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Comparison of Panicker PPH suction cannula with medical methods in case of intractable PPH

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Abstract:

Background: Postpartum hemorrhage (PPH) is the most dreadful obstetric emergency and is a leading cause of maternal mortality. It accounts for almost one maternal mortality every four minutes.

Aims and Objectives: The aims of the present study was to analyze the incidence of atonic PPH, the effectiveness of suction cannula in management of atonic PPH after failure of medical management and the maternal outcome after suction technique.

Material and Methods: This study was carried out in Department of Obstetrics and Gynecology, Muzaffarnagar Medical College and Hospital, Muzaffarnagar, Uttar Pradesh. All the patients who delivered in Muzaffarnagar Medical College by vaginal or caesarean delivery and underwent PPH were included in this study. Patients requiring PPH management were admitted to the obstetrics ward.

Results: This study included 48 patients out of which 30 patients with medical management in Group A and 18 patients managed with medical treatment and Panicker cannula in Group B. All the patients in group A stopped bleeding within a period of 4 minutes. However, in group B patients it took more than four minutes to stop bleeding. Statistical significance was not applicable here as the group B had nothing to compare with. Out of group A patients, 18 patients had loss of upto 250 ml and 12 patients had loss of 251-500 ml blood .Out of group B patients, 10 patients had loss of 501 - 1000 ml blood (Vaginal delivery) and 8 patients had loss of more than 1000 ml blood (Cesarean section). As per Guidelines, 500-1000 ml loss of blood is considered as PPH with vaginal delivery and more than 1000 ml loss of blood is considered as PPH with caesarean section.

Out of group A patients, 24 patients did not receive any transfusion and only four patients received one transfusion. Out of group B patients, 8 patients received two transfusions, four patients received three transfusions and six patients received more than three transfusions.

Conclusion:

Management of intractable PPH is made easier due to Panicker suction cannula. This study concludes that Panicker suction cannula is the safest, cheapest and best method in the treatment of intractable PPH especially in rural settings to reduce the maternal mortality rate due to haemorrhage.

Keywords

Post-partum hemorrhage, Panicker cannula, suction cannula, negative intrauterine pressure suction device, active management of third stage of labour, blood loss, bleeding

Introduction

Postpartum hemorrhage (PPH) is the most dreadful obstetric emergency and is a leading cause of maternal mortality. The incidence of maternal death in low-income countries is as high as 1 in 45 among low-resource settings. Every year, 14 million women around the world suffer from PPH. It is estimated that worldwide, 140,000 women die of PPH annually. It accounts for almost one maternal mortality every four minutes. PPH contributes to nearly one-third of all maternal deaths worldwide. The maternal mortality rate (MMR) in Indian women stands at a figure of 97 per one lakh live births.[1,2] PPH still remains the leading cause of maternal mortality and morbidity, especially in low-middle- income countries. The major contributing factors to PPH are anemia, multiparity and delay in seeking antenatal care leading to undiagnosed high-risk conditions. Common cause of PPH are four Ts'; tone (atonicity), tissue (retained bits, blood clots), trauma (genital tract injury) and thrombin (coagulopathy).

The reported incidence of PPH in India is 2-4% after vaginal delivery and 6% after cesarean section, with uterine atony being the most common cause (50%).[3] Postpartum hemorrhage is defined as blood loss from the genital tract exceeding 500 ml within 24 hours of vaginal delivery and 1000 ml or more during a cesarean section. The American College of Obstetrics and Gynecology (ACOG) defines PPH as the amount of blood loss that decreases the hematocrit by 10% or any amount of blood loss that necessitates a blood transfusion. For clinical purposes, any

amount of blood loss that has the potential to produce hemodynamic instability should be considered PPH.[4]

PPH-preventing interventions need to be prioritized and can be integrated with conventional methods of PPH prevention. The introduction of negative intrauterine pressure using a suction cannula can be one of the cheapest modalities to decrease PPH secondary to uterine atonicity. This negative pressure acts by sucking on the inner surface of the uterus, thereby mechanically closing all the sinusoids in the endometrium. The current study was designed for comparison of Panicker PPH suction cannula with medical methods in case of intractable postpartum hemorrhage.

Material and Methods

This observational study was conducted in Department of Obstetrics and Gynecology, Muzaffarnagar Medical College and Hospital, Muzaffarnagar, Uttar Pradesh. All the patients who delivered in Muzaffarnagar Medical College by vaginal or caesarean delivery and underwent PPH were included in this study. Patients requiring PPH management were admitted to the obstetrics ward from December 2022 to November 2023 fulfilling all inclusion criteria like all the patients with atonic PPH who failed to respond to uterotonic drugs. The exclusion criteria included traumatic PPH, previous cesarean section with risk of scar dehiscence, morbidly adherent placenta, congenital coagulation disorder and HELLP syndrome.

Administration of 10 IU of oxytocin through the intravenous route slowly within one minute of delivery, placental delivery by controlled cord traction, and assessment of uterine tone in the third stage of labor as per the hospital protocol was done. In case of vaginal delivery if atonic bleeding does not stop by all routine medical measures, SR suction cannula was applied in lithotomy position, and the bladder was catheterized. Blood clots were removed from uterine cavity by bimanual compression. The cannula was kept in position as long as the threat of recurrence of bleeding was expected.

Panicker's PPH suction haemostatic cannula is 25 cm long and 12 mm diameter SS cannula with multiple holes of 4 mm diameter at the distal 12 cm (total 48 holes).The cannula was inserted into the post partum uterus to prevent and treat PPH. After introducing the cannula 700 mm of negative pressure was applied. The wall of the uterine cavity was strongly sucked into the small holes of the cannula thereby closing all the bleeding sinusoids and arterioles due to pressure effect of suction. Because the wall of the uterine cavity was strongly sucked and held by the cannula the uterus

cannot expand and relax even in atonic PPH. The negative suction pressure was maintained for 30 minutes so that the clotting occurs in these small vessels and bleeding was permanently stopped. After 30 minutes the suction was released and the cannula was slightly rotated and taken out. This is a very simple and safe break through invention to prevent and treat PPH with absolute success.

In case of caesarean section, one end of the suction tube was connected to the cannula the other end was inserted through the uterine wound and brought outside the vagina. If cervix was not well dilated, the small size cannula was used. The outer end of suction tube was connected to the suction machine. Uterine wound was closed when negative suction pressure was working.

The study comprised of total of 48 patient (30 patients with medical management and 18 patients managed with medical treatment and Panicker cannula).No surgical method was required after using Panicker cannula.

Picture 1: Uterus contracted well and bleeding stopped completely.

(Source: J Obstet Gynaecol India 2017 Apr ; 67(2) :150-151.

Results

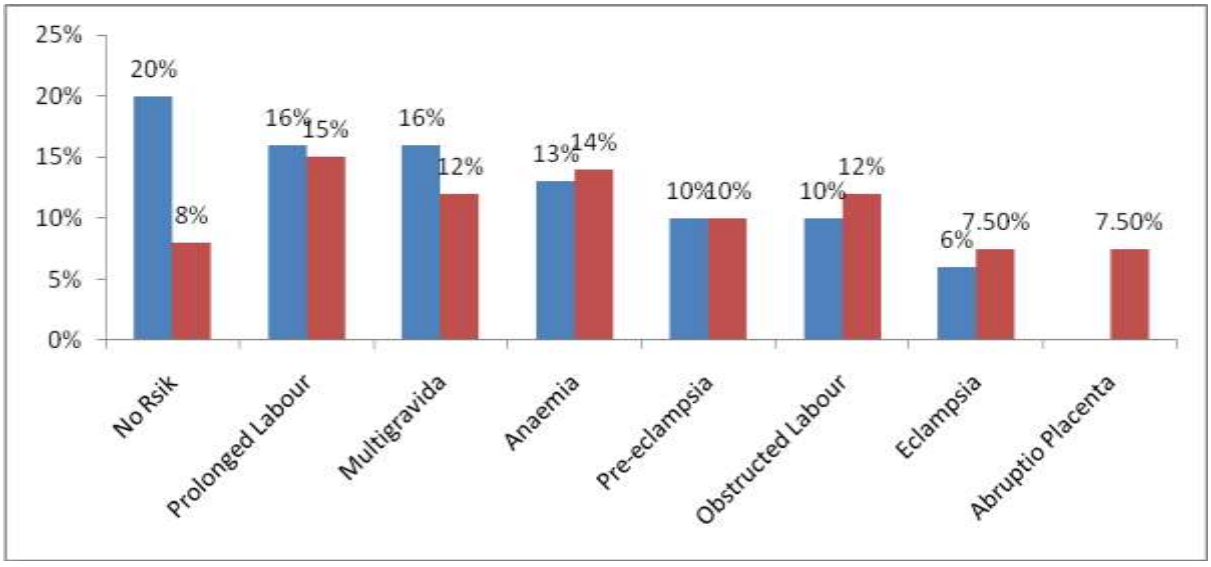
The study comprised of 48 patients (30 patients with medical management in Group A and 18 patients managed with medical treatment and Panicker cannula in Group B) during the period of December 2022 to November 2023 (one year period).

Figure 1: Age distribution of patients in the two groups

Age of the patients (Yrs)	Group A (30 Patients with medical management) Number (%) of patients	Group b (18 Patients managed with medical treatment and Panicker cannula) Number (%) of patients	Statistical Significance (p<0.05)
<20	4 (13.3%)	2(11.1%)	No Statistical significant difference between the groups
21-25	10 (33.4%)	5 (27.8%)	
26-30	6 (20%)	3 (16.7%)	
31-35	6 (20%)	4 (22.2%)	
>35	4 (13.3%)	4 (22.2%)	
Total	30 (100%)	18 (100%)	

In group A patients, majority of the patients were in age groups of 21-25, 26-30 and 31-35 years. However, in group B patients, majority of the patients were in age groups of 21-25, 31-35 and more than 35 years. There was no statistically difference between the groups.

Diagram 1 : Distribution of patients in groups A and B according to risk factors



Group A
– 20% had no risk factor,16% each had prolonged labour and multigravida,13% had anaemia,10% each had pre-eclampsia and obstructed labour and 6% had eclampsia

Group B –
8% had no risk factor,15% had prolonged labour,12% had multigravida,14% had anaemia, 10% had pre-eclampsia ,12% had obstructed labour ,7.5 % each had eclampsia and abruptio placenta

The above diagram shows risk factors associated with groups A and B patients. 20% patients in group A had no risk factor compared to 8 % in group B patients. Prolonged labour, multigravida, anaemia and pre-eclampsia risk factors were almost equal in both the groups. However, obstructed labour, eclampsia and abruptio placenta were more in group B in comparison to group A patients.

Figure 2: Distribution of patients as per mode of delivery in two groups

Mode of Delivery	Group A Number (%) of patients	Group B Number (%) of patients	Statistical Significance (p<0.05)
Vaginal	18 (60%)	10 (55.6%)	No Statistical significant difference between the groups
Operative Vaginal Delivery	7 (23.3%)	5 (27.8%)	
Caesarean Section	5 (16.7%)	3 (16.6%)	
Total	30 (100%)	18 (100%)	

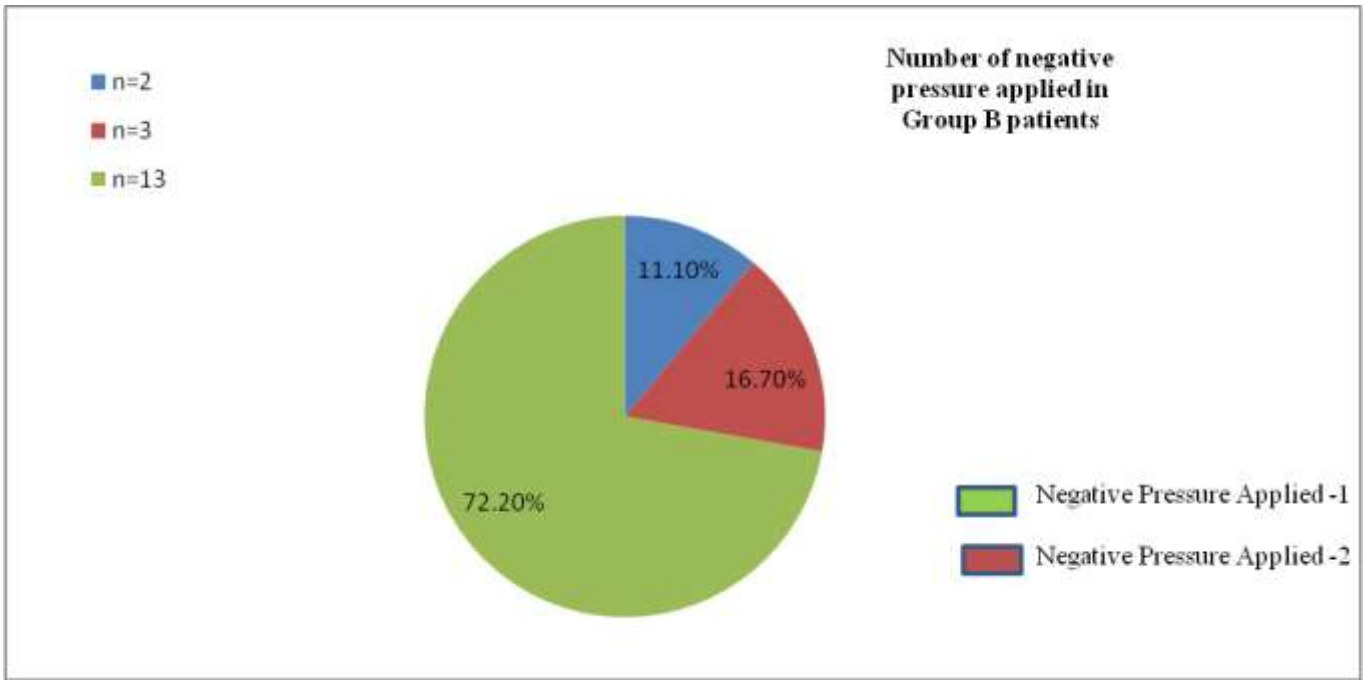
The patients in groups A and B delivered by vaginal, operative vaginal delivery and caesarean section. However, no significant statistical difference was observed between the groups.

Figure 3: Distribution of patients in two groups according to time taken to stop PPH bleeding

Time taken in minutes to stop bleeding	Group A Number (%) of Patients	Group B Number (%) of Patients	Statistical Significance (p<0.05)
<3 min	18 (60%)	-	No Statistical significant difference between the groups
3-4 min	12 (40%)	-	
>4 min	-	18 (100 %)	
Total	30 (100%)	18 (100%)	

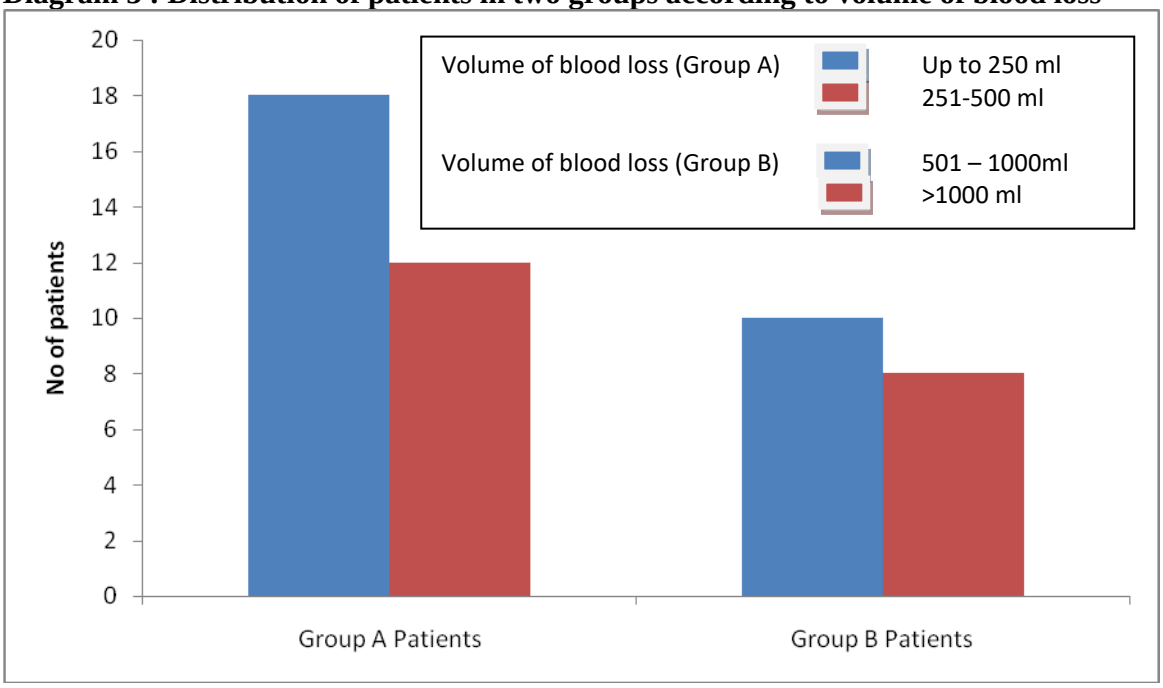
All the patients in group A stopped bleeding within a period of 4 minutes. However, in group B patients it took more than four minutes to stop bleeding. Statistical significance was not applicable here as the group B had nothing to compare with.

Diagram 2 : Distribution of patients in group B according to number of times of negative pressure applied



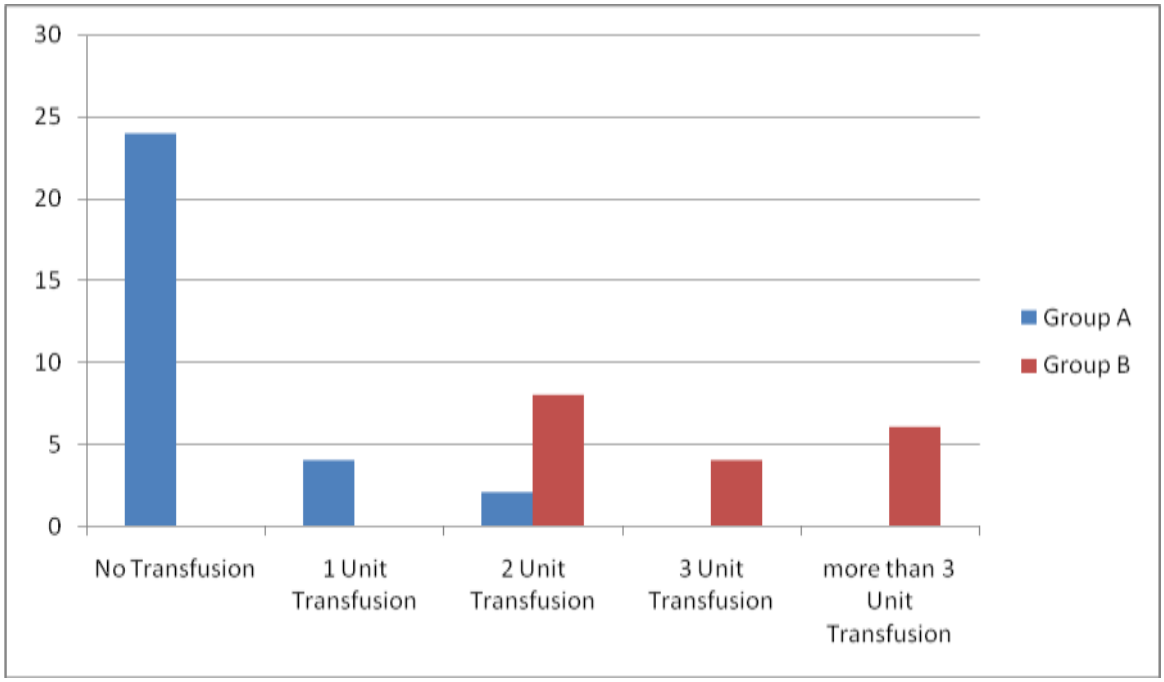
Group B comprised of 18 (100%) patients which did not respond to the medical treatment only and had to be cannulated in order to stop bleeding. Thirteen patients (72.2%) required negative pressure only once, three patients (16.7%) needed negative pressure only twice and two patients (11.1%) required three negative pressures to control bleeding.

Diagram 3 : Distribution of patients in two groups according to volume of blood loss



Out of group A patients, 18 patients had loss of upto 250 ml and 12 patients had loss of 251-500 ml blood .Out of group B patients,10 patients had loss of 501 - 1000 ml blood (Vaginal delivery) and 8 patients had loss of more than 1000 ml blood (Cesarean section). As per Guidelines, 500-1000 ml loss of blood is considered as PPH with vaginal delivery and more than 1000 ml loss of blood is considered as PPH with caesarean section.

Diagram 4 : Distribution of patients in two groups according to number of blood units transfused



Out of group A patients, 24 patients did not receive any transfusion and only four patients received one transfusion. Out of group B patients, 8 patients received two transfusions, four patients received three transfusions and six patients received more than three transfusions.

Figure 4 : Distribution of patients in two groups according to final outcome of the patients

Outcome	Group A Number of patients -30 (100%)	Group B Number of patients -18 (100%)
Survived	30	18
Died	Nil	Nil

All patients in group A and group B survived during the study.

Discussion

In our study in groups A and B, majority of patients were between 21-25 yr of age. In group A, 10 patients (33.4 %) belonged to 21-25 years age group, 6 patients each (20% each) belonged to 26-30 years and 31-35 years age groups, 4 patients each (13.3% each) belonged to less than 20 years and more than 35 years age . In group B,5 patients ((27.8%) belonged to 21-25 years age group, 4 patients each (22.2% each) belonged to 31-35 and more than 35 years of age groups. Three patients (16.7%) belonged to 26-30 year age group and 2 patients (11.1%) belonged to less than 20 year age group. No statistically significant difference was found between the groups.

In present study according to mode of delivery of patients,in group A patients,18 patients (60%) delivered by vaginal route. Seven patients (23.33%) delivered by operative vaginal delivery and five patients (16.67%) delivered by caesarean section. In group B patients, 10 patients (55.5%) delivered by vaginal route, 5 patients (27.8%) by operative vaginal route and three patients (16.7%) delivered by caesarean section. Comparison of the groups showed no stattistically significant difference.

Panicker TNV[5] stated that the strong negative suction produced in the uterine cavity by the special cannula resulted in sucking out all the blood and blood clots. The inner surface of the uterine cavity got strongly sucked by the cannula. All the bleeding vessels including arterioles and sinusoids get sucked into the holes of the cannula, thereby mechanically closing them. The bleeding points are permanently closed due to clot formation within 30–40 min. This is a very simple, safe, sure and inexpensive technique to control and cure PPH with absolute success. There were no complications and no failure observed by using this device. This life-saving procedure will have a key role in bringing down maternal mortality.

Priyanka D et al[6] studied the role of SR vacuum cannula for atonic PPH and reported that in 50% of the cases the bleeding stopped in less than 3 minutes, in 32 % of the cases the bleeding stopped in 3-4 minutes and in 18% cases the bleeding stopped in more than 4 minutes.

In our study, majority of the patients (60%) in group A took less than 3 minutes to stop bleeding and 40 % of patients took 3- 4 minutes to stop bleeding. No patient in group A took more than 4 minutes to stop bleeding. However, in group B patients who first were put on medication and then with use of catheter because of non-stoppage of bleeding, it took more than 4 minutes to control bleeding in 100 % of the patients.In our study, all patients in group A had no PPH. In group B patients, the bleeding did not stop after medical treatment and had to be cannulated.

Purwosunu Y et al[7] studied control of postpartum hemorrhage using vacuum-induced uterine tamponade. Their study showed that using vacuum-induced uterine tamponade, the device remained in place for a minimum period of 1 hour. In our study,within maximum period of 15 minutes of application of the cannula, the bleeding stopped in all cases.

In our study in group B patients, thirteen patients (72.2%) required negative pressure only once, three patients (16.7%) needed negative pressure only twice and two patients (11.1%) required three negative pressures to control bleeding. Study done by Samartha RH et al [8] showed that 68.2% patients needed negative pressure once only, 27.2% patients needed negative pressure twice only and 4.5 % patients needed negative pressure thrice only to control bleeding.

Sharma JC et al [9] studied application of a negative intrauterine pressure suction device for prophylactic management of atonic postpartum hemorrhage. The incidence of atonic PPH was reduced by more than 75% after the introduction of NIPSD (negative intrauterine pressure suction device) complementing routine AMTSL (active management of third stage of labor).As per Guidelines, 500-1000 ml loss of blood is considered as PPH with vaginal delivery and more than 1000 ml loss of blood is considered as PPH with caesarean section.

Out of group A patients,18 patients had loss of upto 250 ml and 12 patients had loss of 251-500 ml blood .Out of group B patients,10 patients had loss of 500 - 1000 ml blood (Vaginal delivery) and 8 patients had loss of more than 1000 ml blood (Cesarean section).

Study conducted by Shanthi C and Chitra KS[10] assessed blood loss in third stage of labour using vaccum retraction cannula and reported mean blood loss of 299 ml in AMTSL group compared to mean blood loss of 223.6 ml in AMTSL with cannula group which was statistically significant.

Conclusion

Management of intractable PPH is made easier due to Panicker suction cannula. All the patients who were not managed by medical treatment were completely treated by Panicker suction cannula and surgical treatment was not needed in any one of the patients. This concludes that Panicker suction cannula is the safest, cheapest and best method in the treatment of intractable PPH especially in rural settings to reduce the maternal mortality rate due to haemorrhage.

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