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Intervention or interference? The need for expectant care throughout normal labour

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Introduction

Although healthcare professionals talk about the “stages” of labour, this is a medical label, not a definition that women recognise. To them, and in physiology, labour is a continuum, a state of being that changes, develops and transforms women into mothers, both physically and emotionally. One cannot, therefore, focus on intervening or modifying care in any part of pregnancy and labour without looking at its effects on all other aspects. Any action we take has consequences far beyond the intended effect on that particular ‘stage’ of labour, so any intervention we introduce (either medico-technical or more ‘natural’) must be for a good reason, based on sound research evidence and resulting in more good than harm, otherwise it is just interference.

The objective of this paper is to describe and evaluate some common medico-technical interventions in normal pregnancy or labour and critique their usefulness in terms of overall effects on women and neonates. There are many interventions used in modern maternity care, but three are chosen for special focus: induction of labour, episiotomy and active management of the third stage of labour (including early clamping of the cord). These three have been chosen for particular discussion as they are the most invasive of procedures conducted in the first (or pre-labour), second and third stages of labour, respectively.

Method

A comprehensive review of the literature was undertaken to seek evidence of the benefits and adverse effects of three routine interventions. PubMed and the Cochrane databases were searched using the three interventions as search terms. Reviews and randomised trial results were given priority. The findings are presented firstly as background information on each intervention, and then as focused information on how to avoid using the intervention as interference.

Background

Induction of labour

Intervention rates in labour are rising throughout the world. In Europe, induction of labour rates vary from very low (6.8 - 10.2% in Lithuania, Latvia, Czech Republic, Estonia), low (13.5 - 18.8% in Cyprus, Sweden, Italy, Denmark, Norway, Slovenia, Finland) and moderate (21 - 22.7% in England, Iceland, the Netherlands, Flanders, Germany, Wales, Scotland, France), to high (26.2 – 33% in Luxembourg, Northern Ireland, Brussels, Malta, Valencia, and Wallonia).¹ Given the considerable variation, one has to wonder, which countries have the “right” rates? This is difficult to answer as the figures may be influenced by rates of other interventions. For example, Sweden has a low induction of labour rate at 13.7%, and it is teemed with a low elective caesarean section rate of 8.9%, so that a total of 22.6% of women have their pregnancies ended artificially. Cyprus’s similarly low induction rate of 13.5, however, exists with a very high elective caesarean section (CS) rate of 38.5, giving the highest rate of intervention at the end of pregnancy (52%) of all European countries.¹ In addition, there is confusion in the definitions that countries use, so that the intervention of using oxytocic drugs to augment a labour that has started spontaneously but is showing ‘slow progress’ (however defined) is, in some countries, merged with data on induction of labour.¹

Although induction of labour is sometimes necessary for good medical reasons, the variation in rates across Europe, without demonstrable effect on perinatal mortality rates, means that many inductions are being conducted without due cause. Of course, induction of labour is necessary when fetal growth restriction is detected, or other compelling fetal or maternal medical conditions are present. Induction for ‘post-

term', however, is a contentious area, where clinicians differ in their views of what is 'post-term'.

A Cochrane Review of 22 randomised trials, including 9383 women² found that a policy of induction at 41-42 weeks resulted in fewer perinatal deaths (although absolute numbers were small) and fewer caesarean sections. The authors recommended that all women at 41-42 completed weeks of pregnancy should have the option of accepting induction of labour. They further state that, for those women who choose to wait for labour to start spontaneously after 41-42 weeks, regular antenatal fetal monitoring should be made available.² Induction at or beyond 41 weeks is thus phrased as an option, not a practice to be strongly encouraged for all women, and induction for postmaturity before 41 weeks is not recommended and shows no benefits. As induction of labour with oxytocin is associated with a greater need for epidural analgesia,³ it is presumably more painful and thus should be avoided unless necessary. Induction of labour for 'postmaturity' before 41 completed weeks gestation, or induction at any time for clinicians' or women's convenience, can therefore be considered an interference, not an intervention.

Episiotomy

Episiotomy, an intervention that many consider to be "minor", causes pain and distress to women, which persists as long as 6 weeks postnatal in up to 13% of women.⁴ Rates vary across Europe from 75% in Cyprus and 72.9% in Portugal, to 4.9% in Denmark and 6.6% in Sweden.¹ Such dramatic differences in rates indicate that this operative procedure is being undertaken in many European countries without consideration of the research evidence. This is very concerning, given that the surgical incision is performed in a sensitive perineal area, and that suturing of the wound causes pain and disturbance at a time when the new mother and father are trying to get to know their baby.

Episiotomy does not prevent severe lacerations, or urinary incontinence, so these are not indications to perform one. In fact, routine episiotomy results in more severe perineal trauma and more healing complications when compared to restrictive use.⁵ One Irish study of the practice of experienced midwives showed that, following audit

and feedback on their perineal trauma rates, midwives did respond to evidence and changed their practice.⁶ The reduction in episiotomy rate from 54% to 34% in primigravid women and from 25% to 7% in women having their second baby led to no increase in rates of spontaneous tears requiring suturing. For multiparous women (para 2 or greater before the present birth), the decrease in episiotomy rate from 5% to 2% led to a significant fall in spontaneous tear rates from 18% to 11%,^{6,7} indicating that, when midwives start trying to avoid episiotomy they also gain skill in preserving the perineum intact. Results such as these demonstrate that, far from *preventing* tears, as episiotomies are supposed to do, they actually *cause* them as midwives lose their perineum-preservation skills.

As the authors of the Cochrane Review on episiotomy in vaginal birth have recommended restrictive use of episiotomy,⁵ this intervention should now be viewed as interference when used routinely, or too frequently. Episiotomy rates may vary in different populations due to differences in variables such as race, parity, age profiles, or obesity levels; however, rates in Denmark and Sweden of 4.9 - 6.6%¹ give a suitable target that countries and individual units can aim for.

Active management of the third stage of labour

Postnatal blood loss may be increased by both induction of labour with amniotomy and intravenous oxytocin,⁸ and episiotomy,⁵ indicating how the effects of one intervention in pregnancy or labour lead on to another. Postpartum haemorrhage rates are rising world-wide⁹ without any very clear indication of the cause. Active management of the third stage of labour (AMTSL) appears to be an accepted part of routine care in even normal labours of low-risk women, with the intent of preventing postpartum haemorrhage (PPH). A recent survey of members of the Royal College of Obstetricians and Gynaecologists and the Royal College of Midwives showed that the majority 'always' or 'usually' use AMTSL (94% of obstetricians and 71% of the midwives).¹⁰

The Cochrane review comparing active and expectant third stage management includes 5 studies involving 6486 women.¹¹ Results of meta-analyses show that AMTSL reduces rates of severe blood loss, blood transfusions and anaemia in the

postnatal period but causes a number of harms including vomiting, increased diastolic blood pressure, increased after-birth pains and a decrease in baby's birthweight. This decrease is likely due to the reduction in transfer of approximately 80 mls of fetal blood into the baby's circulation as a result of early cord clamping.¹² Three of the studies (3134 women) included only women at low risk of bleeding, and analysis of these studies showed no difference in severe blood loss (greater than 1000 ml) or postnatal anaemia, with the above noted harms still remaining. The authors conclude that all women should be given information on the benefits and harms of both methods, to support their informed choice.¹¹

One additional harm of AMTSL, as currently practised, is due to early cord clamping and cutting, to aid controlled cord traction. The reduction of 80 mls of blood in the baby's circulation, caused by immediate cord clamping, leads to lower Hb concentrations in term neonates in the first 24 to 48 hours and twice the level of anaemia at 3-6 months.¹³ For pre-term babies, delayed cord clamping (1-3 minutes) decreases the number of blood transfusions required for anaemia,¹⁴ and results in a lower incidence of intraventricular haemorrhage and lower risk of necrotising enterocolitis. The only noted adverse effect of delayed clamping is higher bilirubin levels in preterm infants¹⁴ or an increase in jaundice requiring phototherapy in term babies.¹³ On the basis of these review results, the World Health Organization now recommends late cord clamping at approximately 1-3 minutes after birth for *all* births.¹⁵ This will be possible in the future even for births of preterm or other babies needing resuscitation, using the specially designed LifeStart resuscitation trolley that can be brought to the mother's side, so that resuscitation can proceed while the cord is still supplying oxygen to the baby.¹⁶ This is important, as 50% of even healthy term babies have been shown to have a heart beat below 100 beats per minute, following early cord clamping,¹⁷ whereas with delayed cord clamping the heart rate remains above 110 beats per minute.¹⁸ From all the research discussed here, it is now apparent that early cord clamping (before 1-3 minutes) is a routine intervention that has considerable harms for the infant, with no perceived benefit. It is thus interference, and should be stopped forthwith.

A recent large randomised trial, conducted in 8 low/moderate-income countries has shown that omitting controlled cord traction from the AMTSL package has no appreciable effect on severe postpartum haemorrhage.¹⁹ Thus it would appear that the key, effective fraction of the AMTSL package is the administration of a uterotonic, usually oxytocin.²⁰

The over-riding harm of AMTSL, which is not documented or spoken about, is that it interferes with the early post-birth minutes when mother, baby and father are coming together as a new family for the first time. Unless there is a threat to the mother or baby's health, to have that precious time disturbed by clinicians rushing to clamp the cord as soon as possible, taking the baby to weigh, measure and 'tag', administering an injection, palpating the woman's uterus and peering under the covers, is inexcusable.

Many midwives working in hospitals, especially if AMTSL is part of routine policy, may have forgotten how to use physiology to their advantage, or may be nervous of omitting administration of a prophylactic uterotonic because they believe that, without it, women will bleed excessively. The spectre of postpartum haemorrhage hangs over clinicians working in maternity care, all of whom will have been taught that PPH is a major cause of maternal mortality. In low-income countries it certainly is, because women often are anaemic and so even a small blood loss has a dramatic effect on them. Sufficient skilled healthcare professionals are not available and those that work in maternity care in these countries do not always have access to uterotonics. The maternal mortality rate in South Sudan is 956.8 per 100,000, very different to the rate of 2.4 in Iceland.²¹

In high-income countries, however, healthy women with normal haemoglobin levels do not suffer any ill effects from a PPH of 500mls, which is only slightly more than would be given voluntarily in a routine blood donation. Examining the details of all maternal deaths in the UK in the period 2006-2008 shows that, out of 2.3 million women birthing, only 5 died of PPH. Three of the five women died because of insufficient post-operative observations using a Modified Early Obstetric Warning Score chart, and failure of staff to realise they were bleeding. One woman had a

haemoglobin of 7.5 prior to caesarean section, lost 1-2 litres of blood during the operation and then died a few months later of pneumonia. The fifth woman had a concealed pregnancy and laboured and died alone at home.²² So, none of these women fall into the category of 'normal, healthy women with normal haemoglobins who are at low risk to haemorrhage.' It would thus be fair to say that PPH is not a major cause of maternal mortality among low-risk women cared for by skilled clinicians in high income countries, and that there is no reason why such women should not be cared for expectantly in the third stage. If a woman starts to bleed excessively while having expectant care in the third stage of labour, she can of course be given a uterotonic as a treatment.

Two factors affect the outcomes seen in Cochrane Review of management in the third stage of labour.¹¹ The first is that a high percentage of women participating had received an oxytocic for induction or acceleration of labour, which may predispose them to PPH. Secondly, expectant management was not the norm for the midwives involved, so the blood loss seen in these trials may be greater than would be obtained by midwives experienced in using expectant management of the third stage of labour (EMTSL). For example, the PPH rate in the physiological management group in the Dublin trial comparing AMTSL and EMTSL, was 21% in the one-month pilot study, 13% in the next 4 months and 6% in the last 8 months as midwives became more skilled in providing physiological care.²³

Areas of expertise exist in the world where midwives are skilled in facilitating EMTSL, and PPH rates are low. One population based, retrospective cohort study, reporting on third stage management in New Zealand included 33,752 low-risk women who had no oxytocic for induction or acceleration of labour. Almost half the population had EMTSL (48%) and the remaining 52% had AMTSL, so the midwives were equally skilled at both types of management. Of the women cared for using EMTSL, 3.7% had a PPH of greater than 500 ml, whereas in those given AMTSL, 6.9% had a PPH.²⁴ Similarly, in a cohort of 445 low-risk women birthing in two midwife-led units in Ireland, who had no oxytocin for induction or acceleration of labour, 29% had EMTSL, and 71% had AMTSL. Of the women cared for using EMTSL, none had a PPH, and in those given AMTSL, 1.3% had a PPH.²⁵

Although these are observational studies, the results demonstrate that, in cohorts of women at low-risk to haemorrhage, who do not develop risk factors during labour, have high haemoglobin levels, and who are cared for by midwives experienced and skilled in using EMTSL, PPH rates are low. This may be, in part, that midwives who are expert at using EMTSL are also good at selecting those who need active management and those who do not. A policy of *routine* active management in the third stage, in such a cohort, must thus qualify as interference, not intervention.

Avoiding interference

Induction of labour

Given the adverse effects of these interventions, it is sensible to try to avoid using them unless absolutely necessary. To avoid induction, women and clinicians can try a number of techniques aimed at starting labour more naturally. These include: 'sweeping' the membranes,^{26,27} and breast stimulation.²⁸ 'Sweeping' the membranes increases the probability of spontaneous labour either within 48 hours or one week, has no adverse outcomes but does cause discomfort.²⁶ Breast stimulation had similar results to the use of oxytocin for induction of labour and, when compared with no intervention, resulted in an appreciable reduction in the number of women not in labour within 72 hours, 62.7% compared with 93.6%.²⁸ 'Mechanical methods,' such as the introduction of laminaria tents or catheters into the cervix, have much the same result, in terms of stimulating labour, as the use of prostaglandins.²⁹ Other 'natural' means of inducing labour such as castor oil,^{27,30} acupuncture^{27,31} intercourse, or hypnotherapy²⁷ have not been shown to be successful.

Episiotomy

To avoid episiotomy, women and clinicians can practice some procedures designed to help the perineum to stretch. Antenatal digital perineal massage, once or twice a week from 35 weeks of pregnancy has been shown to reduce episiotomies and perineal trauma,³² and women who massaged more frequently also had less perineal pain at three months. Warm compresses on the perineum, or massage during the second stage, may relax the tissues and aid stretching, as both result in a reduction

in third and fourth degree tears.³³ Upright positions during the second stage also seem to decrease the rate of episiotomies.³⁴

The actions midwives take to prevent episiotomies is a controversial area for debate. The 'HOOP' trial showed that, when midwives used 'hands poised,' episiotomy rates were decreased but postnatal pain was increased compared with the 'hands on' technique,³⁵ which may have led to more midwives being 'hands poised' since then. It should be noted that in this trial, whereas in the 'hands on' group the protocol was adhered to in 96% of births, in the 'hands poised' group compliance was only 73%. The results should thus be viewed with caution as the 27% of women cared for when the protocol was broken might have had considerable degrees of perineal trauma had the midwives not felt the need to put their 'hands on' during the birth. The Cochrane review of perineal techniques during the second stage of labour for reducing perineal trauma³³ found that 'hands off' led to fewer episiotomies, with no difference in third and fourth degree tears. 'Hands off', however, resulted in more third and fourth degree tears when compared with perineal massage. The evidence is not strong and, overall, no clear recommendation can be made regarding hand manoeuvres.

The simple dichotomy of choosing either 'hands on' or 'hands off', therefore, does not provide a clear direction as to the best care. It would appear from the above evidence that a policy of 'hands on,' using perineal massage and warm compresses, while using patience and deliberately trying not to use episiotomy unnecessarily, is probably the best course of action, but requires further research to support.

Active management of the third stage of labour

To avoid routine active management of the third stage of labour, midwives need to develop their skills of facilitating expectant care of women in the third stage. This is "a basic midwifery competency", according to the International Confederation of Midwives, who further state that "every midwife is required to attend the birth of the placenta without the aid of uterotonics".³⁶ Similarly, the UK Royal College of Midwives guidelines state that "midwives should be competent in both active management and physiological management".³⁷

The MEET study (Midwives' Expertise in Expectant Third stage management) was conducted in the two areas described above, New Zealand and the midwife-led units in Ireland, where data showed that midwives were using EMTSL frequently with good results. This qualitative study explored 27 expert midwives' views of how they facilitated EMTSL and how they achieved such low PPH rates.³⁸ In brief, the findings emphasised the need to 'watch and wait', leave the cord unclamped until the placenta is born or pulsation has ceased, to observe the women's behaviour and cues rather than interfere by touching the fundus or looking for blood loss, and to use gravity to assist maternal effort in birthing the placenta (walking to the toilet, sitting on the toilet or birthing stool, or squatting over a bedpan). In addition, 26 of the 27 midwives spoke of how they used "just a little lift" to guide the placenta out, when they could see that it had separated and was in the vagina.³⁸ As these were all classified as 'experts' because they used EMTSL more than 30% of the time, and had PPH rates of less than 4%, the actions they take are the ones from which we should learn. The most recent edition of Myles Textbook for Midwives has incorporated these changes into the chapter on third stage management,³⁹ which would be a good guide for any midwives wishing to develop their skills.

The midwives in the MEET study had not always used EMTSL as they had been practising as qualified midwives for a mean of 13.6 years, but had only been using EMTSL for 7.1 years. They had learnt the method by trial and error and by discussing it with others who used the technique, so it is very feasible for other midwives to do the same. The experts talked of how, when they started practising EMTSL first, they overestimated the amount of blood lost and gave uterotonic drugs quite often as a treatment for what they perceived to be a PPH and what they gradually came to realise was a normal separation bleed.³⁸ This would need to be remembered by any midwives starting into the same process now.

When AMTSL is deemed necessary because of the existence of risk factors, the cord should be left unclamped for 1-3 minutes¹⁵ to facilitate transfusion of the extra 80 mls of blood to the baby. Administration of the uterotonic drug should be withheld until after the cord is clamped, to prevent unwanted medication of the baby. Any

necessary resuscitation measures should be carried out at the mother's side while the cord is left to pulsate. Controlled cord traction is not an essential part of care, but can be carried out by trained personnel.

Discussion

A common thread throughout this paper has been the need to avoid interference in pregnancy or labour when the intervention proposed is not necessary. All the interventions are beneficial when they are truly required, but cause distress, or pain, or morbidity to mothers and/or babies when they are not. They are not, therefore, acceptable practice when used routinely. In particular, the over-use of episiotomy, early clamping of the cord, and active management of the third stage of labour, in addition to the physical harms they cause, result in an undesirable disruption of the early post-birth period when the new family are coming together for the first time, a time that should be cherished and protected.

Due to differing definitions, augmentation or acceleration of labour deemed to be progressing 'too slowly' is often reported as 'induction' of labour and so has not been discussed here. The too-frequent use of oxytocin to augment labour that is possibly only in the latent phase, is an important intervention also, and needs to be addressed in further research and/or debate articles.

Conclusion

Further research is needed into alternative methods of inducing labour, and trials of induction compared to expectant care with fetal monitoring, for postmaturity between 41 and 42+ weeks. Studies of ways to prevent episiotomy and preserve the perineum intact are needed, as are trials of early versus late cord clamping, and trials of EMTSL and AMTSL in cohorts of truly low-risk women cared for by midwives skilled in using EMTSL.

Routine policy has no place in evidence-based maternity care practice, as nothing can be good for everyone. The need for expectant care throughout normal pregnancy and labour has been emphasised in this paper, in respect of three common interventions. Clinicians need to develop their skills in these areas and

reduce reliance on implementing induction of labour, episiotomy and active management of the third stage, in order to provide the best possible care for women and babies.

References

¹ EURO-PERISTAT Project with SCPE and EUROCAT. *European Perinatal Health Report. The health and care of pregnant women and babies in Europe in 2010*. May 2013. Available www.euoperistat.com

² Gülmezoglu AM, Crowther CA, Middleton P, Heatley E. Induction of labour for improving birth outcomes for women at or beyond term. *Cochrane Database of Systematic Reviews* 2012, Issue 6. Art.No.:CD004945. DOI: 10.1002/14651858.CD004945.pub3.

³ Alfievic Z, Kelly AJ, Dowswell T. Intravenous oxytocin alone for cervical ripening and induction of labour. *Cochrane Database of Systematic Reviews* 2009, Issue 4. Art. No.: CD003246. DOI: 10.1002/14651858.CD003246.pub2.

⁴ Macarthur AJ, Macarthur C. Incidence, severity, and determinants of perineal pain after vaginal delivery: a prospective cohort study. *American Journal of Obstetrics and Gynecology* 2004;**192**:1199-204.

⁵ Carroli G, Mignini L. Episiotomy for vaginal birth. *Cochrane Database of Systematic Reviews* 2009, Issue 1. Art. No.: CD000081. DOI: 10.1002/14651858.CD000081.pub2.

⁶ Begley C. M. Episiotomy - a change in midwives' practice. *Irish Nursing Forum and Health Services* 1987 Jan/Feb. pp. 12-13, 34

⁷ Begley C. Episiotomy rates can change following evidence-based intervention. *British Medical Journal* 2002, April 23, <http://www.bmj.com/rapid->

[response/2011/10/29/episiotomy-rates-can-change-following-evidence-based-intervention](#) Accessed 20th May 2014

⁸ Howarth G, Botha DJ. Amniotomy plus intravenous oxytocin for induction of labour. *Cochrane Database of Systematic*

Reviews 2001, Issue 3. Art. No.: CD003250. DOI: 10.1002/14651858.CD003250.

⁹ Knight M, Callaghan WM, Berg C, Alexander S, Bouvier-Colle MH, Ford JB, Joseph KS, Lewis G, Liston RM, Roberts CL, Oats J, Walker J. Trends in postpartum hemorrhage in high resource countries: a review and recommendations from the International Postpartum Hemorrhage Collaborative Group. *BMC Pregnancy and Childbirth*. 2009 Nov 27;9:55. doi: 10.1186/1471-2393-9-55.

¹⁰ Farrar D, Airey R, Tuffnell D, Duley L. Care during the third stage of labour: a postal survey of obstetricians and midwives. *Archives of Disease in Childhood. Fetal and Neonatal Edition* 2009;**94**(Suppl 1):Fa40.

¹¹ Begley CM, Gyte GML, Devane D, McGuire W, Weeks A. Active versus expectant management for women in the third stage of labour. *Cochrane Database of Systematic Reviews* 2011, Issue 11. Art. No.: CD007412. DOI: 10.1002/14651858.CD007412.pub3.

¹² Werner EJ. Disorders of the fetomaternal unit. In: de Alarcon PA, Werner EJ editor(s). *Neonatal Hematology*. Cambridge: Cambridge University Press, 2005:10–39.

¹³ McDonald SJ, Middleton P, Dowswell T, Morris PS. Effect of timing of umbilical cord clamping of term infants on maternal and neonatal outcomes. *Cochrane Database of Systematic Reviews* 2013, Issue 7. Art. No.: CD004074. DOI: 10.1002/14651858.CD004074.pub3.

¹⁴ Rabe H, Diaz-Rossello JL, Duley L, Dowswell T. Effect of timing of umbilical cord clamping and other strategies to influence placental transfusion at preterm birth on maternal and infant outcomes. *Cochrane Database of Systematic Reviews* 2012, Issue 8. Art. No.: CD003248. DOI: 10.1002/14651858.CD003248.pub3.

¹⁵ World Health Organization 2014 Optimal timing of cord clamping for the prevention of iron deficiency anaemia in infants.

http://www.who.int/elena/titles/cord_clamping/en/ Accessed 24th May 2014

¹⁶ Hutchon DJR. Evolution of neonatal resuscitation with intact placental circulation. *Infant* 2014, 10(2), pp 58-61.

¹⁷ Dawson JA, Kamlin COF, Wong C, te Pas AB, Vento M, Cole TJ, et al. Changes in heart rate in the first minutes after birth. *Arch Dis Child Fetal Neonatal Ed* 2010 **95**: F177–81.

¹⁸ Hutchon DJR. Early versus delayed cord clamping at birth; in sickness and in health. *Fetal and Maternal Medicine Review*, 2013, 24, pp 185-193.

¹⁹ Gülmezoglu AM, Lumbiganon P, Landoulsi S, Widmer M, Abdel-Aleem H, Festin M, Carroli G, Qureshi Z, Paulo Souza J, Bergel E, Piaggio G, Goudar SS, Yeh J, Armbruster D, Singata M, Pelaez-Crisologo C, Althabe F, Sekweyama P, Hofmeyr J, Stanton M-E, Derman R, Elbourne D. Active management of the third stage of labour with and without controlled cord traction: a randomised, controlled, non-inferiority trial. *Lancet*. 2012; 379(9827): 1721–1727.

²⁰ Westhoff G, Cotter AM, Tolosa JE. Prophylactic oxytocin for the third stage of labour to prevent postpartum haemorrhage. *Cochrane Database of Systematic Reviews* 2013, Issue 10. Art. No.: CD001808. DOI: 10.1002/14651858.CD001808.pub2

-
- ²¹ Kassebaum NJ, Bertozzi-Villa A, Coggeshall MS, Shackelford KA, Steiner C, Heuton KR, Gonzalez-Medina D, Barber R, Huynh C, Dicker D, Templin T, Wolock TM, et al. Global, regional, and national levels and causes of maternal mortality during 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet*. 2014 May 2. doi: 10.1016/S0140-6736(14)60696-6.
- ²² Centre for Maternal and Child Enquiries. Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer: 2006–2008. *BJOG: An International Journal of Obstetrics & Gynaecology*, 2011; 118: 1–203. doi: 10.1111/j.1471-0528.2010.02847.x
- ²³ Begley C. M. Comparative studies in the third stage of labour. Unpublished MSc thesis. 1989 Trinity College Dublin, Ireland.
- ²⁴ Dixon L, Tracy SK, Guilliland K, Fletcher L, Hendry C, Pairman S. 2013 Outcomes of physiological and active third stage labour care amongst women in New Zealand. *Midwifery* 29(1):67-74
- ²⁵ Begley C, Devane D, Clarke M. An evaluation of midwifery-led care in the Health Service Executive, North-Eastern Area: the report of the MidU study. Dublin: Health Service Executive, 2009.
- ²⁶ Boulvain M, Stan CM, Irion O. Membrane sweeping for induction of labour. *Cochrane Database of Systematic Reviews* 2005, Issue 1. Art. No.: CD000451. DOI: 10.1002/14651858.CD000451.pub2.
- ²⁷ Mozurkewich EL, Chilimigras JL, Berman DR , Perni UC, Romero VC, King VJ, Keeton KL. *BMC Pregnancy and Childbirth* 2011, 11:84
<http://www.biomedcentral.com/1471-2393/11/84>

-
- ²⁸ Kavanagh J, Kelly AJ, Thomas J. Breast stimulation for cervical ripening and induction of labour. *Cochrane Database of Systematic Reviews* 2005, Issue 3. Art. No.: CD003392. DOI: 10.1002/14651858.CD003392.pub2.
- ²⁹ Jozwiak M, Bloemenkamp KWM, Kelly AJ, Mol BWJ, Irion O, Bouvain M. Mechanical methods for induction of labour. *Cochrane Database of Systematic Reviews* 2012, Issue 3. Art. No.: CD001233. DOI: 10.1002/14651858.CD001233.pub2.
- ³⁰ Kelly AJ, Kavanagh J, Thomas J. Castor oil, bath and/or enema for cervical priming and induction of labour. *Cochrane Database of Systematic Reviews* 2013, Issue 7. Art. No.: CD003099. DOI: 10.1002/14651858.CD003099.pub2.
- ³¹ Smith CA, Crowther CA, Grant SJ. Acupuncture for induction of labour. *Cochrane Database of Systematic Reviews* 2013, Issue 8. Art. No.: CD002962. DOI: 10.1002/14651858.CD002962.pub3.
- ³² Beckmann MM, Stock OM. Antenatal perineal massage for reducing perineal trauma. *Cochrane Database of Systematic Reviews* 2013, Issue 4. Art. No.: CD005123. DOI: 10.1002/14651858.CD005123.pub3.
- ³³ Aasheim V, Nilsen ABV, Lukasse M, Reinart LM. Perineal techniques during the second stage of labour for reducing perineal trauma. *Cochrane Database of Systematic Reviews* 2011, Issue 12. Art. No.: CD006672. DOI: 10.1002/14651858.CD006672.pub2.
- ³⁴ Gupta JK, Hofmeyr GJ, Shehmar M. Position in the second stage of labour for women without epidural anaesthesia. *Cochrane Database of Systematic Reviews* 2012, Issue 5. Art. No.: CD002006. DOI: 10.1002/14651858.CD002006.pub3.
- ³⁵ McCandlish R, Bowler U, van Asten H, Berridge G, Winter C, Sames L, Garcia J, Renfrew M, Elbourne D. A randomised controlled trial of care of the perineum during

second stage of normal labour. British Journal of Obstetrics and Gynaecology. 1998, 105, pp. 1262-1272

³⁶ International Confederation of Midwives. Role of the midwife in physiological third stage labour. The Netherlands, ICM, 2008.

<http://www.internationalmidwives.org/Portals/5/Documentation/ROLE%20OF%20THE%20MIDWIFE%20IN%20PHYSIOLOGICAL%20MANAGEMENT%20OF%20THE%20THIRD%20STAGE%20OF%20LABOUR.doc>

³⁷ Royal College of Midwives 2012 Evidence-based guidelines for midwifery-led care in labour: third stage of labour. RCM, London. <http://www.rcm.org.uk/college/policy-practice/evidence-based-guidelines/>

³⁸ Begley C, Guilliland K, Dixon L, Reilly M, Keegan C. Irish and New Zealand midwives' expertise in expectant management of the third stage of labour: the 'MEET' study. Midwifery 2012; 28:733-739

³⁹ Raynor MD, Marshall JE 2014. Myles Textbook for Midwives (16th ed). Churchill Livingstone, UK