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# Towards a physiological management of the third stage that prevents postpartum haemorrhage

Judy Slome Cohain

Postpartum haemorrhage (PPH) rates for low-risk women having vaginal births in the Western world are reported as 5% (500ml), 1% (>1000ml), and 1% of women receiving blood transfusions as a result of these events. While it could be argued that these are accepted by-products of birth, there is a need to question why both active and expectant management appear to show no reduction in those rates and whether this is because speed of placental delivery is the critical factor that has not been emphasised. Active management causes PPH because of increased manual removal rates and expectant management causes increased atony by delaying placental delivery. Where there is greater acknowledgement that a shorter third stage results in a lower PPH rate, this leads to reappraisal of third stage

management. The knowledge that the vast majority of placentas deliver in five minutes was seemingly forgotten during the period of putting women under anaesthesia during delivery. Waiting for signs of separation causes unnecessary delay in third stage, thereby increasing the PPH rate. A protocol was devised based on timing the actions *and* non actions necessary at three, four and five minutes from the birth for delivery of the placenta using a squatting position. This idea was born out of an attempt to eliminate PPH, based on the logic that vaginal delivery of a placenta weighing one kilo requires maternal effort, not passivity. In my practice, 350 consecutive attended homebirths resulted in a 0.6% PPH rate (500ml), which compares favourably to the published PPH rates of other third stage protocols.

## Background

One important aspect of a midwife's work is to observe and reflect on what these observations mean. Most authorised views of anatomy and physiology evolved from new observations. This is never so important or as appropriate as when the midwife works independently, since her setting involves more continuity of care, offering her a more holistic viewpoint, and since she has less outside support her outcomes are usually directly a result of her own management.

In Western society, women have adopted lifestyles that are far removed from their evolutionary species of primates. The development of chairs led to the adoption of a sitting rather than squatting position. Over some considerable time, sophistication in lifestyles has meant that the majority of women in the Western world have lost the habit, and muscle and knee strength, involved in routine squatting to urinate or defaecate where there are now widespread use of toilets for these functions. There are also aspects of protection and preservation which can also be seen in higher primate behaviour, and which are now largely hidden in societal norms for childbirth in the Western world. An example of this is if an unknown primate approaches a mother gorilla and her newborn immediately after birth, the gorilla will sense threat and attack. The instinct of human mothers to protect their children from strangers may or may not be totally lost, but it is rare to see a glimpse of it at birth where the majority of women deliver in hospital and entrust their newborn to a whole range of strangers previously unknown to them. The argument for maintaining physiological birth as it evolved over millions of years is difficult in the present birth environment and this is probably even truer when it comes to placental delivery.

## Neither active nor expectant management are physiological

There are currently two main approaches to management of the third stage within formal Western health care. The first is referred to as 'actively' managing placental expulsion and the second is referred to as 'expectant' management or the '*non-interventionist, passive, and physiological approach*' (McDonald 2007). However, in fact they both **actively** manage the third stage. More importantly, neither approach has evidence supporting its ability to decrease or prevent PPH in low-risk women (Fahy 2009).

Active management does what its description suggests in being proactive in assisting the descent of the placenta through the cervix by pulling on the cord. The protocol calls for uterotonic within one minute of birth and controlled cord 'traction'. Active management has the serious drawback of higher rates of manual extraction as well as pain, caused by the uterotonics, which may interfere with the mother's ability to focus on the establishment of breastfeeding. Active management is associated with a reduction in PPH, but not in the absolute sense, only when compared to the relatively poorer outcomes of expectant management (McDonald 2007). Magann *et al* (2005) concluded that the length of the third stage was the critical factor in lowering the PPH rate, not uterotonics. Any decrease in PPH using active management may have little or nothing to do with the uterotonic but rather because timely yanking on the cord gets the placenta out more quickly than expectant management, albeit with some cords breaking, sometimes leaving parts inside, which necessitates manual extraction.

Expectant management entails waiting for signs of placental separation, delayed cutting of the cord and waiting for the placenta to deliver preferably spontaneously, and if it does not deliver by 10–15 minutes, intervening with squatting, pushing, nipple stimulation and/or infant sucking (McDonald 2007). Its shortcoming derives from the incorrect assumption that maternal effort is not needed to deliver the placenta unless it doesn't deliver by 10–15 minutes after birth. What miracle would explain why the woman pushes hard to get even a 2 kilo or 2.5 kilo baby out, but a sticky 1 kilo placenta attached to a slimy bag of membranes is expected to slide down the uterus through a partially closed cervix and down the narrow diameter of the vagina by itself and quickly enough to avoid associated excessive blood loss? In about 96% of cases, the placenta does deliver uneventfully using expectant management, albeit with maternal effort. But 4% of the time expectant management results in PPH >500ml (Combs *et al* 1991, Janssen *et al* 2002, Hofmeyr *et al* 2008, Janssen *et al* 2009). A theory, supported by current research, explaining why expectant management results in a 4% PPH rate, is because it delays the placental delivery needed to empty the uterus enabling the uterus to contract the wound where the placenta was attached.

Since expectant management often entails intervention, 'passive' or 'non-interventionist' are misnomers. 'Physiological' may be a misnomer as well, since the resistance by women to squat immediately after birth may not be physiological, but rather due to the relatively recent invention of indoor plumbing. Counting off 10–15 minutes and then squatting is neither physiological nor research-based, since a delay of even five minutes has been shown to double the PPH rate (Magann *et al* 2005).

Instinctual third stage management is an oxymoron. Instinctive birth is not divided into first, second and third stages with various management protocols for each. One might hypothesise that instinctive third stage would be where the placenta followed immediately after the baby, pulled along by the suction created by the body of the fetus as it leaves a relatively airless cavity. The only argument against delivering the placenta in a squatting position at five minutes is a non-evidence based feeling that it is not physiological to interfere with delivery of the placenta until 10–15 minutes if it hasn't delivered 'on its own'. The desire for a physiological third stage may be admirable, but it is out of context with the way birth currently takes place in the Western world. How many women elect to birth physiologically when it involves walking to the hospital, fetching drinking water from the river, refusing the use of electricity, or food and drinks that used electricity or gas to be produced, or going outside to use an outhouse in the trees behind the hospital? Most women forsake such a birth when they leave the privacy of their home to give birth among strangers, and not only that, take a car to get there. It is unclear why the desire to return to nature suddenly surfaces for the first 10–15 minutes after the baby is born. Women rarely object to squatting to push the placenta out at 4–5 minutes when it is explained to them that waiting five minutes doubles their risk of PPH.

### Placental separation takes 'a very few minutes'

The 16<sup>th</sup> edition of *Williams Obstetrics* (Williams *et al* 1980) describes the delivery of the placenta in great detail:

*'...as the baby is born (NB not after, but DURING the delivery of the infant) immediately the uterus spontaneously contracts down on its diminishing contents. Normally, by the time the infant is delivered, the uterine cavity is nearly obliterated and the organ consists of an almost solid mass of muscle, the fundus lying below the umbilicus. This sudden diminution in uterine size inevitably is accompanied by a decrease in the area of the placental implantation site. Because of the limited elasticity of the placenta it is forced to separate. During cesarean section, this phenomenon can be observed directly when the placenta is implanted posteriorly... Placental separation occurs within a very few minutes after delivery... The membranes usually remain in place until the separation of the placenta is nearly completed. They are then peeled off the uterine wall, partly by further contraction of the myometrium and partly by traction exerted by the separated placenta as it falls into the lower uterine segment with the force of gravity and uterine contraction... When the woman is upright, the placenta may be expelled by abdominal pressure, but women in the recumbent position frequently cannot expel the placenta spontaneously.'*

Rates of 50% of placental deliveries within five minutes (Dombrowski *et al* 1995) have been reported; however, this rate was confounded by the routine use of oxytocin before placental delivery, which can slow or prevent delivery of the placenta by closing the cervix.

Recent ultrasound studies (Herman 2002, Mo & Rogers 2008) have taken great care to document whether placentas separate all at once (monophasic) or from the sides (multiphasic). The multiphasic separation was further observed to take place either from the right, or the left, or bipolar. These detailed observations have no relevance for prevention of PPH. The length of time that it took for the placenta to separate was not reported in a single ultrasound study. These studies may only be reporting part of the story, since they relate only to placentas delivered in the prone position. No study has examined when or how the placenta separates when the woman is upright or squatting.

### Seconds count

The median length of the third stage of labour was seven minutes for women without a PPH and nine minutes for women with a PPH (Magann *et al* 2005). Seconds make large differences in PPH rates. Magann found the risk of postpartum haemorrhage (>1000ml) to be twice as high for third stages over 10 minutes compared to those under 10 minutes, four times as high for third stages over 20 minutes as under 20 minutes, and six times as high for third stages over 30 minutes compared to those under 30 minutes. Each of the 6,588 women in this study received 10u of oxytocin upon delivery of the shoulder and 5.1% of vaginal deliveries caused the loss of >1000 ml of blood.

### Upright position eliminated during the period of twilight sleep

Although the version of the textbook *Williams Obstetrics* (Williams *et al* 1980) reports on the expedience of upright position for placental delivery, protocols apparently had to be adjusted for anaesthetised women during vaginal delivery, who were unable to be upright for third stage. Despite the fact that twilight sleep and chloroform haven't been used for the past 30 years, current third stage protocols appear not to have readjusted to reflect this change. One explanation for this may be an underlying preference for intervention by carers rather than deferring to woman-initiated actions. Typical Western practice includes high rates of routines that are done to low risk women such as prenatal ultrasound, induction, augmentation, epidurals, vacuum and caesareans which are promoted as being critical to delivering a healthy baby, when in fact planned attended homebirth involving very low rates of those interventions results in equally good outcomes (Janssen *et al* 2002, Janssen *et al* 2009).

Fitting with the distrust of women's capacity to give birth unaided, widespread objection to getting the woman into an expedient position like squatting would be expected, despite its obvious use of gravity and the diaphragm muscles to facilitate separation and delivery of the placenta in a timely fashion. Both Magann *et al* (2005) and Dombrowski *et al* (1995), together observing over 52,000 births, found that the women whose placentas were delivered within five minutes had the lowest PPH rates. The researchers admit that the 'vast majority of women had epidural anesthesia' which would have made it challenging to get them into a squatting position. However, their conclusion was not to assist the woman to expedite delivery of the placenta herself, but rather to decrease the protocol for manual removal by the carer from 30 minutes postpartum to 18 minutes (Magann *et al* 2005) or to 15 minutes (Dombrowski *et al* 1995). In a population which does not use epidurals, taking five minutes as a reputable baseline, I invited women to expedite placental delivery themselves, and created the protocol of 3, 4, 5, 10 minute third stage protocol (Cohain 2010).

### Redefining what is acceptable blood loss

If a contractor who builds houses had a reputation that 5% leaked when it rained (PPH), and 1% of the houses needed a costly overhaul (blood transfusion) every time it was used, he would not have much business. Neither active nor expectant management has 'shown a significant, consistent reduction in the PPH rates reported in industrialized countries in recent times' (McDonald 2007). What this means is that both usually result in PPH rates of 5% or more and blood transfusion rates of 1%–2%. I question the need for this excessive blood loss in one of every 20 births and blood loss adequate enough to justify blood transfusion in about one of every 100 births.

### Exact blood loss is hard to measure but PPH is not

Wide ranges of PPH rates can be explained by inaccurate assessments of blood loss (McDonald 2004). If a woman

delivers in a squatting position, using a bowl to catch all blood at birth and subsequently measuring it with a measuring cup is probably the most accurate way to measure blood loss. There is still the problem of how much is amniotic fluid or urine, and so overestimation of the amount of blood loss within the total is likely but reduces the risk of underestimation. Without a bowl, it may be difficult to distinguish exactly between 200 and 300ml or 600 and 700ml. However, defining the blood loss as over 2 cups, or 500ml, is relatively easy, since blood overflows the standard 60 x 90 disposable underpad and flows on to the bed, chair, floor or bathtub, and clots appear on the pad and floor. Alternatively, the blood clots inside the uterus and if one or more 10cm diameter clots emerge upon massage of the uterus, this is considered to be a PPH. This is based on calculations that the volume of one 10cm round clot =  $(4/3)\pi(5)^3 = 524\text{ml}$ . Measuring the diameter of a round clot is a skill which practitioners are familiar with from measuring cervical dilation. If the clot is 15cm in diameter, the volume of blood loss is 1766ml.

### Protocol

The protocol for the 3, 4, 5, 10 minute third stage management is to use a digital watch or Programmed Talking Timer that announces at three minutes, 'cut cord if you like', at four minutes, 'up to squatting and push', five minutes, 'push harder if placenta not out yet', and ten minutes, 'check bleeding'. Use of the bowl is optional.

There will have already been a discussion with the woman about adopting the squatting position for delivery of the placenta. The exact time of the birth is noted on a digital watch and said quietly out loud to help keep track of the time. Immediate continuous skin-to-skin contact with the baby is initiated for the first 3½ minutes postpartum. The following is optional but recommended. At three minutes: check to see if cord has stopped pulsing and cut non-pulsing cords. At four minutes: if the placenta has not delivered yet, assist the mother into a squatting position. The mother is encouraged to push out placenta with or without a contraction. At five minutes: if the placenta is not yet born, assist the cord to come out further by gently pulling it down another 5–20cm in length in order to bring the placenta low enough to give the woman the urge to push. At ten minutes: the uterus is massaged to check for clots.

A bowl can be placed under the woman when she gets into a squatting position to measure blood loss. Immediately after delivery of the placenta, the mother is given a sanitary pad, assisted into bed, and immediately given the baby.

If bleeding is flowing from the vagina in a 1.5–2cm wide stream, rather than dripping or spotting the pad, an intramuscular shot of 10u Pitocin (oxytocin) or 0.2 mg methergine is given at ten minutes postpartum. Early suckling at the breast is encouraged.

To refer to the three minute timing, 99% of cords have stopped pulsing by three minutes (McDonald 2007). The timing of cord clamping does not affect the incidence of PPH (McDonald 2007); however, having the baby connected to the mother often delays the mother getting into a squatting position, for which timing is critical. If the

cord is not cut, delivery of the placenta may be delayed by the juggling of the position of the baby relative to the mother.

### Outcomes

The 3, 4, 5, 10 minute third stage protocol has now been used to deliver 350 women with only two occasions of PPH (0.6%). Both of these were in high-risk women — one with severe vulvodynia who had an unusual tear, ripping a 1 inch strip of cartilage-like tissue which bled profusely (500ml), and the other who had severe emotional difficulties around the time of the birth and wished to die (800ml). Among 350 births using the 3, 4, 5, 10 minute protocol, 347 (99%) delivered between five and six minutes. Two women delivering their ninth babies delivered at 15 minutes postpartum — in these cases no tension was put on the cord to pull it down because of the multiparous uteri, and one first birth had a retained placenta that was separated by hand and then removed at 30 minutes. Seven per cent of women required a shot of Pitocin or methergine at 10 minutes.

### Discussion

New evidence is presented here indicating that 99% of placentas in mothers who get into the squatting position are separated and delivered around five minutes after birth. This is subsequently associated with a low PPH rate, with blood loss accurately measured in a bowl.

Several theories for this observation, or a combination of the three, can be offered:

1. Squatting facilitates separation occurring more quickly.
2. Gravity and abdominal and diaphragm muscles speed the delivery of an already separated placenta.
3. The increased speed of delivery could be mediated by an unknown neurochemical pathway, such as the mother's confidence in her ability to birth.

A trial in various populations of women is recommended.

It is possible this protocol unnecessarily delays placental delivery. Waiting to get the woman into a squatting position at four minutes was chosen to allow for the cord to stop pulsing at three minutes, for the convenience of cutting the cord before squatting, and to allow some time for the woman to examine her newborn. My tendency is to stay with 3, 4, 5 because neither of the two PPHs were likely to have been prevented with faster delivery of the placenta, since one was from the tear, and one was mediated by a psychological desire to die. There is no

evidence, however, for not getting the woman to squat at two or three minutes, for example.

It may surprise some that the 3, 4, 5 protocol contradicts the practice of waiting for the four classic signs of separation. Watching for signs of separation only causes unnecessary delay which leads to an increase in PPH. Caregivers still have to look for bleeding. An early gush of blood before four minutes means the placenta has separated right away and is ready for delivery before four minutes. Once the woman is squatting several centimetres above the floor, a **gush of blood and cord extension** are poorly visualised and squatting makes it impossible to palpate a firm, globular uterus or see whether the uterus rises in the abdomen. Waiting for the woman to feel contractions only leads to unnecessary delay.

Perhaps other practitioners have tried similar protocols. I would be very happy to correspond with any readers about the protocol, with the aim of finding a third stage protocol that prevents PPH.

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**Cohain JS. MIDIRS Midwifery Digest, vol 20, no 3, September 2010, pp 348–351.**

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### Editor's note:

A recent *Cochrane* review has been published which looks again at the evidence for management of the third stage: Begley CM, Gyte GML, Murphy DJ *et al* (2010). Active versus expectant management for women in the third stage of labour. *The Cochrane Database of Systematic Reviews*, issue 7.

A *MIDIRS* review of this is planned for the December issue of *Essentially MIDIRS*.