CRIMSONpublishers
http://www.crimsonpublishers.com

Short Communication

Mod Appro Drug Des

A Comparative Study between Prostaglandin 2α and Methyl Ergometrine in the Active Management of Third Stage of Labour

Sabha Malik[1]*, Cimona Lyn Saldanha[1] and Fida Md[2]

[1]*Department of Obstetrics and Gynaecology, Sher-i-Kashmir Institute of Medical Sciences, India*

[2]*Medical officer, JLMN Hospital, India*

***Corresponding author:** Sabha Malik, Department of Obstetrics and Gynaecology, Sher-i-Kashmir Institute of Medical Sciences, Srinagar, Jammu & Kashmir, India; Email: *mohammedsarwarmir@gmail.com*

Submission: December 12, 2017; **Published:** January 30, 2018

Abstract

Background: Post-partum hemorrhage (PPH) which occurs in upto 18% of the births carries with it a 3% risk of death and is a largely preventable event.

Material and Methods: A prospective study was carried out in the Post Graduate Department of Obstetrics and Gynecology, SKIMS, over a period of one and half years. A total of 200 women were enrolled in the study and were divided into two groups. In Group I Prostaglandin 2α was given intramuscularly and in group II methyl ergometrine was given intravenously at the time of delivery of anterior shoulder of the foetus. The main outcome measures that were studied included the duration of third stage of labour, amount of blood loss and a drop in hemoglobin and haematocrit concentration from before delivery to 24 hrs after delivery.

Results: It was observed that the mean duration of third stage of labour was significantly shorter in Group I as compared to Group II. The mean blood loss was also significantly less in the Group I as compared to Group II. The percentage drop in hemoglobin in Group I was significantly lesser than in Group II.

Conclusion: It was concluded that I/M Prostaglandin 2α is a better alternative to I/V methyl ergometrine in the active management of third stage of labour as it reduces blood loss significantly.

Keywords: Uterotonics; Labor; Post-partum hemorrhage; Methyl ergometrine; Prostaglandin 2α

Introduction

Post-partum hemorrhage (PPH) which occurs in upto 18% of the births carries with it a 3% risk of death and is a largely preventable event [1]. Post-partum hemorrhage (PPH) is the most serious complication in obstetric practice. The greatest number of maternal deaths from hemorrhage is due to PPH, which is almost entirely a preventable condition. PPH occurs in approximately 4% of vaginal deliveries, and estimates are that it causes significant morbidity and 25% of all the maternal child birth related deaths [2]. The WHO defines PPH as blood loss of 500ml or more in first 24h post partum [3]. Postpartum blood loss is difficult to evaluate especially in developing country like India where most of the women are anaemic with poor reserve and this conditions are further aggravated by increased demand during pregnancy and blood loss during 3rd stage of labor [4]. The days of expectant management, the so called ''hands off'' [5] approach seems to be over, in view of serious consequences of PPH.

Active management of labour is associated with two to three fold decrease in the risk of PPH .It includes use of oxytoxics with the delivery of anterior shoulder of the baby ,early cord clamping and delivery of placenta by controlled cord traction. Oxytocin and methyl ergometrine are commonly used uterotonics for prevention of PPH. The importance of prostagladin use for the treatment of PPH even after failure of conventional treatment is well established.15 methyl Prostaglandin 2α is well used at the time of delivery complement physiological process during labour by causing simulation of uterine contractions and results in duration of third stage of labour and thus reduction in blood loss [6].

In present study, an attempt was made to study the efficacy and safety of Intramuscular Prostaglandin 2α versus Intraveous MethylErgometrine in active management of third stage labor, at the Post Graduate Department of Obstetrics and Gynecology, Sher-i-Kashmir Institute of Medical Sciences, Srinagar.

Copyright © All rights are reserved by Sabha Malik.

Aims and Objectives

i. To compare efficacy and safety of intramuscular Prostaglandin 2α and intravenous methyl ergometrine (2mg) in the active management of third stage of labor.

ii. Comparison of mean blood loss, fall in hemoglobin and hemotacrit values in intramuscular prostaglandin 2α and intravenous methylergometrine group.

Material and Method

A prospective study was carried out in the Post Graduate Department of Obstetrics and Gynecology, SKIMS, Soura from 1st April, 2017 to 31st September, 2017. A total 200 women were enrolled in the study. Women were randomized to one of the 2 groups once they fulfilled all the selection and exclusion criteria. Active management of 3rd stage of labor was done in Group I with intramuscular Prostaglandin 2α (125 microgram) and in Group II with intravenous methylergometrine (0.2mg).

Inclusion criteria

Women with singleton pregnancy, between 37 and 42 week of gestation, anticipated vaginal delivery, vertical lie, no high risk factors and ready to give written and informed consent were enrolled in the study.

Exclusion Criteria

Women with hemoglobin 6gm% and above, pregnancy induced hypertension, abruption placentae/marginal placenta previa/low lying, placenta, multiple pregnancy, grand multipara, malpresentation, polyhydramnios, previous uterine scar, chorioamnionitis, prolonged labor, intra uterine fetal death, coagulation abnormalities, history of medical disorder-Asthma/epilepsy/heart or renal disease were excluded from the study. On admission to labor room, hemoglobin levels were determined. All the women were followed and monitored through the 1st and 2nd stage of labor.

Time interval between the delivery of the baby and the placenta was noted. Duration of the 3rd stage was thus calculated. Pulse rate, temperature and blood pressure were recorded 1hour after delivery. Amount of blood loss was calculated by weighing the gauzes/sponges before delivery followed by again weighing them after delivery. Patient was kept in labor room under observation for a period of 2hours any complaint such as nausea, vomiting, fever, headache, chills, diarrhoea and shivering was noted. A repeat hemoglobin estimation was done 2nd post-partum day after 24hours.

The statistical analysis was performed using student's t test. P value of <0.001 was considered statistically significant. Data were calculated as means, standard deviations (SD), numbers and frequency (%).

Results

A total of two hundred women were studied during the research period.

Duration of third stage of labor

Mean duration of third stage of labor was significantly shorter in Group I as compared to the Group II (2.52±1.35 minutes in group I v/s 3.41±1.1 minutes in group II) (Table 1).

Table 1: Duration of Third stage of labour (in minutes) in Group I and Group II.

Duration of third stage (in minutes)	Parity	Group-I (Prostraglandin 2α) (n= 100)	Group-II (Methyl Ergometrine) (n=100)	P Value
	Primigravida	2.42±1.2	3.22±0.92	0.000657
	Multigravida	2.61±1.5	3.61±1.2	0.000434
	Mean	2.52±1.35	3.41±1.1	0.000065

Blood loss (in ml)

Table 2: Blood loss (ml) in group I and Group II.

Parity	Group-I (Prostraglandin 2α) (n= 100)	Group-II (Methyl Ergometrine) (n=100)	P Value
Primipara	124±34.55	256±36.65	0.000021
Multipara	134±24.43	253±34.58	0.000156
Total	129±27.25	250± 35.21	0.000698

The mean blood loss was significantly less in Group I (129±27.25 ml) than in Group II (250± 35.21 ml) (Table 2).

Pre and post delivery Hematocrit levels

The mean pre delivery hematocrit and the mean post delivery hematocrit in group I was 29.6±3.24 and 27.5±2.5 respectively. The difference was found to be statistically insignificant. The mean pre delivery hematocrit and the mean post delivery hematocrit in group II was 32.6±3.1 and 26.5±2.5 respectively. The difference was found to be statistically significant (Table 3).

Table 3: Pre and post delivery hematocrit in Group 1 and Group II.

Group	Status	Hematocrit	P Value
Group I (Prostraglandin 2α) (n=100)	Pre delivery	29.6±3.4	0.128
	Post delivery	27.5±2.5	
Group II (methyl ergometrine) (n=100)	Pre delivery	32.6±3.1	0.00098
	Post delivery	26.5±2.5	

Pre and post delivery Hemoglobin levels

The mean pre delivery hemog lobin and the mean post delivery hemoglobin in group I was 10.42±1.2 and 9.64±0.76 respectively. The difference was found to be statistically insignificant. The mean pre delivery hemoglobin and the mean post delivery hemoglobin in group II was 10.62±0.72 and 8.64±0.66 respectively. The difference was found to be statistically significant (Table 4).

Table 4: Pre and post delivery hemoglobin in Group I and Group II.

Group	Status	Hemoglobin (Hb)	% Drop in Hb	Absolute Drop in Hb	P Value
Group 1($PGF_{2\alpha}$) (n=100)	Pre delivery	10.42±1.2	3.74±1.95	0.47±0.32	0.08762
	Post delivery	9.64±0.76			
Group II (methyl ergometrine) (n=100)	Pre delivery	10.62±0.72	6.97±2.95	0.87±0.32	<0.000065
	Post delivery	8.64±0.66			

Side effects

Table 5: Side effects in Group I and II (in %, n=100).

Side Effects	Group 1(Prostaglandins 2α)	Group II (Methyl Ergometrine)	P Value
Nausea	24	14	0.000876
Vomiting	12	6	0.000765
Diarhhea	2	0	0.000987
Shivering	6	14	0.000187
Pyrexia	4	0	0.000154

Among the side effects nausea was the most common side in group I patients present 24% of the patients while as it was present in only 14% of the patients of group II (Table 5). Overall side effects were significantly higher in Group I patients.

Discussion

Post-partum hemorrhage (PPH) is one of the leading causes of maternal mortality especially in developing countries. Among all the causes of hemorrhage the main cause of maternal deaths worldwide and in India is Post partum hemorrhage. It is mostly caused by uterine atony. It is the excessive blood loss i.e, more than 500ml in vaginal delivery and more than 1,000ml in cesarean section. The factors that predispose to PPH include a history of post partal hemorrhage in previous pregnancy, prolonged, augmented or rapid labor, pre eclampsia, operative delivery, chrioamnionitis, trauma to the genital tract, i.e., large episiotomy, laceration of perineum or an over distended uterus due to macrosomia, twins or hydramnios and coagulation defects. Many of these risk factors can be identified during the antenatal/prenatal care or in early labour so that, ideally, women are referred to a health facility where prophylaxis and treatment are available [7].

Prostaglandins are considered to be the physiological stimuli for myometrial contractility. Prostraglandin 2α causes dose dependent increase in uterine tone as well as frequency and amplitude of uterine contractions. It is highly effective drug in the management of massive bleeding. Common side effects of prostaglandins include fever, vomiting, diarrhea and excessive uterine contractions. Care should be taken in women with asthma (can cause bronchospasm) and Glucoma(raise intraocular pressure).In patients with existing cardiovascular disfunction, they can lead to cardiorespiratory failure [7].

Methyl ergometrine is a semi-synthetic ergot alkaloid derivative. Utertonic action is seen immediately after intravenous adminstration. It is used alone or on in combination with oxytocin in the prevention and treatment of PPH. The intensity of press or response is enhanced when the blood pressure is already elevated; therefore it is contraindicated in women with hypertension [7].

In present study, an attempt was made to study the efficacy and safety of Intramuscular Prostaglandin 2α versus Intraveous Methylergometrine in active management of third stage labor. The main outcome measures that were studied included the duration of third stage of labour, amount of blood loss and a drop in hemoglobin and haematocrit concentration from before delivery to 24hours after delivery.

In present study the mean duration of third stage and amount of blood loss after delivery was found significantly lower in Group I (Prostaglandins 2α) in comparision to methylergometrine group. Significant reduction duration of third stage of labor and amount of blood loss was also observed by Devi et al. [8], Bhattacharya et al. [9] and Nageria T et al. [10]. Abdel Aleem et al. [11] studied and reported similar observations while comparing two drugs in prevention of atonic PPH. Lamba et al. [12] in 2014 found prostaglandins were associated with least blood loss compared to oxytocin and methyl ergometrine. Shreatha et al. [13] also observed that prostaglandins were better in reducing duration of third stage as compared to methylergometrine.

It was observed in our study that in prostaglandin group, the post delivery mean absolute and mean percentage fall in hemoglobin was significantly lower supporting the fact that prostaglandins reduce the amount of blood loss when given during third stage of labour. Purshottam et al. [14] also reported the same findings who reported that mean fall in Hb% to be less in prostaglandin group compared to the methyl ergometrine group.

Nausea and vomiting were more Group I as compared to Group II. Similiar results were observed by Nageria et al. [10]. Anjanayelu et al. [15] and Bhatacharya et al. [9] reported diarrheoa as the most common side effect with vomiting in 2% of the cases who received prostaglandins. Ebourne et al. [16] reviewed various studies and concluded that prostraglandins are superior to ergot alkaloids and oxytocin because it was less likely predispose to retained placenta and oxytocin had higher potential to cause water retention.

Conclusion

Prostaglandin 2α is a safe and efficacious drug in the management of third stage of labour. When used as prescribed and judiciously it causes significant reduction in the blood loss which makes it so important especially in the developing countries like India where large numbers of women are anaemic and may develop serious life threatening problems even with moderate amount of it blood loss. It can contribute to greater extent in reducing maternal mortality and morbidity in developing countries like

India by reducing Post partum hemorrhage, anemia and associated problems. However larger scale studies are required to confirm the same and usage of uterotonics especially in women with co-morbidities needs further research for optimal management in third stage of labour in these women.

References

1. Janice M Anderson, Duncan Etches (2007) Prevention and management of Post partum hemorrhage. Am Fam Physician 75(6): 875-882.
2. Maughan KL, Heim SW, Galazka SS (2006) Preventing post-partum hemorrhage: managing the third stage of labour. Am Fam Physician 73(6): 1025-1028.
3. Fenton JJ, Baumeister LM, Fogarty J (2005) Active management of third stage of labour among American Indian women. Fam Med 37(6): 410-414.
4. Justus Hofmeyr G, Sandra Ferreira V, Nikodem C, et al. (2004) Misoprostol for treating post partum hemorrhage: a randomized controlled trial [ISRCTN72263357]. BMC Pregnancy Childbirth 4(1): 1-16.
5. Prendiville WJ, Elbourne D, Mc Donald S (2000) Active versus expectant management in third stage of labour. Cochrane Database Syst Rev (3): CD000007.
6. Ruby Kumari, Suman Lata M, Prabha Kumari, Renu Bhatia (2015) Comparision of efficacy and safety of I/M $PGF_2\alpha$ versus I/V methyl ergometrine in the active management of third stage of labour. Indian obstetrics and Gynaecology 5(1): 19-22.
7. Anshu Gupta (2013) Comparative study of methyl ergonovine and 15 methyl prostragladin in active management of third stage of labor. Obstet Gynecol sci 56(5): 301-306.
8. Devi Pl (1988) Prophylactic use of 15 PGF_2 for control of post partum bleeding. Acta Obstet Gynecol Scand 67(S145): 7-8.
9. Bhattacharya (1988) Prophylactic use of 15 methyl PGF_2 by intramuscular route for control of post partum bleeding-a comparative trial with methyl ergometrine. Acta Obstet Gynecol Scand 145 suppl: S 13-15.
10. Nageria T, Ekka Manju (2006) Intramuscular $PGF_2\alpha$ 125g versus intravenous methyl ergometrine 0.2 mg in the active management of third stage of labour. Obstet Gynecol India 56(5): 396-398.
11. Abdel Aleem H, Abol Oyoun EM, Moustafa SA, Kamel HS, Abdel Wahab HA (1993) Carbopost trometatol in the management of third stage of labour. International J Gynecol Obstet 42(3): 247-250.
12. Lamba A, Godawari Joshi, Purohit RC (2013) Comparision of oxytocin, methergin and carboprost in active management of third stage of labour. International Journal of Medical Sciences 6(2): 65-68.
13. Shrestha A, Urala MS, Dhurba Upreti, Surya Niraula (2008) Comparision of intramyometril and intra muscular 15 methyl PGF_2 against traditionally used intramuscular methergin for active management of third stage of labor. NJOG 3(2): 35-39.
14. Purshottam BJ (2008) I/M $PGF_2\alpha$ versus I/V methyl ergometrine for prevention of atonic PPH in high risk women. J Obstet Gynecol India 58(5): 417-420.
15. Anjanaeyulu R (1988) Prophylactic use of 15 methyl PGF_2 by intramuscular route-a controlled clinical trial. Acta obstet Gynecol Scand 145 Suppl: 59-61.
16. Elbourne D, Prendiville W, Chalmers I (1988) Choice of oxytocics preparation for routine use in the management of the third stage of labour an overview of evidence from controlled trials. Br J O Gynecol 95(1): 17-30.