When is Baby too small, and what to do about it?

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SGA versus IUGR

- SGA (small for gestational age)
  - Defined as an infant with birthweight <10th centile

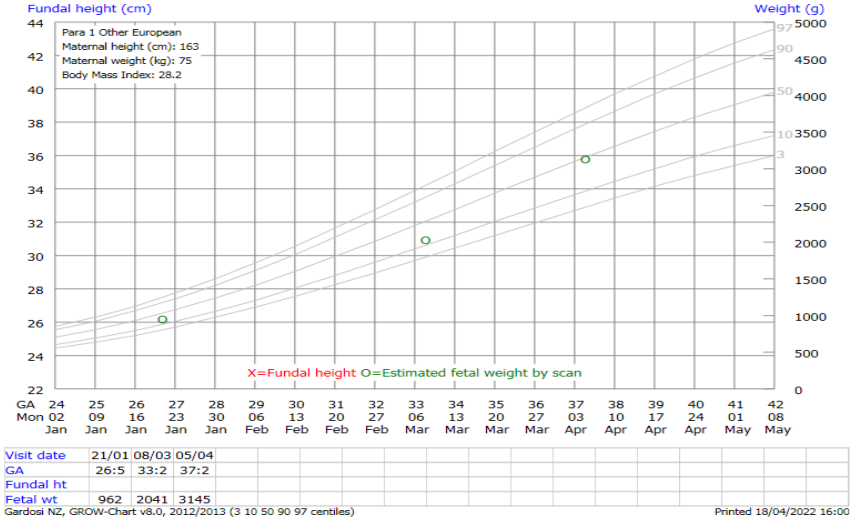
- IUGR (intrauterine growth restriction) or FGR (fetal growth restriction)
  - Defined as a fetus that has failed to reach its biological growth potential because of placental dysfunction

NZ definitions

- SGA
  - EFW or birthweight <10th customized centile
- FGR
  - EFW <10th customized centile or AC 5th population centile
- High risk FGR
  - EFW <3rd centile, abnormal UA, uterine artery, MCA or CPR Doppler
- Reduced growth velocity (ie FGR not SGA)
  - AC or EFW crossing centiles: >30% reduction

Customised GROW chart

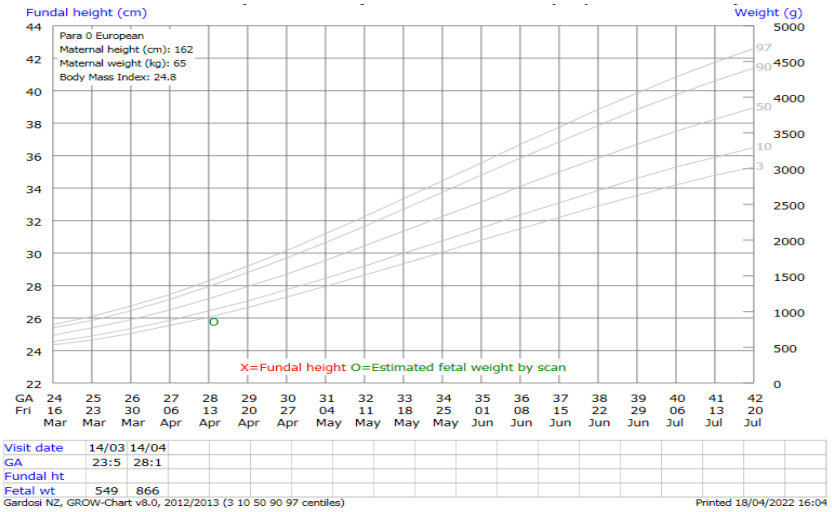
Normal



Visit date	21/01	08/03	05/04
GA	26:5	33:2	37:2
Fundal ht			
Fetal wt	962	2041	3145

Gardosi NZ, GROW-Chart v8.0, 2012/2013 (3 10 50 90 97 centiles) Printed 18/04/2022 16:00

SGA and/or FGR

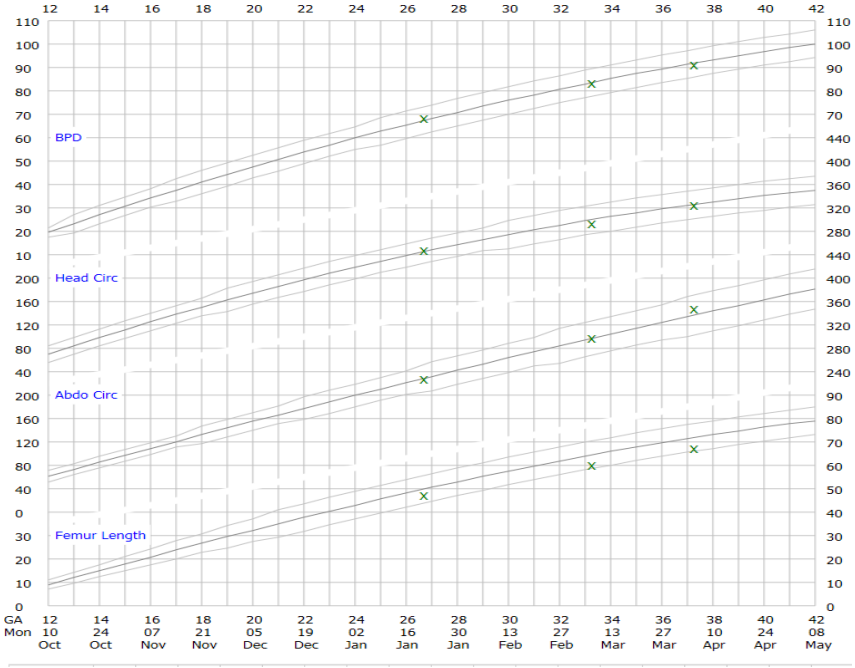


Visit date	14/03	14/04
GA	23:5	28:1
Fundal ht		
Fetal wt	549	866

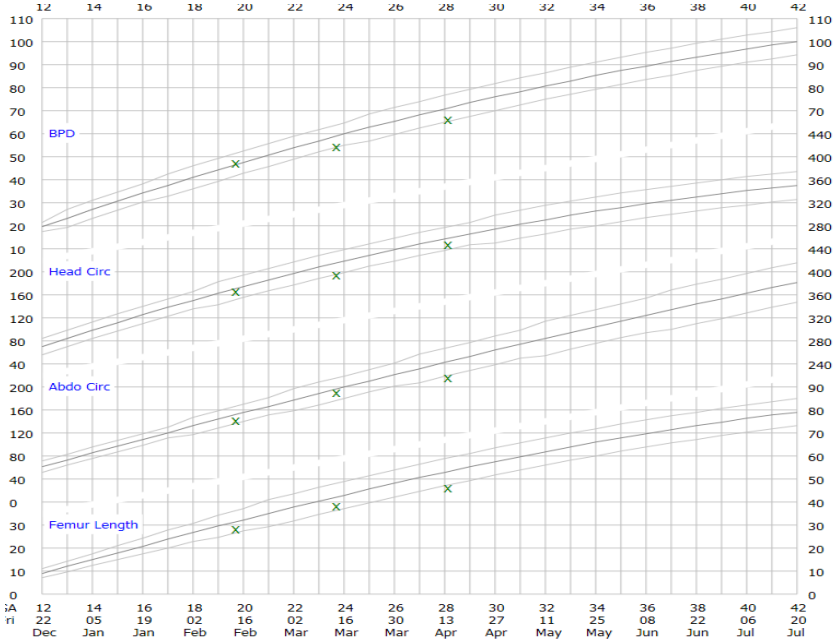
Gardosi NZ, GROW-Chart v8.0, 2012/2013 (3 10 50 90 97 centiles) Printed 18/04/2022 16:04

Biometry (population charts)

Normal



FGR



Does it matter?

- SGA babies compromise 28-45% non-anomalous stillbirths
- SGA often not detected before birth
- SGA – approx 20% will be normal/constitutionally small babies
- IUGR (FGR) – not all are SGA

What next - identify the cause:

- Genetic difference (5-10%) – aneuploidy, deletions/duplications, uniparental disomy
- Fetal infection (5-10%) – CMV,Toxoplasmosis
- CPM – found in 10% idiopathic FGR, and 1% of CVS
- Ischaemic placental disease (placental insufficiency)
- Placental and cord abnormalities – SUA, velamentous CI, marginal CI(weak association)
- Placental mesenchymal dysplasia – rare
- Teratogens, radiation

Baseline investigations

- Viral serology (CMV, toxo)
- Amniocentesis (FISH/PCR; micro-array, VIRAL PCR)
- NIPT – if decline invasive, good for excluding common triploidies
- Detailed anatomy (tertiary scan or MFM)
- Doppler studies
- BP/urine/pre-eclampsia screen

So what's the issue?

- NZ guidelines only start from 34 weeks
- Variations in practice:
  - How to monitor?
  - When to deliver?
  - Criteria for delivery?
  - Mode of delivery?
- Avoiding iatrogenic harm from early delivery

ISUOG 2020

- Definitions FGR (use Delphi FGR consensus)
  - SGA <10th centile
  - Doppler should be used to distinguish between SGA and FGR
  - AC or EFW <3rd centile greatest risk
  - Reduced growth velocity >50 percentiles for AC or EFW
  - Early onset is <32 weeks

Table 2 Definitions for early- and late-onset fetal growth restriction (FGR) in absence of congenital anomalies, based on international Delphi consensus

Early FGR: *GA < 32 weeks, in absence of congenital anomalies*	*Late FGR:* *GA ≥ 32 weeks, in absence of congenital anomalies*
AC/EFW < 3rd centile *or* UA-AEDF *Or* 1. AC/EFW < 10th centile *combined with* 2. UtA-PI > 95th centile *and/or* 3. UA-PI > 95th centile	AC/EFW < 3rd centile *Or at least two out of three of the following* 1. AC/EFW < 10th centile 2. AC/EFW crossing centiles > 2 quartiles on growth centiles* 3. CPR < 5th centile *or* UA-PI > 95th centile

*Growth centiles are non-customized centiles. AC, fetal abdominal circumference; AEDF, absent end-diastolic flow; CPR, cerebroplacental ratio; EFW, estimated fetal weight; GA, gestational age; PI, pulsatility index; UA, umbilical artery; UtA, uterine artery. Reproduced from Gordijn *et al.*[16].

Key Studies

- GRIT – published 2003
- TRUFFLE – published 2013
- Truffle 2 year outcomes 2015

Recommendations

- 23-26 weeks – individualised
- Offer active intervention on fetal grounds once over 450g
- Consideration of steroids and magnesium sulphate
- Inpatient monitoring to be offered for AREDF
- Scans Mon/Wed/Fri if AREDF
- CTG twice daily – one hour, assess STV, aim to be done within working hours (eg 7-8am and 4-5pm)
- Scans 1-2 per week for raised PI dependant on gestation/growth trajectory individual factors
- Use ISUOG guidance for cCTG parameters and delivery indications
- AEDF – deliver by 34+0 at latest
- REDF – deliver by 32+0 at latest

ISUOG DELIVERY CRITERIA

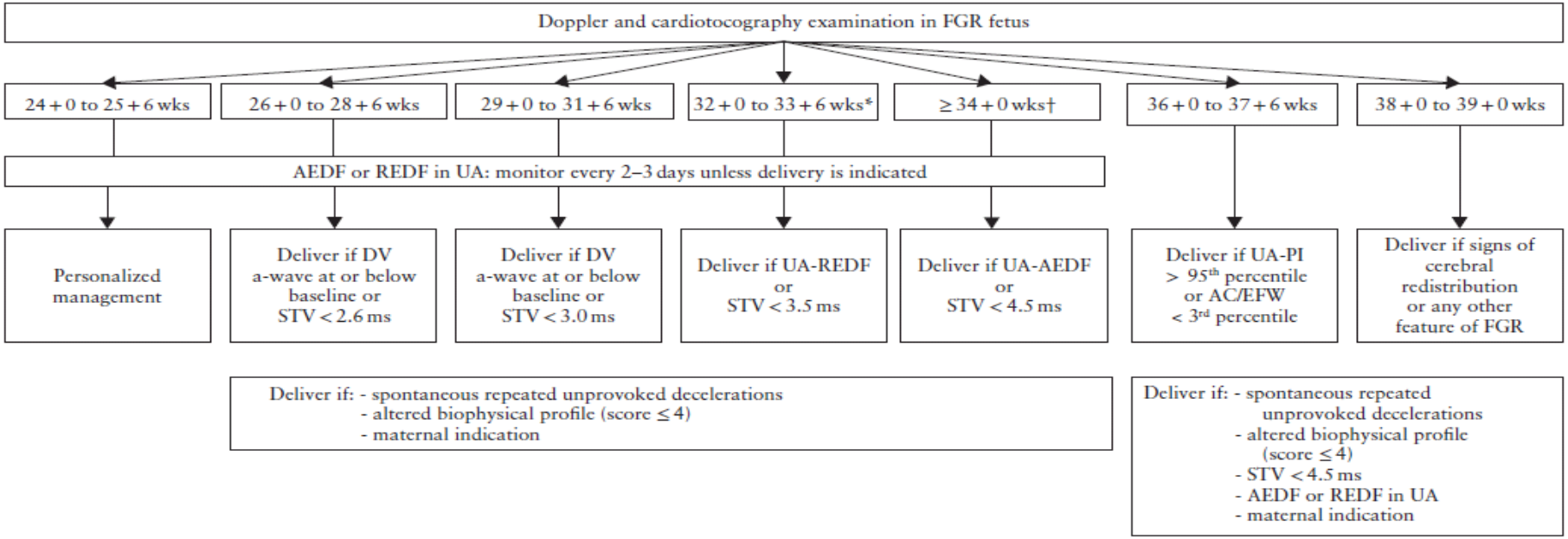


Figure 2 Recommended management of pregnancies with fetal growth restriction (FGR), based on computerized cardiotocography and Doppler findings. *Permitted after 30 + 0 weeks. †Permitted after 32 + 0 weeks. AC, fetal abdominal circumference; AEDF, absent end-diastolic flow; DV, ductus venosus; EFW, estimated fetal weight; PI, pulsatility index; REDF, reversed end-diastolic flow; STV, short-term variation; UA, umbilical artery; wks, gestational weeks.

*23+0 to 25+6 weeks personalised

Mode of delivery

- Caesarean section if AREDF and delivery on fetal grounds
- Exception may be peri-viability and delivery indicated on maternal grounds after careful counseling
- Role for offering feticide

Bibliography

- Evidence based national guidelines for the management of suspected fetal growth restriction: comparison, consensus and controversy. McCowan et al, AJOG 2018
- ISUOG Practice Guidelines: diagnosis and management of small for gestational age fetus and fetal growth restriction. Ultrasound Obstet Gynecol 2020
- Comparative analysis of 2 year outcomes in GRIT and TRUFFLE studies. Ganzevoort et al Ultrasound Obstet Gynecol 2020
- ACOG practice bulletin, Feb 2021
- SOGC Clinical practice guideline 2013
- RCOG guideline 2014
- Consensus definition of FGR: a Delphi procedure. Ultrasound Obstet Gynecol 2016