

A Study on Assessment of Blood Loss in Third Stage of Labour Using Vacuum Retraction Cannula

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Abstract

Objective: To compare the effects of AMTSL only, AMTSL without uterine massage, AMTSL with vacuum retraction cannula in prevention of post partum hemorrhage and to compare the effectiveness of vacuum retraction cannula with same pressure maintained at different duration of 5mins, 10 mins, 15 mins. **Study Design:** Randomised comparison study. **Setting:** Labour ward of a tertiary care hospital, Government Rajaji Hospital, Madurai. **Participants:** 100 patients in whom AMTSL only performed, 100 patients AMTSL performed without uterine massage, 100 patients in whom AMTSL with vacuum Retraction cannula performed. **Methods:** Informed and written consent was obtained from all patients who participated in this study. After dividing 300 participants into three study groups in AMTSL only group after delivery of the baby, inj Oxytocin 10 units IM given and then controlled cord traction done & placenta is removed. Uterine massage is done. In AMTSL without uterine massage group, AMTSL as in AMTSL only group with the exception of uterine massage is performed. In AMTSL with Cannula group, Along with AMTSL, Vacuum retraction cannula is applied in sequential manner and suction pressure of 650mmHg is maintained for 5,10,15 minutes. Finally in all three groups the blood loss was assessed using surgical drape. **Outcome variable:** various

grades of postpartum hemorrhage after cannula application. **Results:** Mean blood loss in routine AMTSL only group is 299.0 ml, in AMTSL with cannula group is 223.6 ml, in AMTSL without uterine massage group is 280.8 ml (p value < 0.001). in subgroups of AMTSL with cannula group where same pressure maintained at different durations of 5 mins, 10 mins, 15 mins, mean blood loss was 273ml if pressure was maintained for 5mins and 194 and 208ml if pressure was maintained for 10 and 15minutes respectively (p value 0.003). **Conclusion:** Vacuum retraction cannula significantly reduces the amount of blood loss and there by improves the grades of post partum hemorrhage as compared to AMTSL with or without uterine massage only and it also stops significant bleeding when applied for 10 and more minutes.

Keywords: Post Partum Hemorrhage; Vacuum Retraction Cannula; AMTSL.

Introduction

Every year 14 million deaths occur due to obstetric haemorrhage and postpartum haemorrhage accounts for a major proportion of these deaths (WHO 2004). Postpartum haemorrhage is defined as the loss of 500ml or more of blood from the genital tract within 24hrs of birth of a baby, with severe PPH occurring with a blood loss of 1000ml or more. (Mousa and Alfirevic 2007) [1].

The American college of obstetricians and gynaecologists defines PPH as blood loss which decreases the hematocrit by 10% or necessitates transfusion (ACOG 2006). PPH is classified as- Primary PPH occurs within first 24hrs of postpartum & Secondary PPH occurs between 24 hrs and upto six weeks of postpartum.

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The blood supply comes from lateral end of the uterus and traverses the myometrium. Primary haemostasis from placental bed is due to compression of the uterine vessels when they pass through the myometrium. The degree of compression of these vessels depends on the force acting on the uterine vessels. This force obeys the law of Young-Laplace relationship ($F = 2T / r$) F - equals the compressive force acting on blood vessels, T -Wall tension (generated by the uterine contraction), R - Radius of uterus.

From the formula it is apparent that the force compressing the vessels cannot be very high if r is large. So, it is essential that the radius of the uterus should be made small by emptying the uterus from blood or placental tissue and increasing the wall tension of the uterus (T) by giving ecbolics. This is the main scientific basis of the initial treatment and the prevention of primary postpartum haemorrhage.

Only 40% of women with PPH will have an identifiable risk factor (Combs et al. 1991) [2]. In spite of progress made to reduce morbidity and mortality due to post partum haemorrhage, it is still the leading cause of maternal mortality in low socio economic countries and it is one of the primary cause of nearly one quarter of maternal deaths. All over the world PPH continues along with hypertension and infection as one of the infamous triad of causes of maternal deaths in both developed and developing countries. It is one of the leading cause for admission of pregnant ladies to maternal intensive care units.

PPH occur in 5.8% women in first pregnancy, risk of a first PPH in a 2nd/3rd pregnancy is 4-5%, risk of recurrence of PPH in consecutive pregnancy is 15%. Since 2000, WHO recommendations support AMTSL as a critical procedure for PPH - CEMONC resulted in 33% reduction in Maternal deaths and AMTSL is one of the important component. In developed countries, PPH decreased as it is largely preventable and also manageable. But in developing countries, mortality remains high due to PPH. Though data are limited, studies shows that PPH as a cause for upto 60% of maternal deaths in developing countries.

Women surviving after severe post partum haemorrhage experiences significant morbidity in form of major interventions,maternal intensive care admission, exposing to blood products, disseminated intravascular coagulopathy, anemia, infection, multi organ damage associated with hypotension and shock and rarely pituitary infarction and last but not least prolonged hospitalization.

Active management of third stage of labour lowers the maternal blood loss and reduces the risk of PPH. Prophylactic oxytocics offered routinely in the

management of the third stage of labour in all women as it reduces the risk of PPH about 60%. For women without risk factors for PPH delivering vaginally, oxytocin (10 IU by intramuscular injection) is the drug of choice for prophylaxis in the third stage of labour.

Methods

This randomized comparison study was conducted in the labour ward of a tertiary care hospital in southern India from september 2016 to August 2017. 300 antenatal mothers who have got admitted in labour ward for normal delivery were selected and the they were selected randomly into three groups of each having 100 in number. Mothers who were the candidates for Lower segment caesarean section, Instrumental deliveries excluded from the study. Among 300 patients all sorted into three groups, randomly 100 patients are selected for AMTSL alone during third stage of labour, 100 patients are candidates for Cannula insertion during third stage of labour, of these they again subdivided randomly into three subgroups for same pressure maintenance for different durations of 5 mins, 10 mins, 15 mins, 100 patients are selected for AMTSL without uterine massage in third stage of labour. Informed and written consent was obtained from all patients who participated in this study. This study confirms to the standards of Helsinki declarations.

Vacuum Retraction Cannula is also known as Panicker's PPH suction haemostatic cannula and is 25cm long, 12mm diameter. It has multiple holes 5mm diameter at distal 12cms. Cannula is connected to a connector and fixed in the suction apparatus. After introducing cannula 650mm Hg negative pressure applied. By creating negative pressure within a



minute, wall of the uterine cavity is strongly sucked into the small holes of the cannula there by closing all the bleeding sinusoids and arterioles. Thus it aids in natural physiological process of contraction and retraction to prevent atonicity.

In AMTSL only group, as per WHO recommendation, AMTSL is followed, after delivery of the baby inj Oxytocin 10 units IM given, then controlled cord traction done & placenta is removed, Uterine massage is done and blood loss is measured using the surgical drape.

In AMTSL with Cannula group, after delivery of the baby inj Oxytocin 10 units IM given, controlled cord traction done & placenta is removed. After removal of placenta, wide blade vaginal Sims speculum is applied to retract posterior vaginal wall, then anterior lip of cervix grasped with sponge holding forceps, uterine end of cannula is introduced upto to the level of fundus gently. Then cannula is fit to the suction apparatus with connector and suction tube, precaution to be done to look for air leak so that to create sufficient negative pressure. Suction apparatus is on after confirming the position of cannula and pressure of 650 mg Hg is created within one minute and study is done in maintaining the pressure for three different duration 5 mins, 10 mins, 15 mins. Then suction machine is switched off. Then cannula is gently removed after pressure reached 0 mm Hg. Blood loss is assessed by measuring blood collected in surgical drape and inside suction apparatus. Patient is monitored by vitals and uterine tone and blood loss per vagina.

In AMTSL without uterine massage group, after delivery of the baby, Inj. Oxytocin 10 units IM given, controlled cord traction done but uterine massage is not done, then the blood loss is assessed by using surgical drape.

All three groups were compared and statistical analysis done according to various modes of prevention for PPH and outcome is tabulated according to grades of PPH.

A p value of <0.01 was considered a statistically significant level of difference.

Result and Discussion

This study showed the usefulness of vacuum retraction cannula when performed with active management of third stage of labour.

Samartha ram H et al. (2014) [3] stated that vacuum shrinking of uterus is a very effective physical method

which can assist the natural physiological process of contraction and retraction to stop atonic postpartum hemorrhage.

In our study blood loss is significantly reduced in AMTSL with cannula group. Mean blood loss in routine AMTSL only group is 299.0 ml, in AMTSL with cannula group is 223.6 ml, in AMTSL without uterine massage group is 280.8 ml, p value is <0.001 which is statistically significant. There was no severe PPH (>1000ml) in all three groups. In Samartha Ram et al. (2014) [3] study there was no significant blood loss of severe grade. When we compared obstetric code of patients in each study groups, in primigravidae mean blood loss was 310, 205, 251ml 268ml respectively in AMTSL only, AMTSL with cannula, AMTSL without uterine massage group with p value of <0.001 which is statistically significant for cannula group. In our study, in subgroups of AMTSL with cannula group where same pressure maintained at different durations of 5 mins, 10 mins, 15 mins, mean blood loss was 273ml if pressure was maintained for 5mins and 194 and 208ml if pressure was maintained for 10 and 15 minutes respectively. So it shows that if pressure maintained for 10 mins & more, its highly effective than maintaining pressure for 5 mins only. p value was 0.003 which is statistically significant. In one study proposed by Purwosunu Y et al. (2016) [4] using vacuum-induced uterine tamponade, the device remained in place for a minimum of 1 hour. But in our study by maximum of 15 min application of vacuum retraction cannula, we could be able to get good results.

When analyzing the quantity range of blood loss, AMTSL with cannula group contributes 43% in < 200 ml when compared to other two groups, thus cannula usage helps in reducing the blood loss and thus can prevent post partum haemorrhage, also >500 ml blood loss is more in AMTSL only group & AMTSL without uterine massage than in AMTSL with cannula group, so amount of blood loss even in PPH is less for AMTSL with cannula group. When comparing in subgroups of AMTSL with cannula group, quantity range of blood loss is statistically significant in Pressure maintained for 10 minutes duration, <200 ml blood loss occurred in 60 % of patients.

Conclusion

We conclude that following third stage of labour, vacuum retraction cannula helps in maintaining the uterine physiology of normal contractile and retractile nature and it takes negligible time to arrange and can stop significant bleeding when applied for 10 and more minutes as shown in this study. This vacuum

Parameter	AAMTSL only (n=100)	AAMTSL with ccannula (n=100)	Aamtsl without uterine massage (n=100)
Blood Loss (in ml)	299.0 ± 103.0	223.6 ± 99.2	280.8 ± 119.5
Blood loss in ≥ 37 weeks GA	298.5 ± 109.7	217.6 ± 86.8	268.1 ± 118.5
Blood Loss in Primi	310.5 ± 115.9	205.6 ± 66.0	251.4 ± 124.9

	Pressure at 5 mins Mean ± SD	AMTSL with Cannula Pressure at 10 mins Mean ± SD	Pressure at 15 mins Mean ± SD	P Value
Blood Loss	273.3 ± 150.7	194.0 ± 28.4	208.5 ± 68.6	0.003

suction cannula is very simple to use and no need of any mastering in handling this device. So we can train people even in primary health centre like nursing midwives and untrained dhais. As we applied this device only in nontraumatic deliveries, we expect wider applications of this technique in conditions like placenta accreta, and placenta previae with some necessary changes in the future.

What is already known?

AMTSL aids in decreasing post partum hemorrhage.

What this study adds?

AMTSL with vacuum cannula significantly reduces post partum hemorrhage when compared to traditional AMTSL.

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