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ORIGINAL ARTICLE

RECTAL MISOPROSTOL VERSUS INTRAMUSCULAR OXYTOCIN FOR PREVENTION OF POST-PARTUM HAEMORRHAGE

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ABSTRACT: BACKGROUND: Post-partum haemorrhage is a common cause of maternal mortality in developing countries. The present study was conducted to study the efficacy and safety of rectal misoprostol versus IM oxytocin for prevention of PPH in Dr. RPGMC, Tanda, Dist. Kangra, H. P. **METHODS:** Women were randomized to receive either 600 microgram rectal misoprostol tablet (Group A) or 10 unit oxytocin (Group B) .The parameters studied were incidence of PPH, amount of blood loss, duration of third stage of labour, incidence of side effects, pre and post-delivery haemoglobin and use of additional uterotonics. **CONCLUSION:** Rectal misoprostol was found to be as effective as IM oxytocin for preventing post-partum haemorrhage and is recommended to be used as an uterotonic agent to manage third stage of labour routinely.

KEYWORDS: Postpartum haemorrhage, Maternal mortality, Developing countries, Efficacy, Rectal misoprostol and oxytocin.

INTRODUCTION: Post-partum haemorrhage (PPH) is the leading single direct cause of maternal mortality and morbidity accounting for a quarter of all maternal deaths worldwide and causing approximately 140,000 deaths annually.[1]

The clinical threshold for PPH as defined by WHO is post-partum blood loss in excess of 500ml. However in a population with a high prevalence of anemia, blood loss less than 500ml has been noted to have severe consequences.[2] Uterine atony or failure of the uterus to contract after delivery is the most common cause of PPH and occurs in up to 18% of births.

The primary cause of PPH is uterine atony which accounts for 70% of cases leading to severe haemorrhagic shock requiring blood transfusions and surgical interventions. Although PPH occurs everywhere, the risk of maternal deaths from PPH is 100 times greater in developing countries than it is in developed countries (1 in 1000 deaths in developing versus 1 in 100, 000 in United kingdom).[3]

It is estimated that haemorrhage is the main cause of maternal mortality in Asia and Africa (30% or more of all maternal deaths).

Out of these women who survive PPH, 12% will experience anemia, resulting in 1.6 million women of reproductive age suffering from its long lasting and debilitating consequences.

The best preventive strategy is the active management of third stage of labour (AMTSL) which involves administering uterotonic drugs soon after the delivery of anterior shoulder, controlled cord traction and fundal massage. The incidence of PPH is reduced by 68% by active management of third stage of labour as compared to expectant management.[4]

With the high rates of maternal morbidity and mortality in developing countries and the large proportion of deaths attributable to PPH, the use of uterotonics in the active management of third stage of labour in low resource settings will have a dramatic impact. It is an essential step towards achieving the fifth UN millennium development goals to reduce MMR by three -quarters by year 2015.[5]

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Misoprostol is a prostaglandin E1 analogue. It is an active uterotonic agent and allows uterus to contract within few minutes. It is stable at room temperature, inexpensive and rapidly absorbed into the circulation after rectal administration.

The rectal route is chosen for this study because of the practical advantages of the rectal route like:

1. Easy administration.
2. Patient compliance is not required.
3. Gastro-intestinal side effects like diarrhoea, nausea, vomiting may be less than oral route.

Oxytocin is an octa-peptide, synthesised in the supra optic and paraventricular nuclei of the hypothalamus and transported to the posterior pituitary where it is eventually released. Oxytocin is thought to bind to the oestrogen receptor in uterine myometrium. Bound intracellular calcium near the cell membrane is eventually metabolised from the sarcoplasmic reticulum to activate the contractile protein. Oxytocin is also thought to release prostaglandins from the decidua. The uterine contractions are similar to the physiological pattern i.e. causing fundal contraction and relaxation of the cervix.

AIMS AND OBJECTIVES: To compare the effectiveness of rectal misoprostol with intramuscular oxytocin in the prevention of postpartum hemorrhage under following parameters.

1. Blood loss.
2. Fall in haemoglobin.
3. Duration of third stage.
4. Side effects.

MATERIAL AND METHOD: This prospective study was conducted from 2013 to 2014 in the Department of Obstetrics and Gynaecology, at Dr. Rajendra Prasad Government Medical College (Dr. RPGMC) at Tanda, District Kangra, H. P.

Inclusion Criteria:

1. Singleton pregnancy, between 37 and 42 week of gestation.
2. Longitudinal lie, no risk factor and who are ready to give written informed consent will be enrolled in the study.

Exclusion Criteria:

1. Hemoglobin <8gm%.
2. PIH.
3. APH.
4. Multiple pregnancy.
5. Malpresentation.
6. Polyhydraminos.
7. Chorioamnionitis.
8. Intrauterine Death.
9. Coagulation abnormalities.
10. Previous uterine scar.
11. History medical illness like asthma, heart disease, epilepsy and renal disease.

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METHODOLOGY: Hundred women undergoing full term vaginal delivery with or without episiotomy were enrolled and randomly distributed in 2 groups.

Group 1: (Misoprostol) 50 women received 600 microgram misoprostol per rectal.
Group 2: (Oxytocin) 50 women received 10 U oxytocin intramuscularly after the delivery of anterior shoulder.

Primary Outcome: Measure is amount of blood loss 1hr and 4hrs after delivery and fall in hemoglobin level from pre delivery and 24hrs after delivery.

Secondary Outcome: Measures includes duration of third stage of labour and side effects, use of additional uterotonics, manual removal of placenta, operative intervention if any for post-partum hemorrhage.

After admission and informed consent, history regarding demographic profile and obstetrics care was taken. Maternal blood sample for determination of hemoglobin was taken.

Pre-weighed sterile linen, sponges and pads were kept ready. After delivery of the baby, amniotic fluid was allowed to drain away and a kidney tray was kept beneath the women's buttocks for blood collection. Cord clamping was done and once uterus was contracted, placenta was removed by controlled cord traction and blood loss was measured. Duration of third stage of labour, need for manual removal of placenta, use of additional uterotonics and any operative interference was noted. Details of baby regarding sex, weight and Apgar score was noted. The woman was observed during fourth stage of labour for the side effects of drug like nausea, vomiting, fever and shivering. The amount of blood loss in 1hr and after 4 hr after delivery was noted by clinical estimation. The amount of blood loss was determined by weighing the used linen, sponges, pads and then subtracted by known dry weight. After 24hrs of delivery, blood sample was taken for haemoglobin estimation.

RESULT: The total number of patients enrolled during the study period was 100. Out of study population 100 (50%) received rectal misoprostol and 100 (50%) received IM oxytocin for active management of third stage of labour. The comparison of demographic characteristics like age, gestational period and parity in both groups were similar as shown in table 1. The comparison of estimated blood loss between misoprostol and oxytocin was not statistically significant (p=0.795, table 2) .As shown in table 3, the pre and post-delivery haemoglobin within misoprostol and oxytocin groups were statistically significant (p=<0.001) , Whereas the pre delivery (p=0.420) and also the post-delivery (p=0.269) haemoglobin between misoprostol and oxytocin was statistically not significant. The mean duration of third stage of labour between the misoprostol and oxytocin was statistically not significant (p=0.192).

The table 4 showed that the fever was most frequent in misoprostol group as compared to oxytocin group (8% versus 0), and the difference was statistically significant (p=0.041).

Shivering was also most commoner in misoprostol group (14%) as compared to 6% in oxytocin group but the difference was not statistically significant (p=0.182) .

Only 2% women had vomiting in misoprostol group as compared to 8% in oxytocin group but again the result was not statistically significant (p=0.169) . 2% of the patients reported diarrhoea in the misoprostol group as against no patient in the oxytocin group (p=0.315 NS). No case of pain

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abdomen was reported in misoprostol group whereas 6% had pain abdomen in oxytocin group and the result again was not statistically significant (p=0.079).

No difference was observed for additional uterotonics between the two groups (P=0.362).

The incidence of PPH was 8% in misoprostol group and 2% in oxytocin group, (p=0.362) shown in table 3.

Variables	Misoprostol	Oxytocin	p-value
Age (years)	25.74±3.65	26.10±3.40	0.611
Gestational age (weeks)	38.52±0.93	38.68±1	0.409
Parity			
Primigravida (n%)	50	54	0.689
Multigravida (n%)	50	46	

Table 1: Baseline characteristics

Blood loss (ml)	Misoprostol	Oxytocin	p-value
mean	237.00±146.65	230.10±116.03	0.795

Table 2: Comparison of average blood loss

Variables	Misoprostol (n=50) mean±sd	Oxytocin (n=50) mean±sd	p-value
Hb Before delivery gm/dl	10.81±1.73	10.54±1.54	0.420
Hb After delivery gm/dl	8.98±0.95	8.78±0.81	0.269
p-value	<0.001	<0.001	
Mean duration of third stage of labour	4.96±1.76	5.50±2.32	0.192
Additional oxytocics	8%	2%	0.362
PPH	8%	2%	0.362

Table 3

Side effect	Misoprostol (%)	Oxytocin (%)	p-value
Nil	74	80	0.476
Shivering	14	6	0.182
Fever	8	0	0.041
Vomiting	2	8	0.169
Diarrhoea	2	0	0.315
Pain abdomen	0	6	0.079

Table 4: Comparison of side effects

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DISCUSSION: In our study no significant difference between the groups in average blood loss was observed (misoprostol=237 and oxytocin=230, p=0.795), and it was similar to the study done by Steven M. et al[6] (Misoprostol=163.5 and oxytocin=186.5). In Firouzbakht et al.[7] study the estimated blood loss during the third stage in the misoprostol group (136±111.3) decreased significantly as compared to oxytocin group (162.4±115.2) (p=0.003). It was observed that there was no statistically significant difference in the pre delivery haemoglobin between the group 1 (10.81±1.73) and 2 (10.54±1.54) in the present study (p=0.420) .This is comparable to the study Shrestha A et al[8] (p=0.120) , Firouzabakht et al[7] (p=0.206) and Mirteimouri et al[9] (p=0.462) study. In the present study there was no significant difference observed in post-delivery Hb in group 1 and 2 (8.98±0.95, 8.78±0.81, p=0.269), that is comparable to Shrestha A et al[8] (p=0.222), Firouzbakht et al.[7] (p=0.206) and Atukunda EC. et al[10] (p=0.074).

In our study mean duration of the third stage of labour in the misoprostol group was 4.96±1.76 min, while that in the oxytocin group was 5.50±2.32 min. The difference between misoprostol and oxytocin group was not significant; as both of them were equally effective in reducing the duration of the third stage of labour. Present study and study done by Shrestha A et al[8] and Atukunda EC et al[10] were comparable, as no difference was observed in all this studies in mean duration of third stage of labour both misoprostol and oxytocin group. Mean duration of third stage of labour was shorter in Atukunda EC et al. Study while it was longer in Shrestha A et al. study as compared to our study, though the difference was not statistically significant.

In the present study main side effects observed were shivering, fever, vomiting, diarrhoea and pain abdomen. More frequent side effects were seen in misoprostol group were shivering and fever, that is consistent with other studies.[6,9,10,11]

In our study additional oxytocics requirement was more in 4 patients (8%) in misoprostol group as compared to oxytocin group 1 case (2%). Similar findings have been reported by Atukunda EC et al[10] and Minoo Rajaei et al[12] i.e. 8.2% and 7.5% in misoprostol group respectively. Though the additional use of oxytocics is higher in oxytocin group i.e. 5.4% and 10.5% in both the studies as compared to our study i.e. 2 % only, the results in the study by Firouzbakht et al[7] and Sharma et al[12] showed a lower use of oxytocics in misoprostol group (6% and 1%) as compared to oxytocin group (8% and 3%), which is different from our study.

In our study blood loss of >500 ml was present in 8% in misoprostol group and 2% in oxytocin group respectively. The difference was not statistically significant (p=0.362). The results were similar to Firouzbakht et al[7] study in which the incidence of PPH was higher, 12% in misoprostol group as compared to 10% in oxytocin group, though the difference was not statistically significant in both the studies. Similarly in Atukunda EC et al[10] study incidence of PPH was also higher in misoprostol group, 28.6% as compared to oxytocin group 17.4%, which was comparable to our study. Similarly in Gohil et al.[13] study higher incidence of PPH was observed in the misoprostol group, 20% patients who were given misoprostol developed PPH as compared with 10%, 4%, 6% respectively with oxytocin, methylergometrine and oxytocin-ergometrine groups with p=0.03, which is statistically significant .Whereas in Shrestha A et al. study[8] PPH was less observed in the misoprostol group (4%) as compared to 6% in oxytocin group.

CONCLUSION: We found that rectal misoprostol 600 microgram is equivalent to oxytocin 10 IU for prevention of primary PPH during active management of third stage of labour among women undergoing uncomplicated delivery. The simplicity and ease with which misoprostol can be

administered suggest it can have wide application in low resource settings .The transient and self-resolving nature of the side effects associated with misoprostol, and the effectiveness and ease of administration compared with injectable oxytocin can be particularly useful in busy and crowded labour rooms, or when a skilled delivery attendant is not available to administer an injection.

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