International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Rana V et al. Int J Reprod Contracept Obstet Gynecol. 2024 May;13(5):1277-1280
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20241079

Case Series

Use of Panicker's cannula in management of atonic postpartum hemorrhage

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Received: 14 March 2024
Revised: 09 April 2024
Accepted: 10 April 2024

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ABSTRACT

Postpartum hemorrhage (PPH) is leading cause of maternal mortality worldwide. Panicker's cannula creates negative pressure inside the uterus that causes shrinking of the uterus which can assist the physiological process of contraction and retraction to stop atonic postpartum hemorrhage. It is safe and simple technique to prevent and treat PPH. It can be used in low-resource and primary care settings, where even para medical personnel can use this method effectively to prevent morbidity and mortality. This can also be used in non-PPH conditions. In this study total 20 women with singleton pregnancy (14 had vaginal delivery and 6 underwent cesarean section), who developed atonic postpartum hemorrhage were included in the study. Panicker's cannula was used in the patients, in whom bleeding was not stopped despite using uterotonics. Cessation of complete bleeding was observed in all 20 women within 4 minutes, which was associated with contraction and firm retraction of the uterus. Amount of the blood in bottle ranged from 150-250 ml. Vacuum retraction of uterus assists in the normal physiological process of contraction and retraction. This simple and cost effective technique, takes very little time to stop bleeding. This lifesaving technique is useful in all settings especially in low resource settings.

Keywords: Atonic PPH, Vacuum retraction, Panicker's cannula, Blood loss

INTRODUCTION

The World Health Organization (WHO) states that the rate of maternal death is very high. Pregnancy and delivery caused the deaths of almost 287,000 women in 2020. In 2020, countries with low and lower middle incomes accounted for about 95% of all maternal mortalities. In 2020, Sub-Saharan Africa accounted for 70% of all maternal deaths worldwide, with Central and Southern Asia coming in second with over 17%.[1] Approximately 14 million women worldwide develop postpartum hemorrhage (PPH) each year, which leads to 70,000 maternal deaths. India was responsible for 12% of the world's maternal deaths, according to Federation of Obstetric and Gynaecological Societies of India (FOGSI). PPH is the most common cause of maternal mortality; 47% of instances have been reported, and the percentage may be higher in areas with low incomes.[2] Recent years have seen an increase in atonic PPH tendencies, according to numerous studies.[3] Even yet, atonic PPH can be caused by some risk factors, including twin pregnancies, big babies, PIH, accidental hemorrhage and obstructed and prolonged labour.[4,5] This problem is unpredictable for the same reason. As of right now, the only management tactic is to maintain a "watchful expectancy" and take prompt action as soon as an issue arises. In limited resource circumstances, simpler methods such as uterine massage, uterotonics, uterine packing and balloon tamponade can be used. Higher centers offer specialized procedures like B-lynch suturing, stepwise devascularization, internal iliac ligation, and uterine artery embolization. When simpler methods fail, some parturient women are not able to access these higher techniques. Unpredictable, massive PPH

makes it challenging to arrange for competent manpower, compatible blood, and prompt transportation to higher centers in areas with limited resources. Mothers often may die from hypovolemic shock on roads while being transported to higher centers. Some women die from hemorrhage so quickly that the typically described first one or two hours as the "golden hours" are missing.[6] In certain cases, women pass away within one to one and a half hours of onset of bleeding. The concerning thing about hemorrhagic shock is that certain women may develop coagulation failure and multi-organ dysfunction syndrome so quickly. Maternal mortality in countries with limited resources is not declining for these complex reasons. A more straightforward and reliable method to stop bleeding is required. Using a vacuum retraction uterine cannula, we tried vacuum constriction of the uterus by generating negative pressure inside the uterine cavity in present study, which is a safe, simple and inexpensive method.

CASE SERIES

Fourteen singleton pregnant women who had normal vaginal delivers and six women who underwent caesarean sections, and who developed atonic postpartum hemorrhage were included in this study. All the women received 10 units of oxytocin IM at the appearance of anterior shoulder or 5 units of IV oxytocin after the delivery of placenta, and then uterine massage. Injection (inj.) Methergine 0.2 mg IV or inj. Carboprost 250 microgms IM was also given when the bleeding did not stop. Blood pressure, pulse rate, hemoglobin, hematocrit, platelet count, and coagulation profile were noted.

Uterine vacuum retraction system includes: firstly, uterine retraction cannula [Panicker's cannula]: cannulas are of two different sizes. One measuring 25 cm long with 12 mm diameter, and the other one measuring 25 cm long with 18 mm diameter, and they have uterine angle and perforations on uterine and cervical portions. Cannulas are made up of metal or plastic (Figure 1). Secondly, thick-walled flexible plastic suction tube with 1.25 cm diameters (Figure 2). Thirdly, suction machine with a bottle, or vacuum extraction pump which produces negative pressure up to 650 mmHg within 1 minute.

In case of vaginal delivery, women were kept in lithotomy position, and the bladder was catheterized with Foley's catheter. Sims speculum applied, the genital tract was explored to exclude traumatic PPH and to confirm uterine atony. Blood clots were removed from uterus by bimanual compression. The anterior lip of cervix was held with sponge holding forceps and the uterine end of the cannula was inserted in to the uterine cavity up to the level of fundus, taking care not to perforate the uterus. Sponge holder and speculum were removed. The outer end of the cannula connected to the suction machine with suction tube (Figure 3). Air leak in this system was prevented by proper fitting. The left palm is kept over fundus per abdomen and right hand holds the outer end of the cannula, while pushing it towards the fundus. Keeping the cannula in this position, suction machine started and a negative pressure of 650 mmHg was created and maintained for 10 minutes. Then the suction machine was put off. The cannula gets fixed in the position due to sucking of cervical tissues in to the perforations. This procedure was repeated every hour for 3 hours. After this, the negative pressure was created whenever required. The cannula was removed after 6 hours in all women. After the procedure, we faced difficulty to remove the cannula. This was because of the temporary adhesions formed due to sucking of soft cervical tissues in to perforations of the cannula, which were released by gentle finger manipulation. After this the cannula could be easily removed.

Figure 1: Different sized metal cannula.

Figure 2: Plastic suction tube attached with cannula.

Figure 3: Panicker's cannula insertion in vaginal delivery.

In caesarean section, the cannula was inserted through the uterine incision and brought outside through vagina. The outer end of the cannula was connected to the suction machine through suction tubing. The uterine wound was closed quickly. Cannula fixation (tip at the level of fundus)

was done in the similar way as in vaginal insertion and then negative pressure was applied.

Informed and written consent was obtained from all subjects who participated in this study.

There was complete cessation of bleeding in all the women within 4 minutes of beginning of this procedure, which was related with uterine contraction and firm retraction. There was no recurrence of bleeding after three hours of the commencing the procedure in any women and no more suction was required. During this procedure, every patient remained clinically stable. Approximately 150 to 250 ml of blood were drawn into suction container. Total blood loss was approximately 300-350 ml. Five out of these patients needed blood transfusions. Table 1 provides clinical information of all the women who underwent vacuum retraction of the uterus in the course of the study. During the caesarean section, we saw contraction and firm retraction of the uterus with formation of rugosities on the surface of uterus.

Table 1: Clinical information.

Cases	Age (years)	Gravida	Para	Gestational age (weeks)	Duration of labor (hours)	Time taken to stop bleeding (minutes)	Blood collected in bottle (ml)	Mode of delivery
1	28	2	1	38	7	3.0	150	Vaginal
2	30	3	2	37	5	2.5	250	Vaginal
3	24	1	0	39	11	3.5	200	Vaginal
4	25	2	1	38	6	3.0	150	Vaginal
5	31	3	1	38	8	3.5	100	Vaginal
6	28	3	2	39	6	2.5	150	Vaginal
7	22	1	0	40	10	4.0	200	Vaginal
8	35	4	2	37	8	2.5	200	Vaginal
9	30	2	1	40	7	3.0	150	Vaginal
10	20	1	0	38	9	4.0	250	Vaginal
11	29	2	1	37	5	2.5	100	Vaginal
12	24	2	0	37	6	2.5	150	Vaginal
13	29	3	2	38	8	3.0	200	Vaginal
14	32	2	0	40	12	4.0	250	Vaginal
15	25	3	2	37	5	2.5	150	CS
16	27	2	1	39	7	3.5	200	CS
17	22	2	1	38	6	3.0	250	CS
18	21	1	0	39	12	4.0	250	CS
19	29	2	1	37	5	2.5	100	CS
20	27	2	0	38	6	3.5	150	CS

DISCUSSION

Atonic PPH is most important cause of maternal mortality, particularly in low-income countries. In our study, bleeding stopped in all women within 4 minutes after negative pressure created inside the uterine cavity.

Nowadays, balloon tamponade is being used as an economical choice for managing blood loss in patients with severe atonic postpartum hemorrhage who are not responding to uterotonic therapy.[7] Using this method, hydrostatic pressure is used to keep the condom or Bakri balloon inside the uterus. The uterine cavity is expanded by this water-filled balloon, which continuously presses against the sinusoids to halt bleeding. One of the drawbacks is that, the mechanism of action goes against the normal physiological contraction and retraction mechanisms. The organization of this balloon tamponade system and the tamponade test take less time. In case of adherent cotyledons causing extensive bleeding, delaying the tamponade system may result in disastrous consequences. Occasionally, the balloon can expel when the tone in the uterine wall increases if the vagina is not properly packed with gauge.[8]

On the other hand, with vacuum retraction, the uterus physically contracts as a result of the negative pressure that is created inside the uterine cavity, which facilitates the body's natural contraction and retraction process. This process also takes minimal time as well as expertise. Trained nursing personnel can also do this easy method. This life-saving method stops bleeding without the need for a laparotomy or other difficult operations.[9] A mechanical suction unit of a ventouse or an MVA syringe can be utilised in place of a suction machine.[10]

Frances et al did study of multiple RCTs, comparing medical and surgical interventions treating PPH. They concluded that currently there is insufficient evidence from RCTs to determine the relative effectiveness and

safety of mechanical and surgical methods.[11] Winikoff et al in their study compared Oxytocin versus Misoprost in PPH. There was cessation of active bleeding within 20 mins with both drugs.[12] Darwish et al compared Bakri balloon VS condom catheter in Atonic PPH. Bakri balloon required shorter time (9 min as compared to 11 min).[13]

CONCLUSION

The uterine vacuum retraction aids in the normal physiological contraction and retraction process. The cannula exerted a high suction on the inner surface of the uterus. A mechanical suction unit of ventouse or an MVA syringe can be utilized in place of a suction machine. A mechanical suction unit of a ventouse or an MVA syringe can be utilized in place of a suction machine. This sentence is removed from conclusion and added in discussion as per your suggestion. According to this study, an easy-to-use and inexpensive method can stop bleeding in atonic PPH in 4 minutes and requires very little setup time. This method can save lives in any setting, but it's especially helpful in areas with limited resources. In order to immediately stop bleeding, a vacuum retraction cannula should be included in standard delivery trays and labor room personnel should be educated in its use. With little modifications, we expect this method to have broader uses in the treatment of placenta praevia, placenta accreta spectrum and traumatic PPH. More research is necessary to determine the long-term effects of ischemia on the cervix and uterus due to the suction effect. Since this was a small study, more research is required to fully assess these findings before they can be recommended for widespread application.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Rana V, Patel A, Patel V. Use of Panicker's cannula in management of atonic postpartum hemorrhage. Int J Reprod Contracept Obstet Gynecol 2024;13:1277-80.