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Injection Oxytocin versus Injection Methergine in Active Management of Third Stage of Labour

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Abstract: ***Post partum hemorrhage is one of the most common causes of maternal death throughout the world and is preventable with effective management of labour. Objectives: To assess effect of injection oxytocin vs. injection methergine in active management of third stage of labour. Materials & Methods: Two groups simple randomized design used on 50 parturient women. Group 1 contains 25 parturient women and injection oxytocin 10 IU given IM within one minute of birth of baby and group 2 given injection methergine 0.2 mg. IV at the delivery of anterior The main outcome measures were amount of blood loss, duration of third stage and other maternal outcome. Results: Injection oxytocinMethergine are equally effective, with duration of third stage of labour (P=0.2455), third stage blood loss (P=0.6603). Majority 50(100%) of women showed no variation in temperature, pulse, and respiration except observation of diastolic blood pressure at 60 min. of delivery. Higher incidence of nausea & vomiting in patients given. InjectionMethergine. Study reveals 76% women in Group I & 64% women in group II experienced mild abdominal pain & 8% women in gr. I & 16% women from group II experienced severe abdominal pain.Conclusion:The study concluded that intramuscular oxytocin and intravenousMethergineare most effective drug in reducing the 3rd stage blood loss. This reduction in blood loss reduce incidence of post partum anemia, infection and hence maternal mortality and morbidity.***

Keywords: Uterotonics; 3rdstage of labour; postpartum hemorrhage; Brass V drape

1. Introduction

Tourist flock to the Tajmahal, unaware that the events symbolized by this monument were built by emperor Shahajahan in the memory of his wife empress Mumtaz who died of PPH during her 14th delivery [1].Post Partum hemorrhage (PPH) is one of the most common causes of maternal deaths throughout the world. [2]India has the largest number of maternal death 63,000. According to WHO 25.7% of maternal deaths are contributed by India [3]

Two third of PPH occur in women with no identifiable risk factors. Without proper management PPH can rapidly progress to cause life threatening blood loss, often within few hours because of this unpredictability and rapid progression, reducing the incidence of PPH & improving PPH outcome it does often remains a challenge [4] Where maternal mortality is high & resources are limited, the introduction of low cost evidence based practices to prevent & manage PPH can improve maternal & infant survival.

Routine practice of active management of third stage of labour has been shown to dramatically reduced hemorrhage by upto 60%. Also it reduces the need for more complex medical interventions to stop bleeding & reduces the need for blood transfusion. This is a particular benefit in setting where provisions of such maternal health services are inadequate [5].

Giving a uterotonic drug within one minute of birth is the component of active management of third stage of labour (AMTSL) that has greatest impact on the prevention of post partum hemorrhage [6]. Every attendant at birth needs to have the knowledge, skills and critical judgement needed to carry out active management of third stage of labour and assess the needed supplies and equipments [7].

2. Literature Survey

2.1 Active Management of Third Stage of Labour

In order to understand how to prevent uterine atony it is necessary to understand the physiological processes that occur during the third stage of labour. According to ICM & FIGO, 2003 the three components of AMTSL intended to augment uterine contractions and prevent PPH due to uterine atony are administration of uterotonic agents within one minute of birth, controlled cord traction and uterine massage after delivery of placenta, as appropriate. Immediately after birth of baby muscles of uterus contract and the placenta separates from the uterine wall as the surface of the uterus become smaller. At the end of a term pregnancy 500-800 ml. of blood flow through the blood vessels at the placental site every minute (WHO 1996). As the placenta separates these vessels break and bleeding occurs. Continuous coordinated contractions of the uterus compress these blood vessels to control bleeding at the placental site and allow formation of a retroplacental clot. When the uterus fails to have coordinated muscular contractions, it is said to be atony; in this case blood vessels at the placental site are not constructed and hemorrhage occurs. In 2003 the ICM & FIGO issued their first international joint statement endorsing the use of AMTSL by a skilled provider, stating that AMTSL is proven to reduce the incidence of PPH, the quantity of blood loss and use of blood transfusion. [6]

2.2 Reviews on use of oxytocic drugs for prevention of post partum hemorrhage in AMTSL

A randomized comparative clinical trial was conducted in Nepal at T.U. T.H.by Adhikari S., Rana A., Brita K. to compare the efficacy of intramuscular Methylergometrine with intramuscular Oxytocin in the third stage of labour for

the prevention of PPH. Two hundred women undergoing normal vaginal delivery were recruited, 100 in each group. Study revealed that intramuscular methylergometrine was observed to be equally effective as intramuscular oxytocin in prevention of port partum hemorrhage (PPH). [Defined as fall in Hb and/or HCt level 10% from before delivery to 24 hrs. after delivery). Also there was no difference in the risk of prolonged third stage, need for additional uterotonic agent, need for exploration & uterine evacuation & need for blood transfusion in the two groups. The mild side effects are elicited. Study concluded that intramuscular methylergometrine is as efficacious as intramuscular oxytocin in the prevention of third stage blood loss with comparable side effects. Yet the researchers concluded that due to greater number of women in methylergometrine group experienced rise in blood pressure, retained placenta and MRP use of 10 units of Oxytocin intramuscularly for prophylaxis of PPH in the third stage of labour is appropriate and IM Oxytocin should be continued as a routine practice [3]

A comparative study was conducted in Govt. Medical College Srinagar, India by Mustafa G. Firdous N, Taing S, et.al to compare prostaglandin PGF2α versus ergometrine in the management of post partum hemorrhage. Hundred women of postpartum hemorrhage were studied in year 2001-2003. They were divided in two groups. Group A women were given intravenous methylergometrine (0.25 mg) and group B received intramuscular injection of prostaglandin F2α (250 μg). Two groups were comparable with regard to parity. Study revealed that mean duration of third stage of labour was shortened in group B. Blood loss was comparably less in group B (P<001). Side effects were noted in both groups but more in group A. Prostaglandin F2α (250μg) thus surfaced a life saving drug in active PPH. It shortens the duration of third stage of labour& minimizes blood loss. Prostaglandin F2αoffers an advantage over Methylergometrine in case of hypertension [8]

A comparative study was conducted in Srinagar, India by Khurshid R, Parveen S, Salman R,, et.al with an objective to assess, evaluate & compare the safety & efficacy of intramuscular PGF2α 125μg and intravenous methergine 0.2 mg in the active management of third stage of labour. Study was conducted on two hundred women who were divided in two groups. Group I PGF2α, 125μg was given intramuscularly and Group II 0.2 mg methergine was given intravenously at the time of delivery of the anterior shoulder of the fetus. Results revealed that mean duration of the third stage of labour was significantly shorter in Group I (4.3 ± 1.2 minutes) as compared to that in Group II (6.3 ± 1.4 minutes) (P=0.000). The mean blood loss was also significantly less in the study group (63.6 ± 10.1 vs. 83.6 ± 14.1 ml, P=0.000). The only side effects were nausea & vomiting in two women in Group I. Study concluded that intramuscular PGF2 125 μg is a better alternative to intravenous methergine 0.2 mg in the active management of third stage of labour [9]

A comparative study conducted in Bijapur (India) with an objective to assess, evaluate & compare the safety & efficacy of intramuscular PGF2α125 mg. and intravenous 0.2 mg. methylergometrine during active management of third stage of labour in high risk women who are prone to develop atonic PPH by Purushottam BJ, Roopa P., 200 women at high risk factors of developing atonic PPH were divided into two groups. In group I PGF2α 125 mg. was given IM and in group II methylergometrine 0.2 mg was given IV at the delivery of anterior shoulder prophylactically. Study revealed that the mean duration of the third stage of labour after giving uterotonic drug was significantly shorter in group I (2.634 ± 0.975 min) as compared to group II (3.342 ± 0.876 min) P <0.001. The mean blood loss was significantly less in group I 111.4 ± 65.3 ml. vs. 169 ± 112 ml. in group II (P<0.001). There was no significant rise in BP in group I as compared to group II. Only significant side effect was diarrhoea in group I. Study concluded that prophylactic intramuscular PGF2α 125 μg. is a better alternative to prophylactic intravenous methylergometrine 0.2 μg in high risk women who are more prone to develop active PPH. [10]

Randomized controlled trial of oxytocin alone versus oxytocin and ergometrine in active management of third stage of labour done in Western Australia by Mc Donald S. Prendiville W, Blair E, with an objective to compare intramuscular oxytocin alone and intramuscular oxytocin with ergometrine (Syntometrine) for their effect in reducing the risk of post partum hemorrhage in AMTSL. Three Thousand Four Hundred & Ninety Seven women were randomly allocated to receive oxytocin ergometrine (n=1730) or oxytocin (n=1753). Study revealed that rates of post partum hemorrhage (≥ 50 ml or ≥ 1000 ml) were similar in both arms. (Odds ratio 0.90 (0.82); 95% CI 0.75 to 1.07 (0.59 to 1.64) at 500 ml. (1000 ml.) Also the use of oxytocin ergometrine was associated with nausea, vomiting & increased blood pressure. Study concluded that these are few advantages but several disadvantages for the routine use of oxytocin ergometrine when prophylactic active management of third stage of labour is practiced. They suggested further investigation of dose response for oxytocin may be warranted [11]

An observational study was conducted with the main objective to find out blood loss and side effects at spontaneous delivery with Ergometrine or Oxytocin by MoirDD,Amoa AB. Blood loss and the frequency of vomiting were assessed at 88 spontaneous vertex deliveries. An i.v. injection of oxytocin 10 unit was as effective as ergometrine 0.5 mg in controlling bleeding from the uterus after delivery. The study concluded that both the drugs are equally effective in controlling bleeding but vomiting or retching occurred in 13% of the mothers who received i.e. ergometrine, while none of the women who received Oxytocin suffered emetic sequelae. [12]

2.3 Reviews on Blood Loss Estimation

An observational study on drape estimation versus visual assessment for estimating postpartum hemorrhage by Patel.Goudar S. Gellers SE, Kodkany B S. Edalvitch, WaghK. was done on a randomized sample of 123 women delivered at the District Hospital, Belgaum, India. A subsample of 10 drape estimates was compared with photo spectrometry results. The visual estimate of blood loss was 33% less than the drape estimate. The interclass correlation

of the drape estimates to photo spectrometry measurement was 0.92. The study concluded that drape estimation of blood loss is more accurate than visual estimation and may have particular utility in the developing world. Prompt detection of postpartum hemorrhage may reduce maternal morbidity and mortality in low-resource settings. [13]

2.4 Reviews on nurses knowledge of AMTSL

A quasi-experimental study was conducted in Belgaum by Deepathy G.to evaluate the effectiveness of planned teaching programme on active management of third stage of labour among staff nurses working in maternity units. One group pretest posttest design was used on 45 staff nurses selected by purposive sampling technique. Study revealed there was statistically significant gain in knowledge scores in the posttest with a mean difference of 74.37 and gain in knowledge scores is significant.(t=17.91) ,thus providing planned teaching programme is an effective method of teaching on AMTSL. [14]

2.5 Objectives

1. To assess the effect of intra muscular (IM) injection Oxytocin 10 IU in terms of blood loss, duration & other maternal outcomes in third stage of labour.
2. To assess effect of intravenous (IV) injection Methergine 0.2 mg. in terms of blood loss, duration & other maternal outcomes in third stage of labour.
3. To compare the effect between intramuscular (IM) injection Oxytocin and intravenous injection Methergine in terms of blood loss, duration & other maternal outcomes in third stage of labour.

3. Material and methods

The study was conducted on fifty parturient women admitted in maternity ward of Krishna Hospital, Karad from 19th September 2011 till 31st October, 2011.by using two group simple randomized design with an evaluative & comparative approach.

The independent variable of the study was injection oxytocin and injection methergine and the dependent variable was blood loss and duration of third stage of labour, other maternal outcomes such as abdominal pain, nausea, vomiting and variations in vital signs. The sample selected by simple random sampling using lottery method experimental group 1 contains 25 parturient women and injection oxytocin 10 IU given within one minute of birth of baby and control group 2 given injection methergine 0.2 mg. IV at the delivery of anterior shoulder .Women with single tone pregnancy between 37 and 42 weeks of gestation anticipated vaginal delivery, vertical lie, no high risk factors and ready to give written and informed consent were enrolled in the study. Background information collected related to age, booking status, gravida, para & pre delivery vital signs.

After administration of injection oxytocin &methergine information Including duration of different stages of labour, amount of blood loss, and other maternal outcomes i.e. vital signs after 5 minutes, 15 minutes, 30 minutes & at the end of one hour, abdominal pain was assessed at the end of one hour by numerical pain scale and presence of nausea and vomiting at the end of one hour was also assessed.Brass V drape was used to measure the blood loss and abdominal pain was assessed at the end of one hour by standardized numerical pain assessment scale which describes the intensity of pain ranging from 0 to 10. The obtained data was tabulated and analyzed in term of objectives of the study using descriptive and inferential statistics.

4. Findings

4.1 Findings Related to sample characteristics

Maximum number of 11 (44%)of parturient women were belonged to the age group of 24-26 years in group I & maximum number of 9 (36%)of parturient women was belonged to the age group of 21-23 years in group II and minimum 1(4%) were in between 27-29 in group I and group II respectively and also 1(4%) in the age group of 30 years and above in group II. Majority 48% women were primigravida in both groups ,and 9(36%) in group I and 10 (40%) were multi gravida in group II& 4(16%) in group I and 3(12%) in group II were grand multi gravida .

Table 1: Distribution of duration of different stages of labour in both the groups N=50

Duration of Labour	*Parity*	*Gr.I Mean ± SD*	*Gr.II Mean ± SD*	*t*	*P*	*Inference*
1st Stage	Primi	549.23 ± 160.34	600 ±124.90	0.9007	0.376	NS
	Multi	527.08 ±204.90	425 ±126.53	1.468	0.156	NS
	Mean	538.60 ±179.51	516.00 ±151.99	0.4804	0.6331	NS
IInd Stage	Primi	33.462 ±13.131	36.692 ±10.355	0.6966	0.4928	NS
	Multi	31.250 ±9.324	29.417 ±12.191	0.4138	0.6830	NS
	Mean	32.4 ±11.28	33.2 ±11.64	0.2467	0.8062	NS
IIIrd stage	Primi	4.846 ±1.345	4.308 ±2.057	0.7901	0.4372	NS
	Multi	4.000 ±2.494	3.275 ±1.111	0.8901	0.3831	NS
	Mean	4.44 ±2.043	3.812 ±1.720	1.176	0.2455	NS

NS = Not Significant

The mean duration of third stage in primiparawas 4.846±1.345 & 4.308±2.057in group I & II respectively. And the mean duration of multipara was 4.000±2.594 mins& 3.275±1.111 mins in group I & II respectively. The total duration of labour in hrs.ranges from 4.45 to 16.33. Group I & 4.18 to 13.47 group II respectively. The findings of the table no.1 reveal that the duration of 1st& 2nd stages of labour in the study groups remained constant as P is >0.05 level of significance. Also there is no any significant effects of Inj. Oxytocin vs. Injection methergine on duration of third stage of labour as P is >0.05 level of significance.

Table 2: Distribution of mean blood loss in both the groups N=50

Parameters	*Group – I Mean ± SD*	*Group – II Mean ± SD*	*t*	*P*	*Inference*
Mean Third Stage Blood Loss in(ml)	166.00± 64.177	156.72± 82.985	0.4423	0.6603	NS
Mean Blood loss after 1 hr.	66.4± 39.857	51.8± 20.304	1.632	0.1092	NS
Mean Total blood loss inMl.	232.4± 73.529	208.52± 94.078	1.000	0.3223	NS

NS = Not Significant

4.2 Blood Loss

In the third stage of labour blood loss ranged between 80 to 400 ml. in group I and 30 to 400 ml. in group II. The mean blood loss in third stage was 166.4±64.040 and 156.72±82.985 in group I and group II respectively. And blood loss when observed 1 hr. post partum ranged between 30-180 and 20-100 in group I & group II significantly. The mean blood loss after one hour was 66.4±39.857 ml. and 51.8±20.304 in group I & group II respectively. The women belonging to group I had total blood loss that ranged between 130 to 450 ml. while subjects in group II had total blood loss ranging between 50 ml to 470 ml. The mean blood loss was 232.4+73.529 ml. and 208.52+94.078 in group I and group II respectively and p>0.05 level of significance, shows that there is no significant blood loss in both the groups.

Table 3: Distribution of third stage blood loss & blood loss, after 1 hr. & total blood loss in primigravida& multi gravida women in both the groups, **N=50**

Parameters	*Gravida*	*Group – I Mean ± SD*	*Group – II Mean ± SD*	*T*	*P*	*Inference*
Third Stage Blood Loss in (ml)	Primi Multi	178 ± 79.639 152.916± 40.59	124.846± 48.523 191.25± 99.775	2.088 1.233	0.0476 0.2307	S NS
Blood loss after 1 hr.	Primi Multi	68.8464± 48.268 63.75± 30.161	48.846± 18.502 55± 24.462	1.395 0.8060	0.1758 0.4289	NS NS
Total blood loss in Ml.	Primi Multi	246.923± 84.374 216.666± 59.250	124.846± 48.523 191.25± 99.775	4.522 0.7587	0.0001 0.4561	ES NS

S= Significant, NS = Not Significant, ES = Extremely Significant

The findings of the table 3 reveals that there is significant blood loss in primigravida as P is 0.047. Also total blood loss in primigravida was extremely significant as P = 0.0001.

4.3 Discussion

The study population includes the women ranging from 18-32 years. The mean age was 23.92±2.812 years & 22.68±3.078 years in group I and group II respectively. This study was supported with the study of Nagaria Tripati[15]which is on intramuscular PGF2α (125μg) vs. intravenous methylergometrine 0.2 mg in the active management of third stage of labour. In this study mean age group of primi was 22.6± 3.27 & 22.4±2.94.

4.4 Gravida

The current study included primigravida, multi gravida and grand multi gravida subjects: In the present study there are 48% primigravida, 48% multi gravida& 2% grand multi gravida in both the groups. The study population was almost comparable to study done by Nagaria Tripati[15] which includes 50% of primigravida& 50% of multi gravida subjects in both the study groups.

4.5 Distribution of duration of different stages of labour in both the groups

- The mean duration of first stage of labour among methergine group was 10 ± 2.08 hours similar finding were found in a study conducted by KhursidRabia etal[9].
- The mean duration of 2nd stage of labour in oxytocin group was 32.356±11.22 min.& the similar finding were found by study conducted by Neesha Ojha[16] on AMTSL by oxytocin in which it was 24.4±14.1 minutes.

The mean duration of second stage of labour in methergine group among primi para was 36.692±10.355 & in multi para it was 29.417±12.191. Similar finding was noted in the study conducted by Rabia Khurshid[9] wherein duration of second stage among primi was 46.2±10.7 min. & in multi para 20.4±3.7 minutes.

The mean duration of third stage of labour in oxytocin group was 4.423±1.96 & in methergine group was 3.791±1.584. Also the mean duration of third stage among primi para in oxytocin group was 4.846±1.345 & in multi para 4.000±2.594 and in methergine group mean duration of third stage in primi para 4.308±2.057 & in multi para it was 3.275±1.111. No statistical significance was found in both the groups as (P>0.05).

The mean duration of third stage of labour in present study was 4.423±1.96 min. in oxytocin group which was contradictory with the findings by Steven M. Robert Wally[17] on Oral misoprostol vs. oxytocin in the management of third stage of labour wherein it was 6.3±5.8 min.

The mean duration of third stage in methergine group was 3.791±1.584 min. similar findings were noted in the study conducted by B. Jajuetal [10] in which it was 3.342+0.876 min. The mean blood loss in third stage of labour in oxytocin group was 166.00±64.177 ml. and in that of methergine group was 156.72±82.985 ml. No statistical significance was found in both the groups (P=0.6603).In present study nausea was found in nine mothers but no mother experienced vomiting in both the group, which is similar to study by Gowil JT. Tripathi Beenu [18].

5. Conclusion

Study concluded that IM Injection oxytocin is as effective as IV Injection methergine in reducing the incidence of post partum hemorrhage, strongly favouring its routine use as oxytocics for active management of third stage of labour.

The undesirable side effects of nausea vomiting & elevated blood pressure associated with methergine.

The main interest of the study was to equip nurses who are conducting deliveries at grass root level with knowledge of the use of injection oxytocin and injection methergine. In the skill birth attendant's guidelines oxytocin 10 IU is mentioned as ideal drug for active managements of third stage of labour. The nurse therefore should have detail knowledge of this drug pharmokinetics and side effects. So that they can effectively practice active management of third stage of labour and prevent post partum hemorrhage.

6. Ethical clearance

Ethical clearance was obtained from institutional ethical committee before conducting study.

7. Future Scope /Recommendations

1. Nursing Education

The role of midwives in the management of postpartum hemorrhage is obvious wherein she should diagnose the bleeding and call for help & investigate emergency treatment. Midwives should be central to the prevention, identification and management of PPH. As any postpartum hemorrhage has the potential to cause maternal collapse with loss of consciousness, midwives need to be competent & knowledgeable with the drugs used in AMTSL. There should be organization of workshops. CNE & structured knowledge questionnaire on drugs for the nurses for oxytocic drugs .Midwives should have knowledge of BRASS V drape and it should be included in their syllabus.

2. Nursing Practice

Active Management of third stage of labour is a strategy to all practical knowledge to reduce complications during child birth & thus aid in the reduction of maternal mortality & morbidity. Health promotion is the important role of nurse to improve health of individuals. Staff should have detailed knowledge of active management of third stage of labour& with knowledge & skills they should practice their profession. Regular in service education can be conducted on different aspects of care during pregnancy, use of BRASS V drape & child birth to refresh & update the knowledge & skills of nurses. Training as multi disciplinary teams can be effective in improving outcomes for women & their families.

3. Nursing Administration

The nurse administrator can organize & conduct in service education & continuing education for the nurses to enhance their knowledge & keep them aware of latest advancement of third stage of labour. The knowledge of these drugs could be utilized by administrators to formulate protocols in intrapartum care and use of BRASS V drape should be compulsory in labour room for accurate estimation of blood loss.

4. Nursing research

There is great need for an extensive nursing research to upgrade the knowledge & skills of midwives in the management of labour to reduce maternal mortality with use of potent oxytocics. Research should be done on the role of misoprostol in third stage of labour as it is easy and simple to administer, cheap to obtain & safe to use by individuals with little or no formal medical training. The present study conducted by the investigator could be a source of review of literature for others who are intending to conduct during studies on active management of third stage of labour. Findings of the study could be disseminating to nurses via workshops, SOMIs conferences etc.

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