Research Article

IJCRR
Section: Healthcare
Sci. Journal
Impact Factor
4.016

# COMPARATIVE EFFICACY OF SYNTOMETRINE VERSUS OXYTOCIN IN ACTIVE MANAGEMENT OF THIRD STAGE OF LABOUR

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## ABSTRACT

**Objective:** Postpartum hemorrhage is a major obstetrical complication and one of the important but preventable causes of maternal morbidity and mortality. The aim of the study is to compare the efficacy of syntometrine versus oxytocin in the active management of third stage of labor in reducing the risk of PPH and other adverse third stage outcomes.

**Methodology:** This is a randomized prospective comparative study conducted from September 2008 to August 2009 at the department of Obstetrics and Gynecology, Institute of Social Obstetrics and Govt. Kasturba Gandhi Hospital for Women and Children, Chennai, on 300 patients. The patients were assigned to 2 groups at random of 150 patients in each group. All pregnant women with singleton pregnancy of 20-35 years of age with no known risk factor for PPH were included. Exclusion criteria observed for patients with previous caesarean section, previous scarred uterus, multiple pregnancy, Cardiac patient, hepatic disorders, disorders of blood coagulation. The data was analyzed using t test and chi square test.

**Results:** The mean blood loss in syntometrine group was 120ml and oxytocin group was 171ml. The difference of mean blood loss between two group was 51ml, which is statistically significant (p=0.000).

**Conclusion:** It is concluded from this study that the use of syntometrine as part of routine AMTSL (Active Management of Third Stage of Labor) appears to be associated with a statistically significant reduction in mean blood loss when compared to Oxytocin.

**Key Words:** Syntometrine, Oxytocin, Third stage of labor, Postpartum hemorrhage

## INTRODUCTION

Postpartum hemorrhage (PPH) is a nightmare to every obstetrician as it is sudden, frequently unpredicted and could be catastrophic. In the early decades of 20th century, PPH was the most common cause of maternal death (Thilaganathan et al[1] – 1993).

PPH is a major cause of maternal mortality worldwide with an overall prevalence of approximately 6%; Africa has the highest frequency of about 10.5%.[2] PPH complicates 4% of vaginal deliveries and 6% of caesarean deliveries.[3] About 14 million women suffer from severe PPH each year, and 140,000 of these die one in every 4 minutes.[4]

### Excessive blood loss at delivery is defined as:

1. A loss in excess of 500 ml at vaginal delivery; 1000 ml at caesarean section or 1500ml at Caesarean hysterectomy (Prichard[5]).
2. 10% change in hematocrit between admission and postpartum period[6]
3. Need for an erythrocyte transfusion (Coomb)[6]

Primary PPH is loss of blood estimated to be > 500ml, from the genital tract, within 24hours of delivery[7]. Secondary PPH is defined as abnormal bleeding from genital tract, from 24 hours after delivery until six weeks postpartum. Studies quote an incidence of PPH of around 5-10%.[8,9]

### Etiological factors for PPH are as follows[10]:

1. Abnormalities of uterine contraction (Tone)
2. Retained products of conception (Tissue)
3. Genital tract abnormalities (Trauma)
4. Abnormalities of coagulation (Thrombin)

Uterine atony is the commonest of the numerous causes of PPH, accounting for 80-90% of cases.

Active Management of Third Stage of Labor (AMTSL) is an effective intervention to prevent PPH resulting from

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**Received:** 17.02.2015 **Revised:** 11.03.2015 **Accepted:** 29.03.2015

uterine atony. AMTSL comprises the following series of interventions :

1. Administration of prophylactic uterotonic within 1 minute of delivery of the baby.
2. Controlled cord traction
3. Uterine massage after delivery of placenta.

AMTSL has been shown to reduce the incidence of PPH by approximately 60-70%.[11,12,13] This study compares the efficacy of Syntometrine versus Oxytocin in AMTSL in reducing the risk of PPH.

## MATERIALS AND METHODS

This randomized prospective case control study was conducted from September 2008 to August 2009, at Institute of Social Obstetrics and Govt. Kasturba Gandhi Hospital for Women and Children, Chennai on 300 patients, who were admitted in labor ward with no known risk factors for PPH. All patients included in the study delivered vaginally. The patients were assigned to 2 groups at random of 150 patients in each group. In group I, Syntometrine (5 IU Synthetic Oxytocin and 0.5 mg ergometrine maleate) and in Group 2 Oxytocin was administered i.m within 1 minute after delivery of the baby. This study was approved by Ethical Committee.

### Inclusion Criteria:

1. Singleton pregnancy
2. No contraindication for oxytocin / syntometrine
3. No obstetric or other indication that could warrant abdominal delivery.
4. No known risk factor for PPH.

### Exclusion Criteria:

1. Previous caesarean section
2. Previous scarred uterus
3. Multiple pregnancy
4. Cardiac patient
5. Hepatic disorders
6. Disorders of blood coagulation
7. Past history of third stage complications
8. Known risk factor for PPH
9. Instrumental vaginal delivery
10. Absolute or relative risk factors for spontaneous vaginal delivery and hence posted for elective caesarean section.

### Procedure:

The delivery was effected with the patient at the edge of the table. Within 1 minute of delivery of the baby, either 10 units of injection oxytocin or 1 ampoule of syntometrine were given in a randomized order. The user will be unaware of the drug being given since all these drugs will be of the same color and ampoules will only be marked with appropriate numbers and no names will be mentioned. Once the placenta is removed, she was placed over a blood drape, which is a disposable, conical, graduated plastic collection bag.

The amount of blood collected in the blood drape is measured. The average immeasurable blood loss due to episiotomy was taken as 50ml and the same is not included in the blood loss. Similarly when there was profuse bleeding following episiotomy, such patients were excluded from the study.

## RESULTS AND ANALYSIS

This study was commenced with 300 women and the outcome was analyzed using various parameters. The results were subjected to statistical analysis using the t test and chi square test.

Most of patients in both groups were in age group of < 25 years. 70% of cases in group 1 and 62.7% of cases in group 2 were in age group < 25years. Only 5.3% in group 1 and 3.3% in group 2 were in age group > 30 years.

62.7% of women in group 1 and 60% of cases in group 2 were primigravida. 37.3% of cases in group 1 & 40% of cases in group 2 belonged to multigravida.

All patients in our study group were booked cases, though they were selected at random basis. The mean blood loss in group 1 was 120ml and group 2 was 171 ml. The difference of mean blood loss between two group was 51ml, which is statistically significant ( p = 0.000).

2% of cases in group 2 and none of the case in group1 had blood transfusion, which is not statistically significant (0.082). None of the case in group 2 had side effects, whereas in group 1, 3.3% of cases developed adverse effects like nausea and vomiting.

Only 2% of cases in group 2 had drop in hemoglobin level of 0.7 to 1 grams percent after delivery. The mean birth weight of the baby in both groups was 3.1 Kg.

## DISCUSSION

The synthetic form of the octapeptide, oxytocin is commercially available as Syntocinon or Pitocinon. It increases the frequency and strength of uterine contraction and augments retraction of uterus. Syntometrine injection is a clear, colorless solution and contains maleic acid as a buffer, pH3.2. Syntometrine combines the rapid uterine action of oxytocin with sustained uterotonic effect of ergometrine. The uterotonic effect of syntometrine lasts for several hours compared with only ½ to 1 hour when oxytocin is given alone.

When syntometrine is stored for prolonged periods of time, it must be kept at between 2 and 8°C and protected from light ( Hozerzeil et al[14], 1994). Oxytocin is more stable in tropical climates. The efficacy of syntometrine has been shown to be significantly reduced when it is stored in a suboptimal environment (Chua[15] et al 1993).

The review by McDonald[16] et al comparing syntometrine and oxytocin revealed that the use of intramuscular syntometrine was associated with reduced risk of PPH with a summary odds ratio of 0.74 (95% CI – 0.85) regardless of the dose of oxytocin used. Docherty and Hooper[17] (1981) reported that oxytocin was associated with a 40% increase in mean blood loss, but absolute rate of PPH was not stated.

Yuen et al[18] (1995) reported a 40% reduction in risk of PPH and the need for repeated oxytocin injections in the syntometrine group compared to oxytocin and side effects were uncommon in both groups. The overall comparison of 10 units of intramuscular oxytocin with syntometrine still favors syntometrine.

Edgardo Abalos[19] stated that the use of syntometrine as part of AMTSL is associated with significant reduction in the incidence of PPH (blood loss 750 ml) irrespective of the dose.

Since the prevention of maternal death from PPH is considered a fair price to pay for experiencing nausea, vomiting and hypertension ( Dwyer[20] 1994), syntometrine is now routinely used in most developed countries.

## CONCLUSION

It is sad that inspite of tremendous advancement in medical science, women still die of PPH even in the developed countries. Active management should be the routine management of choice for women expecting to deliver a baby by vaginal route in a health care facility.

The choice of drug depends on cost, facilities for storage and refrigeration, availability of trained personnel and assessment of trade off between benefits and side effects.

The RCOG in the UK recommends that the oxytocics be offered routinely in the management of the third stage of labour in all women, as their administration reduces the risk of PPH by about 60%. The combination preparation syntometrine as part of routine AMTSL appears to be associated with a statistically significant reduction in risk of PPH, compared to oxytocin.

### Onset of Labor:

**Table 1**

| Onset of labor | Legend | Syntometrine group | | Oxytocin Group | | Total |
|---|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage | |
| Spontaneous | 1 | 96 | 64% | 54 | 36% | 150 (50%) |
| Oxytocin Induction | 2 | 37 | 24.7% | 89 | 59.3% | 126 (42%) |
| PGE2 gel Induction | 3 | 11 | 7.3% | 7 | 4.7% | 18(6%) |
| PGE2 gel Followed by Oxytocin | 4 | 6 | 4% | 0 | 0% | 6(2%) |
| Total | | 150 | 100% | 150 | 100% | 300 (100%) |

The % is calculated for the individual number of cases in the respective groups (150 in each group) and for 300 cases in the grand total.

### Mode of Delivery

**Table 2**

| Mode of Delivery | Legend | Syntometrine Group | | Oxytocin Group | | Total |
|---|---|---|---|---|---|---|
| | | Frequency | Percentage | Frequency | Percentage | |
| Labor Natural | 1 | 43 | 28.7% | 39 | 26% | 82 (27.3%) |
| Labor Natural With Episiotomy | 2 | 93 | 62% | 93 | 62% | 186 (62%) |
| Labor Natural With LP1º | 3 | 13 | 8.7% | 18 | 12% | 31 (10.3%) |
| Labor Natural With LP2º | 4 | 1 | 0.6% | 0 | 0% | 1(0.3%) |
| Total | | 150 | 100% | 150 | 100% | 300 (100%) |

Most of the cases in Group 1 (62%) & Group 2 (62%) were delivered by Labor natural with episiotomy.

## DURATION OF THIRD STAGE OF LABOR :

**Table 3**

| | Frequency | Mean duration of third Stage in Minutes |
|---|---|---|
| Syntometrine Group | 150 | 11.86 |
| Oxytocin Group | 150 | 11.74 |

The difference between mean duration of 3rd stage between two groups was 0.12 minutes, which is not statistically significant (p=0.816)

## ABBREVIATIONS

PPH – Post Partum Hemorrhage

AMTSL – Active Management of Third Stage of Labour

## ACKNOWLEDGEMENT

Author acknowledges the enormous help received from the scholars whose article have been cited and incorporated in references. Author is also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this articles has been reviewed and discussed.

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