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Original Article

Prophylactic intramuscular $PGF_2\alpha$ versus intravenous methyl ergometrine for prevention of atonic PPH in high risk women

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Abstract

Objectives : To assess, evaluate and compare the safety and efficacy of intramuscular $PGF_2\alpha$ 125mg and intravenous 0.2mg methylergometrine during active management of third stage of labor in high risk women who are prone to develop atonic postpartum hemorrhage. *Methods:* Two hundred women at high risk factors of developing atonic PPH were divided into two groups. In group 1 $PGF_2\alpha$ 125mg was given intramuscularly and in group II methylergometrine 0.2mg was given intravenously at the delivery of anterior shoulder prophylactically. Duration of third stage of labor, amount of blood loss, side effects of drugs used and complications if any were noted and analyzed. Tools of statistical analysis used were Paired 't' test, 'Z' test and mean ± SD. *Results:* The mean duration of the third stage of labor after giving uterotonic drug was significantly shorter in group I (2.634±0.975min) as compared to group II (3.342±0.876min) P<0.001. The mean blood loss was significantly less in group I 111.4±65.3ml versus 169±112 ml in group II (P<0.001). There was no significant rise in BP in group I as compared to group II. The only significant side effect was diarrhea in group I. *Conclusions:* Prophylactic intramuscular $PGF_2\alpha$125mg is a better alternative to prophylactic intravenous methylergometrine 0.2 mg in high risk women who are more prone to develop atonic PPH.

Key words : prophylactic $PGF_2\alpha$, prophylactic methylergometrine, high risk women, atonic PPH

Introduction

Post partum hemorrhage is one of the major causes of maternal morbidity and mortality. It accounts for nearly 25% of maternal deaths in India. High prevalence of anemia and multiparity add to this morbidity in developing countries like India. Hence active management of third stage of labor is the most important step towards reduction of maternal morbidity and mortality.

The safety of labor is increased by administering oxytocics. Methylergometrine is most widely used oxytocic for prevention of atonic PPH. Prostaglandins are the natural stimulants of myometrial contraction and have proven to be effective in induction of labor and abortion. Most obstetricians are using 250µg of 15 methyl $PGF_2\alpha$ as a therapeutic measure for atonic PPH. It is used when atonic PPH has already taken place and fails to respond to conventional measures like uterine massage, I.V. methylergometrine and oxytocin.

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Use of prostaglandins in the active management of 3rd stage of labor is an extension of their use in obstetrics. 15-methyl PGF_2a, a synthetic derivative of prostaglandin, has as advantage that it can be given intramuscularly, is more potent and is longer acting than natural prostaglandin. The present study was undertaken to analyze the efficacy of prophylactic 125 µg PGF_2a in women prone to develop atonic PPH.

Methods

Two hundred women with vertex presentation and spontaneous onset of labor at term presentation and high risk factors for developing atonic PPH, like grand multipara, antepartum hemorrhage, previous h/o PPH, hydramnios, twins, prolonged labor, large baby and anemia were included in the study. Those having bronchial asthma, hypertension, renal disease, cardiac disease, endocrinal problem, epilepsy, coagulation disorders and sensitivity to prostaglandin or methylergometrine were excluded from the study.

They were randomly divided in two groups of 100 each. Group I received 125mg PG_2a intramuscularly and group II received methylergometrine 0.2 mg intravenously at the time of delivery of anterior shoulder. In twins it was given during the delivery of anterior shoulder of second baby. The interval between injection and expulsion of placenta, amount of blood loss, third stage complications, side effects and need for second injection of additional drug were noted. Blood loss was estimated by blood and blood clots collected in the kidney tray and adding the difference in the weight of the drapes before and after delivery. Blood pressure was recorded before onset of labor and 30 minutes after delivery. Hb% was estimated at the time of admission and two days after delivery. The difference was noted down. The data was analyzed.

Results

The two groups were well matched in terms of parity, age and high risk factors (Table 1).

The mean injection, placental expulsion interval and hence the duration of third stage was significantly less in group I as compared to group II (2.634±0.975 min Vs 3.342±0.876 ml; $P<0.001$) (Table 2).

The mean amount of blood loss was significantly less in group 1 (111.4±65.3ml) as compared to that in group II (169±112). $P<0.001$ (Table 3).

The mean rise in systolic and diastolic BP in group I was not statistically significant ($P>0.05$), whereas the difference was statistically significant in group II ($P<0.01$). (Table 4).

The mean fall in Hb% was significantly less in group 1 (0.18%) as compared to group II (0.31%).

There were six cases of atonic PPH in group II. There were no cases of retained placenta and hemorrhagic shock in either group. Additional drug was required in six cases of methylergometrine group and none in prostaglandin group. Diarrhea was seen in 5% women in prostaglandin group, none in methylergometrine group. Nausea, vomiting were seen in 3 women in each group. None of the side effects were severe enough to need energetic management in either group.

Table 1. Distribution of high risk factors.

Sl. No.	High risk factors	Group I n=100	Group II n=100
1.	Grand multipara	19	21
2.	APH	12	10
3.	Previous h/o PPH	7	5
4.	Hydramnios	12	14
5.	Twins	8	6
6.	Prolonged labor	10	10
7.	Big baby	6	7
8.	Anemia	26	27

Table 2. Duration of third stage.

Duration in minutes	Group I Mean±SD	Group II n	Mean±SD	in	P value
0-2	1.58 ± 0.09	20	1.775 ± 0.175	8	P<0.01
> 2-4	2.65 ± 0.528	72	3.277 ± 0.57	80	P<0.01
>4-6	5.125 ± 0.582	8	4.812 ± 0.601	12	P>0.05
>6		0	6.35 ± 0.057	4	
Mean	2.634 ± 0.975	100	3.342 ± 0.876	100	P<0.001

Table 3. Distribution of blood loss.

Blood loss in	Group I		Group II		P
ml	N	Mean±SD	n	Mean±SD	Value
0-50	10	34.0 ± 14.3	0		
51-100	40	64.25 ± 7.21	40	82.5 ± 15.5	P<0.001
101-150	20	117.5 ± 10.6	16	127.5 ± 18.8	P>0.05
151-200	16	159.38 ± 4.79	20	182 ± 12	P<0.001
201-250	8	221.25 ± 7.91	6	226.7 ± 18.6	P>0.05
251-300	6	260 ± 4.47	8	277.5 ± 15.8	P<0.01
>300	0		10	434.0 ± 96.3	
Mean	100	111.4±65.3	100	169 ± 112	P<0.001

Table 4. Systolic & Diastolic blood pressure.

Blood pressure	Group I n=100			Group II n=100		
(mm Hg)	Before	After	P value	Before	After	P value
Mean systolic B.P	117.64±8.44	117.48±8.48	P>0.05	1173±8.98	122.52±0.41	P<.01
Mean Diastolic BP	76.92±5.64	776.4±5.89	P>0.05	78.64±7.53	81.96±8.06	P<.05

Table 5. Comparison with other studies.

	Anjaneyulu et al[1]	Reddy et al[5]	Bhattacharya et al[2]	Present Study
1. Blood loss (ml)				
Group	95.2±89.0	127±97	72.0±9.4	107.62 ± 70
Group II	154.9±105.6	202±84	145.0±15.1	165.3 ± 95.7
2. Duration of third stage (min)				
Group I	3.5 ± 1.1	2.33 ±1.13	4.8±0.8	2.63±0.97
Group II	6.1±2.1	2.44±0.95	8.06±0.6	3.6±1.1

Discussion

Prostaglandins because of their potent uterotonic action at all times of gestation have been extensively used both to induce first and second trimester abortions as well as in the treatment of atonic postpartum hemorrhage. The natural prostaglandins are rapidly metabolized in the circulation and therefore require higher dose for desired action, which causes more side effects like nausea, vomiting and diarrhea.

Prostaglandin analogue, 15 methyl $PGE_2\alpha$, is 10 times more potent than its natural form and is able to resist enzymatic degradation. It has a longer duration of action. It has the advantage that it can be given intramuscularly which is not possible with natural $PGF_2\alpha$ because of severe pain at the site of injection as well as thrombophlebitis. Single intramuscular injection of 15 methyl $PGF_2\alpha$ is absorbed rapidly and produces increased tone of uterus which is sustained for a period of 5 to 7 hours. Cyclical contractile uterine activity resulted in rapid separation and expulsion of placenta and sustained contraction of uterus resulted in significant control of blood loss.

In the present study we observed a significant reduction in duration of third stage and amount of blood loss in 15 methyl PGF_2a group as compared to that in methylergometrine group. Similar observations were made by other authors (Table 5).

Anjaneyulu et al[1] and Bhattacharya et al[2] noted diarrhea as the most common side effect, with vomiting in 2% of cases receiving prostaglandin. In the present study nausea and vomiting was seen in three cases, whereas diarrhea was seen in five cases in the prostaglandin group. Bhide et al[3] observed in their study that side effects like nausea, vomiting and hypertension are common with ergot derivatives and oxytocin.

Elbourne et al[4] reviewed various studies and concluded that $PGE_2\alpha$ was superior to ergot alkaloids and oxytocin because is was less likely to predispose to retained placenta and oxytocin has higher potential to cause water retention. The pressure effects observed with methylergometrine restricted its use in cases with hypertension which may even prove fatal. Reddy et al[5] observed increase of blood pressure in 10% of cases whereas Patki et al[6] observed rise of BP in 50% of cases. In the present study rise of blood pressure has been found in 50% cases in methylergometrine group.

Conclusion

$PGF_2\alpha$ 125µg given intramuscularly at the time of delivery of anterior shoulder is safe, well tolerated and more effective than methergin in the high risk women who are prone to develop atonic post partum hemorrhage.

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