COMPARISON OF THE FREQUENCY OF POSTPARTUM HEMORRHAGE AFTER INDUCED LABOR VERSUS SPONTANEOUS LABOR AT TERM

Shakila Yasmin[1], Aisha Javed[2], Tahira Khalid[3], Khalid Faheem Yasin[4], Shazad Bashir Momina[5], Muhammad Ameer Hamza[6]

[1,2,3,5,6] Department of Obstetrics and Gynecology, Bahawal Victoria Hospital, Bahawalpur
[4]Dean, Basic Sciences CMH institute of medical sciences Bahawalpur

Correspondence
Dr. Shakila Yasmin
Associate professor, Department of Obstetrics and Gynecology,
Bahawal Victoria Hospital, Bahawalpur
Email:dr.shakilayasmin@live.com

ABSTRACT

OBJECTIVE: The objective of current study was to compare the frequency of postpartum hemorrhage after induced labor versus spontaneous labor at term.
METHODS: A Randomized controlled trial was conducted at Department of Obstetrics and Gynecology, Bahawal Victoria Hospital, Bahawalpur from July 2107 to January 2018. In the present study 68 cases, 34 in each group in the age range of 18 to 35 years presented at the gestational age of 37 to 41 weeks were included. Group A underwent induction of labor and group B underwent spontaneous labor. Both the groups were assessed for postpartum hemorrhage.
RESULTS: The mean age in group A was 31.24±3.12 years and in group B, 30.87±4.34 years. Postpartum hemorrhage was seen in 17 (50%) cases of group A as compared to 7 (20.58%) cases of group B (p-value=0.04). Group A had a significantly high number of Postpartum hemorrhages in terms of pregnancy-induced Hypertension (p=0.04).
CONCLUSION: Postpartum hemorrhage is significantly higher in cases with induced labor as compared to spontaneous one.
KEYWORDS: Labor induction. PPH, HTN
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INTRODUCTION

The leading cause of maternal mortality is post partum. Women whose pregnancy is beyond 20 weeks' of gestation are at higher risk of Postpartum hemorrhage (PPH) and its sequelae. Maternal mortality rates have decreased greatly in developed world but PPH remains a leading cause of maternal deaths in developing areas of the world.

The pregnancy-related mortality ratio in the United States was 17.3 deaths per 100,000 live births in 2013. According to National statistics, almost 11.4% of these deaths were due to PPH (1). In developed countries, PPH ranks among the top 3 causes of maternal mortality the other two are embolism and hypertension. While among the developing world, many countries have maternal mortality rates of 1000 women per 100,000 live births, and according to World Health Organization 60% of maternal deaths in developing countries are due to PPH, accounting for more than 100,000 maternal deaths per year (2). A Practice Bulletin from the American College of Obstetricians and Gynecologists states that about 140,000 maternal deaths per year or 1 woman every 4 minutes died due to PPH (3). The rate of PPH raised from 1.5% in 1999 to 4.1% in 2009, and the rate of atonic PPH increased from 1% in 1999 to 3.4% in 2009. The chances of PPH with a morbidly adherent placenta are markedly higher (4).

The definition of PPH is somewhat arbitrary and ambiguous. PPH is defined as a blood loss of more than 500 mL following a vaginal delivery or more than 1000 mL following a caesarean delivery (5,6) .Loss of this amount of blood within 24 hours of delivery is termed early or primary PPH but if the loss occur after 24 hours of delivery it's called secondary PPH.

Estimation of blood loss at the time of delivery is subjective and generally not accurate. Studies suggested that caregiver's often underestimate actual blood loss. Another suggestion is to use a 10% fall in hematocrit value can define PPH, but change in hematocrit depends upon the time of blood sample drawn and the amount of fluid injected during resuscitation process (7).

PPH is usually reserved for pregnancies which are delivered after 20 weeks' of gestation. Delivery of fetus less than 20 weeks' gestational age is called spontaneous abortion. Bleeding per vaginum due to spontaneous abortion may have causes and their management same as those for PPH. The increased frequency of PPH in the developing world is more likely reflected by the rates given above for expectant management because of the lack of widespread availability of medications used in the active management of the third stage of labor. First of all there is lack of experienced birth attendant who might be trained to successfully manage PPH if it occur. Lack of blood transfusion services, anaesthetic services, and operating expertise also play major role.

METHODS

A Randomized controlled trial was conducted at Department of Obstetrics and Gynecology, Bahawal Victoria Hospital, Bahawalpur from July 2107 to January 2018. The calculated sample size was 68 i.e. 34 for each group with 95% confidence level, 80% power of the study, taking the percentage of postpartum hemorrhage after augmented labor as 53.8%2 and in spontaneous labor as 24.4%2 respectively. Sampling technique was non probability, consecutive sampling.

All pregnant females with a singleton pregnancy of cephalic presentation (assessed on ultrasonography) with

gestational age between 37 to 41 weeks (assessed on LMP) of 18-35 years of age having Parity 0-4 were included in study. Patients with multiple pregnancies (assessed by ultrasonography or with previous caesarean section (assessed on history) or with history of bleeding disorder or women with chronic liver disease, renal failure, asthma and diabetes mellitus were excluded from study.

After permission from the ethical review committee, a total of 68 pregnant females who presented to the Department of Gynecology of Bahawal Victoria Hospital, Bahawalpur, fulfilling the Inclusion criteria were selected. Informed written consent was taken from every woman. Cases were divided into two groups i.e. A & B by using random number tables. Group A included the women in which induction of labor was done while group B included the spontaneous labor group. Postpartum hemorrhage was noted in both groups after 12 hours of delivery by the researcher herself. All this data was recorded on a specially designed proforma.

Statistical analysis was performed using SPSS version 20. Results were presented as mean and standard deviation for the age of patients and gestational age. Frequency and percentage were calculated for parity, pregnancy-induced hypertension (yes/no), gestational diabetes and postpartum hemorrhage (yes/no). The outcome variables of the two study groups (e.g. postpartum hemorrhage), were compared for the difference by Chi-Square test and p-value ≤ 0.05 was considered as significant. Effect modifiers like age, parity, gestational age gestational diabetes mellitus and pregnancy-induced hypertension were controlled through stratification and post-stratification chi-square was applied to see their effect on the outcome. P-value $\leq$ 0.05 was considered as significant.

RESULTS

In current study, there were 68 cases; 34 in each group. The mean age of group A was 31.24±3.12 years and of group B was 30.87±4.34. Postpartum hemorrhage was seen in 17 (50%) cases of group A as compared to 7 (20.58%) cases of group B (p-value 0.04). PPH was significantly high in group A with respect to both age groups where it was seen in 22.22% cases in 18-25 years and 60% in 26 to 35 years (p-value 0.02) (Table 1). There was no significant difference in terms of duration of gestation (Table 2). Group A had a significantly high number of PPH in terms of pregnancy-induced HTN (p=0.04) (Table 3).

Table 1: PPH with respect to age groups

Age groups		PPH		Total	p Value
		Yes	No		
18-25	Group A	2 (22.22%)	7 (77.78%)	9	0.02
	Group B	1 (10%)	9 (90%)	10	
	Total	3 (15.79%)	16 (84.21%)	19	
26-35	Group A	15 (60%)	10 (40%)	25	0.02
	Group B	6 (25%)	18 (75%)	24	
	Total	21 (42.85%)	28 (57.15%)	49	

Table 2: PPH with respect to duration of gestation

Duration of gestation		PPH		Total	p Value
		Yes	No		
37-39	Group A	13 (56.52%)	10 (43.48%)	23	0.07
	Group B	6 (28.57%)	15 (71.43%)	21	
	Total	19 (43.18%)	25 (56.82%)	44	
40-41	Group A	4 (36.36%)	7 (63.64%)	11	0.14
	Group B	1 (7.69%)	12 (92.31%)	13	
	Total	5 (20.83%)	19 (79.17%)	24	

Table 3: PPH with respect to pregnancy induced HTN

Pregnancy-induced HTN		PPH		Total	p-Value
		Yes	No		
Yes	Group A	6 (60%)	4 (40%)	10	0.04
	Group B	0 (00%)	5 (100%)	5	
	Total	6 (40%)	9 (60%)	15	
No	Group A	11 (45.83%)	13 (54.17%)	24	0.14
	Group B	7 (24.13%)	22 (75.87%)	29	
	Total	18 (33.96%)	35 (66.04%)	53	

DISCUSSION

According to World Health Organization statistics, haemorrhage and hypertensive disorders of pregnancy are among the leading causes of maternal mortality in developing countries, while haemorrhage contributes more than 30% of reported deaths. As labour inductions is increasing day by day there is a need to study the supposedly increased risk of postpartum haemorrhage associated with induced labor. Studies shown that the number of inductions performed had doubled in the period from 1989-1997. According to studies, 9.5 to 33.7% of all pregnancies annually undergo labor induction (13). It is observed that third stage blood loss is more in patients in which labor is induced with oxytocin as compared to patients who underwent spontaneous progress of labour. This may be due to failure of uterus to contract after delivery of the placenta which is already under influence of oxytocin in first stage of labour. There is also increased incidence of precipitated labor in patients who underwent induction of labour though it was not observed in our study. Prostaglandins as labour inducer is better than oxytocin because of their ability to produce changes in the poorly ripe cervix, making it favourable for dilatation and effacement during the first stage of labor. Another advantage of prostaglandien is that it can be used by different routes. Studies showed that labor induction with prostaglandins was associated with decreased risk of PPH (14-15).

Postpartum hemorrhage was seen in 17 (50%) cases of group A as compared to 7 (20.58%) cases of group B with p-value of 0.02. These findings were similar to the study done by Khireddine I et al, where the frequency of postpartum hemorrhage in cases with labor induction was seen53.8% of cases as compared to 24.4% with cases who delivered by spontaneous progress of labor (16).

Several hypotheses might explain the higher risk of PPH and severe PPH after induction of labor. First, the drugs used for labour induction might have affect on the uterine myometrium by causing excessive uterine muscles contractions and acting as a fatigue factor on the myometrium thus leading to postpartum uterine atony and causing PPH (17-19).

In addition, oxytocin is administered throughout in labor in almost all women who have induction of labour at the onset of labour proocess can causes higher risk of PPH mediated by the cumulative effect of this drug on the uterine muscle (20). This would explain our finding that induction is associated with PPH, regardless of the method used. Indeed, several recent studies have reported an increased risk of PPH associated with augmentation of labor, independently of its onset i.e spontaneous or induced (21-22).

PPH showed a significantly high difference in single parous women where it affected more cases in group A (93.75% cases) with p-values of 0.001. In multiparous, it also affected a large number of cases with induction of labor but this difference was not statistically significant.

A study conducted by Shahzadi et al where they also compared PPH in spontaneous versus induced labor. In this study evaluation of multiparous showed that frequency of PPH is more in induced group 16.66% as compared to patients with spontaneous onset of labor 3.03% (23). They revealed that in multigravida, induction of labor should be done very carefully as there is an increased risk of PPH. Another study showed that in multigravida, induction of labor is associated with increased frequency of PPH as compared to spontaneous labor.

Group A had a significantly high number of PPH in terms of pregnancy-induced HTN (p=0.04) as compared to group B. This variable is also highly studied in the past to look for its confounding effect on PPH. Results are however inconsistent, varying from no significant association (after adjustment for confounders) to a two to fivefold increased risk of PPH (24-27) used in combination with different ways to estimate blood loss values. Only one study focused on the relation of Pre-eclampsia and PPH. In a cohort study of 315,085 singleton pregnancies, Eskild et al showed an increased risk for PPH in women with PE (≥500 ml blood loss, OR 1.94 95% CI 1.87 to 2.02 and for ≥1500 ml blood loss OR 2.20, 95% CI 1.99 to 2.45). The results were same in nulliparous women with normal vaginal delivery. However, evaluation of subgroups of women with and without induction of labor was not studied.

PPH was significantly high in group A with respect to both age groups where it was seen in 22.22% cases in 18-25 years and 60% in 26 to 35 years with a p-value of 0.02. This revealed that the cases with higher age groups were more vulnerable to postpartum hemorrhage as compared to younger females. Clinical data showed that ageing impairs myometrial function as there is increased rates of caesarean section for shoulder dystocia and instrumental delivery in elderly mothers who have spontaneous or induced labor previously (28-29). A Scottish study onspontaneous and induced laboring women, showed that the adjusted OR for a five year increase in age was 1.49 (95% CI 1.48–1.50) for the risk of an instrumental delivery and 1.49 (95% CI 1.48-1.51) for the risk of an intrapartum caesarean section. So by increasing maternal age there is an increased risk of induction of labour with instrumental delivery or intra partum cesarean section leading to post partum haemorrhage ultimately. The need for oxytocin augmentation of labor also increased with age until 30–34 years (30).

CONCLUSION

Postpartum hemorrhage is significantly high in cases with induced labor as compared to spontaneous one.

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