INTRODUCTION

Excessive blood loss after childbirth (postpartum haemorrhage, PPH) is a major cause of morbidity and mortality in both industrialized and non-industrialized countries.1,2 Women who survive PPH are likely to suffer from anaemia and other complications. Bleeding that cannot be controlled using drugs often requires surgery, including devascularization procedures, B-Lynch surgical technique, arterial embolization and hysterectomy.3-5 To enhance the ability of uterus to contract, a series of procedures are conducted postpartum and are collectively termed as active management of third stage of labour. These simple procedures have the potential to prevent more than 130,000 maternal deaths every year.6

Reducing the time of delivery of placenta through active management of third stage can prevent uterine atony and PPH.7 Oxytocin administration immediately after childbirth is probably the single most important intervention used to prevent PPH. Women receiving oxytocin lose less blood and deliver placenta faster, resulting in a reduced incidence of postpartum haemorrhage and manual removal of placenta.8-10 Prophylactic oxytocin and ergot derivatives were tried in trials alone or in combination. Complications like nausea, vomiting, headache and hypertension were found more with ergot derivatives rather than oxytocin.11-13

Intraumbilical vein oxytocin reaches the placental bed in high concentration that stimulates the uterine contractions, thus decreasing the placental attachment site. The resulting tension causes the deciduous spongia to give way with the formation of a haematoma, which then accelerates the process of placental separation. In agreement with this hypothesis, the aim of this study was to find out the beneficial effect of adding intraumbilical vein oxytocin in reducing primary postpartum blood loss and reduction in the incidence of manual removal of retained placenta in comparison to intravenous 5 IU oxytocin+0.5 mg ergometrine alone.

ABSTRACT

Objective: To determine the role of intraumbilical vein oxytocin reducing blood loss during and after one hour of delivery of placenta and its efficacy in reducing the frequency of retained placenta.

Study Design: Randomized controlled trial.

Place and Duration of Study: Combined Military Hospital, Multan, from June 2002 to October 2002.

Methodology: Five hundred parturient women with low risk singleton term pregnancy were enrolled in the study. Two hundred and fifty women each were included in the study and control group after randomization. The patients and health care providers both were blinded to the intervention. Primary outcome measures were kept as duration and amount of blood loss in third stage of labour. Secondary outcome measures included incidence of retained placenta, abdominal need for additional utero-tonics, frequency of postpartum pain, nausea and vomiting, fever, need for blood transfusion, establishment of breast feeding and total duration of hospital stay.

Results: Women in study group who received intraumbilical vein syntocinon lost 234.03 ml of blood while the control group lost 276.51 ml (p=0.001). Mean duration of third stage was 2.59 minutes in the study group and 7.67 minutes in the control group (p<0.001). The frequency of retained placenta was 1.2%, which involved only the control group. Abdominal pain was experienced by study group but the difference was not found statistically significant. Nausea and vomiting was more in study group (p=0.001). No discernible difference was found in length of hospital stay, the need for blood transfusion, fever and establishment of breast-feeding in both groups.

Conclusion: The addition of intraumbilical vein syntocinon 10 units resulted in marked reduction in amount of blood loss, duration of third stage and incidence of retained placenta in comparison to intravenous 5 IU oxytocin+0.5 mg ergometrine alone.

Key words: Retained placenta. Active management. Third stage. Postpartum haemorrhage. Labour.
METHODOLOGY

This study was conducted at Combined Military Hospital Multan, from June 2002 to October 2002. Ethical approval was taken from the Hospital Research Committee.

Five hundred parturient women with low risk singleton cephalic pregnancy at term and in spontaneous active labour were included in the study. All high risk pregnancies i.e. hypertension, diabetes mellitus, pregnancy with other medical disorders, multiple pregnancies, preterm and instrumental deliveries were excluded. Informed written consent was taken on admission. Parturient women fulfilling the inclusion criteria were randomly allocated into the study and control group. Each group comprised of 250 parturient women. Randomization was performed by computer generated list of random numbers by means of opaque sealed envelopes. Both groups received intramuscular vein injection after cord clamping and cutting in addition to intravenous 5IU oxytocin + 0.5 mg ergometrine at the delivery of anterior shoulder. Group A received oxytocin while B (control group) received placebo. Proforma were filled after taking detailed history and clinical examination. Sequentially numbered sealed envelopes according to the allocated group, containing an ampoule of 2 ml clear fluid were delivered to the attending health provider. Group A envelopes contained oxytocin and group B envelopes contained distilled water. Identity tags were painted black on both ampoules. After delivery, the envelope was opened and intramuscular injection was administered. The labour ward staff, including doctor-in-charge and the patient were blinded to the intervention. The attending staff was pre-trained to measure the blood loss and when to start and stop the stopwatch. Women in active spontaneous labour were kept in labour room. Intravenous access was obtained and partogram was maintained. Both groups received active management of third stage of labour. It included intravenous 5IU oxytocin + 0.5 mg ergometrine at the delivery of anterior shoulder. Cord was clamped and cut after the delivery of baby. Study group A received 2 ml (10 units) of intramuscular vein oxytocin while group B i.e. control received 2 ml of distilled water intramuscularly in order to keep assessors blind and unbiased. Placenta was delivered by Brandt Andrew method and controlled cord traction. The duration of third stage was calculated by stopwatch. Separate pad was applied over the episiotomy so that blood did not mix with blood that was lost during and after separation of placenta. After the delivery of the baby, amniotic fluid was allowed to drain away, linen was covered with plastic sheet under the buttocks to avoid soiling/mixing with blood. The lower end of plastic cover was moulded into funnel that dipped into a low profile bed pan (kidney tray with capacity of 500 ml) for next hour. The collected blood, blood clots and heavily soaked swabs from the pan were decanted into a measuring cylinder (graduated cut opened urine bag) and measured by an attending nurse. The blood loss was measured in milliliters (mls).

Parameters like age, parity, social status, haemoglobin, blood group and duration of first and second stage were endorsed. Record of outcome measures i.e. blood loss, duration of third stage and retained placenta was made. Records were kept in labour room for subsequent follow up until discharge. All parturient were kept under observation for abdominal pain, fever, postpartum haemoglobin, need for blood transfusion and establishment of breast-feeding for another 24 hours.

The data was analyzed on computer package SPSS version 10.0. The results are given as means, standard deviation for quantitative/continuous variables like age, parity etc. Percentages for qualitative/categorical variables like retained placenta, the need for additional uterotonics and abdominal pain were calculated. Their associations with the intervention i.e. groups and between each other were tested with Chi-square test. Pearson’s correlation coefficient was applied to find out linear relationship between retained placenta and blood loss, postpartum hemoglobin and blood loss and parity. The means for quantitative variables between groups (cases and control) was compared by Student’s t-test and p-values <0.05 was considered significant.

RESULTS

A total of 2035 deliveries including 468 caesarean sections took place in C.M.H, Multan during the study period from June to October 2002. To achieve 80% power with 95% confidence interval, a sample size of 599 parturient was required. In actual study, 500 parturient were enrolled after application of strict inclusion and exclusion criteria per study protocol. Five women (2%) were excluded from the study group as they declined to proceed with study, while 3 were later excluded due to cervical tears. Seven from control group B (2.8%) were excluded, 4 had instrumental deliveries, one cervical tear and 2 underwent emergency caesarean sections for fetal distress. Intention-to-treat analysis was used for final analysis.

All cases were booked and belonged to lower socioeconomic group. Parity ranged from 0 to 5. Majority was multiparous with only 27 primigravidas, which were distributed equally in study group (10) and the control group (17). The association of increasing parity with greater blood loss was found significant (p= 0.001).

The difference in blood loss was found statistically significant (p= 0.001, 95% CI 250.07-260.47) in study group (234.03 ml + 6.17) and in control group (276.51 ml + 54.45) (Table-I). Mean duration of third stage of labour 2.59 ± 0.52 minutes in study group and 7.65 minutes ± 3.9 in control group was statistically significant (p = 0.001, 95% CI 4.80-5.46).
Intraumbilical oxytocin injection for third stage of labour

### Table I: Comparison of primary parameters observed in both groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean blood loss (ml)</th>
<th>Standard deviation</th>
<th>Mean duration of third stage (min)</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>234.03</td>
<td>6.17</td>
<td>2.59</td>
<td>0.52</td>
</tr>
<tr>
<td>Control group</td>
<td>276.51</td>
<td>54.4</td>
<td>7.67</td>
<td>3.9</td>
</tr>
<tr>
<td>p-value</td>
<td>0.001</td>
<td>-</td>
<td>0.001</td>
<td>-</td>
</tr>
</tbody>
</table>

Placenta was retained in 6 cases of control group (2.6%) while no such occurrence was recorded in the study group (p = 0.001). Association of retained placenta with increased blood loss was also found significant (p = 0.002). The additional uterotonic was again used only in the control group with the difference (p = 0.0001). The incidence of nausea and vomiting was observed more in the study group, 152 (60.8%) patients in the study group, while in control group 101 (40.4%) patients experienced nausea (p = 0.001, Table II).

### Table II: Comparison of secondary parameters observed in both groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Retained placenta</th>
<th>Nausea</th>
<th>Vomiting</th>
<th>Uterotonics</th>
<th>Curettage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>0</td>
<td>152</td>
<td>160</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Control group</td>
<td>6</td>
<td>101</td>
<td>74</td>
<td>155</td>
<td>4</td>
</tr>
<tr>
<td>p-value</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The mean haemoglobin in the study group was 10.27 gm/dl while in control group it was 10.17 gm/dl (Table III). The postpartum reduction in haemoglobin in study group was 1 gm while in control group it was 0.4 gm. The difference is significant with p-value 0.001.

### Table III: Evaluation of pre and postpartum haemoglobin.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean haemoglobin</th>
<th>Mean postpartum haemoglobin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study group</td>
<td>10.27/gm/dl</td>
<td>9.857</td>
</tr>
<tr>
<td>Control group</td>
<td>10.17/gm/dl</td>
<td>9.119</td>
</tr>
<tr>
<td>p-value</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

DISCUSSION

This is the premier double blind randomized study in Pakistan for active management of third stage of labour by administration of intraumbilical vein syntocinon. Previously, international studies have been done on the subject but have been criticized due to either inadequate sample size or being biased due to lack of blinding. Both the issues were addressed in this study by randomization and double blinding. Sample size was also pre-calculated in order to attain valid results. Significant role of intraumbilical vein oxytocin was found in achieving reduction in the overall postpartum blood loss and in reducing incidence of retained placenta.

Kore in 1997 managed actively third stage of labour with intraumbilical, vein 10 units oxytocin diluted in 20 ml saline in study group and intravenous oxytocin in control group. They found significant reduction in blood loss as well as duration of third stage with the intervention. The average blood loss in their study was 125 ml in study group and 275 ml in control group, which was statistically significant. While the mean of third stage was 5.6 minutes in study group and 10.2 minutes in control group. Retained placenta was seen only in 2 cases of control group of Kore study while 6 cases were encountered in control group, which is higher than their study.

Kaur in 1995 conducted the same study as Kore and found mean blood loss as 125 ml and 152 ml for study and control group and the duration of third stage as 3.2 minutes and 4.2 minutes respectively. But both studies lacked blinding and their sample size was limited to 200 patients, while the presently studied sample consisted of 500 women and double blinding was exercised to eliminate bias.

A large meta-analysis by Carroli and Bergel, comprising of 12 studies involving 1045 participants and comparing umbilical vein injection of saline and oxytocin with expectant management in reducing the incidence of manual removal of placenta did not find the difference statistically significant (RR: 0.86; 95% CI: 0.72 to 1.01). Saline solution with oxytocin compared with saline alone showed a significant reduction in manual removal of placenta (RR: 0.79; 95% CI: 0.69 to 0.91, number need to treat: 8; 95% CI: 5 to 20). However, they did not detect any discernible difference in the length of third stage, blood loss, haemoglobin reduction, need for blood transfusion, hospital stay, fever and abdominal pain. Another study where only the patients were blinded used saline solution plus prostaglandin and compared it with saline solution alone. The intervention was associated with a statistically significant lower incidence in manual removal of placenta (RR: 0.05; CI: 0.00 to 0.73) but again did not find difference in above-mentioned secondary outcomes. They finally concluded that umbilical vein injection of saline solution plus oxytocin appears to be effective in the management of retained placenta.

Similarly, Yuen in 1995 compared the effect of intramuscular syntometrine and syntocinon in the
management of third stage of labour. They found reduction in blood loss after delivery and reduction in incidence of postpartum haemorrhage but the incidence of manual removal of placenta was higher with syntometrine. Higher frequency of retained placenta in syntometrine (5 IU oxytocin + 0.5 mg ergometrine) group i.e. was also found in the present control group.

Rogers observed the effects of active versus expectant management of third stage of labour in 1998 on 1512 women with term low risk pregnancy. Their study was not blinded. They found statistically significant reduction in PPH (6.8% vs. 16.5%, p<0.0001), the need for blood transfusion (0.5% vs. 2.6%) and the requirement for therapeutic oxytocics (3.2% vs. 2.65). The incidence of nausea and vomiting was higher in active management group. Length of hospital stay was similar among the groups. The present results mirror these results except that we did not encounter postpartum haemorrhage at all.

Age and parity are confounding factors as well as closely related to maternal mortality. Age remained between 20-30 years in both groups and was not found to be associated with increase in blood loss and duration of labour. Maternal mortality and morbidity rises in women with high parity. The first is being at a higher risk and from fifth pregnancy onwards the risk raises considerably. In this study, there were 27 primigravida and 23 grandmultiparas. The blood loss did increase with higher parity but remained below the definition of PPH. In addition to this we did not find association of higher parity with placental retention.

**CONCLUSION**

The administration of intraumbilical vein 10 unit oxytocin along with intravenous 5 IU oxytocin+0.5mg ergometrine reduced blood loss and the frequency of retained placenta more significantly than intravenous 5IU oxytocin + 0.5 mg ergometrine alone. Hence, it reduced the need for anaesthesia and infection. Its use in the management of third stage of labour recommended as it is readily available, easy to administer, economical, and non-invasive. In the local set-up it will be of great help to traditional birth attendants as most of deliveries take place at home, therefore, will contribute in reducing maternal morbidity and mortality.

**REFERENCES**


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