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Original Research Article

## A study of effect of intra umbilical oxytocin in active management of third stage of labour

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### ABSTRACT

**Background:** Postpartum haemorrhage is a single major and leading cause of maternal morbidity and mortality. PPH is the loss of more than 500 ml blood following vaginal delivery or 1000 ml blood following caesarean section. India has a maternal mortality ratio of 167 per 1 lakh live births. The most common cause of maternal mortality is haemorrhage which accounts for 25-30% of maternal mortality of which PPH is a significant cause.

**Methods:** 200 patients were included in this prospective observational study and divided into two groups, group A, underwent only active management of third stage of labour and group B received intra umbilical oxytocin administration in addition to AMTSL. The maternal and neonatal outcome was observed between the two and the difference was noted.

**Results:** Mean duration of third stage of labour of group A patients was  $3.89 \pm 0.89$  minutes and Mean blood loss was  $386 \pm 85.30$  ml and that of group B patients was  $1.96 \pm 0.68$  minutes and  $235 \pm 72.99$  ml respectively. These were found to be statistically significant among all the other parameters.

**Conclusions:** The duration of third stage of labour and the amount of postpartum blood loss was significantly less when intra umbilical injection of oxytocin was used in addition to AMTSL. So, to conclude intra umbilical vein oxytocin injection should be used routinely in addition to AMTSL in order to prevent PPH.

**Keywords:** PPH, Oxytocin, Third stage of labour

### INTRODUCTION

Postpartum haemorrhage is a single major and leading cause of maternal morbidity and mortality, not only in developing countries but also in developed countries. Every 4 minutes, one woman dies from pregnancy or child birth related complications. Each year about 14 million women experience PPH resulting in about 70,000 maternal deaths globally.<sup>1</sup> The events of labour are divided into 4 stages. The third stage of labour begins after expulsion of foetus and ends with complete expulsion of placenta and membranes also known as afterbirth.<sup>2</sup> The third stage is the most crucial stage of labour. The length of third stage of labour itself is usually about 15 minutes for both

primigravida and multigravida. However, the duration can be reduced to 5 minutes with active management. Postpartum haemorrhage (PPH) is the loss of more than 500 ml blood following vaginal delivery or 1000 ml blood following caesarean section. The incidence of PPH in India is 2-4% following vaginal deliveries and 6% following caesarean section.<sup>3</sup> India has maternal mortality ratio of 167 per 1 lakh live births and maternal mortality rate of 11.7%. The most common cause of maternal mortality is haemorrhage which accounts for 25-30% of maternal mortality, of which postpartum haemorrhage is a significant cause and one of the most dreaded and common complication of third stage of labour accounting for 15-25% of maternal deaths in India.<sup>4</sup> Therefore, in order to

reduce the MMR, it is essential to achieve a major reduction in the incidence of PPH. Since 2007, WHO recommendations have supported active management of the third stage of labour (AMTSL) as a critical intervention for PPH prevention. Active Management of third stage labour includes: Administration of utero tonic agent, early cord clamping and cutting with controlled cord traction to deliver the placenta and uterine massage following delivery of the placenta.<sup>5</sup> Different routes and timings of administration of utero tonic agents have been suggested by the following authorities. According to WHO, AMTSL guidelines 2012 suggests the use of Injection oxytocin 10 IU IM after the delivery of the baby. NICE guidelines on intra partum care (2014) suggests "For active management, administer 10 IU of oxytocin by intramuscular injection with the birth of the anterior shoulder or immediately after the birth of the baby and before the cord is clamped and cut." ACOG suggests the use of injection oxytocin 10-40 IU IV diluted in 500-1000 ml of normal saline after delivery of baby. FOGSI recommends administration of utero tonic agent (preferably Injection oxytocin 10 IU IM or 5 IU diluted in 500 ml NS or RL IV) within one minute of the delivery of the baby, after ruling out the presence of second foetus. Even after the introduction of these many methods, the incidence of PPH is on the rise. The cause of which is still not clear. In 2020, following four recommendations were updated by WHO:<sup>6</sup> Uterine balloon tamponade for the treatment of PPH, umbilical vein injection of oxytocin for treatment of retained placenta, routes of oxytocin administration for the prevention of PPH after vaginal births and advance misoprostol distribution to pregnant women for prevention of PPH in hilly and rural areas. Therefore, this study is to assess the efficacy of intra umbilical vein injection of oxytocin 10 IU diluted in 10 ml of Normal saline in addition to active management of third stage labour so that we can apply it in daily practice and further decrease the incidence of PPH.

## METHODS

A prospective observational study was carried out Surat municipal institute of medical education and research, South Gujarat, from January 2020 to June 2021, in which 200 patients were included in this study. Patients who had singleton, full term pregnancy with live foetus, undergoing vaginal birth, willing to participate in the study were included as study participants. Those who had obstetrical conditions like gestational hypertension, preeclampsia, placenta previa, placental abruption, instrumental delivery, previous caesarean section, adherent placenta, multiple pregnancy, polyhydramnios, medical disorders and cervical and vaginal lacerations were excluded from the study. The patients were randomly divided into two groups (each group comprising 100 patients). Group A: Patients of this group received only active management of third stage of labour. Group B: Patients of this group received intra umbilical vein oxytocin (10 IU of oxytocin diluted in 10 ml of normal saline) immediately after clamping the

cord in addition to the active management of third stage of labour.

Once patient gets admitted, detailed history and clinical examination was carried out with routine antenatal investigations. Constant monitoring was done and partograph, according to the new WHO labour care guide 2021, was charted.<sup>7</sup> The delivery of all the patients was conducted vaginally. All patients from both the groups were subjected to active management of third stage of labour (AMTSL). In addition, group B patients were given intra umbilical vein injection of 10 IU oxytocin diluted in 10 ml normal saline (Figure 1). The duration of third stage of labour was noted from the delivery of the baby to the complete delivery of placenta, using a stop watch. Placenta was checked for completeness in terms of cotyledons and membranes.

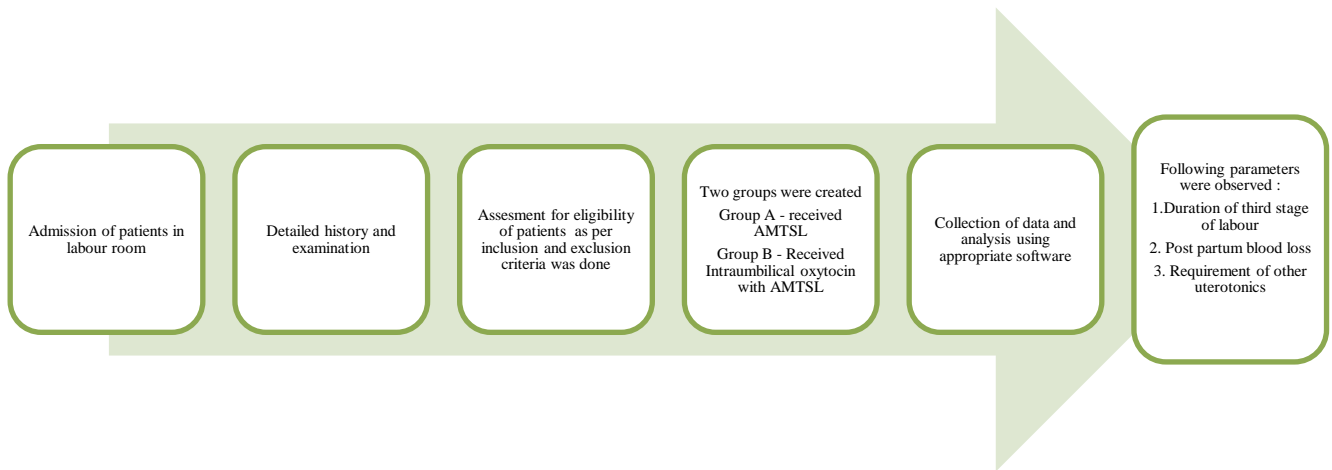


**Figure 1: Demonstration of intraumbilical oxytocin administration.**

Postpartum blood loss was measured using vaginal pads kept beneath patient's perineum. Post-delivery, patient's haemoglobin was sent and compared with the pre-delivery haemoglobin. The labour outcome details were noted down according to the proforma. All the data was entered in computer and analysed using appropriate software (open EPI). The significance was calculated with the  $p < 0.05$  using independent paired t test.

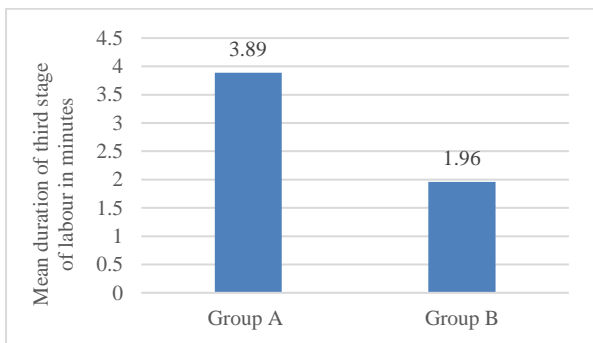
## RESULTS

Out of total 200 patients, majority of the patients were from 26-30 years of age group. Mean age of group A was 26.26 years and of group B was 26.24 years. Out of 100 patients in each group, majority patients were primigravida (58%), followed by second gravida (32.5%) and third gravida (8.5%). Mean duration of third stage of labour of group A patients was  $3.89 \pm 0.89$  minutes and that of group B patients was  $1.96 \pm 0.68$  minutes, ( $p < 0.001$ ). There was a significant reduction in Mean blood loss in patients of group B,  $235 \pm 72.99$  ml as compared to group A which was  $386 \pm 85.30$  ml ( $p < 0.001$ ) (Figure 3). In Group A, 22% of the patients needed additional uterotonic agents and placental bits had to be removed manually in 16% of the patients (Figure 4).

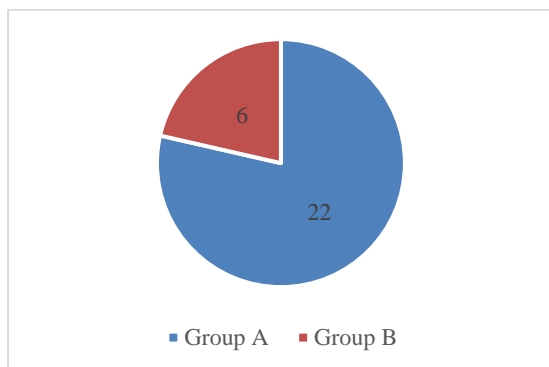


**Figure 2: Sequence of events illustrating data collection.**

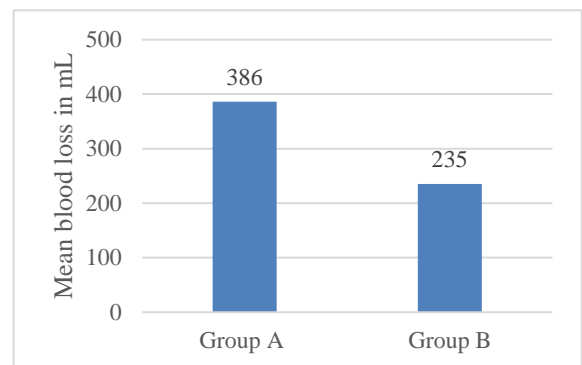
Post-delivery, 12 patients required injectable iron therapy and 3 patients required blood transfusion. While in group B, 6% patients required other uterotonic agents and 8% patients required manual removal of placental bits. Only 2 patients needed injectable iron therapy and there was no requirement of blood transfusion, which is significantly better than the control group (Figure 5). There was a significant mean difference of pre-delivery and post-delivery haemoglobin of 1.88 gm/dl in Group A and 0.62 gm/dl in Group B (Figure 6).



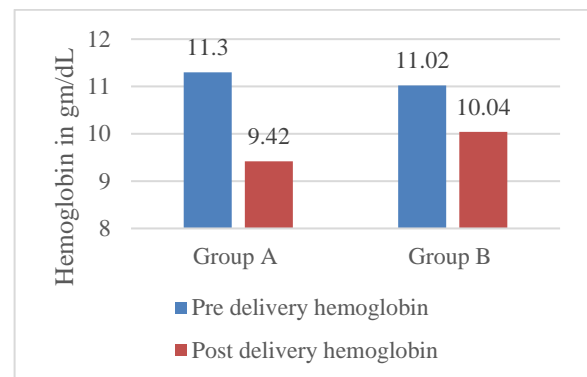
**Figure 3: Comparison of mean duration of third stage of labour**



**Figure 4: Comparison of need of other uterotonic agents.**



**Figure 5: Comparison of mean blood loss.**



**Figure 6: Comparison of pre- and post-delivery haemoglobin.**

## DISCUSSION

The present study was done to determine the effect of intra umbilical oxytocin along with active management of third stage of labour. The contribution of every component of AMTSL is important but the use of uterotonics definitely plays a key role. Administration of intra umbilical oxytocin has been proposed as a simple, safe and effective method for active management of third stage of labour. The results of our study showed that intra-umbilical

oxytocin along with AMTSL was effective at reducing the amount of blood loss and duration of third stage of labour which had correlation with several other studies done using the same uterotonic drug through the same route of administration. In our study, both groups were comparable with regard to demographic data. When we look at the mean duration of third stage of labour in this study, it was found to be  $1.96 \pm 0.68$  minutes in the study group, Group B, while it was  $3.89 \pm 0.89$  minutes in Group A. The duration was found to be significantly less with intra umbilical oxytocin administration in the study group. A similar study by Manhas et al was conducted in 2012, in which they reported a significant reduction of the duration of third stage of labour group with a duration of  $3.17 \pm 1.55$  min in the study group and  $8.22 \pm 2$  min in the control group.<sup>8</sup> Reddy et al also got similar results with respect to duration of third stage of labour when intra umbilical vein oxytocin was used in study group.<sup>9</sup> In our study, the mean blood loss in group A was  $386 \pm 85.30$  ml, which was statistically higher and significant than the mean blood loss in group B i.e.  $235 \pm 72.99$  ml. A similar comparative study, done by Dr. Neeraj Gupta in 2017, reported a similar statistical finding in which the study group had a mean blood loss of  $95.35 \pm 51.15$  ml while in the other group, the blood loss was  $125.9 \pm 54.76$  ml.<sup>10</sup> We observed that the group that was managed with only AMTSL, 12 patients required parenteral iron therapy and 3 required Blood transfusion, while with the addition of intraumbilical oxytocin, only 2 patients required iron sucrose therapy and there was no requirement of blood transfusion. Another similar randomised control trial done by Patil et al reported that one patient in each group required blood transfusion.<sup>11</sup> In the present study, 22% patients required uterotonics when only AMTSL was done while with additional administration of intraumbilical oxytocin, the percentage was significantly less and accounted to 6%. A study done by Gungorduk et al showed that there was a statistical difference in requirement of additional uterotonics in case and control groups, hence supporting the administration of intraumbilical oxytocin.<sup>12</sup> We observed that 16 patients of group A, required manual removal of retained bits of placenta while in group B, only 8 patients required the same and this was statistically significant. A study conducted by Anisodowleh also showed similar significant results, wherein, out of 89 patients in the study group, only 1 patient required manual placental removal while in the control group, 8 out of the 89 patients, required manual removal of placenta.<sup>13</sup> In this study, the difference between pre-delivery and post-delivery haemoglobin in group A and B was 1.88 gm/dl and 0.62 gm/dl respectively. A study done by Dahiya et al had similar results compared with this study.<sup>14</sup>

### Limitations

Limitations of our study were that, having drawn from a smaller population over a period of 18 months, the results cannot be applied to national population. For that, large and more powered studies are advocated. High risk conditions in which excess bleeding is expected such as

preeclampsia, placental abruption, multiple pregnancy was excluded, so their association couldn't be assessed. For blood loss assessment, we have used pictorial reference for visual blood loss and pre and post-delivery haemoglobin deficit. Other methods like calibrated measuring flasks can be more accurate for blood loss assessment.

### CONCLUSION

The duration of third stage of labour was significantly less when intra umbilical injection of oxytocin was used in addition to active management of third stage of labour. The amount of postpartum blood loss as well as the requirement of parenteral iron therapy and blood products are also significantly less with combined management with intra-umbilical oxytocin along with AMTSL. Furthermore, the need of manual removal of placental bits was less with the use of intra umbilical oxytocin in addition to active management of third stage of labour. So, to conclude, intra umbilical vein oxytocin injection should be given as a part of active management of third stage of labour in order to prevent PPH.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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