Comparative Outcome of Active Management of Third Stage of Labour with prophylactic use of Oxytocin, Methyl Ergometrine and Misoprostol

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Abstract

Background- *Post partum hemorrhage (PPH) is an important cause of maternal mortality accounting for nearly 15 -20% of maternal deaths in India. Oxytocic drugs like oxytocin, ergot alkaloids, and various prostaglandins are being used for active management of third stage of labour.*

Objectives- *To compare duration of third stage of labour, the efficacy of the drug in prevention of atonic post partum haemorrhage , retained placenta and side effects associated with the use of Oxytocin, Methyl ergometrine and Misoprostol*

Material and Methods- *A prospective study was conducted to find out the efficacy of 10 Units of oxytocin (Gr A), 0.2 mg of methyl- ergometrine (Gr B) and per rectal 600 microgram of Misoprostol (Gr C)in the active management of third stage of labour for prevention of postpartum hemorrhage.*

Results- *The mean of duration of third stage of labour in Group A was 49 seconds, 1min 10 seconds and 1min 30 seconds in group A, B and C groups respectively. The mean amount of blood loss was 227 ml, 235 ml and 350 ml. in group A ,B and C respectively. The maximum blood loss was 1000 ml in group C , 580 ml in Group B and 520 ml in Group A. There were 10 cases of atonic PPH during the study period, of which 9 were of mild variety and 1 was of severe variety.Minimum side effects were observed in Group A (Oxytocin group). Third stage complications were observed in 30 cases (6.66%).They were more in Group C (8.66%) than Group A (6.0%) and B (5.33%).*

Conclusion- *It was concluded that efficacy of the drug was more with Oxytocin followed by Methyl ergometrine. The duration of third stage of labour, mean blood loss and the complication rate were relatively more with Misoprostol .The side effects related to the oxytocic drug, were more with Misoprostol and Ergot alkaloids than Oxytocin.*

Keywords-*Post Partum Hemorrhage, Active Management of third stage of labour, Maternal Mortality , Oxytocin, Methyl ergometrine, Misoprostol*

Introduction

Pregnancy and childbirth involves significant health risks, even to women with no pre-existing health problem. Postpartum hemorrhage is one of the most common causes of maternal deaths throughout the world. Worldwide there are estimated 500,000-600,000 deaths of mothers during childbirth annually of which 25% are due to postpartum haemorrhage.World Health Organization also estimated 20 million annual maternal morbidities due to hemorrhage.

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In developing countries, where maternal mortality rates are exponentially high, postpartum hemorrhage plays an even greater roll[1]. World Health Organization defines postpartum haemorrhage as blood loss of more than 500ml during the third stage of labour or during the first 24 hours after delivery[2]. It occurs in approximately 3- 4% of vaginal deliveries[3].

Active management of third stage of labour (AMTSL) is the WHO recommended intervention in prevention of atonic pph. There are various drugs and methods available for management of atonic PPH .Drugs like oxytocin, ergot alkaloids, and various prostaglandins are being used for active management of third stage of labour. Methyl ergometrine and oxytocin and Misoprostol have found to be effective oxytocic drugs in prevention of postpartum haemorrhage. Methyl ergometrine is considered as second line drug in comparison with oxytocin because of minor side effects associated with its use. Although oxytocin is recommended as drug of choice for active management of labour, many a times it requires use of additional utero-tonic agent to treat postpartum haemorrhage. Methyl-ergometrin is a better uterotonic drug.

Aims & Objectives

1. To compare duration of third stage of labour with the use of Methyl ergometrine, Oxytocin and Misoprostol(PG E1)
2. To know the efficacy of the drug in prevention of atonic post partum haemorrhage. and retained placenta.
3. To study the side effects associated with the use of Oxytocin, Methyl ergometrine and Misoprostol (PG E1)

Material And Methods

Prospective observational study was carried out in the Department of Obstetrics and Gynaecology of Rural Medical College, Loni ,Maharashtra over a period of 2 years from 15th September 2014 to 14th September 2016 in 450 low risk pregnant women coming for delivery to Pravara Rural Hospital. Women with singleton pregnancy, between 37 and 42 weeks of gestation, anticipated vaginal delivery, longitudinal lie, no high risk factors and who gave written and informed consent were included in the study. Women with hemoglobin < 7 gm%, pregnancy induced hypertension, abruption placenta, placenta previa, multiple pregnancy, grand-multipara, malpresentation, polyhydramnios, previous uterine scar, chorioamnionitis, prolonged labor, intrauterine fetal death, coagulation abnormalities were excluded. Patients with history of medical disorders like asthma, epilepsy, heart or renal disease were also excluded from the study.

Methodology

A comparative study was conducted to find out the efficacy of 10 Units of oxytocin, 0.2 mg of methyl-ergometrine and 600 microgram of Misoprostol in the active management of third stage of labour for prevention of postpartum hemorrhage.A total number of 150 cases in each of the three groups were enrolled. Patient to be included in the study were allotted to one of the groups by lottery method (random sampling method).

Group A-Oxytocin group

Group B-Methyl ergometrine group

Group C-Misprostol group

One of the standard utero-tonics was administered to each of the case just after the delivery of the anterior shoulder of baby. Oxytocin and methyl ergometrine were administered by intramuscular route. The blood loss during the third stage of labour was measured in blood collecting bag (BRASSS-V-DRAPE). Blood clots were weighed separately considering 1gm equal to 1 ml of blood[4]. Blood soaked swabs were also weighed, the known dry weight subtracted and the calculated volume added to that of the blood volume of measuring bag.

Postpartum hemorrhage in the present study was considered as blood loss of more than 500 ml during the third stage of labour .If the blood loss exceeds 500 ml,the patients were managed by giving additional oxytocics(Carboprost 250 microgram intramuscularly in standard doses and frequency) The amount of blood loss, duration of the third stage of labour (interval between administration of oxytocic and expulsion of placenta) ,third stage complications like retained placenta and need for additional oxytocics were noted.The occurrence of side effects like nausea, vomiting, shivering, fever, diarrhoea, chest pain, chest discomfort etc.within the first two hours of delivery were recorded. Statistical analysis of the three groups was done by ANOVA and the post hoc test used

for multiple comparisons (TUKEY). A p value of less than 0.05 was considered statistically significant. Analysis was done using Statistical Software for Social Sciences (SPSS) version 18

Results

The mean of duration of third stage of labor in Group A was 49 seconds, Group B was 1min 10 seconds, and in Group C was 1min 30 seconds. The mean blood loss in Group A was 227 ml, Group B was 235 ml and in Group C was 350 ml. The maximum blood loss was 1000 ml in group C , 580 ml in Group B and 520 ml in Group A.The difference of mean of pre and post delivery hemoglobin in AMTS group was more in Group C than Group A and Group B. There were only 10 cases of atonic PPH observed during the study period, out of which 9 were of mild variety and 1 was of severe variety. Three cases each were seen in group A ,B ,and C One case of severe PPH was reported from Group C. Nausea,Vomiting ,After pains, Shivering and Sweating were the common symptoms observed following delivery. Minimum side effects were observed in Group A (Oxytocin group).Nausea ,vomiting ,after-pains and sweating were common in Group B(methyl ergometrine) ,where as Nausea, vomiting and diarrhoea were predominantly seen in Group C (Misoprostol).Third stage complications were observed in 30 cases (6.66%).They were more in Group C(8.66%) than Group A(6.0%) and B (5.33%). The need for blood transfusion was more in Group C than in Group A and Group B.There was no maternal mortality in the present study.

Discussion

I-Duration of Third Stage of Labour

In the present study, the duration of 3rd stage of labour was found lower in group A (Oxytocin) as compared to group B (Methergin) & C (Misoprostol). Forty four percent of cases had third stage duration of less than one minute. Eighty five percent of cases had third stage duration of less than two minutes. Less than one percent of cases had third stage duration of more than five minutes. Third stage duration was more in group C than group B and group A. Mean duration of 3rd stage labour was minimum in group A as compared to B & C i.e 49 seconds.The mean duration of third stage of labour was lowest in group A (49 Sec)followed by group B(1 min 10 sec) and was highest in Group C (1 Min 30 Sec).The minimum duration of third stage of labour was noted in Group A (25 Sec), and maximum was noted in Group C (5 Min 20 Sec).The results of the present study do not match with the results shown by other authors. Singh et al [4]conducted a study in which efficacy and adverse effects of intravenous oxytocin and intravenous methylergometrine inactive management of the third stage of labor (AMTSL) and observed that methylergometrine had the longest (6.83 minutes).Meena et al[5] observed that the mean duration of third stage of labour was lowest in methylergometrine group.The mean blood lost in AMTSL group was 130.70±43.81ml, prostadin group was 162.30±63.59ml, Methergin group was 160.60±74.41ml and oxytocin group was 182.80±78.84 ml. The maximum blood lost was between 501 to 1000 ml which was seen in 2 cases of Methergin group and 1 case of oxytocin group, while AMTSL group and Prostodin group had no such cases. Overall the blood lost observed was minimum in AMTSL group being 50 to 150 ml in 81 cases, 151 to 250 ml in 17 cases and 251 to 500 ml in only 2 cases. In Prostodin group, there were 59 cases with blood loss 50 to 150 ml, 34 cases had blood loss of 151 to 250 ml, 7 women had blood loss of 251 to 500 ml. In Methergin group and Oxytocin group, blood loss between 50 to 150 ml was seen in 58 and 49 women respectively, 151 to 250 ml was seen in 37 cases in each group, and 251 to 500 ml was seen in 3 and 13 cases respectively.

II-Amount of Blood Loss

In the present study, the amount of blood loss at time of delivery was less in group A (Oxytocin) & B(Methergin) as compared to group C.(Misoprostol). Maximum number of cases with blood loss less than 150 ml, belonged to group B (methyl ergometrine group).Overall, twenty eight percent cases had blood loss of less than 150 ml, thirty six percent had blood loss between 150 and 250 ml ,thirty three percent had blood loss between 250 and 500 ml ,where as two percent cases had blood loss more than 500 ml.

Mean blood loss was minimum in group A as compared to group B & C. The mean amount of blood loss was lowest in group A (227 ml) and was highest in Group C (350ml).The minimum blood loss was noted in Group A (60ml) , and maximum was noted in Group C (1000ml).

Gupta et al [6]compared the effect of methyl-ergonovine and 15- methyl prostaglandin F2á and found that the blood loss with 15-methyl PGF2á was significantly less as compared to that of blood loss with methylergonovine at four hours of delivery ($P = 0.014$) and the total, i.e., during first four hours, amount of blood loss was significantly less with 15- methyl PGF2á ($P = 0.026$). There was no statistically significant difference in the hemoglobin and hematocrit levels measured pre-delivery and postpartum. Saito et al [7] reported that the routine use of oxytocin is more effective than the use of ergometrine for prevention of PPH in the third stage of labor. The use of oxytocin was associated with a significant reduction in mean total postpartum blood loss, frequency of postpartum hemorrhage , relative risk, confidence , and need for therapeutic oxytocics . There were only 3 cases of PPH observed during the study period, out of which all three were due to atony with cervical tear, 2 in methergin group and 1 in oxytocin group. All three cases of PPH were observed in instrumental deliveries.

III-Incidence of Post Partum Haemorrhage

There were ten cases of postpartum haemorrhage in the present study. Overall incidence of postpartum haemorrhage was 2.22%.Nine cases of PPH were mild (90%), while one case had severe postpartum haemorrhage (10%).There were three cases each of atonic postpartum haemorrhage in group A,B and C .There was one case of severe PPH in group C.

Nambiyal A[8] in her study, there were total 170(1.98%) cases of trivial to intractable postpartum hemorrhage during the study period, out of which there were 74 (0.9%) cases of trivial PPH, 81 (1%) of Severe PPH and 15 (0.2%) of intractable PPH. The incidence of PPH was 1.98% of total deliveries. Out of 170 cases of PPH trivial PPH accounted for 43.53%, severe PPH for 47.65% and intractable PPH was 8.82%. Cohen et al(1995)204 observed PPH in 2 to 10% of all deliveries, out of which severe PPH accounted for 1% of the cases, similar to our study which also showed the incidence of severe PPH as 1% out of all the deliveries during study period. Various authors [Sheikh et al, Bateman et al, Lutomski et al][9-11] ,estimated the incidence of postpartum hemorrhage as 1% to 5%, which is comparable to our study and in another study by Rueangchainikhom et al[12] the incidence of postpartum hemorrhage was 1.98% which is equal to our study.

In another study conducted in a tribal area of central India, by Bang et al[13], the incidence of primary postpartum hemorrhage was 3.2%. Sheikh et al [9] reported the incidence of intractable PPH in 0.64% of the total deliveries, whereas in our study it was 0.2 % of total deliveries.

IV-Side Effects of Oxytocic Drugs

In the present study, nausea and vomiting (12%), pain in abdomen (11%) ,sweating(5%) and shivering(4%)were the commonest symptoms in women following delivery. Less common symptoms were restlessness, pain in chest, diarrhoea and giddiness. Nausea, vomiting and diarrhoea were common in cases of Group C(Misoprostol) ,whereas nausea ,and pain in abdomen were common in Group B(methyl ergometrine). Group A(Oxytocin) cases had least side effects related to drug.

Nambiyal A[8] in her study reported minimum side effects in oxytocin group, with only 2 cases experiencing nausea followed by AMTSL group, with only 4 cases experiencing nausea. Maximum side effects were observed in prostodine group, with 23 women having vomiting, 15 had diarrhoea and 2 had abdominal pain, whereas in methergine group, 22 women had abdominal pain and 2 had vomiting. Khan et al reported that the incidences of nausea, vomiting and headache were significantly lower in the oxytocin group. Gulmezoglu[14] reported that adverse effects (vomiting, diarrhoea and abdominal pain) were more common with prostaglandins when compared to other uterotonic agents. Orji et al[15] reported that patients in the ergometrine group were at significant risk for nausea, vomiting, headaches, and elevated blood pressure.

V-Third Stage Complications

In the present study, the overall complications of third stage of labour were less in group A & B compared to group C. Post partum haemorrhage (10 cases) and retained placenta (2 cases) were the common complications noted in third stage of labour. Ten cases required blood transfusion. There was one case of postpartum collapse in group C. Blood transfusion was needed in 17 cases.(3.77%) .The need for blood transfusion was more in group C than group A and B.

Nambiyal A [8] in her study reported minimum complications in AMTSL group, where only 1 case had uterine inversion as the patient was delivered by first year resident which was reposited back immediately by senior consultant. Maximum complication were seen in methergin group, where 4 patients had cervical tear and 2 had retained placenta, whereas in prostadin group and oxytocin group women having cervical tear were 2 and 3 respectively and women with retained placenta were 3 and 2 respectively.

Begley et al [16]observed a greater need for manual removal noted in the Dublin trial which was attributed to the use of Syntometrine as an IV bolus. Oxytocin given as part of AMTSL has been shown to reduce the need for manual removal of a retained placenta compared with expectant management. Cotter et al [17] reviewed use of prophylactic IM oxytocin during the third stage of labour and demonstrated a significantly reduced need for manual removal of the placenta compared with ergometrine use (RR 0.57; 95% CI 0.41 to 0.79).

Prendiville and colleagues[18] conducted a meta-analysis in which a uterotonic (syntometrine) was administered IV; the result was a lower incidence of PPH but more retained placentas.

Conclusion

In the present study, it was observed that all three groups had almost similar results. The efficacy of the drug was best with Oxytocin followed by Methyl ergo-metrine. The duration of third stage of labour ,mean blood loss and the complication rate were relatively more in group C in which per rectal Misoprostol was used.The side effects related to the oxytocic drug, were more with Misoprostol and Ergot alkaloids than Oxytocin.

The WHO recommended protocol of Active management of third stage of labour (AMTSL) with Oxytocin as first drug of choice, as an oxitocic should be used as routine .Other two drugs may be used as an alternative to Oxytocin.The Labour outcome could be improved with practice of AMTSL which is an easy, reliable, cheap method of prevention of PPH, which could be followed in all the tiers of health care system.

The atonic postpartum haemorrhage must be identified at the earliest by correct estimation of blood loss .The golden hour of management of PPH should not be lost. Additionally, strict adherence to formulated protocols and guidelines is important to further improve outcomes in patients with massive postpartum haemorrhage.

References

1. Dildy, G.A.. Postpartum hemorrhage: New management options. Clin. Obstet Gyneco. 2002; 45(2): 330-344.
2. Fenton, J.J., Baumeister, L.M., Fogarty, J. Active management of third stage of labour among American Indian women. Fam Med.. 2005; 37(6) :410-4.
3. Maughan, K.L., Heim, S.W., Galazka, S.S. Preventing post-partum haemorrhage: managing the third stage of labour. AAFP. 2006;73(6): 1025-8.
4. Singh G, Radhakrishnan G, Guleria K. Comparison of sublingual misoprostol, intravenous oxytocin, and intravenous methylergometrine in active management of the third stage of labor. International Journal of Gynecology & Obstetrics. 2009;107(2):130-4
5. Meena BL. Use of Oral Misoprostol, Intramuscular Oxytocin and Intravenous Methergin in Prevention of Postpartum Haemorrhage. Nepal Journal of Obstetrics and Gynaecology. 2013;8(1):34-6.
6. Gupta A. A comparative study of methylergonovine and 15-methyl prostaglandin F2á in active management of third stage of labor. Obstetrics & Gynecology Science. 2013;56(5):301-6
7. Saito K, Haruki A, Ishikawa H, Takahashi T, Nagase H, Koyama M, et al. Prospective study of intramuscular ergometrine compared with intramuscular oxytocin for prevention of postpartum hemorrhage. Journal of Obstetrics and Gynaecology Research. 2007;33(3):254-8.
8. A Prospective Study Of Women Presenting With Trivial To Intractable Postpartum Hemorrhage With Special Reference To Comparison Of Different Modalities Used For Prevention Of Postpartum Hemorrhage."Published study MUHS Nashik 2014
9. Shaikh S, Shaikh NB, Talpur S, Balouch R. "Postpartum hemorrhage: an experience at tertiary care hospital, Hyderabad" Quarterly Medical Channel 2013;19(1).

10. Bateman BT, Berman MF, Riley LE, Leffert LR. The epidemiology of postpartum hemorrhage in a large, nationwide sample of deliveries. Anesthesia and analgesia. 2010;110(5):1368-73.
11. Lutomski J, Byrne B, Devane D, Greene R. Increasing trends in atonic postpartum haemorrhage in Ireland: an 11 year population based cohort study. BJOG: An International Journal of Obstetrics & Gynaecology. 2012;119(3):306-14.
12. Rueangchainikhom W, Srisuwan S, Prommas S, Sarapak S. Risk factors for primary postpartum hemorrhage in Bhumibol Adulyadej Hospital. Journal of the Medical Association of Thailand= Chotmaihet thangphaet. 2009;92(12):1586.
13. Bang RA, Bang AT, Reddy MH, Deshmukh MD, Baitule SB, Filippi V. Maternal morbidity during labour and the puerperium in rural homes and the need for medical attention: A prospective observational study in Gadchiroli, India. BJOG: An international journal of Obstetrics & Gynaecology. 2004;111(3):231-8.
14. Gülmezoglu AM, Villar J, Ngoc NTN, Piaggio G, Carroli G, Adetoro L, et al. WHO multicentre randomised trial of misoprostol in the management of the third stage of labour. The Lancet. 2001;358(9283):689-95.
15. Orji E, Agwu F, Loto O, Olaleye O. A randomized comparative study of prophylactic oxytocin versus ergometrine in the third stage of labor. International Journal of Gynecology & Obstetrics. 2008;101(2):129-32.
16. Begley CM, Gyte GM, Devane D, McGuire W, Weeks A. Active versus expectant management for women in the third stage of labour. The Cochrane database of systematic reviews. 2011(11): CD007412.
17. Carter CS. Developmental consequences of oxytocin. Physiology & behavior. 2003;79(3):383-97
18. Prendiville W, Elbourne D, McDonald S. Active versus expectant management in the third stage of labour (Review). 2009.