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Supplement

Intrapartum stillbirth: learning from maternity safety investigations that occurred during the COVID-19 pandemic, 1 April to 30 June 2020

Independent report by the
Healthcare Safety Investigation Branch I2020/024

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Contents

1 About this report

This document supports the **national learning report into 37 intrapartum stillbirths referred to the Healthcare Safety Investigation Branch** between 1 April and 30 June 2020. It provides a greater level of detail and background about existing knowledge and opinions relating to the risk factors associated with stillbirth and the maternity assessment tools used to monitor fetal risk during pregnancy.

2 Risk factors for stillbirth in pregnancy

2.1 In some pregnancies that end in a stillbirth there is the potential to identify certain risk factors, for which alternative care and actions may make a difference (MBRRACE-UK, 2017). In other stillbirths the outcome is not predictable with limited or no warning signs or cues during the person's pregnancy.

2.2 Risk factors cited for stillbirth generally refer to antenatal and not intrapartum stillbirth (that is, stillbirths that occur before the woman and pregnant person goes into labour rather than during labour), with only a small number of reports describing differences between the risks in antenatal and intrapartum stillbirth (Salihu et al, 2008; Aliyu et al, 2007; Getahun et al, 2007). However, the factors associated with antenatal stillbirth may carry forward into the intrapartum period, increasing the ongoing risk of perinatal morbidity and mortality (poor outcomes or death of a baby delivered with no signs of life after 24 completed weeks of pregnancy). Risk factors can be divided into the following main groups; some examples are given for each:

- Environmental and socio-demographic factors: social deprivation and smoking.
- Maternal: age, obesity, pre-existing or pregnancy-induced diabetes and hypertension (high blood pressure) and some other maternal medical conditions, pre-eclampsia, mental health issues (Gardosi et al, 2013).
- Fetal growth restriction, chromosomal and congenital abnormalities, multiple pregnancies, congenital infection (virus passed to the baby during pregnancy).
- Placenta and umbilical cord: poor placental function, developmental and structural changes (originating during placental development or secondary during a pregnancy), abruption (separation of the placenta from the wall of the uterus), cord accidents (prolapse).

2.3 Forty three per cent of women and women and pregnant people who experienced a stillbirth noted a slowing down of their baby's movements beforehand (MBRRACE-UK, 2017). Reduced fetal movement is associated with abnormal structure and function of the placenta.

2.4 The MBRRACE-UK perinatal surveillance report published in December 2020 highlighted an increase in the rate of stillbirth among Black and Black British, Asian and Asian British people (MBRRACE-UK, 2018).

3 Interventions for overdue pregnancy

To manage the risks associated with pregnancies continuing beyond 42 weeks' gestation guidance recommends consideration of procedures for inducing labour (starting labour artificially). This section looks at two well-established interventions for induction of labour (IOL) used in maternity care.

3.1 Membrane sweeps

3.1.1 A membrane sweep involves a clinician inserting one or two fingers into the lower part of a woman and pregnant person's uterus (the cervix) and using a continuous circular sweeping motion to separate the membranes surrounding the baby from the lower uterus. It is a low-cost procedure and it can be performed as an outpatient procedure.

3.1.2 The National Institute for Health and Care Excellence (NICE) (2019) recommends that people in their first pregnancy are offered a membrane sweep at the 40-week and 41-week antenatal appointments and people in their second or later pregnancy are offered a membrane sweep at their 41-week appointment. Additional membrane sweeping may be offered if labour does not start spontaneously.

3.1.3 The Royal College of Midwives states:

'Membrane sweeping involves a vaginal examination to assess the cervix which women can be unprepared for and may find painful or distressing. There is moderate evidence that women who have a sweep are more likely to go into spontaneous labour and less likely to have an IOL [induction of labour]. There is some evidence that membrane sweeping is generally safe for women with no other complications of pregnancy. There is low quality evidence to suggest an increased risk of pre-labour rupture of membranes for women having a membrane sweep, however further studies are needed to improve confidence in the findings.'
(Royal College of Midwives, 2019)

3.1.4 Zamzami and Senani (2014) found that carrying out membrane sweeps at term (a pregnancy of 37 +0 weeks or more) was safe and reduced the incidence of people being pregnant beyond their expected due date. Most women and pregnant people required only a single membrane sweep. There is still uncertainty as to the number of membrane sweeps that need to be undertaken to trigger labour and the optimal gestation at which these should be undertaken to reduce the need for a formal IOL (Finucane et al, 2020).

3.1.5 Several studies on the effectiveness of membrane sweeping have produced inconsistent results. A Cochrane review (Boulvain et al, 2001) reported that routine use of membrane sweeping from 38 weeks onwards did not seem to have clinically important benefits.

3.1.6 There is some evidence that women and pregnant people who have a membrane sweep are more likely to go into spontaneous labour and less likely to undergo a formal IOL (Avdiyovski et al, 2019) and that membrane sweeps are generally safe for people with no other complications of pregnancy.

3.2 Induction of labour

3.2.1 IOL is one of the most common interventions offered to women and pregnant people in the UK, with almost a third having their labour induced (NHS Digital, 2018a). IOL involves artificially stimulating a person's uterus, either with drugs such as prostaglandins or oxytocin, or by physical methods such as the insertion of a balloon device into the woman and pregnant person's cervix or breaking the amniotic membranes surrounding the baby.

3.2.2 'Saving Babies' Lives version 2. A care bundle for reducing perinatal mortality' (NHS England and NHS Improvement, 2019) suggests that IOL should be discussed (including risks, benefits and women and pregnant people's wishes) with women and pregnant people presenting with a single episode of reduced fetal movement (RFM) after 38+6 weeks' gestation and the woman and pregnant person should be informed of the increased chance of stillbirth with recurrent RFM. This is not reflected in the NICE (2017) guidance.

3.2.3 Reasons for having an IOL vary and can include past or present medical or obstetric concerns such as slowed growth of the fetus, hypertension, multiple pregnancies and prolonged pregnancy. NICE (2017) states that women are suitable for an IOL as an outpatient if safety and support procedures are in place. IOL rates vary between maternity units (Royal

College of Obstetricians and Gynaecologists and London School of Hygiene and tropical Medicine, 2016) and the number of inductions has risen by 60% over the past 10 years (NHS Digital, 2018b).

4 Maternity assessment tools

The ability of clinicians to recognise and identify cues that indicate significant and cumulative risks for fetal wellbeing depends on the quality of the tools available to them. The following sections examine the evidence for and efficacy of certain assessment tools that are currently recommended and used during maternity care, which are referred to within the full review (**reference to main document**).

4.1 Assessment of fetal movement

4.1.1 The woman and pregnant person's perception of fetal movement is considered to be an indicator of fetal wellbeing (Royal College of Obstetricians and Gynaecologists, 2011, reviewed but not modified in 2017). Changes in fetal movement are concerning for women and pregnant people and may be associated with fetal compromise (restriction of blood flow to the baby during pregnancy). Systematic literature reviews have revealed a lack of good-quality evidence on how to monitor and respond to concerns relating to fetal movement (Mangesi et al, 2015). Studies suggest that as many as 27% of women and pregnant people who report reduced fetal movement (RFM) have small for gestational age (SGA) babies with an associated increased risk of stillbirth. Consequently, the management of RFM focuses on ensuring immediate fetal wellbeing (by assessment of the fetal heart rate) and determining whether the baby is SGA (by ultrasound scan). Although the evidence suggests that there is an increased risk of stillbirth associated with recurrent episodes of RFM (Scala et al, 2015; Dutton et al, 2012; O'Sullivan et al, 2009), there is no agreed definition for recurrent episodes of RFM (Greater Manchester and Eastern Cheshire Strategic Clinical Networks, 2019). There is not a set number of fetal movements expected in a certain time frame; the wellbeing of the baby is based on the expected pattern as experienced by the woman and pregnant person.

4.1.2 According to Scala et al (2015), 'the risk of a stillbirth following a single episode of reduced fetal movements after 28 weeks' gestation is 0.6% (1 in 166 pregnancies)'. Observational data suggests there is an increased risk of stillbirth for people who present on three or more occasions with RFM (Heazell et al, 2018).

4.2 Assessment of fetal growth

4.2.1 Reduced fetal growth is known, in some cases, to lead to stillbirth. It is also associated with an increase in longer-term adverse health and development concerns. Placental insufficiency (inadequate supply of nutrients and oxygen to the placenta) leads to a reduced oxygen and nutrient supply to a baby, which is associated with reduced fetal growth. Babies with slowed growth are more vulnerable to fetal compromise in labour, brain injury due to lack of oxygen, stillbirth and neonatal death (death within the first 28 days of life) (McIntyre et al, 2013).

4.2.2 One method used to monitor a baby's growth rate is symphysis-fundal height (SFH) measurement, which is a non-invasive test that is carried out using a tape measure. Measurements are taken at every antenatal visit, from 28 weeks onward, for women and pregnant people classified as having a low-risk pregnancy. Low cost, objectivity and convenience are all considerations and justifications for the use of tape measures to compelte SFH measurements.

4.2.3 The evidence to support the effectiveness of SFH as a reliable measure is inconclusive. Variable rates of reliability and sensitivity are quoted (Khan, 2016; Pay et al, 2015; Hargreaves et al, 2011) and high false-negative rates (findings that suggest no concern when there should be concern) for SGA have led the Royal College of Obstetricians and Gynaecologists (RCOG) (2013) to highlight that clinicians must be aware of the limitations of this test.

4.2.4 The Perinatal Institute (Williams et al, 2018; Perinatal Institute, n.d. recommends that measurements of SFH should not be undertaken any less than 2 weeks apart to allow for measurable growth. A 'robust training programme and competency assessment' should be in place for clinicians (NHS England and NHS Improvement, 2019). Plotting the measurements may improve detection rates of SGA babies, by facilitating the detection of a significant change in the trend of serial SFH measurements. A baby identified as SGA would suggest the need for earlier intervention(s) in pregnancy to expedite the birth, alteration of the intended place of birth and consideration of the mode of fetal monitoring during labour (National Institute for Health and Care Excellence, 2017; Royal College of Obstetricians and Gynaecologists, 2014). The Perinatal Institute (n.d.) states that SFH measurements on a customised chart are not a predictor of birth

weight, but an indicator of when to refer the woman and pregnant person for further investigations. Estimated fetal weight using an ultrasound scan (USS) is the absolute measurement of the baby and will provide clarity in interpreting appropriate growth. Pay et al (2015) concluded that SFH measurements can be used as a clinical indicator along with other clinical findings such as the woman and pregnant person's previous obstetric and medical history.

4.2.5 Hargreaves et al (2011) investigated the accuracy of SFH and USS in detecting small or large babies. The majority of SGA and large for gestational age (LGA) babies were not identified by clinicians during routine antenatal care. From 3,200 live births, 59 babies weighed less than 2,500g or more than 5,000g. Of these, only 12 had been referred for an ultrasound growth scan, indicating that abdominal palpation (examination with hands to determine fetal presentation) and SFH measurement had a 20% sensitivity in detecting SGA or LGA babies. Of the 12, 4 were detected using ultrasound, indicating a 33% detection rate via USS. Although ultrasound has a slightly higher sensitivity, neither clinical examination using SFH measurements nor third trimester USS were effective at detecting SGA or LGA babies. National guidance (Perinatal Institute, 2020) recommends that serial growth scans for those at increased risk of growth restriction should take place at least every 3 weeks from 26 to 28 weeks until birth. Serial growth scans during a subsequent pregnancy is also advised if a baby was born below the 10th centile for growth (NHS England and NHS Improvement, 2019; Royal College of Obstetricians and Gynaecologists, 2013).

4.2.6 NHS England's 'Saving Babies Lives version 2. A care bundle for reducing perinatal mortality' (NHS England and NHS Improvement, 2019) states that when abnormal uterine artery Doppler measurements (inadequate blood flow to a woman and pregnant person's uterus) are identified in pregnancy there should be serial USS every 2 to 4 weeks from 32+0 weeks until birth.

4.2.7 The Perinatal Institute acknowledges that accurate methods to detect late onset fetal growth restriction remain unclear Perinatal Institute. (n.d.). Francis and Gardosi (2016) found that the detection of SGA by USS at 34 to 36 weeks ranged between 19% and 36%, confirming that detection was poor and may be related to poor scan technique and limitations of the USS to estimate the weight of the fetus. One-off ultrasound scans do not provide information on a baby's growth trajectory, as fetal growth restriction can be late onset and SGA can occur at term, so this may not be evident at the time of the 34-week to 36-week ultrasound scan. A Cochrane review undertaken by the Perinatal Institute states that 'there is no evidence that routine ultrasound in late pregnancy improves perinatal outcomes' (Bricker et al, 2015).

4.2.8 The IRIS study (Henrichs et al, 2019) concluded that in low-risk pregnancies 'routine Ultra Sound Scan (USS) in the third trimester along with clinically indicated USS was associated with higher antenatal detection of small for gestational age but not with a reduced incidence of severe adverse perinatal outcomes compared with usual care alone. The findings do not support routine USS in the third trimester for low risk pregnancies'. Smith et al (2021) come to similar conclusions about the use of USS alone. They consider USS and intervention (IOL) may have some benefit but further understanding of the costs associated with IOL may assist NHS decision making.

4.2.9 Sovio et al (2015) suggest that a universal 35-week to 37-week USS increases the detection of SGA babies to 77% at the time of the ultrasound scan.

4.2.10 The Perinatal Institute states that one-off late trimester USS is a poor use of already overstretched resources (Williams et al, 2018). It recommends that women and pregnant people at increased risk of having a baby with slowed growth have serial growth USS, as recommended by RCOG guidelines (2014) and 'Saving Babies' Lives version 2. A care bundle for reducing perinatal mortality' (NHS England and NHS Improvement, 2019). It also states that a routine USS in the third trimester is ineffective due to poor detection rate, and potentially dangerous due to false reassurance or over-intervention for false positives.

4.2.11 The issue of reliability of SFH measurements has led to research that considers alternative approaches. One systematic review in 2019 highlighted the benefit of using blood tests to identify placenta insufficiencies in SGA babies; however, it also concluded that further research was needed to consider the potential value of the combination of ultrasounds and blood tests (Heazell et al, 2019).

4.2.12 NICE suggests that further prospective research is required to evaluate the diagnostic value and effectiveness (both clinical and cost effectiveness) of predicting SGA babies using customised fetal growth charts to plot SFH measurements and routine ultrasound in the late stages of pregnancy (National Institute for Health and Care Excellence, 2019). Consideration needs to be given to the sensitivity of a single or suite of antenatal surveillance tool(s), which should enhance reliability and efficacy in the identification of risks relating to fetal growth.

4.3 Assessment of fetal heart rate

4.3.1 'Saving Babies' Lives version 2. A care bundle for reducing perinatal mortality' (NHS England and NHS Improvement, 2019) recommends 'regular' (at least hourly) review and assessment of fetal wellbeing, including fetal heart rate, during labour. This should include discussion with another midwife or doctor with a clear guideline for escalation if concerns are raised.

4.3.2 Intermittent auscultation (IA), or 'listening in', is the recommended method for monitoring a baby's heart rate in labour, where there are no anticipated complications and the woman and pregnant person is healthy. This should be performed by either a Pinard stethoscope (a small trumpet-shaped device placed on the woman and pregnant person's abdomen) or a hand-held Doppler device (a small ultrasound device used to detect and monitor the fetal heartbeat) (National Institute for Health and Care Excellence, 2017).

4.3.3 In midwifery-led units the use of IA promotes fetal monitoring. A prerequisite of IA is accurate and robust risk assessment of the suitability of the woman and pregnant person to give birth in a low-risk, midwifery-led unit (National Institute for Health and Care Excellence, 2017).

4.3.4 IA is conducted at least every 15 minutes in the first stage of labour and at least every 5 minutes, or after each contraction, in the second stage of labour. IA should always be performed immediately following a contraction, for 1 full minute (National Institute for Health and Care Excellence, 2017). The clinician counts the number of beats heard and records it as a single rate. A woman and pregnant person's pulse should also be palpated (examined by hand) to differentiate it from the baby's heart rate, at least hourly in the first stage of labour (established labour with regular contractions and the cervix continues to open) and at least every 15 minutes during the second stage of labour (when the cervix is fully open). There is no national guidance for how often IA should be undertaken in the latent phase of labour (before the first and second stage of labour when the cervix softens and contractions are painful but irregular).

4.3.5 The RCOG (2015) states that it is sometimes necessary to bring forward a review of a baby's heart rate assessment, rather than sticking rigidly to a previous plan; clinicians need to be alert to a continuously evolving clinical situation and more frequent observations may be indicated if a woman and pregnant person is having contractions every 2 minutes.

4.3.6 Blix et al (2019) undertook a review of studies and guidelines for IA in order to establish an evidence base for IA methodology. They found that there was variation in technique, and some difficulties in recognising fetal heart rate changes that deviated from an expected pattern.

4.3.7 There are many factors that influence the use of IA including: the outcome of the risk assessment of the woman and pregnant person ; staff members' experience and ability; accessibility of equipment; multitasking; staff availability; family preference; decision to disturb a resting woman and pregnant person; lack of awareness of guidance; recognition and escalation of unexpected findings; and training in IA (Patey et al, 2017).

4.3.8 Current practice requires the use of continuous electronic fetal heart rate monitoring using cardiotocography (CTG) where there is a high risk of complications during labour. In line with national and local guidance, if deceleration (temporary slowing of the fetal heart rate) is suspected on IA, continuous CTG monitoring is advised, as well as transfer of the woman and pregnant person to obstetric-led care (National Institute for Health and Care Excellence, 2017). CTG provides a paper printout or an electronic record of the fetal heart rate presented on a monitor. However, it is recognised that the CTG's potential for improving neonatal outcomes has not been realised (Alfirevic et al, 2017). The quality of scientific evidence may not yet be sufficient to provide confidence in the findings presented by Alfirevic et al and further research to determine the efficacy and effectiveness of CTG in routine clinical situations is needed.

4.3.9 CTG is a well-established practice in maternity care; however, there is concern relating to its efficacy and effectiveness. A review of the evidence on the use of CTG recommends further research to establish its contribution to the management of the risk of adverse outcomes (Alfirevic et al, 2017).

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