

Management of PPH (Placental Site Bleeding) by a Direct Haemostatic Suture in True PPH during Caesarean section: A New Approach

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Abstract

This study includes 20 cases of PPH seen during Caesarean section by a single surgeon Dr. Sadhna Mathur during the last 11 years where this hemostatic suture was used to control PPH from placental site in uterine cavity, after the medical measures failed to control the bleeding from placental site (uterine cavity). The bleeding point was localized and a haemostatic suture in the overlying uterine musculature was applied. It was found to be completely effective hence it is being shared through this paper.

Introduction

Primary post-partum haemorrhage is known for its significant role in maternal mortality and morbidity since ages [1]. After delivery of fetus and placenta the bleeding from torn placental bed sinuses is effectively controlled by contraction and retraction of uterine musculature in majority of the cases. But in some cases one or more of these continue to bleed either due to focal atony or torn sinus not occluded well by this nature's ligature. The technique described in the paper deals to achieve haemostasis in such cases of true PPH.

Rationale for Direct Haemostatic Suture

The technique to stop bleeding from a vessel during any surgery is to hold it with an artery forceps and ligate it directly or ligate the blood vessel proximal to the point of injury, this stops the bleeding. The spiral arteriolar Arrangement makes the blood distribution and supply to the uterus, exchanging nutrition, oxygen and Co2 during pregnancy with placental sinuses for the fetus [1]. After delivery of placenta the venous sinuses and spiral arterioles are exposed and bleeding occurs from the placental bed [2]. The spiral arterioles pass through the interlacing muscle fibres of the uterine musculature. After the delivery of placenta, the uterus contracts. This contraction of the uterine muscle acts as nature's ligatures for

the haemostasis from placental bed.

Exploration after caesarean is usually done to remove products that might have been retained and also to find out any trauma to the uterus and deal with it. If there is failure of the living ligatures to stop the bleeding from placental site even after giving medical measures it needs to be attended more specifically by locating the bleeding vessel or sinus in the uterine cavity. It is done by our four finger technique and to achieve haemostasis, ligation of spiral arterioles in the overlying one centimeter square area of Uterine musculature is done by a figure of 8 suture from the serosa surface including the near total myometrial thickness in the uterine wall overlying that point. This has been seen to stop the bleeding immediately and further interventions were not required. Thus this suture is a direct and more specific approach to achieve haemostasis, in cases of true PPH not controlled by medical measures

Materials and Methods

Study design and sampling: It is a retrospective study from January 2009 to April 2021 conducted in the Department of Obstetrics and Gynecology, NIMS Medical college Jaipur and Kanti Devi Medical College and Research Centre Mathura.

Total no. of cases -20

Inclusion Criteria

The study includes cases of true post-partum haemorrhage (PPH) following caesarean section, randomly selected, where trickle from uterine cavity persisted despite uterine massage and uterotonics (oxytocin infusion, ergometrine, carboprost and misoprostol). When bleeding persisted for more than 15-20 minutes despite the conventional medical treatment, the case was considered for exploration of uterine cavity to precisely locate the bleeding point in the cavity, as described below.

Exclusion Criteria

Patients with unstable vital signs or diagnosed cases of placenta accreta, with or without invasion, were excluded from the study. Cases of PPH following normal delivery and traumatic PPH were not included in our study.

All cases were operated by the same surgeon (Prof. Sadhna Mathur), with the assistance of other skilled obstetricians.

Patient particulars and a written consent were obtained from the patient's attendants prior to the intervention.

After delivery of the foetus and placenta, routine oxytocin injection in the dose of 5-10 IU intravenous directly and 20 IU in 500 ml Ringer solution over 1 hour was started, and the uterus was exteriorized and checked for bleeding from the uterine cavity if any. The margins of the incision site were also examined for any significant bleeding, and if present, was dealt with separately; either by suture or compression.

In cases of PPH, the uterine cavity was explored for any retained placental pieces and if found were removed. Exploration for any possible trauma or laceration was done, ruling out traumatic PPH. For cases of atonic PPH, after excluding contraindications, conventional medical treatment was given, which included uterine massage and injection methergin (0.2 mg intramuscular, up to 2 doses), injection prostodin (250 mcg intramuscular, up to 3 doses) and misoprostol (1000 mcg per rectal).

Cases where trickle of blood continued despite giving conservative medical treatment with apparently contracted uterus for duration of more than 15-20 minutes, were considered for precise localization of the bleeding points, using the technique described below.

• Sadhna's Four Finger Technique

Technique of localizing bleeding point and haemostasis- To precisely locate the trickling point from the uterine cavity, the cavity was arbitrarily divided into four quadrants and each quadrant was packed with a small sponge separately. The inner surface of lower segment, below the caesarean + incision margin, was checked for any bleeding point using a finger tip and a 'figure of 8' haemostatic suture was applied as described below after reflecting the bladder, if necessary.

For localizing bleeding point inside the uterine cavity in upper segment, the sponges were removed sequentially one after the other. As a convention, we followed the sequence of removal of sponges from left lower quadrant first, followed by left upper quadrant. The

procedure was repeated for the right side, removing sponge from the right lower quadrant, before removing the sponge from right upper quadrant.

After removal of sponge in each quadrant, it was closely observed for any bleeding from that specific quadrant and bleeding point was localized using the four-finger technique as described. Filling of cavity with blood on removing sponge from one quadrant, indicates that the bleeder lies in that quadrant, which either could be on the anterior wall, or the posterior wall of the uterus. To differentiate between the two, we first cover the inner surface of anterior wall of uterus inside the cavity with the palmer surface of four fingers of our right hand, applying just enough pressure to prevent any bleeding from that surface. The cavity is observed for any collection or trickling of blood, which if present, indicates the source to be from the inner surface of posterior wall of the uterus. The precise location of the bleeding point, if present, is determined by using 'four finger technique' for each surface separately.

In this technique, we cover the suspected bleeding surface with four fingers of our right or left hand, and lift each finger one by one and observe for any bleeding area in the horizontal plane under each finger, starting from lateral to medial side. On localizing the bleeding point horizontally and securing it beneath one of our fingers, we now proceed to move the finger from above downwards, giving us the exact position of the bleeding point in the vertical plane as well, under that finger where bleeding point is identified by the blood trickling down as soon as the finger uncovers the bleeding sinus in the uterine cavity

Saravi's Haemostatic Suture

For achieving haemostasis, we have used synthetic, absorbable Vicryl 1-0 (polyglactin 910) round body, ½ circle 4cm needle. Covering the bleeding point, that has been localized, with tip of one of our fingers and guiding the needle, a 'figure of 8' suture (Saravi's Haemostatic Suture) is applied over an approximately 1cm square area around the bleeding point, entering through the serosa surface of the uterus and taking near full myometrial thickness, but not entering the uterine cavity. The suture is tied with optimum tension to achieve haemostasis; neither too loose that fails to achieve the haemostasis, nor too tight that cuts through the tissue.

For bleeding sinus localised on posterior wall, uterus was exteriorized and anteverted well for easy placement of suture in the area overlying the bleeding point posteriorly.

Table 1: Distribution of Age groups

S. No	AGE GROUPS	NO. OF CASES	PERCENT-AGE
1	20-30 YRS	12	60%
2	30-40 YRS	08	40%
TOTAL		20	100%

Table 2: Distribution based on Parity

S. No	PARITY	NO. OF CASES	PERCENT-AGE
1	PRIMI	06	30%
2	MULTI PARA	14	70%
TOTAL		20	100%

Table 3: Distribution based on Caesarean Sections

S. No	LSCS	NO. OF CASES	PERCENT-AGE
1	FIRST LSCS	09	45%
2	REPEAT LSCS	11	65%
TOTAL		20	100%

Table 4: Distribution based on Haemostatic Sutures required on Uterus to stop true PPH

S. No	SUTURES REQUIRED	NO. OF CASES	TOTAL SUTURES
1	3 SUTURES	02	06
2	2 SUTURES	05	10
3	1 SUTURES	13	13
TOTAL		20	29

Table 5: Distribution Based On Sutures Applied in Uterus as Per Arbitrary Quadrants Described

S. No	QUADRANT OF UTERUS	NO. OF CASES	PERCENTAGE
1	TWO UPPER QUADRANTS	06	30%
2	TWO LOWER QUADRANTS	12	60%
3	BELOW LSCS INCISION LINE	02	10%
TOTAL		20	100%

In all 20 cases good haemostasis was achieved followed by closure of uterine and abdominal incisions in layers.

1. Preoperative haemoglobin was above 09gm/dl in 19 cases and only 01 unit of whole blood was transfused post operatively.
2. Only 1 case had Hb of 08 gm / dl and 2 units of whole blood were transfused.
3. None of the above cases required any other surgical intervention.
4. Post-operative period was uneventful in all cases and patients were discharged on 07th day as with other cases.

A. 01 suture was placed on the anterior and inner surface of the lower segment of uterus about 2.5cm below and lateral to the left angle of LSCS incision.

This particular case was reopened 01 hours after caesarean due to persistent significant trickle of blood in spite of a contracted uterus and 20 IU of syntocinon running in drip for more than 01 hours. Traumatic bleeding was excluded and Saravi's suture was placed as in other cases through the myometrium after localizing the bleeding point with fingers.

5. In all cases a **Written Informed Consent** was taken from the attendants of patients as usual for LSCS, but in cases where bleeding persisted after medical management a special informed consent for direct haemostatic suture was taken from the attendant.

Discussion

In obstetrics practice in cases with atonic PPH when the medical measures fail, the different methods have been devised by different surgeons to stop bleeding [1].

MS HOLLY ANN ANGER published results of condom catheter uterine balloon tamponade for PPH, at secondary level hospitals they found that Uterine balloon tamponade introduction was associated with an increase in invasive surgery and maternal death due to PPH by Sengstaken and Blakemore tube. They recommended further studies on role of uterine balloon tamponade [3].

A study conducted by J. Seror et al. in 2005 (4) found balloon tamponade to be associated with risk of infection and resumption of bleeding after taking it out, in 17.06% cases in a large series. The patients in whom bleeding restarted were shifted for uterine artery embolization.

Different compression sutures have been devised to oppose the walls of the uterine cavity and also to reduce blood supply to the uterus at the same time, to achieve haemostasis at placental site [3].

Compression Sutures Practiced Are:

1. B Lynch Compression Suture [1].
2. Hayman's Sutures [6].
3. CHO's Square Sutures [7].
4. Mansoura VV sutures [8].

These compression sutures require a skilled obstetrician for the technique and an optimum degree of tension to achieve compression of the large bulk of tissue is required while tying the knot without getting cut through.

Saad Benkirane, at all 2017 has reported uterine necrosis following combination of uterine compression sutures with vascular ligation done for postpartum haemorrhage [9]. The other reported complications are pyometra erosion of strap through the uterine wall, uterine ischaemia and synechie. The frequency of complications still remains unclear.

To overcome the aforesaid complications, removable uterine compression sutures were devised by Zhang ZW 2015, but they found the method of suture removal to be cumbersome [10].

As most of the cases respond well to the medical management, the cases that require a direct haemostatic suture after localising

the bleeding point are few. This study includes a limited number of cases as these are the cases done by a single surgeon in this duration. This technique needs to be multicentre trial so that results with a large number of cases are published. The author strongly believes that this method will become part of PPH management in Obstetrics.

Advantages of This Method Are

1. It is an easy procedure. It only needs learning the technique to locate bleeding point in uterine cavity and to take the suture from serosal surface over it.
2. The area of uterine musculature taken in the hemostatic suture is about 1cm². The area of tissue involved is very small as compared to different compression suture. So the chance of getting cut through, future necrosis, a tight or loose suture is very less.
3. After tying the suture immediate control of bleeding can be seen on the table only
4. Due to early control of bleeding the requirement of blood and blood products is very less.
5. As the uterine cavity is not entered so the risk of synechie formation is not there.
6. As the decision is taken early and sutures are applied there only on the table so the risk of Obstetric shock and its consequences are minimized.
7. The need of procedures like step wise devascularisation, uterine artery embolization and hysterectomy is eliminated.
8. Hospital stay of the patient is equivalent to that of any other caesarean section.

Disadvantages of This Method Are

The only disadvantage is that the technique to localise the bleeding sinus needs to be learned well and this technique is very simple and very easy to learn.

Conclusions

Most of the cases after delivery of placenta respond well to medical management, therefore the requirement of **Saravi' Haemostatic suture** in true PPH arises in very few cases. However, our study is a small series of retrospective cases over a period of 11 years and months. But this is a new technical approach for getting direct hemostasis in PPH. Further it needs a larger, multicenter prospective studies with data to support our positive results. It has a hope of being used in similar cases after vaginal delivery in future, if need for surgical intervention arises. This innovated suture has a vast scope for becoming popular in obstetrics, as it is easy and more specific. Hence the need for devascularisation, uterine artery embolization and hysterectomy will be significantly reduced.

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