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Troubled waters?

AIMS Journal, 2011, Vol 23 No 4

Sarah Davies looks at the significance of meconium in the amniotic fluid

Amniotic fluid is the fluid surrounding the baby inside the amniotic sac. It plays a vital part in the baby's development, creating a warm protective environment in the uterus where it can grow and move freely. The fluid is secreted from the membranes and the placenta; throughout pregnancy it is continually being 'inhaled' and 'exhaled' by the baby's developing lungs as well as swallowed in and urinated out.

Healthy amniotic fluid smells 'like fresh, clear, warm sea water : heavy, salty and clean.'[1] It is normally clear, but sometimes has a yellowish, greenish or brown tinge when it is stained with meconium. Meconium stained amniotic fluid (MSAF) occurs when the baby opens his/her bowels before birth, and is found in about 13% of labours overall. Approximately 30% of babies born at 40 weeks, and nearly half of babies born after 42 weeks of gestation will have MSAF.[2]

Changing opinions

In the past it was generally believed that MSAF alone was a sign of problems with the unborn baby. For example, a 1988 midwifery textbook has one sentence on the subject, stating 'a greenish colour is indicative of meconium stained liquor and is usually a sign of fetal distress.'[3] Since then, however, there have been many research studies and the consensus now is that meconium passage alone is not a sign of distress in the baby.[4] For example, a retrospective case control study from Germany (11,226 women, including 1123 who had MSAF in labour) found that the mean arterial pH (measure of oxygenation of the fetal blood) was the same for both groups.[5] In this study, obstetric management was significantly affected by the presence of MSAF; although outcomes for the babies were similar, the caesarean section rate for labours with MSAF was 17.4% compared with 9.6% of the non-affected labours and the vaginal operative delivery rate 13.9% versus 6.2%.[6] This suggests that the management of labour was affected by the clinicians' perception that MSAF was an indication of fetal distress, and therefore they were quicker to intervene. Naoli Vinaver, a Mexican home birth midwife, writes: 'Unfortunately, most conventional medical care providers in most countries around the world misdiagnose the mere presence of meconium as "fetal distress".

'As a result, they usually perform caesarean delivery within the next few hours. The unfortunate part of this is that the vast majority of these deliveries will result in a worse outcome for both mother and baby than if a vaginal delivery of the baby had been allowed under attentive super vision and care.'[6]

Reasons for MSAF

- MSAF is associated with term/post-term pregnancy and is thought to occur because the digestive system has reached maturity. MSAF rarely occurs before 34 weeks.
- Compression of the head or cord during labour may cause a reflex gastro-intestinal peristalsis (movement of the gut) in the baby. This is a normal physiological response and can occur in the absence of fetal hypoxia.
- Fetal hypoxia (reduced oxygen supply to the baby). The exact cause is unclear, but it is thought that in a hypoxic or compromised fetus, blood is shunted to the brain and heart and diverted from the gut, resulting in gut ischaemia (insufficient blood supply) and increased gastro-intestinal peristalsis.

Degree of meconium staining

MSAF is first noticed when the membranes rupture (this is why some practitioners 'break the waters' to see the colour of the amniotic fluid). The colour can vary from a very light green or yellow tinge (light meconium staining) to a thick, dark green or brown 'pea soup' consistency. Thick meconium is sometimes associated with a reduction in the amount of amniotic fluid. Reduced amniotic fluid both reflects a degree of placental insufficiency, and also predisposes to fetal hypoxia, because of the likelihood of cord compression during labour contractions.[7] However, as Gail Hart, a midwife from the US, writes: 'Meconium itself is not the problem unless it is a sign of severe distress. Even then the problem is the distress rather than the meconium. With good fetal heart tones and a normal labour, even thick meconium is rarely a problem.'[8] It can be concluded that light MSAF in the term labour is a variant of normal; but thick meconium, accompanied by an abnormal heart rate, would suggest hypoxia.

Meconium aspiration syndrome (MAS)

MAS is an extremely rare complication, affecting about two in 1000 births, but it is because of MAS that clinicians have concerns about the presence of meconium in the amniotic fluid. MAS occurs when an already hypoxic baby gasps before birth, and inhales meconium into its lungs; a healthy baby does not inhale amniotic fluid during labour. Most cases occur when there has been thick meconium in the amniotic fluid. Meconium is highly irritant to lung tissue and predisposes to infection. The effect of MAS on the baby can vary from a mild form of MAS which resolves in two to three days, to a severe life-threatening pneumonia. This most severe form of MAS has been linked with significant hypoxia prior to birth, although even with thick meconium, the cause and effect relationship is far from clear. One research study suggested that most cases of severe MAS were not causally related to the aspiration of meconium but rather to other pathological processes occurring in utero, such as chronic asphyxia or infection.[7]

NICE guidelines and care in labour

NICE guidelines state: 'Continuous electronic fetal monitoring (EFM) should be advised for women with significant meconium-stained liquor, which is defined as either dark green or black amniotic fluid that is thick or tenacious, or any meconium-stained amniotic fluid containing lumps of meconium.[9] NICE guidelines also recommend that EFM be accompanied by fetal blood sampling; therefore if thick meconium is found in early labour at home, the midwife's advice would be to transfer to an obstetric unit. In the case of light staining, the NICE guidelines state that continuous EFM should be 'considered', 'depending on a risk assessment which should include as a minimum the stage of labour, volume of liquor, parity, the FHR and, where applicable, transfer pathway.' The NICE guidelines, therefore, advocate a holistic assessment where there is light MSAF. For example, the baby's heart rate can be monitored using a Pinard's stethoscope or a sonicaid, thus enabling the woman to remain mobile, which is beneficial both for optimum oxygenation of the baby and the progress of labour.

If there is an irregularity in the baby's heart rate which indicates hypoxia, advice can be sought from 'such qualified health professional as may reasonably be expected to have the necessary skills and experience'; in this case, it would be an experienced obstetrician (Rule 6, Midwives' Rules, p18). NICE guidelines also recommend that 'healthcare professionals trained in advanced neonatal life support should be readily available for the birth.' Therefore, if significant MSAF occurs at a home birth the midwife will usually advise transfer to hospital and would definitely do so if this were accompanied by any abnormality of the baby's heart rate.

If thick meconium is identified in the second stage of labour at home, and the birth is imminent, it may be safer to remain at home to avoid the risks of birth during transfer. It is physiologically normal for the membranes to rupture at the onset of the second stage, so this situation occurs fairly often at home births, and rarely results in any problems. Judith Kurutac, an experienced UK independent midwife, observes: 'In 18 years of attending home births, I have not seen a case of meconium aspiration syndrome following a planned home birth. If there is a decision to transfer in from any home birth, the key thing is to ensure that there are the experienced personnel available at the receiving facility to review the clinical presentation and be able to deal with any problems immediately. The midwife needs to give a clear and detailed clinical picture when organising the woman's transfer from home.' It is important for everyone involved to understand the decision-making timescale and the practicalities of transfer, to safeguard mother and baby.[10]

Care at birth and afterwards

Suctioning of the healthy baby's airways at birth is no longer recommended; this is advised only if the baby has thick or tenacious meconium present in the mouth and/or nose. For home birth the midwife carries equipment for the rare occasion when the baby needs resuscitation. Leaving the umbilical cord intact until it has ceased pulsating will help the baby gradually adapt to extrauterine life and ensure it has optimum blood volume for full lung expansion. The baby should be kept warm by close skin-to-skin contact with the mother ; early nuzzling and suckling will help the baby absorb any mucus and liquid left in its lungs. NICE guidelines advise that where there has been significant meconium staining, the baby

should be closely observed at one and two hours of age and then two-hourly until 12 hours of age. Following a home birth the midwife will normally stay for at least the first two hours or until she is satisfied that all is well with mother and baby. On leaving, she should ensure the parents know how to recognise any problems, and who to contact if they have any concerns. Well-informed parents are invariably the most diligent observers of the wellbeing of their own baby.

In conclusion, meconium stained amniotic fluid in the term or post-term labour is a variant of normal in the vast majority of cases. Parents need to be aware of the current state of knowledge of MSAF in order to make their own decisions about their care, drawing on the expertise of their clinicians as necessary.

Many thanks to midwives Becky Reed and Judith Kurutac for their careful proofreading and helpful input to this article.

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