Clinical Practice Guideline	**Management of the Small for Gestational Age or Growth Restricted Fetus**
Department	**Women's Health**

Purpose

This Clinical Guideline has been adopted from Monash Health Guidelines to guide management of small for gestational age or growth restricted fetus. As a result the ultrasound Doppler measurement is now changed to PI to be in line with Monash Health, our closest tertiary referral centre to have similar management, facilitate discussion of cases and transfer of care when required.

It has been adapted for local use from the *Royal College of Obstetricians and Gynaecologists (RCOG) Green-top Guideline: The investigation and management of the small-for-gestational-age fetus.*

Scope

To identify small for gestational age and growth restricted fetus and to reduce fetal morbidity and mortality.

Responsibilities

Employer

Peninsula Health acts to minimize risk by supporting adherence to Guidelines, occupational health and safety obligations and duty of care to staff and consumers through a comprehensive clinical governance system which includes the provision of and education in relation to evidence based Guidelines.

Departmental

The Executive supports Department Heads in the monitoring and evaluation of Guidelines. Providing the necessary infrastructure and resource to facilitate compliance with Guidelines and assisting the Department Heads to facilitate education and enforce compliance with Guidelines.

Department Head/Manager

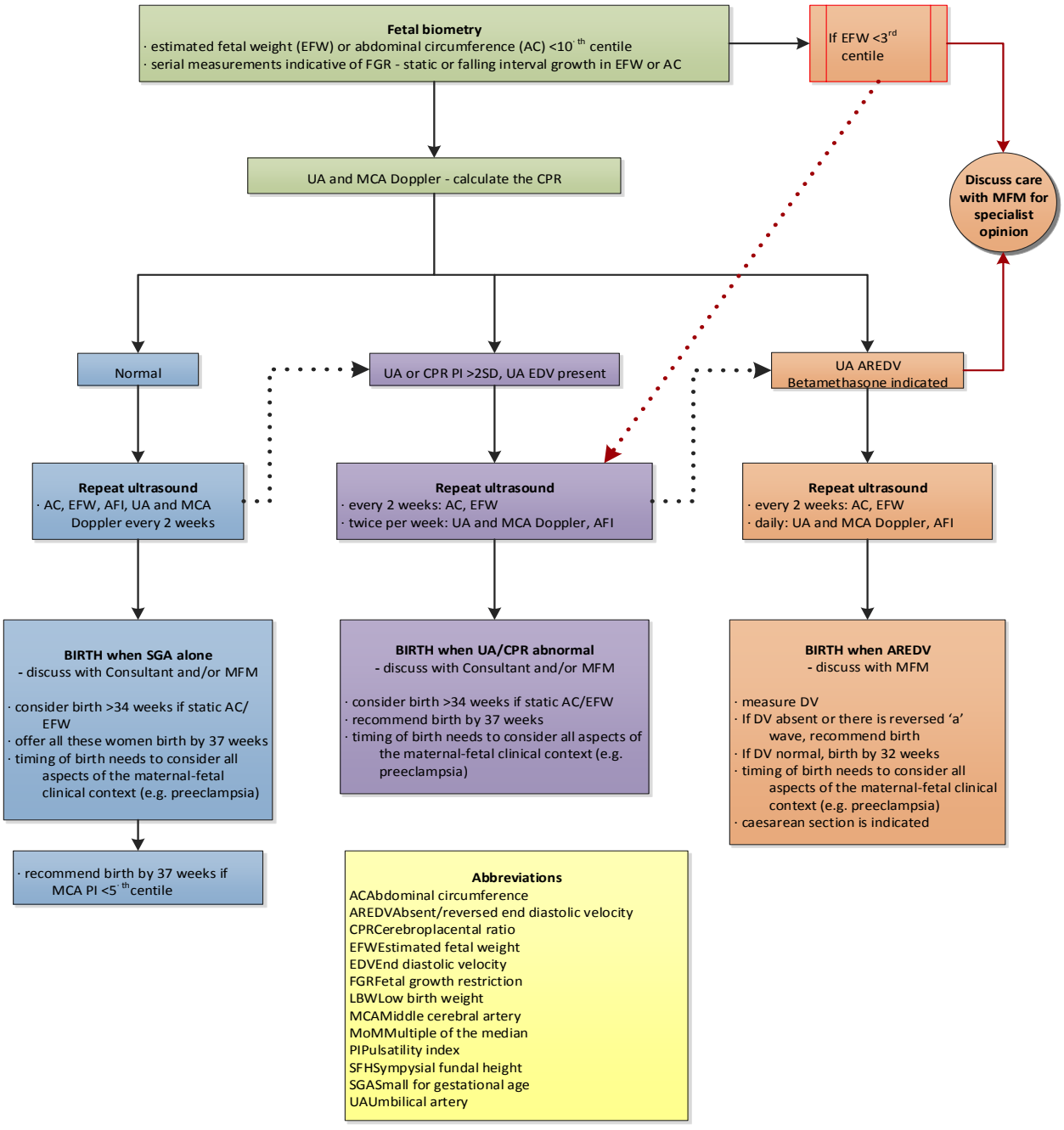
Department Heads/ Managers monitor compliance with Guideline via agreed evaluation methods and associated KPIs. Ensure all staff have easy access to relevant Guidelines and are kept informed of any updates or changes to Guidelines related to their employment and scope of practice. Facilitate education as appropriate in relation to the Guideline.

Employee

All employees must be familiar with and comply with Guidelines relevant to their employment and scope of practice.

Guideline

Management of Small for Gestational Age and Growth Restricted Fetus Guidelines – Adopted from Monash Health



Note: >2SD for UA and CPR Dopplers is: UA PI >95th% and CPR <5th%

A small for gestational age (SGA) fetus is defined as a fetus with an estimated fetal weight (EFW) or abdominal circumference (AC) less than the 10th percentile.[1] Severe SGA is defined as a fetus with an estimated fetal weight (EFW) or abdominal circumference (AC) less than the 3rd percentile.[1] 50-70% of SGA fetuses are constitutionally small.[1]

Fetal growth restriction (FGR) is used to describe a fetus that has not reached its growth potential because of genetic or environmental factors. A growth-restricted fetus may be small for gestational age or of normal size. The likelihood of FGR is higher in severely SGA fetuses.[1] The origin of FGR may be fetal, placental, or maternal, with significant overlap among these entities. Population-based series show that antenatal identification of the growth restricted fetus results in a reduction of adverse perinatal outcomes and stillbirth. Furthermore, most cases of preventable stillbirth are attributable to undetected FGR.

It is often difficult to distinguish SGA and FGR during pregnancy. Thus, management pathways often consider overall care, rather than making a distinction between the two.

SGA VS FGR

While both SGA and FGR refer to overall fetal smallness, usually <10th centile, FGR refers to those fetuses with a higher risk of in utero decompensation, deterioration, stillbirth and overall poorer perinatal outcome.

The FGR fetus may display ultrasound growth, Doppler or amniotic fluid level evidence of haemodynamic redistribution reflecting fetal adaptation to under nutrition or hypoxia, histological and biochemical signs of placental disease, and/or the development of pre-eclampsia.

Constitutional SGA refers to those small babies who do not show the above signs and who usually maintain adequate growth velocities throughout gestation within the context of being small. Such constitutionally SGA babies have similar perinatal outcomes to those who are normally grown.

ULTRASOUND

Ultrasound measurement of fetal size has been shown to be more predictive of FGR / SGA than clinical assessment with SFH measurement (Level III-2).[2]

Both SGA and FGR fetuses can be detected when the fetal abdominal circumference (AC) and/or estimated fetal weight (EFW) are <10th centile (Level I). Such women should be offered serial growth scans at intervals of greater than or equal to two weeks, with fewer false positives for serial scans performed at 3-4 week intervals. A serial fall in the AC or EFW growth velocity can further indicate FGR (Level III-2).

1. Ultrasound parameters of fetal wellbeing

a. Umbilical artery (UA) Doppler

UA spectral Doppler pulsatility index (PI) reflects placental resistance to fetal cord blood flow.

UA Doppler is the only measure that provides both diagnostic and prognostic information for the management of FGR. Increased UA Doppler PI has very good positive predictive value in identifying fetuses with early onset FGR, alone or in combination with cerebroplacental ratio (CPR). Furthermore, the progression of Doppler patterns to absent or reversed end diastolic velocity (EDV) correlates with the risk of perinatal morbidity and mortality. Absent or reversed EDV have been shown to be present around one week prior to acute fetal deterioration.[3]

After 30 weeks the risk of stillbirth of a fetus with isolated REDV in the UA Doppler appears to overcome the risks of prematurity[4], and expediting birth is usually justified. However, false positives can be observed with fetal movement. Abnormal data findings should be repeated at other points in the examination. If still abnormal, it should be repeated within 12-24 hours. Secondary factors such as the EFW, cardiotocograph (CTG), MCA, ductus venosus (DV) and maternal co-morbidities may impact this decision making.

In fetuses with normal UA PI Doppler velocities it is reasonable to repeat the Doppler weekly to fortnightly.

In fetuses with abnormal UA PI and no indication for birth, there is only Level IV evidence to suggest twice a week UA Doppler when there is forward diastolic flow and daily UA Doppler if flow is absent or reversed.

After 34 weeks gestation, the feto-placental circulation is likely too large to reflect raised UA PI within the context of FGR. Therefore the addition of MCA spectral Doppler is warranted from 34 weeks if CPR is not already being utilised.

b. Middle cerebral artery (MCA) Doppler

The MCA PI informs about the existence of brain vasodilatation, a surrogate marker of hypoxia.

MCA PI Doppler measurement has been shown to be useful in the identification and prediction of adverse outcomes among late onset FGR, independent of the UA Doppler (which is usually normal in these cases).

In preterm SGA fetuses, MCA Doppler has limited accuracy to predict fetal acidaemia and adverse outcome and should not be used to time birth (Level III-2). It is a marker for hypoxia

and may guide surveillance in the early onset group and trigger intervention at a later gestational age.

In the term SGA fetus with normal UA Doppler, a low MCA Doppler (<5th centile) has moderate predictive value for acidosis at birth and may be used to time birth (Level III-3).

Furthermore, fetuses with low MCA PI have a six-fold increased risk of emergency caesarean section for abnormal CTG and/or abnormal fetal scalp blood sample finding.[5]

c. **Cerebroplacental ratio (CPR)**

a) Recent literature has suggested that measurement of umbilical artery Doppler, whilst useful in separating the most severe FGR babies from those otherwise classified as SGA, does not provide an adequate screening tool to detect all babies with FGR.

b) In order to detect these babies, the Doppler CPR is becoming more widely utilised and validated (MCA PI ÷ UA PI). This ratio has been shown to be more sensitive to hypoxia than its individual components[6] and correlates better with adverse outcomes. [7]

d. **Ductus venosus (DV) Doppler**

DV PI and 'a' (atrial) wave morphology is the single strongest Doppler parameter to predict short-term risk of fetal death in early onset FGR.

With values above the 95th centile or with an absent 'a' wave, it can be considered as a very late measure of fetal decompensation and relative fetal heart failure.

As such, this sign is normally considered sufficient to recommend delivery at any gestation, after completion of steroids for fetal lung maturity.

In 90% of cases, the abnormalities in the DV will precede a non-reassuring biophysical profile score by 48-72 hours. Like other spectral Doppler, false positives can occur and thus any abnormal reading should be repeated and considered in the wider clinical context.

Currently the technical challenges in performing this measurement mean that there is insufficient data to support its use in timing delivery in FGR, however it may be useful in guiding ongoing fetal surveillance.

e. **Amniotic fluid volume (AFV)**

The amniotic fluid volume is frequently utilised as a proxy marker for fetal hydration from placental function. However, it is a more chronic marker and has been observed to decrease progressively in growth restricted fetuses.

The volume is estimated by the single deepest vertical pocket (SDVP, normal > 2cm) or amniotic fluid index (AFI, normal 5-25 cm though alters with gestation[8]).

A Cochrane systematic review concluded that neither measure was superior. However when using the AFI there were higher rates of oligohydramnios diagnosed, with higher induction of

labour rates and no improvement of perinatal outcomes.[9] Hence, it has been suggested that the SDVP be used as the contemporary measure of amniotic fluid volume to detect oligohydramnios.

One-week prior to acute deterioration, only 20-30% of fetuses will have oligohydramnios[10], therefore its use in modern FGR guidelines is questionable.

f. **Biophysical profile (BPP)**

The biophysical profile score is calculated by combining ultrasound assessment of fetal tone, respiratory and body movements, with the amniotic fluid index (with or without cardiotocography (CTG)).

Each component will either score a 2 if normal or 0 if abnormal, giving a total score out of 8 or 10 (if CTG used).

Recent studies on early onset very preterm FGR fetuses raised concerns over the false positive rate of the BPP, with up to 23% of instances of intrauterine death in fetuses with a BPP > 6, and 11% in those > 8.[11] A meta-analysis has also shown no significant benefit of BPP in high risk pregnancies. [12]

Therefore, the use of BPP is questionable in guidelines for the management of FGR in centres with access to advanced Doppler ultrasound (Level III-2). Some centres opt for a modified BPP that integrates a limited assessment of fetal movement with the AFI and spectral Doppler UA.

g. **Cardiotocography (CTG)**

Early studies on high-risk pregnancies showed that, although highly sensitive, CTG has a 50% rate of false positives for the prediction of adverse outcome. A meta-analysis on high risk pregnancies has failed to demonstrate any effect on reducing perinatal mortality. [13]

With these studies in mind, the use of CTG for routine monitoring of a growth restricted fetus when advanced Doppler is available is questionable, although it may contribute to the overall clinical picture.

2. Timing of birth

In managing the preterm fetus with growth restriction and abnormal Doppler indices, consider consultation with a tertiary center for ongoing surveillance and optimal timing of birth, especially in those detected prior to 32 weeks.

In the preterm fetus with FGR and UA AREDV detected prior to 32 weeks, birth is recommended when the DV Doppler becomes abnormal or UV pulsations appear, provided the fetus is considered viable and after completion of steroids. Even when the DV Doppler is normal, birth is recommended by 32^{+6} weeks of gestation and is to be considered between 30-32 weeks (Level IV).

If the MCA Doppler is abnormal, birth should be recommended no later than 37^{+0} weeks (Level III-3).

In FGR detected after 32^{+0} weeks with a raised UA Doppler PI, birth no later than 37^{+0} weeks is recommended (Level III-3).

In FGR detected after 32 weeks with a normal UA Doppler, a senior obstetrician should be involved in determining the timing and mode of birth. Birth is to be offered by 37^{+6} weeks (Level 1).

Women with a FGR fetus planned for birth between viability and 34^{+6} weeks gestation are to be given a single course of antenatal cortocosteroids (Level II). For those delivering <30 weeks, current Australian guidelines suggest the administration of IV magnesium sulfate for fetal neuroprotection (Level III-3).

3. Mode of birth

There is currently insufficient evidence to guide mode of birth in the term or preterm FGR fetus.

It is reasonable to offer normal vaginal birth or induction of labour to those with a favourable Bishop's score near or at term.

Most fetuses with preterm FGR will be delivered by caesarean section, as it is known there is a higher chance of unsuccessful induction, abnormal CTG, emergency caesarean and fetal hypoxaemia and acidaemia when attempting normal vaginal birth in these women.

It is the responsibility of all Peninsula Health staff involved in the assessment, investigation, planning, care delivery or treatment of a patient irrespective of the care situation to ensure they are providing the right care to the right patient at all times by positively identifying the patient prior to any consultation.

The three approved identifiers at Peninsula Health are patient name (family and given), date of birth and Unit Record (UR) number. In the absence of a UR number or when a new patient is being registered, the patient address can be used until a UR number is assigned.
To correctly identify a patient, the patient or representative should be asked to state their full name (family and given) and date of birth and always check this against the patient identification band and/or labelled documentation.

Aseptic technique is a set of key principles and practices performed under carefully controlled conditions with the goal of minimising contamination of a vulnerable site by infectious organisms. This procedure must be performed in a sequence that ensures efficient, logical and safe practice, allowing the protection of key sites and parts at all times. Key parts are sterile and this must be maintained by use of appropriate sterile fields, hand hygiene and where a key part must be touched sterile gloves must be employed

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