IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 21, Issue 3 Ser.11 (March. 2022), PP 41-47
www.iosrjournals.org

The Role of Vacuum Retraction (SR) Cannula in the Prevention and Management of Post Partum Hemorrhage in Tertiary Care Hospital

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Abstract
Background: *PPH is major obstetrical emergency and one of the important but preventable causes of maternal mortality and morbidity. It is often sudden frequently unpredictable and catastrophic. In this study SR vacuum cannula will be applied to create negative pressure inside the uterine cavity with specially designed uterine cannula which is a simple, safe and cost-effective technique. The aims and objective of the study is to study the role of SR cannula in the prevention of PPH, Application of SR cannula in a woman with risk factors for Atonic PPH immediately after delivery and measuring the blood loss at the end of the use of SR cannula.*
Methods: *This hospital based prospective interventional study was conducted in dept of Obs and gynaec , Government medical college , Kadapa, Andhra Pradesh. Patients between September 2019 to August 2020. The uterine vaccum retraction system consists of SR suction cannula to control PPH after vaginal delivery.*
RESULTS*: In the study 52% of women in group A and 44% in group B belong to age group 26-30 yrs.60% of women in group A and 58% in group B have risk factors. The mean blood loss is 187.6ml in group A and group B with SR cannula and 378ML in group A and group B without SR cannula. Out of 10 cases of PPH ,2(4%) are in the study group and 8(16%) in the control group.*
CONCLUSION: *Majority cases of pph can be predicted based on the risk factors which are recognized antenatally. Regular antenatal checkups and prophylactic application of vaccum suction cannula in high-risk women for atonic pph prevent catastrophic bleeding.*

Date of Submission: 18-03-2022 Date of Acceptance: 02-04-2022

I. Introduction

Postpartum haemorrhage is the most common type of obstetric haemorrhage and accounts for the majority of cases. Primary PPH is classically defined as blood loss from the genital tract, exceeding 500 ml within 24 hours of vaginal delivery and 1000 mL during a Caesarean section.[1]

The most common causes of postpartum haemorrhage are uterine atony [incidence 80%], abnormal placentation including placental abruption, lower genital tract lacerations, retained placental tissue, coagulopathies, vessel malformation, and uterine rupture.[2]

It is estimated that worldwide 1,40,000 women die of PPH annually, i.e., one in every four minutes.[3] Postpartum haemorrhage affects about 4-6% of all deliveries. Overall postpartum haemorrhage accounts for an estimated 25% of maternal mortality worldwide. Postpartum haemorrhage is a significant contributor to maternal morbidity and long term complications.

Samartha Ram et al., Purwosunu Y, and Arulkumaran et al. reported the concept of vacuum suction of the uterine cavity to control atonic PPH. They reported the cessation of atonic bleeding within 4min after initiation of negative pressure.[5,6] Even though atonic PPH cannot be predictable,[7,8], but the risk factors like PIH, Anemia, Placental abruption, Obstructed labour, and Prolonged labour predisposes the women to develop atonic PPH. Prophylactic application of SR suction cannula in these women can prevent catastrophic atonic PPH, and maternal death.

II. Aims And Objectives Of Study:

AIM:

- To study the role of SR CANNULA in the prevention of postpartum haemorrhage.

OBJECTIVES:

1. Application of SR CANNULA in a woman with risk factors for atonic postpartum haemorrhage immediately after delivery.
2. Measuring the blood loss at the end of the use of SR CANNULA.

III. Methodology

The present hospital-based prospective interventional study was carried out in women who had risk factors for postpartum hemorrhage after delivery admitted in labour ward in the Department of Obstetrics and gynecology, Government general hospital, Kadapa .

STUDY METHOD:

A hundred women, with different risk factors for atonic PPH like PIH, anemia complicating pregnancy, multifetal pregnancy, and hydramnios, obstructed labour, prolonged labor, either alone or in combination, and who delivered vaginally were included in this study. Age, parity, and gestational age at delivery was recorded. Women with traumatic postpartum hemorrhage, HELLP syndrome, and coagulation dysfunction were excluded.

COLLECTION OF DATA

- One hundred women in the age group of 18-40 years who undergo vaginal delivery from 36 weeks to 41 weeks of gestational age will be divided into two groups by computer-based randomized chart. In the study group, i.e.,50 women, SR CANNULA is applied prophylactically, and in the control group, 50 women SR CANNULA is not used. Amount of blood loss, changes in hemoglobin are noted and analyzed.
- However, women will not be deprived of the active management of labour..
- **The study period** is from september 2019 to August 2020 after obtaining Ethical Committee Permission.

All cases will be studied and grouped into a study (group A) and control (group B) by the computer-based randomized chart.

A pre-structured proforma will be used to collect data.

1. Appropriate history will be taken.
2. Clinical examination will be done.
3. Investigations.

All cases will be studied and grouped into the study group (group A) and control group (group B) by the computer-based randomized chart:

Inclusion criteria:

1. High risk for atonic postpartum haemorrhage like

- Anaemia (Haemoglobin < 9 Gm/dl)
- Multigravida (Birth order >3)
- Multiple gestations,
- Polyhydramnios (Amniotic fluid index >25),
- Hypertensive disorders (From mild PIH to Eclampsia)
- Placenta previa,
- Prolonged labour (> 20 hours in primigravida, >14 hours in second gravida and higher order)
- Obstructed labour,
- Induced labour.

2. Women who have given consent.

Exclusion criteria:

1. Women who have not given consent.
2. Women who have inherited disorders of coagulopathy.
3. Women who are in disseminated intravascular coagulation stage.
4. Women with traumatic postpartum haemorrhage.
5. Women with severe medical and surgical complications involving the heart, liver, kidney, brain, and blood disorders.

Ethical considerations:

Women included in the study were informed of the study, and written consent was obtained from them. No patient was financially burdened during the study.

Analysis:

Data was entered in MS EXCEL 2007 Microsoft Corporation Publication. Data of the study group and control group were compiled into cross-tabulations to study the significance of blood loss and change of haemoglobin. Percentages were corrected to decimals for convenience. Association between the use of SR cannula and the

amount of blood loss, change of haemoglobin, and incidence of PPH are studied by using the chi-square test and p-value for testing the significance.

IV. Results

In the study group, [GROUP-A]:50 women, SR Cannula, will be used prophylactically.
In the control group, [GROUP-B]: 50 women, SR cannula, is not used.
Group A (STUDY GROUP) : 50
Group B (CONTROL GROUP) : 50

TABLE NO.1: AGE-WISE DISTRIBUTION OF THE STUDY SUBJECTS AMONG THE TWO GROUPS

Age groups	Group A Study group		Group B Control Group	
	Frequency	Percent	Frequency	Percent
<20 yrs	5	10	3	6
21-25 yrs	14	28	16	32
26-30 yrs	26	52	22	44
>31 yrs	5	10	9	18
Total	50	100	50	100
Mean ± SD	26.64 ± 4.42 yrs		27.18 ± 4.09 yrs	

The majority of subjects belonged to the age group 26-30 years, i.e.52% and 44% in Group A and Group B, respectively. The mean age was 26.64 ± 4.42 years & 27.18 ± 4.09 years in Group A and Group B, respectively, which was matched.

TABLE No.2. COMPARISON OF NUMBER OF RISK FACTORS IN STUDY SUBJECTS AMONG TWO GROUPS.

Number of Risk factors	Group A		Group B	
	Frequency	Percent	Frequency	Percent
1	7	14	7	14
2	30	60	29	58
≥3	13	26	14	28
Total	50	100	50	100
CHI-SQUARE TEST = 0.054, P-VALUE = 0.973 (NOT SIGNIFICANT)				

the majority of subjects have two risk factors, i.e., 60% and 58% in the Study group and Control group, respectively. Overall, 14% of cases in Group A and 14% of cases in Group B were having one risk factor; 26% of cases in Group A and 28% of cases in Group B were having three or more risk factors.

TABLE No.3: COMPARISON OF BLOOD LOSS OF STUDY GROUP AND CONTROL GROUP

GROUPS	NUMBER OF PATIENTS	MEAN	STANDARD DEVIATION	P VALUE
Group A	50	187.6	83.11	0.00114
Group B	50	378	157.18	

There is comparison of blood loss of study group and control group with SR cannula (study group) there was mean blood loss of 187.6 ml (SD 83.11), whereas without SR cannula (control group) mean blood loss was 378 ml (SD 157.18) and found to be statistically significant, (p-value 0.00114) indicating that a major amount of blood loss is found in control group.

TABLE No.4: COMPARISION OF HAEMOGLOBIN OF STUDY GROUP AND CONTROL GROUP.

HAEMOGLOBIN	BEFORE DELIVERY		AFTER DELIVERY	
	Group A	Group B	Group A	Group B
Mean	8.20	8.49	7.93	7.96
SD	0.79	1.02	0.78	1.10
Mean difference	0.29		0.03	
p-value	0.125 (NS)		0.87 (NS)	

The mean HB level before delivery and after delivery in the study group was 8.20 g/dl and 7.93 g/dl, respectively. The mean predelivery and postpartum HB levels in the control group were 8.49 g/dl and 7.96 g/dl, respectively. The mean difference in the study group is 0.29, and in the control group is 0.03.

TABLE No.5: COMPARISON BETWEEN INCIDENCE OF PPH IN STUDY GROUP AND CONTROL GROUP.

PPH	Group A		Group B	
	Frequency	Percent	Frequency	Percent
YES	2	4	8	16
NO	48	96	42	84
TOTAL	50	100	50	100
CHI-SQUARE TEST = 4.00, P-VALUE = 0.046 (SIGNIFICANT)				

In my present study, 100 normal deliveries with risk factors were included, out of which 10 cases of PPH were identified. PPH accounts for 10% of all deliveries. Out of the10 cases of PPH identified 2 in the study group (4%) and 8 in the control group (16%) with p-value 0.046.

TABLE No.6: COMPARISON BETWEEN NEED OF BLOOD TRANSFUSION IN STUDY GROUP AND CONTROL GROUP.

NEED OF BLOOD TRANSFUSION	Group A		Group B	
	Frequency	Percent	Frequency	Percent
YES	3	6	11	22
NO	47	94	39	78
TOTAL	50	100	50	100
P-VALUE = 0.0211 (SIGNIFICANT)				

In my present study, data showed a 6% (n = 3) study group and 22% (n = 11) control group women who received a blood transfusion. Overall, 72% (n = 86) of the women who did not receive blood transfusion 94% (n=47) were in study group and 78% (n=39) were in control group and found to be statistically significant (p-value 0.0211).

V. Discussion

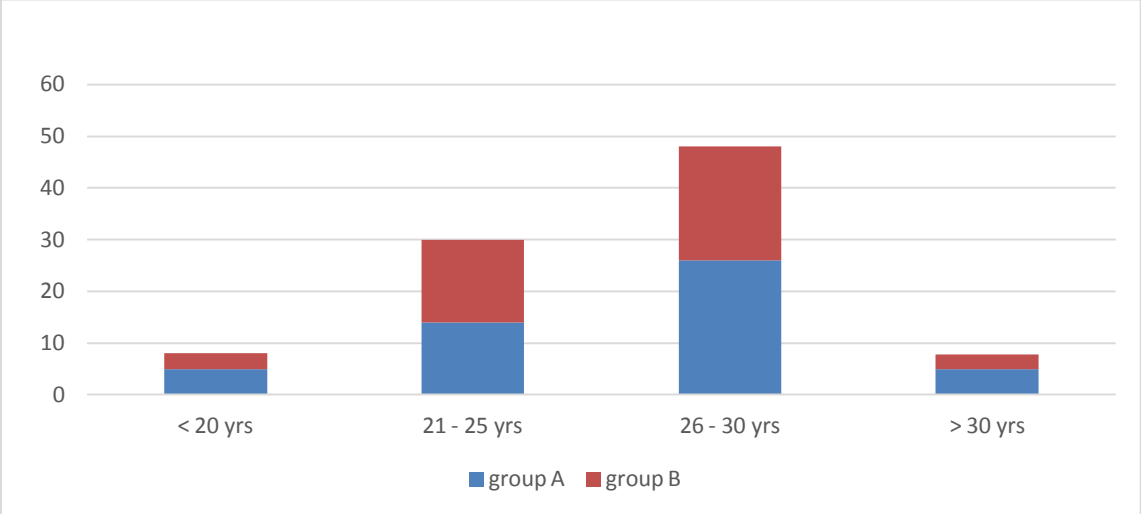
AGE-WISE DISTRIBUTION

In my present study, the majority of subjects belonged to the age group 26-30 years, i.e.52% and 44% in Group A and Group B, respectively. The mean age was 26.64 years & 27.18 years in Group A and Group B, respectively, which was matched.

Mean age in the study by **Bela Makhija, Arpana Haritwal, Manjeet Arora, Dipti Agrawal** was between 22 and 36 years (means 31 years).[9]

The mean age in a study by **1Samartha Ram Hemmanur.2Sai SamyukthaIlla** was between 20 and 33 years.[10]

CHART No.1: AGE-WISE DISTRIBUTION OF THE STUDY SUBJECTS AMONG THE TWO GROUPS

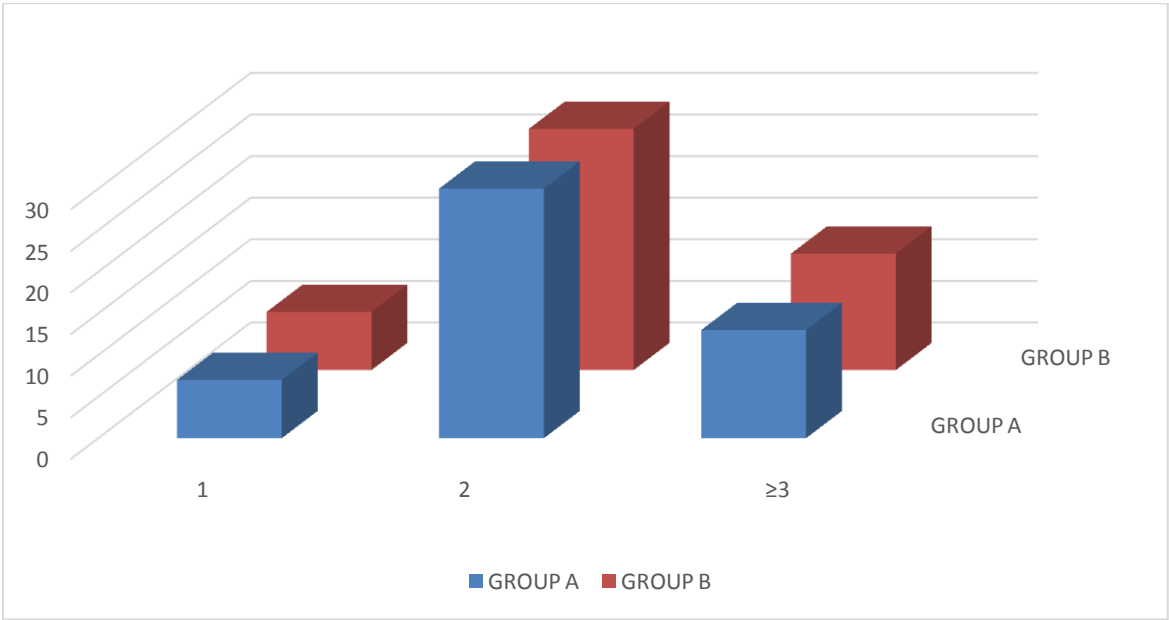


RISK FACTORS

In my present study, the majority of subjects have two risk factors, i.e., 60% and 58% in Group A and Group B, respectively. Overall, 14% of cases in Group A and 14% of cases in Group B were having one risk factor; 26% of cases in Group A and 28% of cases in Group B were having three or more risk factors.

Lill Trine Nyflot et al. conducted a case-control study on Risk factors for severe postpartum hemorrhage found that women with a history of severe PPH had nine-fold increased odds of severe PPH in their index pregnancy. Other risk factors include anticoagulant medication, anemia, severe preeclampsia or HELLP syndrome, uterine fibromas, and multiple pregnancies .[11]

CHART No.2: COMPARISON OF NUMBER OF RISK FACTORS IN STUDY SUBJECTS AMONG TWO GROUPS.



COMPARISON OF BLOOD LOSS OF CASES AND CONTROLS

In my present study, with the prophylactic application of SR cannula, vacuum retraction could stop bleeding in 48 women within 4 minutes after the initiation of negative pressure inside the uterine cavity. The blood collected in the suction jar ranged from 100 to 200ml, and the blood loss was well within the physiological limits of third stage bleeding.

There is a significant difference in the quantity of blood loss. There is comparison of blood loss of study group and control group with SR cannula (study group) there was mean blood loss of 187.6 ml (SD

83.11), whereas without SR cannula(control group) mean blood loss was 378 ml (SD 157.18), and it was found to be statistically significant,(p-value 0.00114) indicating that a major amount of blood loss is found in control group.

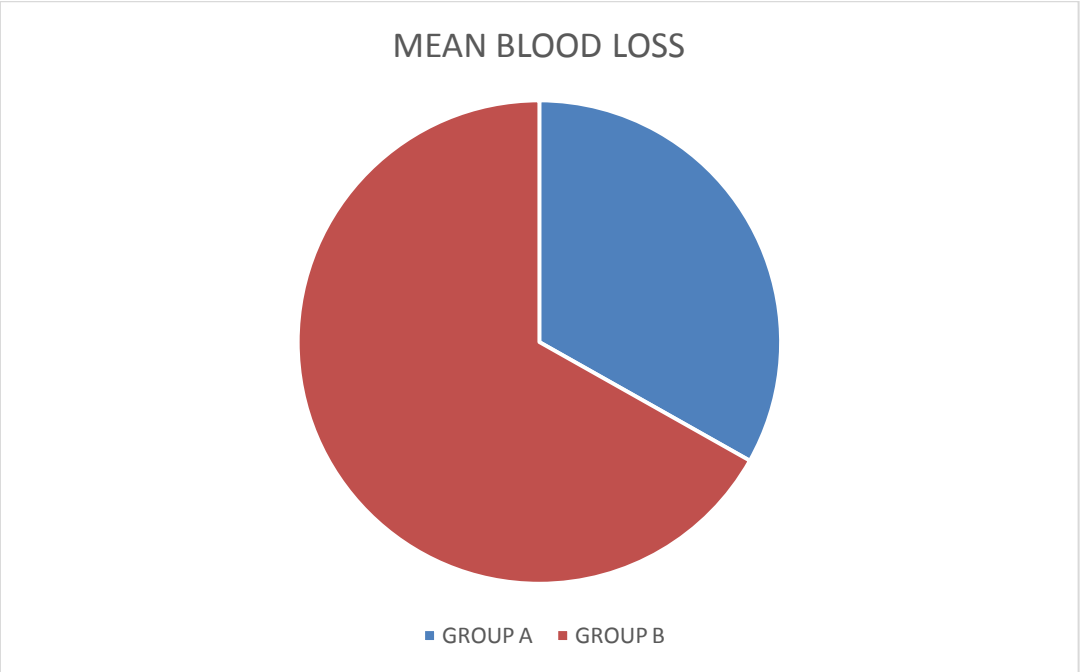
The study conducted by **1Samartha Ram Hemmanur.2Sai SamyukthaIlla**. Prophylactic SR Suction Cannula application for High-risk Women for atonic PPH the amount of blood collected in suction bottle ranged from 50-200ml [26].[10]

In a study by **1Dr Samartha Ram H., 2Dr Shankar Ram HS.,3Dr Sandhya Ram S., 4Dr. Vasudeva Panicker** Complete cessation of bleeding, which was associated with contraction and firm retraction of the uterus, was observed in all women within 4 minutes after initiation of the procedure. The amount of blood collected in suction bottle ranged from 150ml to 250ml.[12]

The study conducted by **Bela Makhija, Arpana Haritwal, Manjeet Arora, Dipti Agrawal** Suction, and evacuation technique with the maintenance of ngative suction pressure successfully stopped bleeding in eight (88.9%) of the nine patients. In one patient (11.1%) the procedure failed, and life-saving hysterectomy was done to control the bleeding [9]

Results of the present study agree with a study by **Dr. Samartha Ram** et al.there is the amount of blood loss decreased in patients when SR cannula is used and preventing atonic PPH.

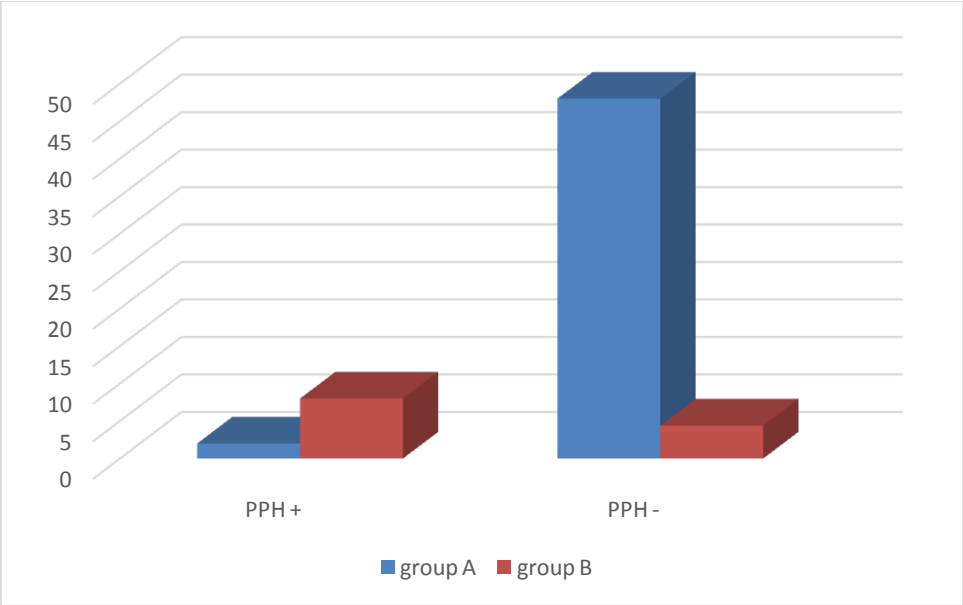
CHART No.3: COMPARISON OF BLOOD LOSS OF STUDY GROUP AND CONTROL GROUP



INCIDENCE OF PPH IN STUDY GROUP AND CONTROL GROUP:

100 normal deliveries with risk factors were included in the study during the study period, i.e., from January 2018 to October 2019 in the institute.10 cases of PPH were identified during the study period accounts for 10% of all deliveries. Out of the10 cases of PPH identified 2 in cases (4%) and 8 in controls (16%).

CHART No.4: COMPARISON BETWEEN INCIDENCES OF PPH IN TWO GROUPS



VI. Conclusion

1) My present study suggests that majority cases of PPH can be predicted based on the risk factors which are recognized antenatally, especially anemia and hypertensive disorders of pregnancy.
2) Regular antenatal checkups and Prophylactic application of vacuum retraction cannula in high-risk women for atonic PPH prevents catastrophic bleeding.
3) Vacuum retraction cannulas should be made part and parcel of the normal delivery tray to facilitate quick application.
4) This Suction with cannula followed by maintenance of negative pressure in the uterine cavity by keeping the cannula inside for 20-30 minutes, is a simple, safe, highly effective and conservative surgical method to control PPH in low resource settings.
5) It requires minimal training, conserves the uterus, and is technically less challenging and associated with less blood loss.

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