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Full length article

Novel third stage protocol https://www.youtube.com/watch?v=AAJPW4p6rzU reduces postpartum hemorrhage at vaginal birth

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ABSTRACT

Objective: To reproduce the absence of postpartum hemorrhage (PPH) experienced by all mammals except humans, in humans, by implementation of the 1, 2, 3 min expedient squatting protocol www.youtube.com/watch?v=AAJPW4p6rzU. The protocol prevents postpartum hemorrhage ≥ 500 mL after vaginal birth. It only requires a digital watch to precisely time 2 min.

Design, setting, sample and methods: Mean blood loss and PPH rate are reported for 2,149 consecutive planned, attended vaginal births using the 1, 2, 3 min squatting third stage protocol.

Main outcome measures: Blood loss; PPH ≥ 1000 mL.

Results: Expedient delivery of the placenta in squatting within 3–5 min postpartum resulted in an average blood loss of 100 mL in the first 2 h after birth and no cases of PPH ≥ 500 mL in the first 24 h after birth. The lowest previously published PPH ≥ 1000 mL rate at vaginal birth is 4 %. The PPH ≥ 1000 mL using Active Management is 5 %.

Conclusion: Less bleeding occurs when women expediently push out the placenta within 3 min of the birth of the newborn, in squatting, taking advantage of the still open cervix, gravity, and the increased effectiveness of their diaphragm and abdominal muscles.

Introduction

Hemorrhaging at birth (PPH) is deadly. Mutations causing PPH, in the absence of blood transfusions, are eliminated by natural selection. An extensive literature search found no accounts of excessive blood loss at delivery or maternal mortality linked to PPH in nonhuman primates [1]. PPH in domestic animals, for whom substantial data is available, is rare and only likely if excessive force is used to deliver the placenta such as via laceration of a uterine blood vessel by an obstetric instrument or by the hand of the obstetrician particularly when the placenta is precipitously removed during elective cesarean sections [2]. Human placental physiology and attachment is identical to apes and chimpanzees [3]. Since PPH does not occur to apes or chimpanzees and humans share the identical placental physiology and attachment, it is logical to suggest that humans can also eliminate PPH.

At present, it is generally accepted as normal for 5 % of women at vaginal birth to lose over 1000 mL, about a third of their blood supply [4]. In 2010, it was suggested that an expedient squatting third stage protocol could eliminate PPH [5]. The protocol involves no intervention other than squatting and requires no equipment other than a digital watch. It is appropriate for all women with functioning legs, and for any setting.

The current 5 % PPH at vaginal birth rate has been the same for the past 100 years, both before and after the synthesis of Pitocin [6,7]. This contradicts the theory that Pitocin prevents PPH at vaginal birth. Active Management only decreases PPH when compared to the 13 % PPH rate associated with Expectant Management [4]. Active management is performed while reclining; it lacks a specific time frame; and involves routine administration of Pitocin to every woman before the placenta delivers which may cause the undesired effect of speeding up the closing of the cervix. Active management causes increased afterbirth pains, increased need for postpartum analgesia, increased incidence of postpartum diastolic blood pressure > 90 mmHg, and increased rehospitalizations due to bleeding [4]. Expedient delivery of the placenta in squatting has none of those drawbacks.

An explanation for how expedient squatting works: The main cause of PPH is uterine atony [4]. Williams Obstetrics (1980) points out that the placenta separates within one minute at vaginal birth. Contraction of the uterine muscles prevents excess bleeding by closing off the uterine blood vessels which once supplied the placenta. But the uterus cannot

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completely contract with all or part of the bulky placenta and sac inside the uterus. Only delivery of the placenta allows the uterus to completely contract. Until the placenta is fully delivered some degree of uterine atony is present. Even when Pitocin is administered before placental delivery, the uterus cannot completely contract until the placenta is delivered. The sooner the delivery of the placenta takes place, the sooner the uterus completely contracts, and the less PPH occurs [8]. The second most common cause of PPH is fully or partially retained placenta but this is essentially the same as the first cause, uterine atony, because until the placenta is fully delivered, the uterus cannot completely contract. In most cases, the cervix starts to close quickly after birth of the fetus, the exact speed varying from woman to woman. The smaller the opening of the cervix, the more difficult it is to deliver the placenta either partially or completely. Retained or partially retained placenta currently accompanies 1–3% of vaginal births [9]. Placenta percreta/accreta is exceptionally rare, occurring at only 1/2,000 births of women with an unscarred uterus. Placenta percreta/accreta is not a cause of PPH because the placenta stays attached to the uterus.

When the woman is lying down, the weighty placenta rests on the posterior wall of the uterus and must move upward, against gravity, in order to deliver. Squatting utilizes gravity. It is also more of an effort to contract the diaphragm and abdominal muscles while reclining compared to while squatting. Neither Active or Expectant Management co-opt the use of gravity, expedience, or efficient use of abdominal muscles to enable the placenta to deliver more quickly and completely. This provides an explanation why expedient squatting results in less bleeding and less PPH.

The outcomes of the delivery of 2,149 placentas within 3–5 min postpartum using the 1, 2, 3 min protocol are presented.

Methods

Pushing out the placenta expediently within 3–5 min of delivery of the newborn, in squatting, was tested on all vaginal births attended from Jan 1, 2000 to Jan 1, 2022 by an Israeli birth service. The original protocol was to deliver the placenta within 5 min, but after 12 years of practice, the protocol changed to delivery of the placenta within 3 min since it was observed that this resulted in even less blood loss. Practitioners working for the Birth Service are formally trained and licensed. Birth outcomes, including blood loss in the first 2 h estimated to +/− 10 mL, were recorded in a patient record and an Excel spreadsheet immediately following the birth. The inclusion criteria were: 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 participants gave written informed consent to deliver the placenta using expedient squatting and to have their outcomes anonymously published. The third stage protocol used was: the mother holding the baby for up to 2 min, cutting the cord at 1 min postpartum if consent to do so had been received prior to the birth; encouraging the woman into squatting at 2 min after the birth; and the birthing mother pushing out the placenta in squatting on a thick plastic sheet on the floor or in an empty bathtub between 2 and 3 min. Where relevant, while the mother pushes out the placenta, family members present were offered the opportunity to hold the newborn. Subsequently the woman gets into bed. If she agrees, the mother's uterus is massaged abdominally for 10 s to encourage uterine contraction. Then the woman begins efforts to nurse the baby. In the first 12 years of using the protocol, a prophylactic 0.125 mg oral dose of Methergine was given between 10 and 20 min postpartum to women who had lost between 200 and 250 mL by that time. In the last 12 years, as the length of the third stage was shortened from 5 min to 3 min, Methergine was not needed or given. Blood loss was carefully measured by delivering over a heavy plastic sheet and pouring the blood into a measuring cup and/or volume estimation. As well as was possible, amniotic fluid was separated from blood. At bathtub births, the bath water was drained before the birth. Volume estimation means manually forming the clots of blood into a ball and measuring the diameter of the ball. Birth practitioners who have developed the ability to measure cervical dilation in centimeters can estimate blood loss by measuring the diameter of clots gathered into a sphere shape. The known volume of a sphere: $V = (4/3)\pi r$ teaches us: 3 cm diameter round clot = 14 mL blood loss; 4 cm diameter = 34 mL; 5 cm = 65 mL; 6 cm = 113 mL, 7 cm = 180 mL; 8 cm = 268 mL blood loss; 9 cm = 381 mL; 10 cm = 524 mL (diameter of a softball); 12 cm = 905 mL; 13 cm = 1150 mL blood loss. This method of estimating blood loss does not appear previously in the literature. It is an accurate way to estimate blood loss where birth practitioners have trained themselves to accurately measure 1–12 cm without a ruler.

The primary outcome measure for this study was estimated blood loss and PPH ≥ 1000 mL. PPH ≥ 1000 mL equals total blood loss of a ball of blood with a diameter greater than 12 cm.

Results

During the study period, 2,159 births were attended by one midwifery practice. This resulted in 2,149 placentas being delivered expediently in squatting except for 3 women who delivered the placenta while standing. Fourteen women attempted to push out the placenta kneeling, but the placenta did not deliver within one minute so they were told to get into squatting and the placenta delivered easily.

Mean age = 31.0 years; Mean term of pregnancy = 40 + 0 weeks; Mean blood loss in the first 2 h = 100 mL. The mean blood loss was typically a 15 mL clot attached to the placenta, an additional 30 mL on the surface below her at the time of the birth of the placenta, and a half full 21x10x2 cm disposable maternity pad worn starting after the birth of the placenta until 2 h after the birth, estimated to be about 50 mL. Manual removal of the placenta was performed between 20 and 30 min after the birth of the baby if the placenta had not yet been delivered. There were 15 [0.7 %] manual removals among the 2,149 placentas delivered. In 14 cases, the placenta was completely separated and sitting near the cervical os but didn't spontaneously deliver, either because the cervix had somewhat closed and/or the woman was excessively exhausted. There was one case of placenta accreta in a healthy 20 year old primipara with no risk factors. At 30 min postpartum, the placenta was manually shorn off and delivered with very little blood loss.

Demographics and Outcomes for 2,149 placental deliveries using expedient squatting.

- Maternal age 15–19 9 (0.4 %)
- Maternal age 20–24 129 (6 %)
- Maternal age 25–29 650 (30 %)
- Maternal age 30–34 842 (39 %)
- Maternal age ≥ 35 519 (24 %)
- Mean age = 31 years old
- Single Parent = 64 (3 %)
- Average BMI = 22.4
- Illicit Drug Use during Pregnancy = 9 (0.4 %)
- Smoking during Pregnancy = 5 (0.2 %)
- Nulliparous = 558 (26 %)
- Multiparous: P1-5: 1,096 (51 %)
- GrandMultiparous: P6-12: 495 (23 %)
- Medical Induction: 0
- Augmentation of Labor using bilateral nipple massage = 430 (20 %)
- Amniotomy = 107 (5 %)
- Postpartum Uterotonic Oral Methergine = 109 (5 %)
- Epidural = 0

- One Rokacet Orally for pain relief between 5 cm and 10 cm dilation = 1,075 (50 %)

Vaginal birth 2,149 (99.5 %); Assisted 2 (0.1 %); Cesarean 8 (0.4 %).

- Episiotomy among vaginal deliveries: 0
- Second degree tear: 66 (3 %)
- Third or Fourth degree tear: 0
- Cervical tear: 2 (both Vacuum births) (0.1 %)
- PPH: 0
- Manual removal: 15 (0.7 %)
- Blood Transfusions: 1/2,149
- Obstetric Shock: 0/2,149

For comparison: Outcomes of Janssen et al. 2009 [10].

- Maternal age 15–19 48 (1.7 %)
- Maternal age 20–24 336 (11.6 %)
- Maternal age 25–29 892 (30.8 %)
- Maternal age 30–34 1025 (35.4 %)
- Maternal age ≥ 35 598 (20.6 %)
- Mean Age = 30 years old
- Single Parent 91 (3.1 %)
- Average BMI 22.8 (SD-4.0)
- Illicit Drug Use during Pregnancy: 39 (1.3 %)
- Smoking during Pregnancy: 166 (5.7 %)
- Nulliparous 1215/2899 **(41.9 %)**
- Epidural 224 (7.7 %)
- Narcotic 122 (4.2 %)
- Medical Induction: 0
- Pitocin Augmentation 172 **(5.9 %)**
- Amniotomy 560 (19.3 %)
- Vaginal Birth 2691 (89.9 %)
- Cesarean 208 (7.2 %)
- Episiotomy 84/2691 **(3.1 %)**
- First or Second degree tear 1262 (43.5 %)
- Third or Fourth degree tear 34 (1.2 %)
- Cervical tear 2 (0.1 %)
- Postpartum hemorrhage 110 (3.8 %)
- Manual removal of placenta 28 (1.0 %)
- Blood Transfusions 2 (0.1 %)
- Obstetric shock 1 (0.03 %)

Expedient squatting resulted in no cases of PPH ≥ 1000 mL in the first 24 h. There were no cases of late onset PPH. One Para 5005, with hemoglobin = 7.9 g/L according to a routine blood test 3 weeks before birth, received one unit of blood. No negative side effects of expedient squatting third stage protocol were observed among 2,149 vaginal births.

Discussion

To date, no other third stage protocol has reported a mean blood loss of 100 mL in the first two hours postpartum nor a 0 % PPH rate. The findings reproduce previous published evidence of a direct relationship between length of the third stage and PPH [8]. Once pointed out, it is obvious that the uterus cannot completely contract with a one pound placenta inside and that gravity and the efficient use of the diaphragmatic and abdominal muscles are useful in expediently emptying the uterus. This cost-free, life-saving, easy to reproduce protocol is useful in optimizing birth outcomes.

A comparison was made to PPH rates of Janssen et al. 2009 [10] who reported PPH rates for vaginal home and hospital births using the identical inclusion criteria as used in this study. Their published definition of PPH was ≥ 1000 mL blood loss [11]. Variations and combinations of active and expectant management were used [12]. Janssen's PPH rates, 3.8 % for home and 6 % for hospital, are similar to other high quality studies documenting planned, attended home and hospital PPH rates: 4.4 % PPH ≥ 1000 mL [11] 4.6 % PPH ≥ 1000 mL [13]; 9.3 % PPH ≥ 500 mL [14]; and 11.7 % PPH ≥ 500 mL [15]; (Birthplace [16] and DeJonge et al. [17] did not report PPH rates;) 5–6.7 % PPH ≥ 1000 mL for multicenter hospital trials [4,18].

Strengths and limitations

Underreporting of PPH is suspected even in the highest quality studies [8]. The most accurate way to define PPH is a > 20 g/L drop in hemoglobin level compared to the level before the birth. This requires reliable blood testing before and after the birth which was not carried out. It is impossible to reliably distinguish between PPH ≥ 500 mL and PPH ≥ 1000 mL by estimating blood loss on disposable 60 × 90 pads because they both cover the entire pad. There was no need to distinguish between PPH ≥ 500 mL and PPH ≥ 1000 mL in this study because the average blood loss was 100 mL, which is noticeably less than 500 mL. Distinguishing accurately between 100 mL and 500 mL is easy for anyone who is not visually impaired.

The 2009 Janssen home birth study group had more cases with risk factors for PPH: episiotomy (3 % vs 0 %), nulliparity (42 % vs 26 %) and the use of IV Pitocin augmentation (6 % vs 0 %) which could account for the higher PPH rate. However, there are many examples of studies, such as with 46 % and 76 % episiotomy rates, which report very similar PPH rates to Janssen [18]. This implies it is unlikely that a 3 % rate of episiotomy rate was an influential contributor to their 3.8 % PPH rate. Both nulliparity and grand multiparity are associated with higher rates of PPH [4]. This study included 26 % nulliparous births, none of whom experienced PPH and 23 % grand multiparas P6–P12, none of whom experienced PPH. The findings here suggest the associations between PPH and nulliparity or grandmultiparity disappear when the placenta is delivered by 3 min in squatting position. It has been suggested that Pitocin augmentation causes PPH [19,20]. This theory contradicts the fact that PPH rates prior to the synthesis of Pitocin were the same 5 % as after the inauguration of Pitocin augmentation. There is also current evidence showing PPH rates without Pitocin augmentation to be identical to PPH rates with Pitocin augmentation [18]. In vitro studies showing a gradual attenuation to Pitocin in mouse muscle have been offered as an explanation for the association of Pitocin augmentation with PPH [19,20] but fail to provide an explanation for a dramatic drop in sensitivity to Pitocin moments after birth, a time documented to have an Oxytocin surge, and also do not explain why only 5 % of those undergoing Pitocin augmentation actually hemorrhage postpartum. The association of Pitocin augmentation with PPH might be due to a several minute delay in the delivery of the placenta.

Interpretation: Women appear not to experience PPH ≥ 500 mL where the placenta is delivered within 3 min of the birth, either squatting or standing.

Conclusion

The 1, 2, 3 min Expedient Squatting Protocol 1-hold baby, 2-get into squat, 3-deliver the placenta appears to be an effective third stage protocol that uses gravity, diaphragmatic and abdominal muscles, and expedience to prevent postpartum hemorrhage.

Declaration

Ethics approval and consent to participate- Ethics Approval from Hadassah Medical Center Helsinki Committee, April 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.

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Authors' contributions: JSC completed all tasks.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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