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Original Article

Comparative Study on Prevention of Postpartum Hemorrhage by Routine Active Management of Third Stage of Labor versus Active Management of Third Stage of Labor with AMR'S Maneuver in Madurai Medical College, Tamil Nadu, India

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Abstract

Background: Postpartum hemorrhage (PPH) is responsible for around 25% of maternal mortality worldwide (WHO, 2007) reaching as high as 60% in some countries. In resource-poor settings, many uterotonics known to be effective in reducing PPH in tertiary care settings may not be useful in community settings because they require refrigeration and/or skilled administration (Patel *et al*. 2006). 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 in such setup.

Materials and Methods: This is a prospective comparative study conducted in Government Rajaji Hospital Madurai, Department of Obstetrics and Gynaecology between January 2016 and July 2016. A total of 500 patients eligible for vaginal delivery were divided into 2 groups: Study Group - 250 patients AMR'S maneuver done, by stretching the cervix for 90 s with ovum forceps, with active management of the third stage of labor (AMSTL). Control group - 250 patients with routine AMSTL alone. The amount of blood loss was calculated by under buttock calibrated drape. All patients were followed up for 6 h.

Results: The mean age in the study group was 23.5 years and control group was 23.6 years. Overall 52.5% were primigravida. About 61% belong to normal body mass index. Nearly 59.8% had spontaneous labor. Almost 91% had labor natural. Maximum number of patients had blood loss in the range of 200-400 ml which was 58.8% in the study group and 59.2% in control group. Severe PPH, i.e., >1000 ml did not occur in both groups. The rate of PPH defined as >500 ml was 3.2% in study group and 3.6% in control group. The difference of which is statistically not significant. Mean blood loss in study group is 263.22 ml and in control group is 285.76 ml which is significant. Eight patients had PPH in the study group, and 9 patients had PPH in control group. In PPH range mean blood loss in cases is 615 ml and in controls is 713.3 ml which is also statistically significant. The mean predelivery hemoglobin (Hb) in the study group was 10.44 g and in control group was 10.47 g. Post-delivery fall in Hb was significant in control group but not in study group.

Conclusions: This randomized control study compared routine AMSTL and AMR'S maneuver with AMSTL. The maneuver is found to decrease amount of blood loss due to PPH when done along with the AMSTL.

Key words: Active management of the third stage of labor, AMR'S maneuver, Ferguson reflex, Postpartum hemorrhage

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INTRODUCTION

Obstetric hemorrhage is the world's leading cause of maternal mortality causing 24% of maternal deaths annually (an estimated 127000).[1] Postpartum hemorrhage (PPH) is defined as blood loss of more than 500 ml, and it is the main cause of death due to obstetric hemorrhage.[2] Incidence of

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PPH is found to be about 1-5% of all deliveries.[3,4] According to a report by the WHO, women in developing countries are more than 40 times likely than women in developed countries to die in childbirth, and PPH is the main cause of maternal mortality in developing countries.[5,6]

Women who survive PPH experience significant morbidities including severe anemia,[2] problems caused by blood products, intensive care admission, further surgical interventions, infection, and prolonged hospitalization (Zelop 2011). The factors responsible for increased maternal mortality due to PPH in developing countries are conduct of delivery by unskilled workers in more than 50% of deliveries,[7] lack of adequate staff and medicines in health facilities[8] and the difficulty in identification of women prone for PPH (Jhpiego, 2001) as many women develop PPH without any associated risk factors.[8]

Thus, PPH is a complication that needs effective preventive measures that is designed to suit varied needs of women and is possible to execute in a low resource setting. AMSTL reduces PPH risk by reducing postpartum blood loss. Prophylactic uterotonics in the third stage of labor decrease the risk of PPH by 60%. Oxytocin is the drug of choice. Ergometrine decreases risk of minor PPH but should be avoided in patients with hypertension. Misoprostol can be used when oxytocin is not available.

PPH is to be expected to occur in all deliveries, and preventive measures of PPH should be followed after every birth. Women are counseled prenatally to have institutional deliveries or to be delivered by trained health staff. However, in low-resource settings, many uterotonics used in the prevention of PPH may not be useful because they require refrigeration and/or skilled health staff for administration (Patel *et al.* 2006). The purpose of this study is to find out the applicability and efficacy of a new simple AMR's maneuver along with AMSTL in reducing the rate of PPH and the amount of blood loss in PPH in such setup.

MATERIALS AND METHODS

In this randomized comparative study, 500 patients attending Government Rajaji Hospital, Madurai for safe confinement from January 2016 to July 2016 were recruited. They were divided into 2 groups. Study Group: Those patients who received active management of the third stage of labor (AMSTL) with AMR's maneuver in the third stage of labor. Control group: Those patients who received AMSTL only.

Inclusion Criteria

Age more than 18 years, patients eligible for normal labor.

Exclusion Criteria

Antepartum hemorrhage in this pregnancy, placenta previa, gestational hypertension, multiple pregnancy, diabetes, severe anemia with hemoglobin (Hb) <8 g, fetal macrosomia >4 kg baby, history of PPH, pre-existing maternal hemorrhagic conditions such as factor 8 or 9 deficiency or von Willebrand disease.

Routine AMSTL is done in control group patients. In study group patients, AMSTL is performed, and 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 the duration of 90 s. In each patient height, weight, body mass index (BMI), BP, Hb before and 48 h after delivery, spontaneous, induced or accelerated, whether labor natural or instrumental, baby weight, episiotomy given or not, perineal tears present or not, uterus initially flabby or contracted and amount of blood loss were recorded.

Description of AMR'S Maneuver

It was observed that after normal vaginal delivery, after delivery of the placenta 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 uterine atony. The traction of the cervix should be sufficient to make the cervix reach the level of the vaginal introitus.

Mechanism of Action

It is supposed that the maneuver can be explained by the Ferguson reflex. The continuous stretch applied to the cervix stimulates the stretch receptors which results in the production of oxytocin from the posterior pituitary. Thus, this will result in contraction of the uterine musculature and causes a significant reduction in blood loss after delivery of placenta. Performing this maneuver also causes kinking of the redundant uterine arteries resulting in a decrease of postpartum blood loss. This will allow more suitable conditions for clotting and thrombin formation.

Measurement of Blood Loss

The estimation is done after AMSTL in Control group and after removal of forceps in study group. Blood loss was measured with blood collecting drape. Visual estimation which is practiced at present is shown to underestimate blood loss.[9] Hence, it is not optimal for estimation of postpartum blood loss, and this method should be replaced by some objective measurement.[10] This can be done by a sterile under buttock drape. It has a funneled and calibrated collecting pouch attached to a plastic sheet. This is placed under the woman's buttocks after delivery. All patients were followed up for 6 h.

RESULTS

Baseline Characteristics

In this study, the age group of patients varied from 18 to 35 years. Maximum number of patients belong to the age group 21-25 years. Among parity, the two groups are similar in distribution. Primigravida were more compared to multigravida. This study group had 52.4% primigravida and 47.6% multigravida. Among PPH patients in study group, 62.5% were primi and 37.5% were multi. However, when compared to control group postpartum blood loss was significantly reduced in primigravida when AMR'S maneuver was used in this study in study group. With respect to BMI most of the patients belonged to normal BMI, i.e., <25. The distribution of BMI was same in both groups. In a study by AMR Hamdy, most of the patients belonged to overweight BMI range. (25-29.99). This may be due to change in ethnicity of the study population. Most of the patients had normal progression of labor. There was a significant reduction in postpartum blood loss in patients who underwent labor augmentation with oxytocin when AMR'S maneuver was used. Most of the patients in this study delivered by labor natural. It accounts for 91.2% in study group and 90.8% in control group. In study group 8.8% and in control group 9.2% had instrumental vaginal delivery. There was a significant reduction in postpartum blood loss in patients who underwent labor natural when AMR'S maneuver was used. Table 1 shows baseline characteristics.

Table 1: Routine AMSTL Versus AMSTL with AMR'S

Parameter	Group A - AMR's+AMSTL		Group B - AMSTL	
	n	PPH	*n*	PPH
Total number of PPH	8		9	
Parity				
Primi	129	5	133	7
Multi	121	3	117	2
BMI category				
Normal	159	4	146	4
Overweight	72	2	91	4
Obese Class I	19	2	13	1
Episiotomy				
Yes	234	7	237	9
No	16	1	13	0
Perineal tears				
Yes	36	3	39	1
No	214	5	211	8
Uterine tone				
Firm	244	6	243	7
Atonic	6	2	7	2
Hb				
Anemic (<11 G)	194	5	198	6
Not anemic (>11 G)	56	3	52	3

AMSTL: Active management of the third stage of labor, PPH: Postpartum hemorrhage, BMI: Body mass index

PPH

PPH was effectively controlled by a combination of AMR'S maneuver with AMSTL than routine AMSTL alone. Mean blood loss in study group is 263.22 ml and in control group is 285.76 ml. The mean blood loss in study group is significantly lower than in control group. The mean blood loss in no PPH patients in study group is 263.22 ml which is comparable to AMR Hamdy study with mean blood loss of 278.6 ml in no PPH group. There was no severe PPH (>1000 ml). Eight patients had PPH in study group, and 9 patients had PPH in control group. The mean blood loss in PPH patients in study group was 615 ml, and in control group it is 713.3 ml. hence, the incidence of pph is almost the same in both groups; however, the amount of blood loss in pph patients is significantly less in study group than in control group. Moreover with the comparative study, the impact of AMR'S maneuver in decreasing PPH is well observed (Figure 1 and Table 2).

Table 2: Blood loss

Blood loss	Study group	Control group
Mean±SD (ml)	263.22±113.21	285.76±128.49
P value	0.038 significant	

SD: Standard deviation

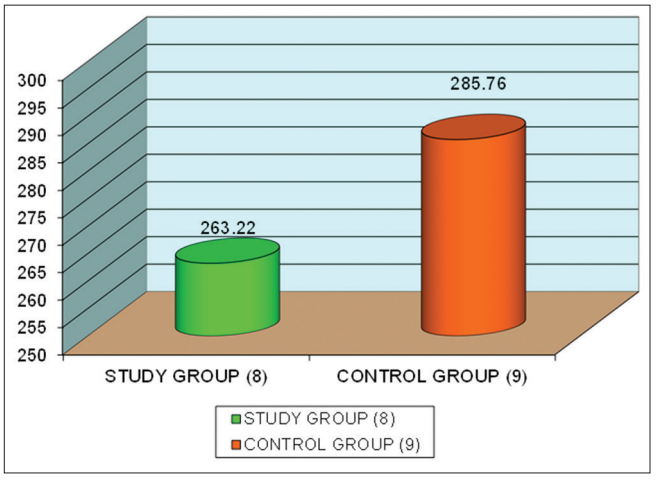

Figure 1: Overall blood loss comparison

Regarding anemia, nearly, 78% of patients were mildly anemic in both groups. Moderate and severe anemia patients were excluded from the study. The postpartum blood loss in anemic patients was significantly less in study group when compared to control group. Furthermore, the postdelivery fall in hb was present in both groups, but the fall in hb was significant in control group than in study group. Patients who had an episiotomy and those without perineal tears had significantly lesser postpartum blood loss in study group when AMR'S maneuver was used when compared to control group (Figure 2 and Table 3).

Table 3: Pre delivery HB

Pre-delivery HB	Mean±SD		*P* value
	Study Group	Control group	
<11	267.758±109.9	288.636±126.45	0.082
>11	247.5±123.7	274.808±136.719	0.278

SD: Standard deviation

Figure 2: After procedure

DISCUSSION

AMR'S maneuver when done along with AMSTL reduces postpartum blood loss more effectively than blood loss in patients in whom only routine AMSTL was done. AMR'S maneuver when added with AMSTL significantly lowers the amount of blood loss in PPH patients thus reducing maternal morbidity. AMR'S maneuver was more effective reducing postpartum blood loss in primigravida, patients who had labor natural, who had an episiotomy and those without perineal tears. The decrease in postpartum blood loss was significant in anemic patients when AMR'S maneuver was used. The post -delivery fall in Hb is significantly lowered when AMR'S maneuver was added to AMSTL. Thus, AMR'S maneuver protects anemic patients from further deterioration. Thus by this study, it is found that the new AMR'S maneuver is an effective and feasible method to reduce PPH in lower source settings.

CONCLUSION

AMR'S maneuver done along with routine AMSTL is an effective method in the prevention of PPH. It reduces the amount of blood loss even when there is a tendency for PPH to occur. It just requires an extra pair of ovum holding forceps in the delivery kit and training the available workforce. Hence, this method is very much suitable in low-resource settings were refrigeration of uterotonics is difficult or workforce to administer intramuscular or intravenous injections is difficult to avail.

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