

A New Maneuver for Prevention of Postpartum Haemorrhage

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About the Author



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Abstract

Background Postpartum hemorrhage (PPH) is the leading cause of maternal mortality worldwide. Many methods have been developed to decrease its rate. The aim of this study was to evaluate the applicability of a new non-pharmacologic maneuver in decreasing its rate.

Methods This case series study was conducted in one center in Cairo, Egypt, from January-2010 to June-2013. 400 pregnant women, aged 18 years or more and candidate for normal labor, were enrolled to this study. High risk subjects for PPH were excluded. After placental delivery, the new maneuver was done by sustained traction of the anterior and posterior lips of the cervix by two ovum forceps for duration of 90 s. The amount of blood loss was

estimated by standardized visual estimation after removal of the forceps. All subjects were followed up for 6 h.

Results The rate of PPH, defined as more than 500 ml, was eight cases (2 %) with 95 % CI (0.63–3.37 %). The rate of PPH was not affected by parity, gestational age, episiotomy, or the presence of tears. PPH is more in cases with anemia (p 0.032). It occurred in all cases with uterine atony (p < 0.001). The range of estimated blood loss was 550–600 ml in cases with PPH and 150–450 ml in cases without PPH. Severe PPH more than 1,000 ml did not occur.

Conclusion This pilot study introduced a novel maneuver that can be helpful in decreasing the rate of PPH and reducing the amount of postpartum blood loss. Further RCT is recommended to investigate it.

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Introduction

Postpartum hemorrhage (PPH) is the leading cause of maternal mortality worldwide with a global rate ranged from 6 to 10.8 % [1, 2]. In Africa and Asia, where most maternal deaths occur, PPH accounts for more than 30 % of all maternal deaths [3]. PPH is commonly defined as a blood loss of 500 ml or more within 24 h after birth, while severe PPH is a blood loss of 1,000 ml or more within the same timeframe [3]. Specifically, PPH is the leading cause of maternal mortality in most of the low-income countries such as Egypt [4]. Moreover, PPH is a significant contributor to severe morbidity and long-term disability [3–6]. In the under-resources settings, several factors can participate in the occurrence of PPH such as anemia, lack of adequate resources and access to health care, delays in transfer to the hospital, and poor management of the third stage of labor [7].

The most important cause of PPH is uterine atony, and also trauma (i.e., vaginal or cervical lacerations), uterine rupture, retained placental tissue, or coagulation disorders may also result in PPH. In addition, it can be aggravated by pre-existing anemia and, in such instances, the loss of a smaller volume of blood may still result in adverse clinical consequences [8].

Many methods have been used to estimate blood loss. Visual estimation is one of these methods but with the risk of underestimation. A recent systematic review found that there is a large underestimation of PPH in studies where blood loss was estimated visually [1]. To rectify the error in this visual estimation, standardized visual estimation can be employed as a simple method to be routinely practiced in the low-resource settings [9].

Over the years, many methods have been developed to decrease the rate of PPH. As an example, during the end of the last century, a package of interventions has been introduced to be performed during the third stage of labor. This approach became the cornerstone for the prevention of PPH, and it has been known as the “active management of the third stage of labour.” It consisted of the following: the administration of a prophylactic uterotonic after the delivery of the baby, early cord clamping and cutting, and controlled traction of the umbilical cord. In addition, uterine massage has been frequently included as part of this active management of the third stage of labor [10].

Despite all the efforts done and in addition to the known strategies to prevent PPH, there is still a need for more simple methods, either pharmacologic or non-pharmacologic, and non-expensive, that are suitable for the low-resource settings [7].

The rationale behind this study is to investigate the applicability and effectiveness of a new simple maneuver in decreasing the rate of PPH and the amount of postpartum

blood loss. We called it Amr’s maneuver as it is novel and of our invention, and there is no mention to it in the medical literature until the moment.

Patients and Methods

The study was a prospective, single-arm case series study. The study adopted the globally accepted standards of GCP and in conformity with the latest revision of the Declaration of Helsinki. In addition, it conformed to national laws and regulations and approved by the Local Ethics Committee.

A total of 400 subjects from one center in Cairo, Egypt were enrolled in the period from January 2010 to June 2013.

The purpose of this study was clearly explained in Arabic language to all subjects attending the center before their enrolment to the study, and an informed consent form was signed by all of those enrolled.

Inclusion criteria Pregnant female aged 18 years or more who are candidate for normal labor

Exclusion criteria Ante-partum hemorrhage in this pregnancy, placenta praevia, pre-eclampsia or pregnancy-induced hypertension, twins’ pregnancy, diabetes, severe anemia with HB <8 mg/dl, fetal macrosomia >4 kg baby, and history of postpartum hemorrhage. Also, subjects with pre-existing maternal hemorrhagic conditions such as factor 8 or 9 deficiency or Von Willebrand’s disease were excluded

All pregnant women were subjected to detailed history (obstetric, medical, and surgical), complete general examination, and obstetrical examination. All pregnant women had undergone normal vaginal deliveries.

All subjects were closely observed for time of placental delivery. After placental delivery, the new maneuver was being done for duration of 90 s, and then the amount of blood loss was estimated by standardized visual estimation. All subjects were followed up post-operatively for any emergent events related to labor.

Description of the New Maneuver

It was observed during normal vaginal delivery and after delivery of the placenta that sustained traction of the anterior and posterior lips of the cervix by ovum forceps for about 90 s leads to marked reduction in the amount of blood loss and significantly decreases the incidence of

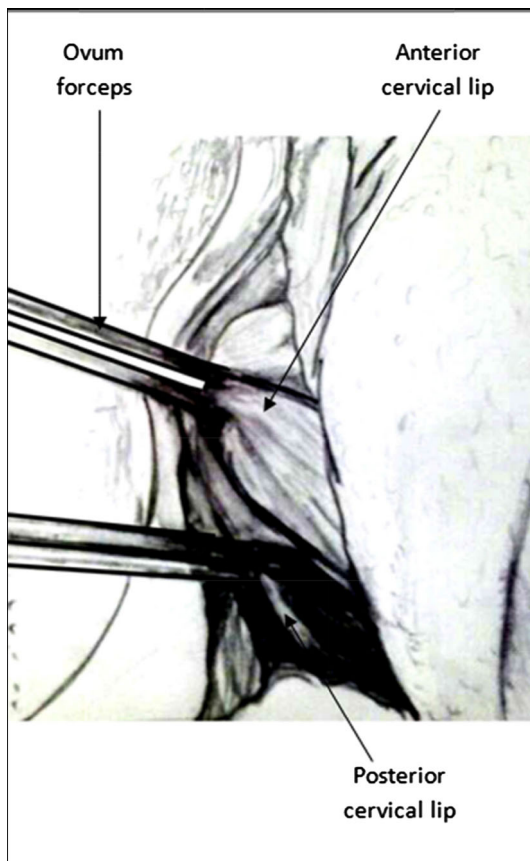


Fig. 1 Sustained cervical traction (Amr's maneuver)

uterine atony. The traction of cervix should be sufficient to make the cervix reach the level of the vaginal introitus, as shown in Fig. 1.

Statistical Analysis

All statistical tests were done using a significance level of 95 %. A value for $p < 0.05$ was considered statistically significant. SPSS software (Statistical Package for the Social Sciences, version 20.0, SSPS Inc, Chicago, IL, USA) was used for the statistical analyses. Data were presented as (mean \pm SD) for continuous variables and as frequency and percent for categorical variables. Comparisons were done using Pearson Chi square or Phi test for categorical variable and the unpaired Student's t test for continuous variables.

Results

Baseline Characteristics

In this study, 400 subjects were enrolled and followed up post-operatively, with average age of 27.7 ± 4.2 years.

Table 1 Baseline characteristics

	Mean (SD)	Range
Age in years	27.7 (4.2)	(18–36)
Weight in kg	75.5 (7.5)	(53–92)
Height in cm	163.7 (3.7)	(153–185)
BMI	28.2 (2.3)	(20.7–32.9)
SBP	116.8 (9.6)	(100–135)
DBP	75.2 (7.7)	(60–90)
HB	10.7 (0.8)	(9.3–12.7)
		<i>n</i> (%)
BMI category		
Normal weight (BMI 18.5–24.99)		34 (8)
Over weight (BMI 25–29.99)		286 (72)
Obese class I (BMI 30–34.99)		80 (20)
Parity		
Primipara		100 (25)
Multipara		300 (75)
Gestational age		
Preterm		64 (16)
Full term		336 (84)
Anemia (HB <10 mg/dl)		
Mild anemia		86 (22)
No anemia		314 (78)

Eight percent of them had normal weight, 72 % “over-weight,” and 20 % “Obese.” Seventy five percent of them were multipara, 22 % had mild anemia (HB between 9 and 10 mg/dl). All of them had normal blood pressure and 84 % of them were at full term. The baseline characteristics of subjects are shown in Table 1.

Postpartum Hemorrhage

The rate of PPH (>500 ml) was eight cases (2 %) with 95 % CI (0.63–3.37 %). No severe PPH, defined as bleeding more than 1,000 ml, detected in this study.

There was no significant difference ($p > 0.05$) in the rate of PPH according to parity, gestational age, episiotomy, and presence of tears, as shown in Table 2. However, the rate of PPH was more in cases with anemia 6 out of 86 cases (p 0.032). All cases with uterine atony suffered PPH (4 cases, $p < 0.001$). PPH occurred in normal weight, overweight groups, and none in the obese group (p 0.009). The details of rate of PPH according to aforementioned factors are shown in Table 2.

Estimated blood loss was 575.0 ± 28.9 ml with a minimum of 550 ml and a maximum of 600 ml in subjects with PPH, whereas it was 278.6 ± 90.6 ml with a minimum of 150 ml and a maximum of 450 ml in subjects without PPH, as shown in Table 3.

Table 2 Rate of PPH

	<i>n</i> (%) ^a	<i>p</i>
Total number of PPH	8 (2)	
Parity		
Primipara (<i>n</i> = 100)	4 (4)	0.261
Multipara (<i>n</i> = 300)	4 (2)	
Gestational age		
Preterm (<i>n</i> = 64)	0 (0)	1.000
Full term (<i>n</i> = 336)	8 (2)	
Anemia (HB <10 mg/dl)		
Anemia (<i>n</i> = 86)	6 (7)	0.032
No anemia (<i>n</i> = 314)	2 (1)	
BMI category		
Normal weight (BMI 18.5–24.99) (<i>n</i> = 34)	4 (12)	0.009
Over weight (BMI 25–29.99) (<i>n</i> = 286)	4 (1)	
Obese class I (BMI 30–34.99) (<i>n</i> = 80)	0 (0)	
Episiotomy		
Episiotomy (<i>n</i> = 156)	4 (3)	0.644
No episiotomy (<i>n</i> = 244)	4 (2)	
Tears		
Tears occurred (<i>n</i> = 72)	4 (6)	0.149
Tears did not occur (<i>n</i> = 338)	4 (1)	
Uterine tone		
Positive (<i>n</i> = 396)	4 (1)	0.000
Negative (<i>n</i> = 4)	4 (100)	

^a Percent is of row

Table 3 Estimated blood loss in ml

	PPH occurred	No PPH
Mean	575.0	278.6
95 % confidence interval for the mean	529.1–620.9	265.8–291.3
Median	575.0	300.0
Std. deviation	28.9	90.6
Minimum	550.0	150.0
Maximum	600.0	450.0

Discussion

PPH is still a major problem all over the world specifically in the developing countries where anemia is highly prevalent and lack of rapid transportation for the hospitals considered being one of the major problems. Also, there is still a need for new simple techniques to be used in the low-resource settings like Egypt [4].

There is no doubt that women in the developing countries have a high risk of dying from PPH which can be related to poor health services provided to them in these

countries. Thus, innovations to improve their care are indispensable.

Therefore, the maneuver discussed in this manuscript may contribute to better health outcomes as it helps in reduction of the rate of PPH and decreases blood loss. Hence, it can be of a great value in reduction of hazardous sequelae of PPH and its burden.

Synopsis of Key/New Findings and Comparisons with Other Studies

In this study, the results showed that with our new maneuver, the rate of PPH was 2 % which is lower than that mentioned in the literature in Africa and to the global rate of 10.8 % [2]. There is no severe PPH occurred in this current study compared to a global rate of 2.8 % (95 % CI 2.4–3.2) [2]. In addition, the estimated blood loss in cases with PPH ranged from 550 ml to 600 ml.

Possible Explanation of How this Maneuver Works

We learned from the medical literature that stretch of the uterine cervix generates sensory impulses to the hypothalamus via stimulation of the stretch receptors, which in turn stimulate the posterior pituitary to release Oxytocine. This Oxytocine produces more powerful contractions of the uterus, so the fetus is pushed more forcefully against the cervix, stimulating more Oxytocine release in a continuous positive feedback cycle. This is a known mechanism of labor progression. This positive feedback continues till expulsion and stops after delivery of the baby in the process of normal labor. In addition, these uterine contractions are reinforced as Oxytocine stimulates prostaglandin production by the uterine lining [11, 12].

It is supposed that the maneuver described in our study can be explained by the same mechanism mentioned before as it applies persistent stimulation to the stretch receptors of the cervix causing the release of more Oxytocine. Consequently, contraction of the uterine muscle fibers and significant reduction of excessive blood loss after delivery of the placenta can occur. Another contributing factor, by which this maneuver decreases the amount of postpartum blood loss, is that it causes kinking of the redundant uterine arteries leading to slow blood flow. Hence, allowing more suitable conditions for clotting and thrombin formation.

Strengths and Weakness of the Study

The maneuver used in this study is new, simple, non-pharmacologic, non-costing, and suitable for low-resource settings with no adverse effects recorded. On the other hand, the limitation of the study is being single-arm and

non-comparative; hence, we cannot rely on it alone to draw a conclusion without doing further RCTs.

There is no acceptable method for accurate estimation of blood loss. The standardized visual estimation of blood loss is more applicable, suitable, and accurate method. The standardized visual estimation of blood loss is based on training of the providers and standardization of pads used during the process of normal delivery. Here, the accuracy of estimating blood loss is not dependent upon experience of the provider. Thus, teaching this method significantly reduces the error in blood loss estimation for the inexperienced as well as the experienced clinicians [9].

Clinical Applicability of the Study

In summary, the results of our study showed that the described maneuver significantly decreases the incidence of PPH and the amount of blood loss.

Despite the limitations of such type of study being single-arm and non-comparative, the study showed that Amr's maneuver significantly decreases the incidence of PPH and the amount of blood loss. We consider this study as a hypothesis generating study with a promising idea that warrants the necessity of doing further RCTs in order to draw an evidence-based conclusion for this research question.

Conclusions

To our knowledge, this is the first description of the sustained cervical traction as a specific maneuver for reduction of PPH rate and amount of blood loss. It is simple and non-pharmacologic maneuver.

In conclusion, this pilot study introduced the new maneuver that can be helpful in decreasing the rate of PPH and reducing the amount of postpartum blood loss. It is just hypothesis generating study. Despite the low rate of PPH achieved, the need for conducting a randomized controlled study is at its highest level before generalization of the use of such maneuver in the current medical practice and before considering it as an evident tool to decrease the burden of PPH. We recommend a four-arm RCT to compare the new maneuver with or without 10 IU Oxytocine and to compare the new maneuver without Oxytocine against uterine massage only. Thus, we can study the new maneuver in passive and active management of third stage of labor.

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Compliance with ethical requirements and Conflict of interest All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all patients for being included in the study. Amr Hamdy declares that he has no conflict of interest.

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