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Novel Modified Compression Suture for Controlling Intractable Atonic Postpartum Hemorrhage

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Abstract

Objective: *To evaluate the efficacy and safety of Novel modified Compression suture in controlling intractable atonic postpartum hemorrhage.*

Methods: *This case serious study was conducted on 15women with primary atonic postpartum hemorrhage (PPH) unresponsive to standard conservative measures and our Novel modified Compression suture was applied to all of them. Follow-up visit was carried out after 3 months and 6 months where 3D Transvaginal ultrasound (TVUS) is was performed to all cases followed by hysteroscopy in cases show positive intrauterine finding in 3D TVUS. Primary outcome measures were stop bleeding, Preserve the uterus and Prevent maternal mortality. Secondary outcome measures were operation time, menstrual irregularity, Fertility preservation, maternal morbidities, Blood transfusion units used, hospital stay and intensive care unit (ICU) admission.*

Results: *From 2400 deliveries were conducted in our hospital (unit C), 120 cases were presented with primary PPH (5%) in the period between May 2016 till June 2018.From these cases 70 cases respond to conservative mechanical and pharmacological measures, 35 cases respond to pelvic devascularization alone. Only 15 cases not responding to previous measures fulfilled the inclusion criteria and included in our study. Our novel compression suture (Single vertical Compression suture, Saif modification) was attempted in15 patients and proper placement and complete hemostasis was achieved in all 15 cases (100 %) and we need no adjuvant hemostatic procedure to control bleeding in all cases of our study.*

Conclusion: *We conclude that Single vertical Compression suture (Novel Saif modification)easily applied and effectively control bleeding in cases of atonic PPH and preserve fertility, also had an equivalent efficacy and safety when compared with original B-Lynch and other compression suture described in the literature .*

Keywords: *Uterine compression sutures, postpartum hemorrhage, novel procedure, uterine brace compressive sutures.*

1. Introduction

Primary postpartum hemorrhage (PPH) is defined by the World Health Organization as bleeding from the genital tract of more than 500 ml blood in the first 24 hours following vaginal delivery or 1000 ml blood after cesarean section [1]

After exclusion of retained products of conception and genital tract trauma, we can diagnose atonic PPH. uterine bimanual compression start immediately and concomitant uterotonic agents followed by uterine ballooning[2]. If the previous measure failed a laparotomy with vessels ligation, uterine compression sutures and finally hysterectomy [3]

After B-Lynch suture, Different uterine compression sutures have been described and performed as an alternative to hysterectomy and control of massive PPH with minimal complications. [4-5-6-7]

This study was conducted to evaluate the efficacy and safety of Novel modified Compression suture for controlling intractable atonic postpartum hemorrhage.

2. Materials and Methods

This case serious study was conducted in the Obstetrics and Gynecology department at Menoufia university hospital, Shibin El-kom city, Menoufia governorate, Egypt, in the period between May 2016 till June 2018.

The study protocol was reviewed and approved by the local ethics committee at Menoufia University hospital and informed consent was obtained from all participants prior to commencing the study.

In our study we excluded women with Traumatic PPH (genital tract laceration and uterine rupture), PPH due to retained placenta and Coagulation defect**.**

15women with primary atonic postpartum hemorrhage (PPH) unresponsive to standard conservative measures enrolled in our study and our Novel modified Compression suture was applied to all of them.

When PPH was diagnosed, all patients received conservative mechanical and pharmacological measures simultaneously until the bleeding stops. If these measures failed to stop bleeding stepwise pelvic devascularization was attempted and if all the previous measures failed to stop bleeding our compression suture was applied as follow (Novel Saif compression suture)

2.1. Our Suture

The uterus was exteriorized and checked for any bleeding point existing, After positive uterine compression test to control bleeding, doyen retractor was inserted anterior to displace bladder leaving the whole lower uterine segment exposed and towel pack posterior to the uterus to displace the intestine, the assistant elevated the uterus upward, No 1 vicryl suture on large curved rounded body needle (100 mm coated EGYSORB, Egypt) was used to place the first stitch entry through the anterior wall of the lower uterine segment at about 3cm medial to the margin of the lower segment and about 3-5cm below the edge of uterine incision in left side. The needle penetrated the whole thickness of both anterior and posterior uterine wall (point A) leaving long part of thread material for final knot. Then the needle passed upward along posterior uterine wall to curve anteriorly around the fundus 2-3 cm medial to the corneal end to penetrate the whole thickness of both anterior and posterior uterine wall at (point B) 3cm above suture line anteriorly. Then from (point B) the needle passed transverse along posterior uterine wall to penetrate the whole uterine thickness from posterior to anterior at (point C) 3cm above suture line anteriorly. Then the needle passed upward along anterior uterine wall to curve posteriorly around the fundus 2-3 cm medial to the corneal end to pass downward along posterior uterine wall to reach (point D) 3cm medial to the margin of the lower segment and about 3 – 5 cm below the edge of uterine incision to penetrate both uterine walls from posterior to anterior. At the end the assistant compressed the uterus and the knot was tied gently through two ends of threads anterior to lower uterine segment as tightly as possible. Finally after the uterus was introduced into peritoneal cavity we evaluated uterine bleeding come out from the uterus and assessed the general condition of the patient through blood pressure, pulse and urinary output, when no uterine bleeding and general condition is stable the operation was completed as usual standard for cesarean section. (Figure 1-2)

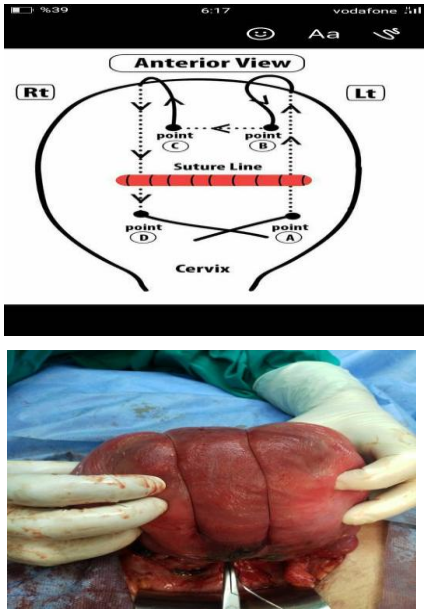

Figure1. *Anterior view for our of Novel modified Compression suture*

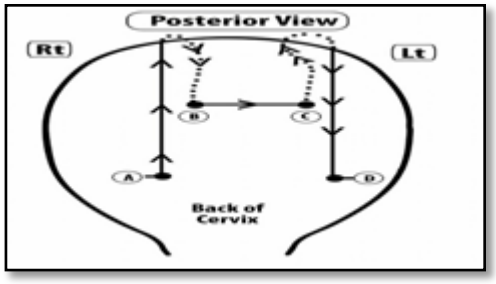

Figure2. *Posterior view for our of Novel modified Compression suture*

Broad-spectrum antibiotics were used in all cases for at least 48 hours. Ultrasound examination was performed to all cases at day 2 and before discharge using Mindray DP-30 portable ultrasound machine (Mindray, China) to evaluate fluid or blood accumulated in the uterine cavity in all cases. After one week follow-up exam was conducted for all patients to evaluate surgical site infection, remove suture material, uterine bleeding and ultrasound was done. A 6-week follow-up exam was conducted for all patients to asses uterine bleeding and ultrasound was done. Additional follow-up visit was carried out after 3 months and 6 months where 3D TVUS is was performed to all cases followed by hysteroscopy in cases show positive intrauterine finding in 3D TVUS.

2.2. Outcome Measures

Primary outcome measures were stop bleeding, preserve the uterus and prevent maternal mortality.

Secondary outcome measures were operation time, menstrual irregularity, Fertility preservation, maternal morbidities, Blood transfusion units used, hospital stay and ICU admission.

3. RESULTS

During the period of study out of 2400 deliveries were conducted in our hospital (unit C), 120 cases were presented with primary atonic PPH (5%), From these cases 70 cases respond to conservative mechanical and pharmacological measures, 35 cases respond to pelvic devascularization alone. Only 15 cases not responding to previous measures fulfilled the inclusion criteria and included in our study.

Patients were in the age group of 20 to 39 years with a mean age of 29.4 years. Parity ranged from 0 to 6 with mean of 3. With gestational age at delivery ranged from 34-40 weeks with mean 37± 2.

Total estimated blood loss was subjectively estimated between 2500 ml to 4500 ml with mean of 3300ml. Fifteen patients (100%) received blood transfusions ranged from 3 to 7 units of whole blood and packed RBC and 2 to 4 units of plasma.

During our study duration of hospital stay among studied women ranged from 3 – 7 days with Mean 4± 1 and 2 cases were admitted to ICU one discharged after 48h and the other discharged after 5 days.

Table1. *Illustrates clinical and demographic data among studied women*

Case No	Age (years)	Parity	Week of gestation	Mood of delivery	Operation time/suture time	Adjuvant hemostatic procedure	Outcome	Blood loss ml	3D TVUS	Resumed normal menstruation (month)
1	21	P0	40+6d	CS	50/10	NO	Succeed	2500	Normal	2
2	30	P3	37+4d	CS	80/16	NO	Succeed	3700	Normal	4
3	28	P3	38	CS	100/15	NO	Succeed	4000	Normal	4
4	26	P29	38+2d	CS	70/10	NO	Succeed	3200	Adhesion	4
5	24	P1	39+1d	CS	55/9	NO	Succeed	2800	----------	2
6	39	P6	40+5d	SVD	80/14	NO	Succeed	4000	Normal	3
7	25	P4	36+6d	CS	65/10	NO	Succeed	2500	Normal	4
8	35	P5	32+3d	CS	95/15	NO	Succeed	3400	Normal	3
9	29	P3	38+5d	CS	70/13	NO	Succeed	3000	Normal	4
10	33	P3	37+5d	CS	70/12	NO	Succeed	3900	Normal	5
11	22	P1	39+2d	CS	65/15	NO	Succeed	2800	----------	2
12	23	P0	40+4d	CS	85/12	NO	Succeed	3200	Adhesion	4
13	30	P4	37	CS	90/10	NO	Succeed	2900	Normal	3
14	39	P6	41+2d	SVD	105/11	NO	Succeed	3300	Normal	2
15	37	P5	37	CS	160/15	NO	Succeed	4500	Normal	3

Our novel compression suture (Single vertical Compression suture, Saif modification) was attempted in15 patients and proper placement and complete hemostasis was achieved in all 15 cases (100%) and we need no adjuvant hemostatic procedure to control bleeding in all cases of our study.

4. DISCUSSION

In our study Single vertical Compression suture (Novel Saif modification) had been applied in 15 cases where it succeed to control bleeding in all cases (15 cases 100%)and preserve their fertility and avoid complicated maneuver as emergency hysterectomy and internal iliac artery ligation This in agreement with many studies performed in the field of compression sutures [8-9-10-11-12-13-14]

Our novel technique has many advantages. ***First*** our suture approximate both whole anterior and posterior uterine wall so can achieve complete hemostasis rapidly and minimizing blood loss

and decrease amount of blood transfusion required. ***Second*** our suture can reach to lower most part of the uterus so it can control bleeding from lower uterine segment as in cases associated with placenta previa. ***Third*** our suture did not need opening of the uterine cavity so help in cases of atonic PPH after vaginal delivery when laparotomy was done. And no need for re opining the uterus after closure of uterine scar in cases of caesarian section so decrease the time and complications of surgery. ***Fourth*** our suture is easy and rapidly applicable and can be performed by junior physicians.

Guang TL studied symbol shaped suture ''&'' to staple the anterior and posterior walls of the lower uterine segment as well as corpus uterus. But we think our suture is easy applicable and more effective in short time [15.]

all cases had good recovery in the early postoperative period but as regarding late postoperative complications several studies reported many complications related to compression sutures like endometritis, uterine necrosis, erosion, pyometra and intrauterine synechiae and Asherman syndrome[16-17-18 19-20-21]

In our study only 2 cases was missed follow up but in13 cases of our study we have 2 late complications related to the procedure where 3d TVUS revealed intrauterine adhesion where diagnostic hysteroscopy was done in our hospital to these cases and revealed normal uterine cavity in one case and small band of filmy adhesion in the other case which excised by hysteroscopic scissor. Only 3 cases suffered from postoperative abnormal uterine bleeding which managed by oral progesterone.

Recently some investigators studied the use of removable uterine compression suture in trial to decrease complications related to compression suture with small number of patients with no long -term follow up data available [22-23].

No maternal mortality reported during study and Bleeding did not resume in any patient after application of our suture and second laparotomy was not required in any case.

Subsequent pregnancies were not included in our study and contraception recommended for all patients. but only one case not received contraception so get pregnant and delivered full term male baby by CS at our hospital where uterus and whole pelvis appear normal indicating that our suture not affecting future fertility and pelvic anatomy.

Small number of patients and short period of follow up with lacking of long-term follow-up information and evaluation of future fertility may constitute limitations of this study

Future research should compare between the standard compression sutures and the novel procedure described in this study in a larger multicenter study with especial attention to future fertility outcomes which considered important task in this topic.

5. Conclusion

We conclude that Single vertical Compression suture (Novel Saif modification) easily applied and effectively control bleeding in cases of atonic PPH and preserve fertility, also had an equivalent efficacy and safety when compared with original B-Lynch and other compression suture described in the literature. So we recommend that this suture should be applied in all cases of atonic PPH to achieve complete hemostasis after failure of conservative measures.

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Conflict of Interest

The authors declare that we have no conflict of interests. The authors alone are responsible for the content and writing of the paper.

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