

'Reds flags' in antenatal care: Fetal movements and fetal growth

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Poor fetal growth in late pregnancy is a very common cause of stillbirth or fetal distress during labour. It is associated with reduced fetal movements, which can be detected by the mother antenatally. A simple management protocol is suggested that can be implemented at any hospital that has access to basic ultrasound scanning and electronic fetal heart rate monitoring.

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What is the problem?

Recently, there has been a growing awareness that poor fetal growth in the third trimester is an important cause of late stillbirth or intrapartum-related adverse outcomes, such as neonatal encephalopathy. During 2014 - 2016, 63 968 stillbirths were recorded in South Africa (SA).^[1] Of those where no apparent cause could be found, 33% occurred at term, while 48% of unexplained stillbirths occurred in women with no obvious obstetric complications. The majority (72%) of babies who died during labour because of presumed intrapartum asphyxia, were infants of low-risk mothers who had no known risk factors. Modifiable factors for intrapartum asphyxia include a prolonged second stage of labour and an apparent inability to detect fetal distress. With regard to patient-related modifiable factors, there were clinical notes relating to reduced fetal movements a few days before fetal death in almost 13 000 cases. However, can a timely and appropriate response by a mother to decreased fetal movements prevent a late intrauterine death? Is it possible to detect late fetal growth restriction (LFGR) in a low-resourced setting and is there any action that can be taken to reduce risk of death? This article reviews the most recent literature and proposes a simplified management protocol.

What are normal fetal movements?

Most women can detect fetal movements by 20 weeks' gestation. Movements do not decrease during the third trimester, and almost all women experience an increase in strength and internal pressure as the pregnancy advances.^[2] Most fetal movements occur in the evening and when the woman is lying down.^[3] Qualitative studies have shown that pregnant women who experience a change or decrease in fetal movements need to be taken seriously and expect prompt care, as they are understandably worried about the wellbeing of their baby.^[4] More than half of women who present with a stillbirth have a decrease in fetal movements before the event.^[5] Therefore, if a woman experiences a qualitative change in fetal movements, it may be more important clinically than any definition of a specific numeric decrease in fetal kick counts.^[6]

Is there evidence for fetal kick counting?

It is reasonable to assume that if placental dysfunction compromises a fetus, body movements are reduced in an effort to conserve

energy. However, will routine counting of fetal movements as part of antenatal care lead to a reduction in stillbirths? A systematic review of fetal movement counting to assess fetal wellbeing concluded that there is not yet sufficient information to inform daily practice.^[7] There is no randomised trial comparing two groups (no counting v. formal method of counting), using stillbirth as an outcome measure. For such a study it will be impossible (because of the nature of the method) to use blinding to reduce bias. In studies where various methods of fetal counting were compared, there was no increase in caesarean section rates, and maternal anxiety was significantly reduced when there was routine counting.

There is no uniform definition of reduced fetal movements and also not any method of counting that is superior to another. Therefore, most existing guidelines are more pragmatic. The guideline of the Royal College of Obstetricians and Gynaecologists on reduced fetal movements does not recommend routine counting, but emphasises the importance of a subjective awareness of a decrease in fetal movements.^[8] Providers of basic antenatal care must therefore inform women about normal fetal behaviour and the need to report a change or decrease in fetal movements. Women must present to a clinic or hospital within 12 hours, if possible. A single episode of excessive fetal movements might also be a sign of fetal compromise owing to fetal seizures or cord entanglement, and warrant investigation.^[9] A systematic review of interventions to enhance maternal awareness of fetal movements during antenatal care did not find any clear evidence of benefit or harm, but there was indirect evidence that suggested improved pregnancy outcomes.^[10]

How does one manage a woman who presents with decreased fetal movements?

The first step is to listen to the fetal heart rate to exclude intrauterine death. Make sure that the heart rate can be detected separately from that of the mother, as there can be a maternal tachycardia due to anxiety or underlying pathology (e.g. abruptio placentae). If the fetus is alive, read the case notes and take a careful history to try to establish risk factors for stillbirth or fetal growth problems. The objective is to identify possible causes of decreased movements, such as congenital anomalies, placental dysfunction, growth restriction or small-for-gestational-age (SGA) babies. This should be followed by a thorough examination to exclude pathological conditions, and

include haemoglobin and glucose measurements. Recalculate the gestational age as precisely as possible and measure the symphysis-fundal height (SFH) to ensure that there is not a decrease in growth or a crossing of centiles. If the fetus has grown adequately, and there are no risk factors for growth restriction (e.g. previous stillbirth or SGA baby, maternal hypertension, poor nutrition, smoking, alcohol or illicit substance abuse, diabetes), the mother can be reassured and instructed how to complete a formal kick chart. If there is access to electronic fetal monitoring, a non-stress test can also be performed.

If there is concern regarding fetal growth or there are other risk factors for stillbirth, the mother needs to be referred to a high-risk clinic for evaluation as soon as possible. A non-stress test can then be performed, which can provide information on immediate fetal wellbeing. An ultrasound scan should be done to rule out fetal anomalies (if no detailed scan was done previously), basic fetal measurements should be determined and amniotic fluid volume should be measured. Fetal movements can often be seen on ultrasound scanning. The management of the SGA baby is described below. If all risk factors are excluded and the woman continues to experience a reduction in fetal movements, it may be advisable to continue management at a high-risk clinic and deliver electively at 38 weeks, although there is no good evidence to guide this.

What is late fetal growth restriction?

In high-income countries, where accurate gestational age data are available, almost half of stillbirths are <10th percentile for gestational age.^[11] In low- and middle-income countries, there are additional factors involved in poor fetal growth, such as low socioeconomic status, poor nutrition, heavy physical work, short inter-pregnancy interval, maternal infection and parasite infestation, high parity and substance abuse. It is reasonable to assume that most late stillbirths are preceded by a period of poor fetal growth. A secondary analysis of SA Perinatal Problem Identification Program data showed that there is a peak in the number of stillbirths for SGA babies at 33 - 37 weeks, with more than half of these occurring in low-risk, healthy mothers.^[12] Therefore, any plan that aims to reduce stillbirths in the third trimester should focus on ways of detecting poor fetal growth.

LFGR is diagnosed at >32 weeks' gestation. In contrast to early-onset growth restriction, which is usually associated with pre-eclampsia, placental infarcts and abnormal Doppler findings, late-onset growth restriction does not involve severe placental lesions and Doppler tests are normal or very mildly abnormal. LFGR is therefore very difficult to diagnose clinically. Although LFGR is associated with a low mortality and morbidity, it is very common, and therefore has many adverse outcomes. The greatest risk is for term stillbirth or fetal distress in labour, as such fetuses do not have many reserves to cope with normal labour. If identified, it is ideal to deliver in a unit that can provide continuous intrapartum fetal monitoring with cardiotocography.

How does one manage poor fetal growth?

The current SA maternity care guideline advocates measurement of SFH and plotting it on a chart with percentiles (gravidogram) to assess fetal growth during routine antenatal care. Any measurement below the 10th percentile for gestation, or a plateau in growth, is an indication for referral to a high-risk clinic, where ultrasound assessment of the fetus can be done.^[13] SFH measurement has a negative predictive value of 76.8%, implying that if it is within normal limits it is unlikely that there is fetal growth restriction or placental insufficiency.^[14]

Serial SFH measurements are more effective to monitor the trend in growth and to predict poor fetal outcome. It is a simple and easy

tool and all providers of antenatal care must ensure that they are skilled to take these measurements correctly. In women in whom it is difficult to measure the SFH owing to morbid obesity or large fibroids, it is advisable to monitor growth with ultrasound scanning. If cost is a factor, the best time to do a growth scan is at ~37 weeks, as this increases the detection rate for LFGR.^[15]

A basic work-up, as for reduced fetal movements, should be done at a clinic. This should be followed by ultrasound scanning for basic measurements of the fetus and amniotic fluid volume. A Doppler test of the umbilical artery should also be performed. It is recommended to use Chitty charts to plot ultrasound measurements.^[16] Calculate the estimated fetal weight (EFW) and plot according to a growth chart for the corresponding gestation, using the INTERGROWTH-21st charts. Data from these charts were collected from an international cohort of healthy women at low risk for adverse perinatal outcomes.^[17] If the EFW is >10th percentile, the baby is not SGA and can be referred back to the clinic, but all potential risk factors must be addressed. EFW <10th percentile is recommended by the American College of Obstetricians and Gynecologists^[18] and Royal College of Obstetricians and Gynaecologists^[19] as the optimum method for diagnosing a SGA fetus; this is supported by a recent systematic review.^[20]

If the baby is SGA and the Doppler test is normal, further care of the pregnant woman should remain at district or regional hospital level. As the woman is at risk of pre-eclampsia, she should be followed up at least every second week to measure her blood pressure and to test for protein with urine test strips. She can also complete a kick chart once the pregnancy is viable. The only treatment for fetal growth restriction is delivery, the main consideration being optimal timing.^[21] Most guidelines advise induction at ~37 weeks, but outcome may be better if the low-risk SGA baby can be distinguished and managed differently than the high-risk growth-restricted fetus. Babies with EFW <3rd percentile have an even higher risk for adverse outcomes.^[22]

If the EFW is between the 3rd and 10th percentiles and the mother remains healthy, a growth scan and cardiotocograph can be repeated at ~36 weeks. If the baby is growing well (but still between the 3rd and 10th percentiles for EFW), the amniotic fluid and Doppler are normal, the mother remains healthy and the cardiotocograph is normal, elective delivery can be planned at term. For more severe SGA babies (EFW <3rd percentile), repeat the growth scan at ~34 weeks. If there is an adequate growth trend with normal amniotic fluid, a normal cardiotocograph and the mother is healthy, plan the delivery at 36 - 37 weeks' gestation, with weekly monitoring. If growth is not adequate, or the Doppler test is abnormal, it is advisable to refer for specialist care as these neonates may need more intense surveillance and early delivery, which is best done in a specialist hospital.

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