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Original Research Article

## The outcome of third stage of labor using carbetocin following vaginal delivery

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### ABSTRACT

**Background:** Primary postpartum hemorrhage (PPH) is a major cause of morbidity and the leading cause of direct maternal death worldwide. Carbetocin, a synthetic analog of oxytocin, has an elimination half-life of 40 minutes compared with 10 minutes for oxytocin,

**Methods:** This cross-section observational study was conducted at the department of obstetrics and gynaecology, Shaheed Suhrawardy medical college hospital, Dhaka, Bangladesh. The study period was from May 2016 to October 2016. 100 women undergoing normal vaginal delivery were the study subject. A convenient sampling technique was used in this study. Necessary data was collected in the data collection sheet. A standardized deliver mat (Quaiyum's mat) was used before placental removal for measuring blood loss. Carbetocin was an intervention in this study. Statistical analysis was carried out by using the statistical package for social sciences version 19.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated by frequencies and percentages.

**Result:** In this study, the majority 54 (54.0%) of patients belonged to age 20-25 years, followed by 30, (30.0%) >25 years. Regarding the occupational status of the patients, it was observed that the majority of 92 (92.0%) patients were housewives. It was observed that the majority of 93 (93.0%) patients had regular menstrual history. Concerning the clinical indices, anaemia was found 69 (69.0%), jaundice 08 (8.0%) and edema 24 (24.0%). Primi para was found 59 (59.0%) and multipara was 41 (41.0%). Primigravida was found 08 (8.0%) and multigravida was 92 (92.0%). In this study, 76 (76.0%) patients had spontaneous delivery, 05 (5.0%) patients had massive blood loss, and 10 (10.0%) patients required further massage.

**Conclusions:** Carbetocin appears to be an effective new drug in the active management of third-stage labor (AMTSL). A single dose (100 mg) of IV carbetocin is more effective for maintaining adequate uterine tone.

**Keywords:** Post-partum hemorrhage, Carbetocin, AMTSL, Labour

### INTRODUCTION

Active management of third-stage labor (AMTSL) refers to the routine use of uterotonic medications, early clamping and cutting of the cord, assisted delivery of the placenta / controlled cord traction once the uterus is well contracted and the placenta has separated, and uterine massage after delivery of the placenta as appropriate.<sup>1</sup> The Bangladesh maternal health services and maternal

mortality survey showed that hemorrhage (antepartum and postpartum) is the leading cause of death (29 percent). World health organization (WHO) statistics suggest that 25% of maternal deaths are due to PPH.<sup>2</sup> In low-income settings, PPH accounts for 30% of maternal death,<sup>3</sup> while in Bangladesh it is 31%. Effective management of the third stage of labor can prevent postpartum hemorrhage (PPH), the single most important cause of maternal mortality worldwide. Active management of the third stage of labor

requires the routine use of uterotonic medications, early clamping, and cutting of the cord. The most common point at which PPH occurs is during the third stage of labor, when the uterus may suddenly lose its ability to contract. Around 80% of cases of postpartum hemorrhage caused due to uterine stony. More than half of all maternal deaths occur within 24 hours of delivery, most commonly from excessive blood loss. It is estimated that some 1,40,000 women die each year from postpartum hemorrhage (PPH).<sup>4-6</sup> Active Management of the Third Stage of Labor (AMTSL) is feasible and inexpensive. The pharmacologic agents currently used routinely to prevent postpartum hemorrhage are mainly oxytocin, syntometrine (a combination of oxytocin and ergometrine), and carbetocin. Syntometrine is associated with a statistically significant reduction in the risk of postpartum hemorrhage when compared with oxytocin alone.<sup>7</sup> However, adverse effects of nausea, vomiting, and hypertension are higher in women receiving syntometrine because of the ergometrine component.<sup>8</sup> The primary purpose of active management of the third stage of labor is to reduce the risk of PPH. Prevention of postpartum hemorrhage is essential in the pursuit of improved health care for women. Over the past two decades, several other alternatives have been explored including the use of prostaglandins such as misoprostol and carboprost. The role of various prostaglandins including misoprostol for postpartum hemorrhage prophylaxis is limited. Among the agents that have been studied, oxytocin agonist (carbetocin) appears to be the most promising for this indication.<sup>9-12</sup> Carbetocin is a long-acting synthetic octapeptide analog of oxytocin with agonist properties. In pharmacokinetic studies, intravenous injections of carbetocin produced tetanic uterine contractions within 2 minutes, lasting 6 minutes, followed by rhythmic contractions for a further hour. Intramuscular injection produced tetanic contractions in <2 minutes, lasting about 11 minutes, and followed by rhythmic contractions for an additional 2 hours. The prolonged duration of activity after intramuscular compared with the intravenous carbetocin was significant. In comparison with oxytocin, carbetocin induces a prolonged uterine response when administered postpartum, in terms of both amplitude and frequency of contractions.<sup>9,12</sup>

### Objectives

#### General objective

General objective was to analyze the outcome of the third stage of labor using carbetocin following vaginal delivery.

#### Specific objective

Specific objective was to know the age distribution and occupational status of the respondents, to assess the menstrual history of the patients, to know the parity and gravidity of the study subject, to determine the outcomes of the third stage of labor.

### METHODS

This cross-sectional observational study was conducted at the department of obstetrics and gynaecology, Shaheed Suhrawardy medical college hospital, Dhaka, Bangladesh. The study period was from May 2016 to October 2016. 100 women undergoing normal vaginal delivery were the study subject. Carbetocin was an intervention in this study. A convenient sampling technique was used in this study. Necessary data was collected in the data collection sheet. A standardized deliver mat (Quaiyum's mat) was used before placental removal for measuring blood loss, which was also measured by pre weighted sanitary pad. Blood loss was measured from each of the pregnant women within 24 hours of the postpartum period. Women were advised to preserve their soaked pads. Women received a bolus of 100 microgram carbetocin IV at delivery of the anterior shoulder. Blood loss, the uterine contraction was assessed by clinical examination of the uterus per abdominally, the need for additional uterotonics, the need for blood transfusion, and side effects of carbetocin within 24 hours of delivery. Statistical analysis was carried out by using the statistical package for social sciences version 19.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated by frequencies and percentages. Before the commencement of this study, written and, or verbal approval was taken. All the information and records were kept confidential. Ethical clearance was obtained from the institutional ethics committee.

#### Inclusion criteria

Women of gestational age more than 36 weeks of pregnancy with labor pain. Patients who had given consent to participate in the study.

#### Exclusion criteria

Women with multiple pregnancies, placenta previa, abruption placentae, pregnancy with severe anemia, known cases of cardiac, renal, or liver disorder, hypersensitivity to carbetocin and unwilling to participate in the study were excluded from the study.

### RESULTS

In this study, the majority (54, 54.0%) of patients belonged to age 20-25 years, followed by (30, 30.0%) >25 years (Table 1).

**Table 1: Distribution of the study patients by age, (n=100).**

Age (In years)	N	Percentages (%)
<20	16	16.0
20-25	54	54.0
>25	30	30.0
Mean ± SD	23.6±4.04	
Range (min-max)	(18-30)	

**Table 2: Distribution of the study patients by occupational status, (n=100).**

Occupational status	N	Percentages (%)
Housewife	92	92.0
Garments worker	08	8.0

Regarding the occupational status of the patients, it was observed that the majority 92 (92.0%) patients were housewives (Table 2).

**Table 3: Distribution of the study patients by menstrual history and clinical indices, (n=100).**

History/ indices	N	Percentages (%)
<b>Menstrual history</b>		
Regular	93	93.0
Irregular	07	07.0
<b>Clinical indices</b>		
Anemia	69	69.0
Jaundice	08	8.0
Edema	24	24.0

It was observed that the majority 93 (93.0%) patients had regular menstrual history. Concerning the clinical indices, anaemia was found 69 (69.0%), jaundice 08 (8.0%) and edema 24 (24.0%) (Table 3).

**Table 4: Distribution of the study patients by para and gravida, (n=100).**

Parity/gravidity	N	Percentages (%)
<b>Para</b>		
Primi para	59	59.0
Multipara	41	41.0
<b>Gravida</b>		
Primigravida	08	8.0
Multigravida	92	92.0

It was observed that primi para was found 59 (59.0%) and multipara was 41 (41.0%). Primigravida was found 08 (8.0%) as well as the multigravida was 92 (92.0%) (Table 4).

**Table 5: Outcome of the third stage of labor, (n=100).**

Outcome of third stage of labor	N	Percentages (%)
<b>Mode of placental delivery</b>		
Manual removal	24	24.0
Spontaneous	76	76.0
<b>Massive blood loss</b>		
Yes	05	5.0
No	95	95.0
<b>Further massage required</b>		
Yes	10	10.0
No	90	90.0

The Table shows the outcome of the third stage of labor. It was observed that 76 (76.0%) patients had spontaneous delivery, 05 (5.0%) patients had massive blood loss, and 10 (10.0%) patients required further massage (Table 5).

## DISCUSSION

In present study showed the mean age was found 23.6±4.04 years with an age range from 18 to 30 years. Similar results were found in a study by Tasmin et al.<sup>13</sup> which showed the mean age of the study population was 25.8±4.5 years where the minimum age was 18 years and the maximum age was 38 years. However, Leung et al showed the mean age was found 28.3±5.1 years the results were also similar to our study.<sup>14</sup> In this series, it was observed that primi para was found in 59 (59.0%) and multipara was 41 (41.0%). Compared with the results of Su et al they found primiparous was found at 42.9% and multiparous at 57.1%.<sup>9</sup> In this series, it was observed that anemia was found in 69 (69.0%), jaundice in 08 (8.0%), and edema in 24 (24.0%). Compared with the study of Tasmin et al showed among the study population 67.1% of patients had mild anemia before delivery.<sup>13</sup> The 4.3% complained of nausea, 5.7%, abdominal pain, 4.3% vomiting, 4.3% and headache which was not statistically significant. In this series, it was observed that 76(76.0%) patients had spontaneous delivery, 05 (5.0%) patients had massive blood loss, and 10 (10.0%) patients required further massage. The study of Tasmin et al showed massive blood loss did not occur in any patient.<sup>13</sup> No patient required immediate blood transfusion. Su et al study found normal vaginal delivery was 91.4%, vacuum-assisted was 7.0% and forceps-assisted was 1.6%.<sup>9</sup> In this present study it was observed that mean blood loss before the use of the weight of Q-mat was found 74.81±1.23 gm, mean blood loss after the use of the weight of Q-mat was 246.28±99.98 gm, mean net blood loss was 141.61±59.93 gm. Regarding the amount of blood loss within 24 hours before the use of the weight sanitary pad (in gm) mean blood loss 2 hrs after delivery was 45.76±5.44 gm, the mean blood loss 12 hrs delivery was 44.71±4.49 gm, the mean blood loss 24 hrs after delivery was 43.45±8.69 gm. After the use of the weight of the sanitary pan, the mean blood loss 2 hrs after delivery was 135.4±20.19 gm, the mean blood loss 12 hrs after delivery was 101.3±18.27 gm, the mean blood loss 24 hrs after delivery was found 69.86±10.24 gm. After the use of a weight sanitary pad, the mean blood loss 2 hrs after delivery was 81.93±28.61 gm, the mean blood loss 12 hrs after delivery was 56.29±18.77 gm, and the mean blood loss 24 hrs after delivery was 24.00±11.81 gm. Leung et al studies showed there was no significant difference in the amount of estimated blood loss and the incidence of PPH (≥500 ml) or severe PPH (≥1000 ml) in both groups.<sup>14</sup> They did not demonstrate any difference in the amount of blood loss during delivery, the incidence of PPH, and the need for additional oxytocic injection between the two groups. Despite the low incidence of postpartum hemorrhage in both treatment groups of women, about 50 and 20% of the whole study group had more than 10 and 20% drop in

hemoglobin levels within 48 hours, respectively.<sup>15</sup> In a study conducted by Nirmala et al intramuscular carbetocin was more effective than intramuscular syntometrine in reducing post-partum blood loss and the drop in hemoglobin level.<sup>16</sup>

### Limitations

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

### CONCLUSION

Carbetocin appears to be an effective new drug in the AMTSL. A single dose (100 mg) of IV carbetocin is more effective for maintaining adequate uterine tone.

### Recommendations

Carbetocin is a long-acting oxytocin analog indicated for the prevention of uterine atony after childbirth. Further studies should be conducted involving a large sample size and multiple centers.

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

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