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Original Research Article

A comparison of the effectiveness of Samarthram vacuum suction cannula with uterotonic drugs as primary management in cases of atonic PPH at tertiary care center: a randomized clinical trial

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ABSTRACT

Background: Atonic PPH is a leading cause of maternal mortality. The SR cannula offers a low-cost, practical alternative by creating negative intrauterine pressure that mimics natural uterine retraction. To compare effectiveness of SR vacuum suction cannula and with uterotonic drugs in cases of Atonic PPH.
Methods: This prospective study at GMC Akola enrolled 100 women developing atonic PPH after AMTSL. Patients were randomized to SR cannula (n=50) or uterotonics (n=50). Group A: Cannula inserted up to fundus, negative suction at 650 mmHg for 10 min, repeated hourly 3 times. Group B: Uterotonics given as needed sequentially (Methergine → Carbetocin→Misoprostol→Carboprost) with 15-min interval. All patients were observed for bleeding, tone, vitals;
Results: In Group A (SR cannula), bleeding stopped in <4 min in 64%, 5-9 min in 26%, 10-14 min in 4% and >14 min in 6%. In Group B (uterotonics),in 6%, 52%, 30% and 12% respectively. Mean blood loss was 302.85±106.07ml in Group A vs 377.9±135.41ml in Group B.
Conclusions: SR cannula is as effective as uterotonics for atonic PPH, with faster bleeding control, lower cost, reusability and transport feasibility, yet larger studies are needed for validation.

Keywords: Atonic PPH, AMTSL, Blood loss, Negative pressure intrauterine vacuum system, SR PPH suction cannula

INTRODUCTION

According to WHO estimates, the global maternal mortality rate (MMR) has declined by 44% over the past 25 years.[1] Despite this, nearly 99% of maternal deaths in 2015 occurred in low-resource regions, predominantly sub-Saharan Africa and South Asia, with India alone accounting for 19% of these.[1] In India, postpartum hemorrhage (PPH) remains the leading cause of maternal mortality (29.6%), with atonic PPH responsible for most cases.[2] Although risk factors such as multiparity ,prolonged obstructed labor, placental abruption, twin pregnancy and macrosomia are recognized, the occurrence of atonic PPH remains largely unpredictable.[3-5] In resource-limited settings, sudden massive bleeding often overwhelms available manpower, blood supplies and referral systems.[6] While basic interventions such as uterine massage, uterotonics, uterine packing or balloon tamponade are feasible in such settings, advanced procedures like B-Lynch sutures, stepwise devascularization, arterial ligation or embolization are restricted to tertiary centers. Delays in transfer frequently result in maternal death within hours due to hemorrhagic shock, coagulopathy and multi-organ dysfunction.[7] These challenges explain why maternal mortality continues to remain high in low-resource countries. To address this gap, simpler, effective and accessible interventions are urgently needed. Vacuum-based management of atonic postpartum hemorrhage (PPH) has emerged as a promising alternative to conventional methods.[8] Early reports by Samartha Ram,

Purwosunu and Arulkumaran demonstrated that intrauterine vacuum suction could arrest atonic bleeding within minutes of applying negative pressure, offering a physiologic mechanism by promoting uterine apposition and retraction.[7,8] Subsequent observational studies using the SR cannula and similar low-cost suction systems in India and other low-resource settings reported rapid hemostasis, reduced blood loss and feasibility during patient transport.[7,8]

In parallel, commercial devices such as the vacuum-induced hemorrhage-control (Jada®) system have been evaluated in prospective multicenter studies, showing high success rates, rapid control of atony (often <5 minutes) and a favorable safety profile, leading to regulatory approval.[8] Comparative feasibility studies suggest potential advantages of vacuum over balloon tamponade, including faster bleeding control and ease of use, though randomized trials remain limited. Reviews and cohort analyses consistently highlight affordability, simplicity and applicability in low-resource settings as key benefits of vacuum techniques.[2,3,7,8] However, most published data are observational or single-arm, with heterogeneous protocols for pressure and duration. Larger randomized studies are needed to validate efficacy, establish standardized guidelines and clarify the role of prophylactic use in high-risk women.

METHODS

A randomised clinical trial was carried out in the Department of Obstetrics and Gynaecology at Government Medical College Akola, Maharashtra between September 2023 and May 2025. The study population consisted of 69 women who had normal vaginal deliveries and 31 women who underwent caesarean sections, all of whom developed atonic postpartum hemorrhage after receiving routine Active management of third stage of labour (AMTSL).

AMTSL included administration Inj. Oxytocin 10 IU intramuscularly for normal deliveries and 5 IU in 500 ml of Ringer lactate or normal saline intravenously for cesarean section, controlled cord traction and uterine massage. In cases where atonicity persisted after AMTSL, informed consent obtained and were randomised and further managed in two groups as Group A with SR suction cannula and group B with uterotonic agents.

In Group A

SR vacuum cannula negative pressure system used comprises three main components.

Uterine retraction cannula

Available in two sizes for normal delivery 23 cm in length with diameters of 24 mm and 20 mm and two sizes for cesarean section 14 cm in length with diameters of 20 mm and 12 mm used as per different cervical dilations. Each cannula is designed with a fundal uterine portion with large perforations and the cervical portion has smaller, round perforations. The smaller openings in the cervical area help prevent blockage of the cannula by cervical tissue during suction. Vaginal cannulas have an additional vaginal portion of 10 cm which helps in connecting suction tube.

Suction tube

A thick-walled, flexible, non-collapsible plastic tube with a diameter of 1.25 cm connects the cannula to the suction apparatus.

Vacuum source

A high-vacuum suction machine with a single collection bottle or a vacuum extraction pump, capable of generating up to 650 mmHg of negative pressure within one minute.

Inclusion criteria

Patients with atonic PPH who developed atonicity even after routine AMTSL.

Exclusion criteria

Traumatic PPH, inherited coagulation disorders, preeclampsia/disseminated intravascular coagulation, morbidly adherent placenta, retained products of conception.

For vaginal deliveries

When bleeding persisted despite uterotonic administration, the woman was placed in the lithotomy position and catheterized with an indwelling urinary catheter. Under adequate lighting, with the aid of a wide-blade vaginal speculum, the genital tract was carefully examined to rule out traumatic causes of PPH and to confirm uterine atony. Retained clots were evacuated by bimanual compression. The anterior lip of the cervix was then grasped with sponge-holding forceps and the uterine end of the cannula was advanced into the uterine cavity up to the fundus. Following placement, the speculum and forceps were removed.

The external end of the cannula was connected to the suction machine through a suction tube, ensuring airtight fitting to prevent leakage. With the left hand supporting the uterine fundus abdominally, the right hand secured the outer end of the cannula, pushing it towards the fundus. The suction machine was then activated to generate a negative pressure of 650 mmHg, which was maintained for 10 minutes before being switched off. This maneuver allowed the cannula to remain in place as the soft cervical tissue was drawn into the perforations, creating a temporary seal.

The procedure was repeated every hour for three hours, with additional suction applied whenever bleeding

recurred. The cannula was removed after three hours in all cases. At removal, temporary adhesions caused by cervical tissue suctioning occasionally impeded withdrawal; these were easily released by gentle finger manipulation, after which the cannula was removed without difficulty.

For cesarean section

The cannula was introduced directly through the uterine incision up to fundus and guided out through the vagina. The external end was connected to the suction machine via tubing and suction applied by approximating uterine incision with allies forceps after which the uterine incision was closed promptly. The cannula secured in the same manner as in vaginal deliveries.

In Group B

Conventional uterotonic drugs used in sequence as Inj. Methergine 0.2 mg IM stat → Inj.Carbetocin 100 microgm IV diluted stat → TabMisoprostol 800 microgram per recital stat→Inj Carboprost 250 microgram IM stat. After administering each drug, the patient was observed for 15 minutes before proceeding to the next if needed. Doses were repeated based on patient response, uterine tone, without exceeding safe maximum limits.

Inj tranexamic acid (1 g over 10–20 minutes) was administered as needed during management of both groups. Patients were closely monitored and reapplication of pressure or administration of uterotonics given as per above protocol. If bleeding persisted beyond 3 hours or if the patient became hemodynamically unstable at any point, alternate interventions were implemented based on expert opinion.

RESULTS

A total of 100 women with atonic postpartum hemorrhage were included in the study. Of these, 50 were managed with the SR cannula (Group A) and 50 with uterotonics (Group B). The baseline demographic and obstetric characteristics, including age, parity and risk factors such as anemia, multiparty , twin , abruption , polyhydramnios and prolonged labor, were comparable between the two groups.

In the present study, most participants in both groups were aged 24–32 years. with no significant statistical difference between two groups (p=0.69). The mode of delivery was comparable between the two groups. In Group A (SR suction cannula), 66% delivered vaginally and 34% by LSCS, while in Group B (uterotonics), 72% had vaginal delivery and 28% LSCS. The difference was not statistically significant (p=0.54). In the present study, parity was comparable between the two groups. In Group A (SR suction cannula), 58% were primiparous and 42% multiparous, while in Group B (uterotonic drugs), 54% were primiparous and 46% multiparous. The difference was not statistically significant (P=0.57).

The distribution of risk factors was comparable between the two groups. In Group A (SR suction cannula), the most frequent risk factor was multigravida (38%), followed by anemia (5%) and prolonged labor (6%), with 8% having multiple risk factors. Similarly, in Group B (uterotonics), multigravida was predominant (40%), followed by anemia (7%) and prolonged labor (8%), with 10% having more than one risk factor. Other factors such as placental abruption, twin pregnancy and polyhydramnios were observed in smaller proportions in both groups. No significant differences were noted in overall distribution of risk factors.

The time required to achieve uterine tone and control bleeding differed significantly between the groups. In Group A (SR suction cannula), bleeding was controlled within 4 minutes in 64%, within 5-9 minutes in 26%, within 10–14 minutes in 4% and after >14 minutes in 6% of cases. In Group B (uterotonics), bleeding stopped within 4 minutes in 6%, within 5-9 minutes in 52%, within 10-14 minutes in 30% and after >14 minutes in 12% of cases. The mean duration to achieve bleeding control was 5.27±3.32 minutes in Group A compared with 9.67±3.86 minutes in Group B, showing a highly significant difference (p<0.0001).

In Group A (SR cannula), was effective with a single application in 80% of cases, required two applications in 10%, three applications in 6% and more than three applications in 4%.In Group B (uterotonic drugs), bleeding was controlled with a single drug in 84% of cases, while 10% required two drugs, 2% required three drugs and 4% required four drugs.

The mean blood loss was significantly lower in Group A (SR suction cannula) at 302.85±106.07 ml, compared to Group B (uterotonic drugs) where it was 377.95±135.41 ml (P<0.0001). This indicates that the SR suction cannula was more effective in minimizing postpartum.

The mean fall in hemoglobin was slightly lower in Group A (SR suction cannula) (1.35±0.33 g/dl) compared to Group B (uterotonic drugs) (1.45±0.51 g/dl). Although the difference favoured the SR cannula group, it was not statistically significant (P=0.1013), indicating that both groups experienced a comparable reduction in hemoglobin levels. blood loss.

The requirement for blood transfusion was slightly higher in Group B (uterotonics, 18%) compared to Group A (SR suction cannula, 16%). The average number of blood units transfused was also lower in Group A (0.21±0.51 units) than in Group B (0.28±0.66 units), though this difference was not statistically significant (p=0.4023). These findings suggest that the SR suction cannula was comparable to uterotonics in reducing transfusion needs among atonic PPH cases. Notably, transfusions were more frequently required in patients with associated risk factors such as abruption, multigravidity, anemia or multiple concurrent risk factors and the number of units transfused varied

according to the patient's hemodynamic condition and pre-intervention hemoglobin level.In the present study, the requirement for additional interventions in the management of atonic PPH was minimal and comparable between the two groups. Both Group A (SR suction cannula) and Group B (uterotonics) had 96% of women who did not require any further intervention. In cases where the intervention method failed, Bakri balloon tamponade was used as a secondary measure. This was required in 4% of cases in both groups. Notably, no women in either group required surgical procedures such as stepwise devascularization, hemostatic sutures or hysterectomy, indicating effective bleeding control with the initial intervention.

Table 1: Distribution of the study participants according to age.

Age (in years)	Group A (SR suction cannula) No. of cases (%)	Group B (Uterotonic drugs) No. of cases (%)
18-23	9 (18.00)	11 (22.00)
25-28	15 (30.00)	14 (28.00)
29-32	20 (40.00)	18 (36.00)
32-35	5 (10.00)	6 (12.00)
>36	1 (2.00)	1 (2.00)

Table 2: Distribution of the study participants according to mode of delivery.

Mode of delivery	Group A (SR suction cannula) No. of cases (%)	Group B (Uterotonic drugs) No. of cases (%)
Vaginal delivery	33 (66.00)	36 (72.00)
Cesarean section	17 (34.00)	14 (28.00)

Table 3: Distribution of the study participants according to parity.

Obstetrics history	Group A (SR suction cannula) No. of cases (%)	Group B (Uterotonic drugs) No. of cases (%)
P1	29 (58.00)	27 (54.00)
P2	8 (16.00)	8 (16.00)
P3	5 (10.00)	6 (12.00)
P4	2 (4.00)	2 (4.00)
P5	5 (10.00)	5 (10.00)
P6	1 (2.00)	2 (4.00)

Table 4: Distribution of the study participants according to risk factors.

Risk factors	Group A (SR suction cannula) No. of cases (%)	Group B (Uterotonic drugs) No. of cases (%)
Anemia	2 (4.00)	4 (8.00)
Abruption	1 (2.00)	1 (2.00)
Prolonged labour	3 (6.00)	4 (8.00)
Multiparity	19 (38.00)	20 (40.00)
Twin gestation	5 (10.00)	3 (6.0)
Polyhydroamnios	1 (2.00)	3 (6.00)
more than one risk factor	4 (8.00)	5 (10.00)
no risk factor (nil)	15 (30.00)	10 (20.00)

Table 5: Comparison of time to achieve tone and control bleeding in min between both groups.

Time to achieve tone and control bleeding minutes	Group A (SR suction cannula) No. of cases (%)	Group B (Uterotonic drugs) No. of cases (%)
0-4 minutes	32 (64.00)	3 (6.00)
5-9 minute	13 (26.00)	26 (52.00)
10-14 minutes	2 (4.00)	15 (30.00)
>14 minutes	3 (6.00)	6 (12.00)

Table 6: Comparison of number of times intervention used between both groups.

Group A (SR suction cannula)		Group B (Uterotonic drugs)	
No of times cannula used	**No. of cases (%)**	**No of uterotonics used**	**No. of cases (%)**
Once	40 (80.00)	**One drug**	42 (84.00)
Twice	5 (10.00)	**Two drugs**	5 (10.00)
Thrice	3 (6.00)	**Three drugs**	1 (2.00)
More than thrice	2 (4.00)	**Four drugs**	2 (4.00)

Table 7: Comparison of mean blood loss, mean change in haemoglobin, blood transfusion requirements between both groups.

Mean	Group A (SR suction cannula)	Group B (Uterotonic drugs)
Blood loss (ml)	302.8±106.07 ml	377.95±135.41 ml
Change in haemoglobin post intervention	1.35±0.33 g/dl	1.45±0.51 g/dl
Blood transfusion needed	0.21±0.51	0.28±0.66

Table 8: Comparison of additional interventions requirements between both groups.

	Group A (SR suction cannula) No. of cases (%)	Group B (Uterotonic drugs) No. of cases (%)
Bakri balloon used in	2 (4.00)	2 (4.00)

DISCUSSION

Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality globally, particularly in low-resource settings where rapid control of bleeding is critical. The present study evaluated the efficacy of the Samartha Ram (SR) suction cannula compared to conventional uterotonic therapy in managing atonic PPH, focusing on immediate clinical outcomes such as bleeding control, blood loss, haemoglobin changes and transfusion requirements.

Baseline characteristics

In the present study, the baseline characteristics of participants were comparable between Group A (SR suction cannula) and Group B (uterotonic drugs).

Age distribution

Most participants in both groups were between 24–32 years. The mean age was 26.13±4.77 years in Group A and 25.88±4.23 years in Group B, with no statistically significant difference (p=0.69). Comparable age distribution has also been reported in previous studies by Suseela et al, Shanthavibala et al, and Sharma et al indicating that age was unlikely to influence outcomes.[9-12]

Parity

In Group A, 58% were primiparous and 42% multiparous, while in Group B, 54% were primiparous and 46% multiparous. The difference was not significant (p=0.57). Similar findings were reported by Sharma JC et al, (2023) and Shrivastav et al, both showing comparable parity distribution across study groups.[9-12]

Mode of delivery

In Group A, 66% delivered vaginally and 34% by LSCS, while in Group B, 72% had vaginal delivery and 28% underwent LSCS. The difference was not statistically significant (p=0.54). Shrivastav et al reported a similar predominance of vaginal delivery, whereas Tyagi et al found significant differences when comparing vacuum suction with balloon tamponade methods, highlighting variability across interventions.[9-12]

Associated risk factors

Multigravida status was the most common risk factor in both groups (38% in Group A vs. 40% in Group B), followed by anemia (5% vs. 7%) and prolonged labor (6% vs. 8%). Around 8-10% of cases had multiple risk factors. Other conditions such as placental abruption, twin pregnancy and polyhydramnios were present in smaller proportions. The distribution was not significantly different between groups. Shanthavibala et al similarly reported comparable anemia prevalence between AMTSL alone and AMTSL with SR cannula groups (68.95% vs. 71.42%, p=0.37).[11]

Overall, the two groups were demographically and clinically comparable, minimizing the risk of baseline confounding.

Comparison of time to achieve tone and control bleeding in min between both groups

The time required to achieve uterine tone and control bleeding differed significantly between the groups. In Group A (SR suction cannula), bleeding was controlled within 4 minutes in 64%, within 5–9 minutes in 26%, within 10–14 minutes in 4% and after >14 minutes in 6% of cases. In Group B (uterotonics), bleeding stopped within 4 minutes in 6%, within 5–9 minutes in 52%, within 10–14 minutes in 30% and after >14 minutes in 12% of cases. The mean duration to achieve bleeding control was 5.27±3.32 minutes in Group A compared with 9.67±3.86 minutes in Group B, showing a highly significant difference (p<0.0001).

Supporting evidence comes from Shrivastav et al who reported that bleeding control was achieved in <5 minutes in 52.7%, in 5–10 minutes in 35.8% and in >10 minutes in 11.4% of cases.11 Likewise, Damor et al, observed bleeding control within <3 minutes in 50.0%, in 3–4 minutes in 31.7% and after >4 minutes in 18.3% of cases. These findings are consistent with the present study, confirming that suction devices achieve faster hemostasis than uterotonics alone.[14]

Comparison of number of Times intervention used between both groups

In Group A (SR cannula), was effective with a single application in 80% of cases, required two applications in 10%, three applications in 6% and more than three applications in 4%. In Group B (uterotonic drugs), bleeding was controlled with a single drug in 84% of cases, while 10% required two drugs, 2% required three drugs and 4% required four drugs.

Comparison of mean blood loss between both groups

The mean blood loss was significantly lower in Group A (SR suction cannula) at 302.85±106.07 ml, compared to Group B (uterotonic drugs) where it was 377.95±135.41 ml (P<0.0001). This indicates that the SR suction cannula was more effective in minimizing postpartum blood loss. Comparable findings were reported by Sharma et al who observed a mean blood loss of 216.66±34.27 ml in the NIPSD+AMTSL group, which was significantly lower than 389.45±65.42 ml in the AMTSL alone group (p=0.012).[9] Similarly, Shrivastav et al, demonstrated that the addition of the SR cannula to AMTSL substantially reduced blood loss (216.66±34.27 ml vs. 389.45±65.42 ml, p=0.012), further supporting the efficacy of mechanical suction devices in improving hemorrhage control.[10]

Comparison of mean change in pre and post intervention haemoglobin between both groups

The mean fall in hemoglobin was slightly lower in Group A (SR suction cannula) (1.35±0.33 g/dl) compared to Group B (uterotonic drugs) (1.45±0.51 g/dl). Although the difference favored the SR cannula group, it was not statistically significant (P=0.1013), indicating that both groups experienced a comparable reduction in hemoglobin levels.

Consistent results were reported by Shanthavibala et al where the mean hemoglobin fall was 1.69±0.28 g/dl in the AMTSL alone group and 1.45±0.33 g/dl in the AMTSL with SR cannula group, with no significant difference (P=0.125).[11] Similarly, Sharma JC et al, (2023) observed hemoglobin declines of 1.69±0.28 g/dl in Group 1 and 1.45±0.33 g/dl in Group 2, again showing no significant difference (p=0.125).[9] Collectively, these findings highlight that the addition of the SR suction cannula does not significantly alter the degree of hemoglobin reduction compared to medical management alone.

Comparison of blood transfusion requirements between both groups

In the present study, the requirement for blood transfusion was slightly higher in Group B (uterotonics, 18%) compared to Group A (SR suction cannula, 16%). The average number of blood units transfused was also lower in Group A (0.21±0.51 units) than in Group B (0.28±0.66 units), though this difference was not statistically significant (p=0.4023). These findings suggest that the SR suction cannula was comparable to uterotonics in reducing transfusion needs among atonic PPH cases. Notably, transfusions were more frequently required in patients with associated risk factors such as abruption, multigravidity, anemia or multiple concurrent risk factors and the number of units transfused varied according to the patient's hemodynamic condition and pre-intervention haemoglobin level.

Comparable observations have been reported in literature. Sharma et al found that the transfusion requirement was significantly reduced in the NIPSD+AMTSL group (1.97%) compared to AMTSL alone (5.31%) (P=0.001).[9] Similarly, Shanthavibala et al demonstrated that patients managed with AMTSL +SR cannula required significantly fewer transfusions (1.4±1.97 units) than those receiving AMTSL alone (3.98±5.31 units), supporting the role of suction devices in minimizing blood loss.[11] In contrast, Damor P et al, (2021) reported that 67.5% of patients did not require any transfusion, while the remaining required variable numbers of blood units; although direct intervention comparisons were not performed, their data highlight typical transfusion patterns in PPH management.[14]

Comparison of additional interventions requirements between both groups

In the present study, the requirement for additional interventions in the management of atonic PPH was minimal and comparable between the two groups. Both Group A (SR suction cannula) and Group B (uterotonics)

had 96% of women who did not require any further intervention. In cases where the intervention method failed, Bakri balloon tamponade was used as a secondary measure. This was required in 4% of cases in both groups. Notably, no women in either group required surgical procedures such as stepwise devascularization, hemostatic sutures or hysterectomy, indicating effective bleeding control with the initial intervention.

Similarly, Singh et al reported that surgical intervention was required in only 1.25% of cases in Group I and 3.75% in Group II, while the vast majority (98.75% and 96.25%, respectively) were managed without surgery. These findings support the conclusion that both mechanical suction devices and pharmacological methods significantly reduce the need for invasive surgical interventions in atonic PPH.

Limitations

This study was limited by its single-center design with 200 participants, which may restrict the generalizability of the findings. The focus was on immediate postpartum outcomes, without assessing long-term maternal health or complications. Blinding was not feasible, introducing the possibility of bias. While common risk factors were considered, other contributors such as coagulopathies or uterine anomalies were not extensively evaluated. Additionally, cost-effectiveness and resource utilization were not analyzed, which may be relevant for large-scale adoption.

Future scope

Future research should focus on larger, multicenter trials to enhance generalizability across diverse populations and healthcare settings. Long-term follow-up is needed to assess maternal recovery, complications and quality of life after intervention. Studies evaluating the cost-effectiveness of the SR suction cannula versus uterotonics would guide resource allocation. Inclusion of a broader range of risk factors and comorbidities could help identify patients who would benefit most. Additionally, research on training, provider acceptance and implementation challenges will support wider adoption, while exploring combined interventions may further optimize atonic PPH management.

CONCLUSION

The present study demonstrates that the SR suction cannula is an effective and reliable intervention for atonic postpartum hemorrhage (PPH), with outcomes comparable to standard uterotonic therapy. Both groups showed a similar distribution of delivery mode and associated risk factors, indicating no selection bias in baseline characteristics.

The SR suction cannula achieved significantly faster control of bleeding and a lower mean blood loss compared to uterotonic drugs, thereby reducing the clinical burden of PPH. Although the fall in haemoglobin levels and the need for blood transfusion were slightly lower in the suction cannula group, these differences were not statistically significant, suggesting that both modalities are broadly comparable in maintaining hematological stability.

Importantly, the majority of patients in both groups did not require any additional interventions and when secondary measures were needed, Bakri balloon tamponade was sufficient, with no cases necessitating surgical procedures such as devascularization, hemostatic sutures or hysterectomy. This highlights the safety and effectiveness of conservative management strategies in PPH.

Overall, the SR suction cannula offers a rapid, minimally invasive, transport feasible and resource-friendly alternative to pharmacological agents, with the potential to reduce blood loss, minimize transfusion needs and avoid major surgical interventions. These findings support its wider adoption, especially in low-resource settings where timely control of atonic PPH is critical to maternal survival.

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REFERENCES

1. World Health Organization. Trends in maternal mortality: 1990 to 2010: WHO, UNICEF, UNFPA and The World Bank estimates. Trends in maternal mortality: 1990 to 2010: WHO, UNICEF, UNFPA and The World Bank estimates. 2012.
2. Samartha Ram H, Shankar Ram HS, Panicker V. Vacuum retraction of uterus for the management of atonic postpartum hemorrhage. IOSR J Dent Med Sci (IOSR-JDMS). 2014;13(11):15-9.
3. Purwosunu Y, Sarkoen W, Arulkumaran S, Segnitz J. 'Control of Postpartum Hemorrhage Using Vacuum-Induced Uterine Tamponade'. Obstet Gynecol. 2016;128 (1):33-6.
4. Hemmanur SR, SamyukthaIlla S. Prophylactic SRPPH suction cannula application for high risk women for atonic PPH. IOSR J Dentaland Medical Sci. 2019;18(4):23-7.
5. Why Mothers Die, Kerala - 2006-09: Editors: VP Paily. K Ambujam, Betsy Thomas Observations, recommendations: Second Report of Confidential Review of Maternal Deaths.: 71. Available at: https://www.kfogkerala.com/media_files/kfog-3j7780.pdf. Accessed on 3 June 2025.
6. World Health Organization. WHO recommendations for the prevention and treatment of postpartum haemorrhage. 2012. WHO: Geneva, Switzerland.
7. Panicker's vacuum suction haemostatic device for treating post-partum haemorrhage. Panicker TN. J Obstet Gynaecol India. 2017;67:150–1.

8. Purwosunu Y, Sarkoen W, Arulkumaran S, Segnitz J. Control of Postpartum Hemorrhage Using Vacuum-Induced Uterine Tamponade. Obstet Gynecol. 2016;128(1):33-36.
9. Sharma JC, Kollabathula P, Jindal S, Anupma A, Sarkar A, Jaggarwal S, et al. Application of a negative intrauterine pressure suction device for prophylactic management of atonic postpartum hemorrhage: a quality improvement study. Cureus. 2023;15(7):42631.
10. Shrivastav R, Shrivastava R. Evaluating the efficacy of metal suction cannula for atonic postpartum haemorrhage management in rural south Gujarat: a two-year observational study. Int J Reprod Contracept Obstet Gynecol. 2024;13:1256-60.
11. Mohanapriya S, Priyanka K. Prospective study to analyse effectiveness of Samartharam suction canula as a preventive strategy for postpartum haemorrhage in high-risk mothers at a teaching hospital over a period of one year. Int J Reprod Contracept Obstet Gynecol. 2025;14:467-72.
12. Shajahan A, Paily VP, Sudhamma A. Postpartum haemorrhage management: A randomized controlled trial comparing transvaginal uterine artery clamp, vacuum-assisted uterine contraction and condom tamponade. European J Obst Gynecol Reprod Biol. 2024;300:337-44.
13. Meshram PS, Kubde AR, Kothalkar VS, VeerendrakumarCM. Role of slow decompression, injection carbetocin and Samarth Ram cannula for preventing postpartum haemorrhage in a patient of acute severe polyhydramnios. Int J Res Med Sci 2023;11:1827-9.
14. Damor P, Maheshwari S, Singh S. Role of SR vacuum cannula as novel technique for atonic PPH management study at Pannadhay Rajkiya Mahila Chikitsalaya and RNT Medical College, Udaipur. Int J Reprod Contracept Obstet Gynecol. 2021;10:4150-6.
15. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller AB, Daniels J, et al. Global causes of maternal death: A WHO systematic analysis. Lancet Glob Health. 2014;2(6):323-33.
16. Knight M, Callaghan WM, Berg C, Alexander S, Bouvier-Colle MH, Ford JB, et al. Trends in postpartum hemorrhage in high resource countries: A review and recommendations from the International Postpartum Hemorrhage Collaborative Group. BMC Pregnancy Childbirth. 2009;9:55.

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