Program ............................................................... www.bcprenatalscreening.ca/
Appendix 5 – PGSP Minimum Reporting Standards for Nuchal Translucency Ultrasound Measurements

Minimum Reporting Standards for Nuchal Translucency Ultrasound Measurements
Initially developed by the BC Radiologists Working Group in conjunction with the NT Working Group (2009), and revised with the Provincial OB Ultrasound Standards Working Group (2015)


The NT ultrasound report is sent to the ordering MD/MW as well as the C&W Prenatal Biochemistry Lab to be incorporated with the patient’s serum results to calculate the Integrated Prenatal Screen (IPS) risk report for the pregnancy. Go to www.bcprenatalscreening.ca for more information on prenatal genetic screening.

As per the Provincial Obstetrical Ultrasound Assessment Standards, the minimum required content for a 1st trimester report (up to 14wks 0d) must include:
- the items listed in “ALL OB Ultrasound Reports” in addition to the following:

<table>
<thead>
<tr>
<th>Include for all 1st trimester (up to and including 14wks 0d):</th>
<th>If greater than 11wks 0d gestation, attempt to include:</th>
<th>With Nuchal Translucency (NT) measurement (performed only if CRL is between 45.0 – 84.0 mm), report to also include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Presence/absence of yolk sac or embryo</td>
<td>• Head circumference (HC)</td>
<td>• NT measurement in mm to 1 decimal point</td>
</tr>
<tr>
<td>• Fetal number:</td>
<td>• Biparietal diameter (BPD)</td>
<td>• FMF# of person performing the NT measurement</td>
</tr>
<tr>
<td>- if multiple: chorionicity and amnionicity</td>
<td>• Choroid plexus filled ventricles</td>
<td>• Standard comments established by the BC Prenatal Genetic Screening Program (PGSP) See comments below (page 2)</td>
</tr>
<tr>
<td>• Location of gestational sac</td>
<td>• Stomach</td>
<td></td>
</tr>
<tr>
<td>• Cardiac activity:</td>
<td>• Symmetrical lung fields</td>
<td></td>
</tr>
<tr>
<td>- presence/absence</td>
<td>• Presence of 4 limbs, each with 3 segments</td>
<td></td>
</tr>
<tr>
<td>- fetal heart rate (FHR)</td>
<td>• Abdominal wall cord insertion</td>
<td></td>
</tr>
<tr>
<td>• Crown rump length (CRL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Maternal pelvic anatomy (adnexa, ovaries, cervix)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

West Tower, 3rd Floor
555 West 12th Avenue, Vancouver, BC, V5Z 3X7
Tel: 604 877 2121 ext 223772 | Fax: 604 872 1987 | www.bcprenatalscreening.ca
**Standard Comments (or Equivalents) for Inclusion on all NT Reports**

<table>
<thead>
<tr>
<th>If NT measurement is...</th>
<th>Standard Comment on NT Report would be....</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Below Cut-Off</strong></td>
<td></td>
</tr>
<tr>
<td>≤2.9 mm (2.9 mm or less)</td>
<td>The risk of Down syndrome associated with this NT measurement will be integrated with other parameters [maternal age, first trimester (PAPP-A) and second trimester (AFP, uE3, HCG, inhibin A) blood test results] to generate a pregnancy specific risk level for Down syndrome (trisomy 21). The C&amp;W Prenatal Biochemistry Laboratory will issue this report after receiving the second blood sample (to be ideally collected between 15 weeks 2 days – 16 weeks 6 days gestation). See <a href="http://www.bcprenatalscreening.ca">www.bcprenatalscreening.ca</a> for more info and to download lab requisition.</td>
</tr>
<tr>
<td></td>
<td>A routine detailed fetal ultrasound is recommended at 18 – 20 weeks.</td>
</tr>
<tr>
<td><strong>Above Cut-off</strong></td>
<td></td>
</tr>
<tr>
<td>≥ 3.0 mm (greater than or equal to 3.0 mm)</td>
<td>The NT measurement is 3.0 mm or above. An immediate risk assessment for Down syndrome and trisomy 18 will be determined by C&amp;W Prenatal Biochemistry Laboratory based on age and the NT only, OR age, NT, and PAPP-A (as part 1 serum availability permits). If screen risk for Down syndrome and/or trisomy 18 is positive (≥ 1/300), a lab report will be sent to the ordering care provider.</td>
</tr>
<tr>
<td>If the NT is ≥ 3.5 mm, add additional comment</td>
<td>An NT measurement greater than or equal to 3.5 mm is a risk factor for a congenital heart defect, or other genetic conditions. A referral to the Dept. of Medical Genetics (Vancouver or Victoria), and a detailed fetal ultrasound and echocardiogram at 18-20 weeks gestation, are recommended.</td>
</tr>
</tbody>
</table>
### CROWN RUMP LENGTH (CRL)

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Days</th>
<th>10% (mm)</th>
<th>50% (mm)</th>
<th>90% (mm)</th>
<th>Weeks</th>
<th>Days</th>
<th>10% (mm)</th>
<th>50% (mm)</th>
<th>90% (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6+</td>
<td>0…</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>10+</td>
<td>0…</td>
<td>26</td>
<td>33</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>7</td>
<td></td>
<td></td>
<td>28</td>
<td>35</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>2…</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td></td>
<td>2…</td>
<td>29</td>
<td>36</td>
<td>44</td>
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<tr>
<td></td>
<td>5</td>
<td>6</td>
<td>9</td>
<td></td>
<td></td>
<td>30</td>
<td>37</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>4…</td>
<td>5</td>
<td>7</td>
<td>10</td>
<td></td>
<td>4…</td>
<td>31</td>
<td>39</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>8</td>
<td>11</td>
<td></td>
<td></td>
<td>32</td>
<td>40</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>6…</td>
<td>7</td>
<td>9</td>
<td>12</td>
<td></td>
<td>6…</td>
<td>34</td>
<td>42</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>7+</td>
<td>0…</td>
<td>7</td>
<td>10</td>
<td>13</td>
<td>11+</td>
<td>0…</td>
<td>35</td>
<td>44</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>11</td>
<td>14</td>
<td></td>
<td></td>
<td>36</td>
<td>45</td>
<td>55</td>
<td></td>
</tr>
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**Source:** Unpublished data - Data was obtained at the same time, using the same methods and analysis as Lessoway V, Schulzer M, Wittman B, et al. Ultrasound fetal biometry charts for a North American Caucasian population. *J Clin Ultrasound* 1998 Nov-Dec; 26(9):433–53.

Reprinted with Permission from Lessoway, V.
Appendix 7 – Intergrowth 21st Fetal Growth Standards Review

On September 6, 2014 The Lancet published Intergrowth 21st international fetal growth standards for the clinical interpretation of routinely taken ultrasound measurements and for comparisons across populations. (Lancet 2014; 384: 869–79) These international standards were developed on the basis of recommendations from a WHO expert committee and the study was funded by the Bill and Melinda Gates Foundation.

A Working Group on biometric standards for assessing fetal growth was brought together to carefully consider the option of replacing the current, widely used, Lessoway standards with the new Intergrowth 21st standards. The working group noted that the Lessoway standard was created using a rigorous methodology and clinicians in British Columbia are familiar with this standard. However, the Intergrowth standard has several compelling features since it was created using stricter inclusion criteria, careful standardization of ultrasound measurements and sophisticated statistical methods. The Working Group was favourably disposed towards adopting the Intergrowth standard and therefore carried out an analysis to anticipate the clinical consequences of switching from the Lessoway standard to the Intergrowth standard. This involved a retrospective evaluation of the medical records of 3 groups of women previously seen at the BC Women’s Hospital including a) low risk women without known pregnancy complications (N=4440), b) women referred for suspected small-for-gestational age (SGA) fetuses (N=2099), or hypertensive complications (N=1086), and c) women referred for suspected large-for-gestational age (LGA) fetuses (N=1016), or who were diabetic (N=1692).

The analysis showed that the frequency of SGA fetuses identified by the Intergrowth standard would be significantly less than that identified by the Lessoway standard. On the other hand, the Intergrowth standard would lead to a substantial increase in LGA fetuses compared with the Lessoway standard. In short, adopting the Intergrowth standard would lead to a significant change in the frequency of SGA and LGA diagnoses in clinical practice (irrespective of whether the 3rd/97th or the 10th/90th centile was used for diagnosis). In analyzing a “low risk cohort”, similar results were seen (the LGA was overrepresented using Intergrowth 21 charts). The Working Group found this concerning, especially since the under identification of small fetuses has the potential for increasing mortality and serious morbidity, while the excess number of LGA fetuses identified would drastically increase the need for clinical resources. An alternative interpretation is that the current standard over-diagnoses SGA fetuses and drastically under-diagnose LGA fetuses (though observed rates of macrosomia at birth contradict the latter proposition).

After careful consideration, the Working Group recommended against adopting the Intergrowth standard and to continue to use the Lessoway standard for fetal biometry assessments. The group continues to keep abreast of future developments in the field and will also pursue analyses that provide an outcome (mortality and serious morbidity) based assessment of the Intergrowth standard.

**Working Group:**
Dr. Blair Butler (MFM)
Dr. Jennifer Hutcheon (Epidemiologist)
Dr. KS Joseph (Epidemiologist)
Vickie Lessoway (Sonographer)
Dr. Ken Lim (MFM)
Dr. Gerry Marquette (MFM)
Amniotic fluid assessment by ultrasound is at best semi-quantitative. It is not a true quantitative measurement and as such reproducibility and accuracy (to the true volume within, especially at the extremes) will be elusive using 2D ultrasound.

Physiological considerations
The assessment of amniotic fluid volume has been an integral component of obstetrical scanning and fetal health surveillance for many years. Abnormalities of amniotic fluid are associated with a variety of adverse maternal, fetal and obstetrical conditions. It is also clear that amniotic fluid volume is dynamic and can rapidly change due to non-pathological processes (maternal hydration, maternal activity/rest, maternal position etc). There is likely a limit to how much amniotic fluid can be affected by these factors, but this modifiable component, as assessed by AFI, is as much as 45-50 mm range (Ulker, 2012, 2013), (Kilpatrick, 1993). At the extremes of diagnostic categories (oligohydramnios, polyhydramnios), this is unlikely to alter the diagnosis, but near the thresholds, this may be a factor. This may help explain the inconsistency of results when tests are repeated within hours of each other, or even between different operators. Furthermore, it is unclear whether manipulation of these modifiable factors affects fetal outcomes, or changes the diagnostic value of amniotic fluid assessment.

It would be difficult to control all the physiological factors which may affect the amniotic fluid volume in the typical diagnostic ultrasound lab. Ulker (2013) found that rest in the left lateral position improved the AFI compared to activity (15 min of sitting followed by 5 min of walking repeatedly for at least 1 hour). There was no change in the AFI in the activity group. Both oral hydration at a rate of 1000 cc/hr and rest in the left lateral position had effects within the first hour of initiation. Maternal hydration can be simply instituted, but maternal rest in the left lateral position for a sufficient duration would be more difficult, given that patients are scanned in a supine (commonly wedged) position. Physiologically, it is unknown if rest in the supine position (as opposed to left lateral) would increase or decrease amniotic fluid volume (due to uterine compression of vena cava and/or aorta leading to decreased placental perfusion). Therefore, we suggest that women be well hydrated prior to the ultrasound exam to control that physiological factor.

Technical and operator factors
Prior studies have demonstrated that using color Doppler (to exclude cord) may affect the assessment. With more modern technology, this should be less of an issue. A recent study by Sande (2015) suggests the limits of agreement of both AFI and SVDP are quite wide, both between and within observers which again, adds to the inconsistency of results which negatively affects clinical utility. Maternal position during fluid assessment is frequently not described in the literature in regards to single pocket assessments.

Choice of ultrasound measurement of amniotic fluid assessment
It is difficult to estimate volume (3 dimensional) based on one or two dimensional measures (such as AFI or SDP). Changes in ultrasound imaging quality and technology, and lack of contemporary modern studies contribute to the complexity of this topic. To minimize intervention rates, without compromising fetal outcomes, the Single Deepest Pocket (SDP) method is advocated. This is based on a Cochrane meta-analysis of existing randomized data comparing a single pocket assessment versus the AFI in diagnosing oligohydramnios. In four of the five trials used in the analysis, the technique can be linked back to the original Chamberlain definition. The fifth article is a foreign language journal which could not be easily reviewed. Chamberlain's original definition of single pocket method leaves some room for interpretation, hence the proposed definition/standard in this document can be best described as modernized and our best interpretation of Chamberlain’s technique.

Chamberlain's original definition: “...the largest pocket of fluid was measured and recorded. The depth of the pocket was measured at a right angle to the uterine contour...the width of the largest pocket of amniotic fluid was measured at a right angle to the depth measurement...In all cases except for decreased amniotic fluid, the width of a pocket of amniotic fluid was >1 cm.”

It should be noted that a linear transducer was used, and no mention is made of transducer scanning plane or orientation. Maternal position is not described. Communication with a co-author revealed that...
“(Chamberlain) emphasized that the transducer should not be angled but when possible should follow the contour of the uterus.”

Another way to think of the modernized description is as follows:

Find the largest pocket free of cord and fetal body parts. If that pocket can fit a 2 x 1 cm rectangle whose long axis is approximately at right angles to the uterine wall, then the amniotic fluid assessment is considered normal. If the pocket is so big, that there is fluid/space around an 8 x 1 cm rectangle (oriented as above), then the amniotic fluid assessment is considered to be polyhydramnios.

**Terminology**

There are different methods to assess the largest pocket of fluid which vary from a single vertical or perpendicular measurement to a two dimensional product of the pocket (Magann, 1994). The terms used are also varied, and unfortunately, are used interchangeably, adding to the confusion when assessing the literature. For example, Chamberlain’s reference has been described using the following terms: Single deepest pocket (Magann, 2004), Maximum vertical pocket (Williams, 1993), Maximum pool depth (Nwosu, 1994) and Single deepest vertical pocket (Moses, 2004). In his recent (2015) article, Sande uses the terms “single deepest vertical pool” or “maximum vertical pocket”, but this is described as the “ultrasound probe being held vertical to the uterine contour onto the abdomen and parallel to the maternal sagittal plane”. This does not appear to match the Chamberlain definition, particularly since the minimum width of the pocket is not included. Maternal position is not described.

For this guideline, it was felt that using the term “single deepest pocket” (SDP) was the one most often ascribed to Chamberlain and removes the word “vertical”, which suggests that the ultrasound plane has to be vertical, or perpendicular to the floor, which is not used in Chamberlain’s description.

**Origin of definitions of fluid abnormalities**

This was based on Chamberlain’s original definitions, and randomised trials used in the Cochrane meta-analysis. The reference ranges are from Magann (2000) (whose group contributed three of the RCTs to the above mentioned Cochrane meta-analysis) and the normal distributions published in that paper, suggest the simple definitions proposed are reasonable to define normal from abnormal.

**References**


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Determination of Gestational Age by Ultrasound

Evidence: Published literature was retrieved through searches of PubMed or MEDLINE and The Cochrane Library in 2013 using appropriate controlled vocabulary and key words (gestational age, ultrasound biometry, ultrasound dating). Results were restricted to systematic reviews, randomized control trials/controlled clinical trials, and observational studies written in English. There were no date restrictions. Searches were updated on a regular basis and incorporated in the guideline to July 31, 2013. Grey (unpublished) literature was identified through searching the websites of health technology assessment and health technology-related agencies, clinical practice guideline collections, clinical trial registries, and national and international medical specialty societies.

Values: The quality of evidence in this document was rated using the criteria described in the Report of the Canadian Task Force on Preventive Health Care (Table 1).

Benefits, harms, and costs: Accurate assignment of gestational age may reduce post-dates labour induction and may improve obstetric care through allowing the optimal timing of necessary interventions and the avoidance of unnecessary ones. More accurate dating allows for optimal performance of prenatal screening tests for aneuploidy. A national algorithm for the assignment of gestational age may reduce practice variations across Canada for clinicians and researchers. Potential harms include the possible reassignment of dates when significant fetal pathology (such as fetal growth restriction or macrosomia) result in a discrepancy between ultrasound biometric and clinical gestational age. Such reassignment may lead to the omission of appropriate—or the performance of inappropriate—fetal interventions.

Summary Statements
1. When performed with quality and precision, ultrasound alone is more accurate than a “certain” menstrual date for determining gestational age in the first and second trimesters (≤ 23 weeks) in spontaneous conceptions, and it is the best method for estimating the delivery date. (II)
2. In the absence of better assessment of gestational age, routine ultrasound in the first or second trimester reduces inductions for post-term pregnancies. (I)

Abstract
Objective: To assist clinicians in assigning gestational age based on ultrasound biometry.

Outcomes: To determine whether ultrasound dating provides more accurate gestational age assessment than menstrual dating with or without the use of ultrasound. To provide maternity health care providers and researchers with evidence-based guidelines for the assignment of gestational age. To determine which ultrasound biometric parameters are superior when gestational age is uncertain. To determine whether ultrasound gestational age assessment is cost effective.

Keywords: ultrasound, gestational age, dating

This document reflects emerging clinical and scientific advances on the date issued and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed. Local institutions can dictate amendments to these opinions. They should be well documented if modified at the local level. None of these contents may be reproduced in any form without prior written permission of the SOGC.
MINISTRY OF HEALTH POLICY COMMUNIQUE 2012
FETAL SEX DETERMINATION BY ULTRASOUND

EFFECTIVE DATE: OCTOBER 22, 2012

POLICY OBJECTIVE

The objective of this policy is to achieve:
- consistency in approach across health authorities to fetal sex determination by ultrasound and disclosure of fetal sex information to patients;
- alignment with the College of Physicians and Surgeons of British Columbia’s Guideline on Disclosure of Fetal Sex; and,
- alignment with Canadian clinical practice guidelines.

SCOPE

This policy applies to obstetrical ultrasound services provided by the regional health authorities and the Provincial Health Services Authority.

POLICY

1. At the time of a routine full fetal anatomical assessment, a reasonable attempt will be made by the practitioner performing the ultrasound assessment to assess fetal genitalia within the allotted exam time.

2. The allotted exam time will not be extended for the sole purpose of determining fetal sex and repeat exams will not be scheduled for the sole purpose of determining fetal sex.

3. The sex of the fetus will be recorded as Male, Female or Not Determined in the notes taken during the ultrasound assessment.

4. The practitioner performing the ultrasound assessment is not to release any information about the sex of the fetus directly to the patient.

5. The sex of the fetus shall be on the final report that is issued to the referring practitioner.

6. The patient may request fetal sex information from her referring practitioner.

MINISTRY CONTACT:    Executive Director, Hospital and Provincial Services Branch
Appendix 11 – Fetal Soft Markers

Extracted from: SOGC Clinical Practice Guideline No. 162 June 2005 – Fetal Soft Markers in Obstetric Ultrasound

Permission to reprint has been provided courtesy of the Society of Obstetricians and Gynaecologists of Canada (SOGC)

Fetal Soft Markers can be assessed during the mid trimester ultrasound. Assessment of fetal soft markers should evaluate 8 markers, 5 of which (thickened nuchal fold, echogenic bowel, mild ventriculomegaly, echogenic focus in the heart, and choroid plexus cyst) are associated with an increased risk of fetal aneuploidy, and in some cases with non-chromosomal problems, while 3 (single umbilical artery, enlarged cisterna magna, and pyelectasis) are only associated with an increased risk of non-chromosomal abnormalities when seen in isolation. Timely referral and/or consultation for confirmation, patient education, and investigation are recommended to maximize pregnancy management options.

1. Nuchal fold (measured in mm) (aka nuchal thickness)
   A nuchal fold measurement is obtained in a transverse section of the fetal head at the level of the cavum septum pellucidum and thalami, angled posteriorly to include the cerebellum. The measurement is taken from the outer edge of the occiput bone to the outer skin limit directly in the midline.
   - Significant at 18–24 wks = 6 mm or greater
   - Significant at 16–18 wks = 5 mm or greater

NOTE: A nuchal translucency (NT) can be measured when the CRL is between 45.0 and 84.0 mm. To be used in the generation of a Prenatal Genetic Screening report, an NT must be performed by an individual certified by the FMF (Fetal Medicine Foundation) to perform NT measurements. Please see Appendix 5 for the “Minimum Reporting Standards for First Trimester Ultrasound Scans which include NT Measurements”.

2. Echogenic bowel (reported as: grade 2 or 3 vs normal)
   Echogenic bowel should be identified by comparison with the echogenicity of surrounding bone using an appropriate transducer (5 MHZ or less) and gain setting. Bowel echogenicity equal to (grade 2), or greater than (grade 3) bone is significant. Grade 1 echogenic bowel (bowel echogenicity less than bone) is not significant and should not be reported.

3. Mild ventriculomegaly (MVM) (measured in mm)
   Mild ventriculomegaly is defined as measurements greater than 10 mm and less than or equal to 15 mm. Measurements are obtained from an axial plane at the level of the thalamic nuclei just below the standard image to measure the BPD. Ventricular measurements are usually obtained in the far image field because of “typical” near-field artifacts. Cursors are positioned perpendicular to the long axis of the ventricle at the edges of the ventricular lumen, near the posterior portion of the choroid plexus.

4. Echogenic intracardiac focus (EICF)
   Defined as a focus of echogenicity comparable to bone. Using an appropriate transducer frequency, 5 MHZ or less, and appropriate gain setting, an EICF can be diagnosed on the standard 4-chamber view of the fetal heart. Echogenicity less than that of bone is not significant and should not be reported.

5. Choroid plexus cyst (CPC) (measured in mm)
   Cysts (greater than or equal to 3 mm) found in the choroid plexus within the lateral cerebral ventricles of the developing fetus at 14 to 24 weeks gestation. Imaging of the choroid plexus is performed in the transverse plane of the fetal head at the same level that the lateral cerebral ventricle is evaluated.
6. Enlarged cisterna magna (measured in mm)
   The cisterna magna is measured on a transaxial view of the fetal head angled 15 degrees caudal to the canthomeatal line. The anterior/posterior diameter is taken between the inferior/posterior surface of the vermis of the cerebellum to the inner surface of the cranium. An enlarged cisterna magna is defined by an anterior/posterior diameter of greater than (or equal to) 10 mm. The measurement will be falsely exaggerated by a steep scan angle through the posterior fossa or dolichocephaly.

7. Pyelectasis (measured in mm)
   Mild pyelectasis is defined as a hypoechoic spherical or elliptical space within the renal pelvis that measures greater than (or equal to) 5mm and less than (or equal to) 10 mm. The measurement is taken on a transverse section through the fetal renal pelvis using the maximum anterior-to-posterior measurement. Measurements less than 5 mm are normal, should not be designated as pyelectasis, and should not be reported.

8. Single Umbilical Artery (SUA)
   Single umbilical artery is the absence of one of the fetal umbilical cord arteries surrounding the fetal bladder.

Permission to reprint has been provided courtesy of the Society of Obstetricians and Gynaecologists of Canada (SOGC)
Fetal Health Surveillance: Antepartum and Intrapartum Consensus Guideline

Abstract

Objective: This guideline provides new recommendations pertaining to the application and documentation of fetal surveillance in the antepartum and intrapartum period that will decrease the incidence of birth asphyxia while maintaining the lowest possible rate of obstetrical intervention. Pregnancies with and without risk factors for adverse perinatal outcomes are considered. This guideline presents an alternative classification system for antenatal fetal non-stress testing and intrapartum electronic fetal surveillance to what has been used previously. This guideline is intended for use by all health professionals who provide antepartum and intrapartum care in Canada.

Options: Consideration has been given to all methods of fetal surveillance currently available in Canada.

Outcomes: Short- and long-term outcomes that may indicate the presence of birth asphyxia were considered. The associated rates of operative and other labour interventions were also considered.

Evidence: A comprehensive review of randomized controlled trials published between January 1996 and March 2007 was undertaken, and MEDLINE and the Cochrane Database were used to search the literature for all new studies on fetal surveillance both antepartum and intrapartum. The level of evidence has been determined using the criteria and classifications of the Canadian Task Force on Preventive Health Care (Table 1).

Sponsor: This consensus guideline was jointly developed by the Society of Obstetricians and Gynaecologists of Canada and the British Columbia Perinatal Health Program (formerly the British Columbia Reproductive Care Program or BCRCP) and was partly supported by an unrestricted educational grant from the British Columbia Perinatal Health Program.

Key Words: Fetal surveillance, intermittent auscultation, electronic fetal monitoring, umbilical Doppler, uterine artery Doppler, contraction stress test, biophysical profile, fetal movement, antepartum, intrapartum, non-stress test
ISUOG Practice Guidelines: use of Doppler ultrasonography in obstetrics

Clinical Standards Committee

The International Society of Ultrasound in Obstetrics and Gynecology (ISUOG) is a scientific organization that encourages sound clinical practice, teaching and research related to diagnostic imaging in women's healthcare. The ISUOG Clinical Standards Committee (CSC) has a remit to develop Practice Guidelines and Consensus Statements as educational recommendations that provide healthcare practitioners with a consensus-based approach for diagnostic imaging. They are intended to reflect what is considered by ISUOG to be the best practice at the time at which they are issued. Although ISUOG has made every effort to ensure that Guidelines are accurate when issued, neither the Society nor any of its employees or members accepts any liability for the consequences of any inaccurate or misleading data, opinions or statements issued by the CSC. They are not intended to establish a legal standard of care because interpretation of the evidence that underpins the Guidelines may be influenced by individual circumstances and available resources. Approved Guidelines can be distributed freely with the permission of ISUOG (info@isuog.org).

SCOPE OF THE DOCUMENT

This document summarizes Practice Guidelines regarding how to perform Doppler ultrasonography of the fetoplacental circulation. It is of utmost importance not to expose the embryo and fetus to unduly harmful ultrasound energy, particularly in the earliest stages of pregnancy. At these stages, Doppler recording, when clinically indicated, should be performed at the lowest possible energy levels. ISUOG has published guidance on the use of Doppler ultrasound at the 11 to 13+6-week fetal ultrasound examination. When performing Doppler imaging, the displayed thermal index (TI) should be ≤ 1.0 and exposure time should be kept as short as possible, usually no longer than 5–10 min and not exceeding 60 min.

It is not the intention of these Guidelines to define clinical indications, specify proper timing of Doppler examination in pregnancy or discuss how to interpret findings or the use of Doppler in fetal echocardiography. The aim is to describe pulsed Doppler ultrasound and its different modalities: spectral Doppler, color flow mapping and power Doppler, which are commonly used to study the maternal–fetal circulation. We do not describe the continuous wave Doppler technique, because this is not usually applied in obstetric imaging; however, in cases in which the fetus has a condition leading to very high-velocity blood flow (e.g. aortic stenosis or tricuspid regurgitation) it might be helpful in order to define clearly the maximum velocities by avoiding aliasing.

The techniques and practices described in these Guidelines have been selected to minimize measurement errors and improve reproducibility. They may not be applicable in certain specific clinical conditions or for research protocols.

RECOMMENDATIONS

What equipment is needed for Doppler evaluation of the fetoplacental circulation?

- Equipment should have color flow and spectral wave Doppler capabilities with onscreen display of flow velocity scales or pulse repetition frequency (PRF) and Doppler ultrasound frequency (in MHz).
- Mechanical index (MI) and TI should be displayed on the ultrasound screen.
- Ultrasound system should generate a maximum velocity envelope (MVE) showing the whole spectral Doppler waveform.
- MVE should be possible to delineate using automatic or manual waveform traces.
- System software must be able to estimate peak systolic velocity (PSV), end-diastolic velocity (EDV) and time-averaged maximum velocity from the MVE and to calculate the commonly used Doppler indices i.e. pulsatility (PI) and resistance (RI) indices and systolic/diastolic velocity (S/D) ratio. On the tracing, the various points included in the calculations should be indicated, to ensure correctly calculated indices.

How can the accuracy of Doppler measurements be optimized?

Pulsed wave Doppler ultrasonography

- Recordings should be obtained during absence of fetal breathing and body movements, and if necessary during temporary maternal breath hold.

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CAR Standard for Performing Diagnostic Obstetric Ultrasound Examinations

The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

Approved: September 25, 2010

Katherine Fong; Cliff Levi; Lisl Mayer; Francoise Rypens, Shia Salem, Chair; Ian Suchet; Ants Toi and Witek Zaleski.
CAR Standard for Communication of Diagnostic Imaging Findings

The standards of the Canadian Association of Radiologists (CAR) are not rules, but are guidelines that attempt to define principles of practice that should generally produce radiological care. The physician and medical physicist may modify an existing standard as determined by the individual patient and available resources. Adherence to CAR standards will not assure a successful outcome in every situation. The standards should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The standards are not intended to establish a legal standard of care or conduct, and deviation from a standard does not, in and of itself, indicate or imply that such medical practice is below an acceptable level of care. The ultimate judgment regarding the propriety of any specific procedure or course of conduct must be made by the physician and medical physicist in light of all circumstances presented by the individual situation.

Approved: September 25, 2010

This standard is partly based on the ACR practice guidelines which we acknowledge.
Gregory Butler, Chair; Reza Forghani, Mehran Midia, and Shia Salem
Content of a Complete Routine Second Trimester Obstetrical Ultrasound Examination and Report

Abstract

Objective: To review the benefits of and requirements for a complete second trimester ultrasound and the documentation needed.

Outcomes: A complete second trimester ultrasound provides information about the number of fetuses, the gestational age, the location of the placenta, and fetal and maternal anatomy.

Evidence: In the production of this document, the American Institute of Ultrasound in Medicine’s “Practice Guideline for the Performance of Obstetric Ultrasound Examinations,” the American College of Obstetricians and Gynecologists’ practice bulletin, “Ultrasound in Pregnancy,” and the Royal College of Obstetricians and Gynaecologists’ Working Party Report, “Ultrasound Screening” were reviewed. PubMed and the Cochrane Database were searched using the words “routine second trimester obstetrical ultrasound.”

Values: The evidence was evaluated using the guidelines developed by the Canadian Task Force on Preventive Health Care.

Benefits, Harms, and Costs: A routine complete second trimester ultrasound between 18 and 22 weeks and a complete ultrasound report will provide the best opportunity to diagnose fetal anomalies and to assist in the management of prenatal care. It will also reduce the number of ultrasound examinations done during the second trimester for completion of fetal anatomy survey. The costs are those involved with the performance of obstetrical ultrasound.

Validation: This is a revision of previous guidelines; information from other consensus reviews from medical publications has been used.


Recommendations

1. Pregnant women should be offered a routine second trimester ultrasound between 18 and 22 weeks’ gestation. (II-2B)
2. Second trimester ultrasound should screen for the number of fetuses, the gestational age, and the location of the placenta. (II-1A)
3. Second trimester ultrasound should screen for fetal anomalies. (II-2B)

SECOND TRIMESTER ULTRASOUND

A n ultrasound scan performed between 18 and 22 weeks’ gestation provides the pregnant woman and her care provider with information about multiple aspects of her pregnancy.1–4 The obstetrical ultrasound will inform them of and/or confirm the number of fetuses present, the gestational age, and the location of the placenta. It will present an opportunity to diagnose congenital anomalies and/or to detect soft markers of aneuploidy and to identify maternal pelvic pathology. The occurrence of twins undiagnosed at delivery is extremely rare when women have received a second trimester ultrasound, and the likelihood of postdates induction and intrauterine growth restriction significantly decreases.1 In the last two decades, the infant death rate from congenital...
Fetal Soft Markers in Obstetric Ultrasound

Abstract

Objective: To evaluate ultrasound “soft markers” used in fetal genetic screening.

Options: Ultrasound screening at 16 to 20 weeks is one of the most common genetic screening and (or) diagnostic tests used during pregnancy. The practical concern for ultrasound screening is false-positive and false-negative (missed or not present) results. The use and understanding of ultrasound soft markers and their screening relative risks is an important option in the care of pregnant women. Currently, the presence of a “significant” ultrasound marker adds risk to the likelihood of fetal pathology, but the absence of soft markers, except in controlled situations, should not be used to reduce fetal risk.

Key Words: Ultrasound, soft marker, prenatal screening, fetus, aneuploidy, trisomy, genetic

Outcomes: The use of ultrasound in pregnancy has significant health and economic outcomes for families and the health care system, compared with no ultrasound use. The Society of Obstetricians and Gynaecologists of Canada (SOGC) recommends a single “routine” ultrasound evaluation at 16 to 20 weeks in all pregnancies. Patients need to be counselled about the positive and negative findings that ultrasound may reveal so they are prepared for unexpected pregnancy knowledge and the possibility of further testing options being offered.

Evidence: Committee members were asked to review specific soft marker ultrasound topics after consensus was reached on the most commonly published soft markers. Medline and PubMed databases were searched for peer-reviewed English articles published from 1985 to 2003. Reviews of each soft marker topic were written by committee members with quality of evidence and classification of recommendations. These reviews were then circulated and discussed by the combined committee. Final format for the guideline was completed by the committee chairpersons.

Values: The quality of evidence and classification of recommendations followed discussion and consensus by the combined committees of Diagnostic Imaging and Genetics of the SOGC.

Benefits, Harms, Costs: It is not possible at this time to determine the benefits, harms, and costs of the guideline because this would require health surveillance and research and health resources not presently available; however, these factors need to be evaluated in a prospective approach by provincial and tertiary initiatives. Consideration of these issues is in the options and outcome section of this abstract.

Recommendations:

1. The screening ultrasound at 16 to 20 weeks should evaluate 8 markers, 5 of which (thickened nuchal fold, echogenic bowel, mild ventriculomegaly, echogenic focus in the heart, and choroid plexus cyst) are associated with an increased risk of fetal aneuploidy and, in some cases with nonchromosomal problems, while 3 (single umbilical artery, enlarged cisterna magna, and pyelectasis) are only associated with an increased risk of nonchromosomal abnormalities when seen in isolation (II-2 B).

2. Identification of soft markers for fetal aneuploidy requires correlation with other risk factors, including history, maternal age, and maternal serum testing results (II-1 A).

3. Soft markers identify a significant increase in fetal risk for genetic disease. Timely referral for confirmation, counselling, and investigation is required to maximize management options (III-B).

Validation: Peer-reviewed guideline development is part of the SOGC’s Genetics Committee in June 2013, and has been reaffirmed for continued use until further notice.

Sponsors: SOGC.
