Expedient Standing Or Squatting Placental Delivery And Postpartum Hemorrhage: A Retrospective Cohort Study

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Abstract

Objective: To compare expedient delivery of the placenta in standing or squatting by 3 minutes postpartum to current third stage management.

Design, Setting, Sample and Methods: A retrospective cohort study comparing 2 practices with identical inclusion criteria differing in third stage management: 2,154 planned, attended low risk vaginal births using expedient squatting to 2,691 planned, attended low risk vaginal births using various forms of active or expectant management.

Main Outcome measures: PPH $\geq$ 1000 cc and manual removal of placenta.

Results: Among comparable populations, combinations of active and expectant management resulted in 4.1% PPH $\geq$ 1000 cc, whereas expedient delivery of the placenta in standing or squatting by 3 minutes postpartum resulted in 0% PPH $\geq$ 500 cc.

Conclusion: Less postpartum bleeding and postpartum hemorrhage occurs when women push out the placenta with the assistance of gravity and expedience, in standing or squatting by 3 minutes after birth.

“The mind of the beginner is empty, open to all possibilities, free of the habits of the expert.”

Introduction

Since the majority of women choosing home birth in high income countries prefer to remain at home postpartum, homebirth midwives are especially motivated to seek ways to avoid postpartum hemorrhage in order to avoid the need for transfer to hospital, Current evidence favored Active Management as resulting in the lowest postpartum hemorrhage rates until the discovery of the expedient squatting protocol at homebirths [1]. The reported PPH $\geq$ 1000 cc rates at vaginal birth before and after the adoption of Active management are consistently reported to be 5%. [2-4] Active Management also increases afterbirth pains, increases the need for postpartum analgesia, increases the incidence of postpartum diastolic blood pressure greater than 90 mmHg, and results in increased rehospitalizations due to bleeding. [5]

The main cause of postpartum hemorrhage is uterine atony. An explanation for why uterine atony occurs in humans and not in any other animals is elusive and appears to defy the theory of evolution. Humans share the same placental genetic make-up as apes and chimpanzees who never hemorrhage after birth unless humans interfere with the birth. [6,7] A logical conclusion would be that postpartum hemorrhage has something to do with human intervention. A genetic mutation causing deadly PPH would only be passed on since the relatively recent use of blood transfusions.

Expedient delivery of the placenta allows the now empty uterus to contract quickly, preventing uterine atony, the main cause of PPH. A prospective study of expedient squatting needs very much to be carried out yet this has not taken place. Until such time that there is interest in testing this new protocol, it seems

fitting to compare delivery of the placenta by 3 minutes postpartum in standing or squatting, to variations of active and expectant third stage management among low risk high income homebirth populations, albeit in different countries, during a similar period.

Methods

Two different third stage protocols were compared among study and control groups both consisting of women from high income countries with socialized medicine, planning attended homebirth, with similarly trained, licensed, nurse-midwives. PPH was defined as blood loss ≥ 1000 cc in the first 2 hours after birth in both groups. The study group was all births attended from Jan. 1, 2000- Jan 1, 2022 by a Home Birth Service serving a population of approximately 5 million. All midwives working for the Home Birth Service are formally trained and licensed nurse-midwives. Birth outcomes were recorded in a patient record and an Excel spreadsheet immediately following the birth. In the study group, blood loss was estimated to the nearest 10 cc. The inclusion criteria for both the study and control groups was identical: Singleton fetus; cephalic presentation; gestational age greater than 36 and less than 41 completed weeks of pregnancy; spontaneous onset of labor; history of up to one previous cesarean; absence of significant pre-existing disease including heart disease, hypertensive chronic renal disease or type 1 diabetes; absence of significant disease arising during pregnancy including hypertension disorders during pregnancy with proteinuria (> 0.3 g/L by urine dipstick), antepartum hemorrhage after 20 weeks' gestation, gestational diabetes requiring insulin, active genital herpes, placenta previa or placental abruption. All study group participants gave written informed consent to deliver the placenta using expedient squatting and to have their outcomes anonymously published. The study group's third stage was managed by: cutting the cord between 1 and 3 minutes after the birth if the woman consented to it, pushing out the placenta in squatting or standing on the floor or in an empty bathtub by 3 minutes; getting into bed by 4 minutes and checking the abdomen to make sure the uterus is contracted at 5 minutes and to massage it to contract if it is not. In the study group, in the first decade of using the protocol, a prophylactic oral dose of a 0.125 mg pill of Methergine was given between 10 and 20 minutes postpartum to women who had lost 250 cc by that time. Study group blood losses were measured using measuring cups and/or assessing clots. Clots of blood were collected formed into a ball and blood loss calculated according to the calculation for volume of a sphere: $V = (4/3) \pi r^3$: 3 cm diameter round clot = 14 cc blood loss, 4 cm = 34 cc; 5 cm = 65 cc blood loss; 6 cm = 113 cc, 7 cm = 180cc; 8 cm diameter ball = 268 cc blood loss; 9 cm = 381 cc; 10 cm = 523 cc; 12 cm = 905 cc blood loss. .

Janssen et. al. 2009 [8] was selected out of the high-quality homebirth studies [9] as the control group. Janssen et.al. 2009 overlaps with the study group in time-period (Jan. 1, 2000 to Dec. 31, 2004). Janssen et.al. 2009 is very closely matched in population, birth management, as well as having identical inclusion criteria to the study group. Janssen et.al. was also chosen because it reported the lowest reported PPH rate in the published literature. British Columbia had a similar population to Israel, of 4.4 million at the time of the study. Like in Israel, British Columbian midwifery care is accessible to all women in the province who meet the criteria. The midwives in British Columbia use variations and combinations of active and expectant management. [10] Their database defines PPH as ≥ 1000 mL blood loss. [11] The

primary outcome measure was the rate of postpartum hemorrhage ≥ 1000 cc. Secondary outcome measure was manual removal of placenta. Formal ethical approval for the methodology of this research received from the Hadassah Medical Organization Helsinki Committee Institutional Review Board, on April 14, 2014. All methods carried out in accordance with guidelines and regulations provided in the ethics approval.

Results

During the study periods, 2,899 women attended by a registered midwife began labor with the intention of giving birth at home in British Columbia and 2,691 did so, using currently accepted third stage management; and 2,154 women attended by a registered midwife began labor with the intention of giving birth at home in Israel of which 2,149 births did so using expedient squatting or standing to deliver the placenta. Table 1 provides patient demographics and selected outcome measures.

Expedient squatting resulted in no cases of PPH ≥ 1000 cc in the first 2 hours. Variations of active and expectant management resulted in 4.1% PPH over 1000 cc. In the control group, active management resulted in 41 women per 1,000 losing ≥ 1000 cc. Expedient squatting resulted in blood losses of an average of 100 cc in the first 2 hours. The one case of PPH over 500 cc was an 800 cc blood loss in a low risk Para 5 woman. The one case of blood transfusion in the study group was another low risk Para 5 woman who began labor with hemoglobin of 7.9 g/L and transferred to hospital a day after the birth feeling weak and received one unit of blood. In the control group, two women received blood transfusions. No negative side effects of third stage expedient squatting protocol were observed among 2,149 vaginal births.

Discussion

In the study population, expedient squatting protocol decreased average postpartum bleeding in the first 2 hours from the current average of 500 cc blood loss at vaginal birth using active management [5] to 100 cc. Expedient squatting decreased PPH ≥ 1000 cc from 4–0% and did so without negative side effects or financial expense. This is the first study to report average blood loss of 100 cc in the first hour and / or 0% PPH ≥ 1000 cc. [12] Other low risk populations report higher PPH rates than Janssen: 4.4% PPH ≥ 1000 cc. [13] 4.6% PPH ≥ 1000 cc. [14] 9.3% ≥ 500 cc. [15] and 11.7% PPH ≥ 500 cc. [16] The two largest high quality homebirth studies: Birthplace and DeJonge et.al. did not report their rates of PPH. [17, 18] Large hospital studies looking at multiple sites continue to report 5% PPH at vaginal birth. [5] Bonding is only interrupted for about one minute that it takes to deliver the placenta in squatting. When relevant, this one minute can be the special time for the partner to hold the newborn baby. As practitioners garnered more experience with expedient squatting, Methergine was no longer needed.

Strengths and limitations: Factors other than timing associated with PPH

The use of IV Pitocin has been associated with PPH but this might be a consequence of factors other than the Pitocin since the PPH rate ≥ 1000 cc prior to the synthesis of Pitocin at vaginal births was the same as

the PPH rate at vaginal births after the synthesis of Pitocin [3]; and hospital PPH rates in the absence of Pitocin augmentation are about the same as the PPH rates with Pitocin augmentation. [5] In vitro studies show the effect of Pitocin on mouse muscle was attenuated with time. [19–21] This research has been offered as an explanation for the association but fails to explain why a sudden drop in sensitivity, not attenuation, supposedly occurs immediately after birth resulting in PPH. The observation associating Pitocin augmentation with PPH might be due to many possible factors including a delay in delivery of the placenta at births augmented with Pitocin. In the study group, 20% of labors were not augmented with IV Pitocin but rather with bilateral nipple massage. Nipple massage, if done correctly, causes contractions by releasing Oxytocin. It is unknown if nipple massage has any association with PPH.

Both nulliparity and grand multiparity are associated with higher rates of PPH [5]. The study group had fewer nulliparas: 26% vs. 44% and likely more grand multiparous women. Although the control group did not report grand multiparity, it is likely the 23% study group rate for grand multiparous women (P6-P12) is higher than that of British Columbia, as the fertility rate in Israel is higher than in British Columbia. 0% PPH was found among the grand multiparas (P6 -P12) who delivered using expedient squatting. The findings here suggest the associations between PPH and nulliparity or grandmultiparity disappear when the placenta is delivered by 3 minutes in squatting.

A common critique of studies reporting postpartum blood loss is underreporting PPH. Underreporting of PPH is suspected even in the highest quality studies. [5] The best definition of PPH is a larger than 20 g/L drop in hemoglobin level compared to the level before the birth. This, however, requires reliable blood testing before and after the birth. Erickson et.al. [4] suggests that the terms PPH over 500 cc and PPH over 1000 cc are indistinguishable without hemoglobin blood level testing [page 610] since both look very similar on disposable 60X90 pads. It is indeed reasonable to suggest that blood losses between 500 and 1000 cc are indistinguishable. However, this observation is not relevant to the results of this study because the average blood loss was significantly less than 500 cc. It is impossible (for the non-visually impaired) to confuse 100 cc blood loss with blood loss of 500 cc at birth, just as it is impossible to confuse 100 cc urine in a Foley bag with 500 cc of urine. The typical 100 cc blood loss consists of a tablespoon or 15 cc attached to the placenta, another 30 cc on the 60x90 pad she gives birth on, and 50 cc seen 2 hours after birth on the pad used starting from 5 minutes after birth when she got into bed.

Interpretation

Except for very exceptional cases, women appear not to experience PPH of over 500 cc where the placenta is delivered expediently in standing or squatting.

Conclusion

Expedient Squatting Protocol appears to be a simple way to use gravity and expedience to prevent postpartum hemorrhage. It's an invention that causes the user to wonder how the idea wasn't thought of years ago.

Declarations

- Ethics approval and consent to participate- Ethics Approval from Hadassah Medical Center Helsinki Committee on April 14, 2014. Signed, Written, Informed consent to participate was received from each woman in the study group.

Guidelines statement: All methods were carried out in accordance with relevant guidelines and regulations. All experimental protocols were approved by the named licensing committee. The experiments were performed in accordance with relevant guidelines and regulations.

Consent for publication- Not applicable. There is no information or images that could lead to identification of a study participant. The initial quality checker acknowledged that in this manuscript there are no such images or identifiable information given.

Availability of data and materials: This study is elegantly simple and easy to reproduce. All relevant data generated during this study are included in this published article.

Competing interests- While the authors have no competing interests, it might be stated that if this COST-FREE, LIFE SAVING protocol with absolutely no negative side effects is not accepted for publication, then the editors and peer reviewers have a competing interest to PROMOTE, rather than reduce or eliminate postpartum hemorrhage. To date, no worthy explanation has been provided for not publishing this protocol.

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Authors' contributions- JSC and REB shared the work equally.

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Table

Table 1: Patient Demographics and Outcomes

Age	Control Group	Study Group
Maternal Age 15-19	2%	0.40%
Maternal Age 20-24	12%	6%
Maternal Age 25-29	31%	30%
Maternal Age 30-34	35%	39%
Maternal Age 35 or over	21%	24%
Single Parent	3%	3%
Average BMI	22.8	22.4
Illicit Drug Use during Pregnancy	1%	0.40%
Smoking during Pregnancy	6%	0.20%
Vaginal Birth	93%	99%
Nulliparous	42%	26%
Multiparous	58%	74%
GrandMultiparous: P6-12	Not reported	23%
Medical Induction	0	0
Augmentation of Labor	24%	20%
Amniotomy	19%	8%
Uterotonic drug postpartum	6%	5% PO Methergine
Epidural	5%	0%
Narcotic Analgesic pain relief	4%	50% PO Rokacet
Vaginal	90%	99%
Assisted	3%	0.10%
Cesarean	7%	0.30%
Episiotomy among vaginal deliveries	3%	0
First or second degree tear	44%	3%
Third or Fourth degree tear	1%	0
Cervical tear	0.10%	0.10%
Blood Transfusions	2/2691	1/2149
Obstetric shock	1/2691	0/2149

Manual Removal of Placenta

1%

0.7%