

The Curse of Meconium Stained Liquor

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When meconium is noticed in amniotic fluid during labour it often initiates a cascade of intervention. A CTG machine will often be strapped onto the woman reducing her ability to move, labour in water, and increasing her chance of having a c-section or instrumental delivery ([Alfirevic et al. 2013](#)). [Time limits](#) for labour may be tightened up further resulting in [induction](#) or augmentation, which increases the chance of fetal distress and for first time mothers, c-section. As the baby is being born he may be subjected to airway suctioning which can cause a vagal response (heart rate deceleration) and difficulties with breastfeeding. Once born, the baby is likely to have his umbilical [cord cut prematurely](#) and be given to a paediatrician who may also suction the

baby's airways. In the first 24 hours after birth the baby will be disturbed regularly to have his temperature, breathing and heart rate assessed. In some hospitals the baby will be taken away from his mother to be observed in a nursery.

This is a lot of fuss for a bit of poo which in the vast majority of cases is not a problem. Indeed many of the interventions implemented because of the meconium are more likely cause complications than the meconium itself.

This post is mostly based on two journal articles. One by obstetricians in an obstetric journal ([Unsworth & Vause 2010](#)) and the other by a midwife in a midwifery journal ([Powell 2013](#)). Both agree that there is very little known about meconium and whether it is a problem at all.

Meconium facts

Meconium is a mixture of mostly water (70-80%) and a number of other interesting ingredients (amniotic fluid, intestinal epithelial cells, lanugo, etc.). Around 15-20% of babies are born with meconium stained liquor.

There are three reasons (theoretically) that a baby will open his/her bowels before birth ([Unsworth & Vause 2010](#)):

1. Because their digestive system has reached maturity and the intestine has begun working ie. moving the meconium out. This is the most common reason – 15-20% of term babies and 30-40% of post-term babies will have passed meconium in-utero.
2. Because their cord or head is being compressed (during labour) ie. a vagally mediated gastrointestinal peristalsis – the same reflex which causes variable heart rate decelerations. This is a normal physiological response and can happen without fetal

distress. This may be why a lot of babies pass meconium as their head is compressed during the last minutes of birth and then arrive with a trail of poo behind them.

3. Fetal distress resulting in hypoxia. However the exact relationship between fetal distress and meconium stained liquor is uncertain. The theory is that intestinal ischaemia (lack of oxygen) relaxes the anal sphincter and increases gastrointestinal peristalsis = passage of meconium. However, fetal distress can be present without meconium, and meconium can be present without fetal distress.

Bear in mind these are theories and there is no evidence to support them. Indeed in ‘animal models’ the theory that hypoxia results in meconium has found to be incorrect. There are also other theories about meconium in pregnancy – that the baby continually passes it – but I think this post is confusing enough with wading into them (see the key articles for further information).

Meconium alone cannot be relied on as an indication of fetal distress: “... *meconium passage, in the absence of other signs of fetal distress, is not a sign of hypoxia...*” ([Unsworth & Vause 2010](#)). An abnormal heart rate is a better predictor of fetal distress; and an abnormal heart rate + meconium may provide an even better indication that a baby may be in trouble. In addition, thick meconium rather than thin meconium is associated with complications. In summary, it is important to remember that:

- Most babies who are born in a poor condition do not have meconium stained liquor
- Most babies with meconium stained liquor are born in good condition

Despite this, babies who are known to have passed meconium (of any variety) without any other risk factors are treated as if they are in imminent danger. I am guessing this is because if a previously unstressed baby becomes hypoxic during labour it may result in the dreaded MAS.

Meconium Aspiration Syndrome (MAS)

MAS is the major concern when meconium is floating about in the amniotic fluid. It is an extremely rare complication – around 2-5% of the 15-20% of babies with meconium stained liquor will develop MAS ([Unsworth & Vause 2010](#)). Of the 2-5% of the 15-20%, 3-5% of babies will die. OK enough %s of %s – basically it is very rare but can be fatal. For those who like numbers if you have meconium in your amniotic fluid your baby has a 0.06% (1:1667) chance of dying from MAS. This risk will go up and down depending on individual circumstances eg. prematurity, additional labour complications, etc.

MAS occurs when the baby inhales meconium stained liquor during labour, birth or immediately following birth. Babies make shallow breathing movements during pregnancy. Breathing movements slow down in response to prostaglandins before birth. In order for a baby to gasp in-utero he must be extremely asphyxiated and have gone through a number of stages. This is unlikely to happen without anyone noticing the baby is in trouble ie. an abnormal fetal heart rate during auscultation and an abnormal labour (or induced contractions). A baby is able to maintain aerobic metabolism until oxygen levels at the ‘placental blood exchange site’ drop 50% below normal levels. The baby then undergoes a number of physiological compensatory responses and if the oxygen level does not improve, or worsens he will descend through hypoxaemia, hypoxia, anaerobic metabolism, metabolic

acidosis, asphyxia, and then become 'unconscious' at which point his limbic system will initiate a gasp in an attempt to get oxygen.

Meconium in the lungs can cause problems with respiration and increase the risk of infection. For 3-5% of these babies it can result in death... but remember there are often other issues occurring along with the MAS eg. prematurity.

So, meconium alone is not a problem. Meconium + an asphyxiated baby = the possibility of MAS

Bizarre Practice

So you would think that the sensible thing to do if a baby has passed meconium (for whatever reason) is to create conditions that are *least likely to result in asphyxia and MAS*. This is where I get confused because common practice is to do things that are known to cause hypoxia, for example:

- [Inducing labour](#) if the waters have broken (with meconium present) and there are no contractions or if labour is 'slow' in an attempt to get the baby out of the uterus quickly.
- Performing an [ARM](#) (breaking the waters) to see if there is meconium in the waters when there are concerns about the fetal heart rate.
- Creating concern and stress in the mother which can reduce the blood flow to the placenta.
- [Directed pushing](#) to speed up the birth.
- Having extra people in the room (paediatricians), bright lights and medical resus equipment which may stress the mother and reduce oxytocin release.
- [Cutting the umbilical cord](#) before the placenta has finished supporting the transition to breathing in order to hand the baby to the paediatrician.

Suctioning the baby's airways?



I am unsure whether this is common practice or not. Evidence based clinical guidelines generally recommend NOT suctioning a baby's airways unless they are unresponsive, floppy and require resuscitation. And then only to do so using a laryngoscope so that you can see what you are doing.

Guidelines: [NICE guideline](#), [Resuscitation Council UK](#), [more guidelines](#). Key research: [Wiswell et al. 2000](#), [Vain et al. 2004](#). So, I would assume that practice would be informed by this research and guidelines.

However, on my frequent youtube birth-surfing trips I encounter suctioning of babies often (without meconium present). Both 'on the perineum' and following birth. I have seen this being done at hospital births, homebirths,

and even unassisted births. You can see an extreme version of suctioning in this [previous post](#). A more conservative method using the suction bulb pictured above seems to figure in a lot of the homebirths on youtube. So, I am guessing that this is a common routine practice in the US. Therefore, I feel obliged to reiterate why this is not only invasive and pointless but may also be detrimental. Suctioning at birth does not reduce the risk of MAS but can:

- Cause the baby to gasp ie. inhale deeply which is exactly what you are wanting to avoid with meconium stained liquor ([Roggensack et al. 2009](#)).
- Lower the baby's heart rate for up to 20 minutes (vagal bradycardia) ([Waltman 2004](#)).
- Interfere with the initiation of breastfeeding ([Killion 2000](#))
- Cause tissue trauma ([Davies & MacDonald 2008](#)).

In addition I am guessing it is not a very pleasant [experience](#)/welcome for the baby. Anyway, the birth process takes care of the mucous and amniotic fluid (and meconium) in the baby's airways. As you can see from the photo below the airways clear as the head is born and while waiting for the next contraction – the chest is compressed, squeezing the fluid out and gravity helps it to drain. Babies born by c-section miss out on this and are more likely to end up with problems associated with fluid in the airways and stomach.



From Navelgazing Midwife's blog ([hover on photo for link](#))

Suggestions

All babies deserve to have the least stressful arrival possible. It is even more important that a baby who has passed meconium does not become stressed during labour and birth because it could lead to MAS. The following

suggestions apply to all births including when there is meconium stained liquor:

- Avoid an ARM during labour so that any meconium present is not known about until the membranes rupture spontaneously (hopefully this will happen after much of the labour is complete). If there is meconium present it will remain well diluted and the [amniotic fluid will protect](#) the baby from compression during contractions.
- Ensure that the mother knows meconium is a variation and not necessarily a complication... the practitioner needs to consider the holistic picture – a post dates baby with old meconium is very different to a 38 week baby with thick fresh meconium.
- If this is a concerning scenario ie. not post dates and thick meconium... or fresh meconium occurring during labour then increased monitoring and/or medical intervention may be required.
- Otherwise, create a relaxing birth environment.
- Avoid any interventions that are associated with fetal distress – ARM, syntocinon/pitocin, directed pushing.
- In hospital do not allow others into the room unless the mother wants them there. If there is a policy to have a paediatrician present they can wait outside the room to be called if needed.

- To assist with airway clearing encourage a slow birth of the baby's head in a position that allows drainage of the airways (ie. mother not lying on her back). Do not pull the baby out – allow the mother and baby to wait for the next contraction whilst the airways clear themselves.
- Once baby is born leave the umbilical cord intact until it has stopped pulsing to allow a gentle transition to breathing.
- Keep baby skin to skin with mother following birth.
- Encourage the mother to let you know if she is concerned about her baby in any way over the next 24 hours (eg. feeling hot, noisy breathing, etc.)



Summary

Meconium in itself is not dangerous unless it is inhaled by the baby. For some babies meconium is a sign of hypoxia and they are at risk of meconium aspiration – these babies need additional monitoring and perhaps medical intervention. For most babies ie. those who are post dates, meconium is a sign of a mature digestive system that has begun to function – in these cases the aim should be to avoid hypoxia during labour and therefore meconium aspiration.

You can listen to an [interview/discussion](#) I had with Pregnancy Birth and Beyond Radio about meconium.

Original article can be found at <https://midwifethinking.com/2010/10/09/the-curse-of-meconium-stained-liquor/>