

New Modified Cross B- Lynch Versus Classic B Lynch in Controlling Postpartum Hemorrhage

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Abstract: Objectives: to evaluate the effectiveness of the new modified B Lynch in controlling postpartum hemorrhage encountered during caesarian sections. Material and methods: clinical trial conducted in Benha university hospital, obstetrics and gynecology department started from November 2012 to January 2014 upon patients with postpartum. Forty (40) patients divided into two groups; group one (20 cases) operated upon by the modified compression suture applied horizontally over the lower segment securing the vertical suture in place and added more compression on the lower uterine segment, saving the life and the uterus of cases. Group two (20 cases) operated upon by the classic b lynch. Main outcome measures: stoppage of postpartum hemorrhage and avoiding cesarean hysterectomy. Results: success rate in group one reached 95% (one case of hysterectomy out of twenty) compared to 70% success rate of group two (6 cases required hysterectomy) with p value < 0.05. Conclusion: compression sutures and the new modification can successfully treat postpartum hemorrhage encountered during cesarean sections (especially in cases with bleeding from the lower segment).

Keywords: atony, compression sutures, obstetric hemorrhage, B lynch

1. Introduction

Postpartum hemorrhage (PPH) may occur in 1-5% of deliveries in developed countries^(1, 2) and is still the most significant cause of maternal morbidity and mortality⁽³⁾. Classically, PPH has been defined as a blood loss greater than 500 mL after a vaginal delivery and greater than 1000 mL after a cesarean section. It is recognized that 500 mL is the average blood loss after a vaginal delivery and 1000 mL is the average blood loss after a cesarean^(4, 5).

A more useful and accepted definition of PPH is defined as blood loss sufficient to cause hypovolemia, a 10% drop in the hematocrit or requiring transfusion of blood products (regardless of the route of delivery)^[5]. PPH of this nature may occur in 4% of vaginal deliveries and up to 6% of cesarean deliveries in developed countries^[6-8].

Postpartum hemorrhage may develop in patients with no risk factors; however, reported risk factors include: multiparity, operative deliveries (forceps or vacuum assisted deliveries), previous postpartum hemorrhage, antepartum hemorrhage, prolonged third stage of labor (delivery of the placenta more than 30 minutes after delivery of the fetus), abnormal placentation (placenta previa, accreta or increta), oxytocin use, maternal obesity, and a distended uterus (from a large baby, multifetal gestation or excessive amniotic fluid)^[6-9].

In March 1997, Christopher B-Lynch and colleagues published their first report using the uterine brace suture for conservative management of postpartum hemorrhage (PPH)^[10].

The technique is comparable to bimanual uterine compression and was used in five women, two of whom later had successful pregnancies. This publication changed thinking in the obstetric community in terms of management of PPH not controlled with medications.

The procedure was relatively simple, uterine sparing, and did not interfere with uterine blood supply. It was also reproducible all over the world, with more than 2875 procedures successfully performed to date and few reported failures. Since the publication of this landmark article, more than 10 variations of uterine compression sutures have appeared, and new medications are still being reported^[12-16].

The search for additional supportive surgical technique continues, not only for uterine atony, but also for adherent placenta accreta or placenta previa. In addition, the search continues for combinations of techniques that can be used sequentially, especially when the surgeon has placed a B-Lynch suture and bleeding continues.

2. Material and Methods

Patient Allocation and Recruitment

A prospective clinical trial conducted in Benha university hospital -Egypt that is a tertiary referral center. Patients of PPH during LSCS operated upon by the new modified B Lynch after counseling with husband and a written consent taken by the husband in the file of the patient when routine uterotonics did not work.

Sample Size

According to Daniel formula

Sample size = $n = \frac{1}{P} \left\{ 1 + \frac{n}{\text{population}} \right\}$

In which $n = Z^2 \frac{P(1-P)}{(D^*D)}$

P = True proportion of factor in the population, or the expected frequency value,

D = Maximum difference between the sample mean and the population mean, Or expected frequency value minus worst acceptable value,

Z = Area under normal curve corresponding to the desired confidence level

Z = 1.96 (when confidence interval 95%)

Study Duration

This study included patients from November 2012 until January 2014.

Patient Groups

Cases of postpartum hemorrhage classified into two groups according to the method of intervention:

Group one (modified b lynch): twenty cases of postpartum hemorrhage operated upon by the new technique which added a horizontal compression suture around the lower segment.

Group two (classic b lynch): twenty cases of postpartum hemorrhage operated upon by the classic b lynch technique.

Patient selection

While performing cesarean section, in all patients with the delivery of the fetus, 10-unit inj. Pitocin given i/m and 20 units added to the drip after expulsion of placenta, if the uterus is flabby. Ergometrine i/m and 800 microgrammisoprostol given rectally with continuous bimanual uterine compression.

If the above mentioned methods of interventions failed to stop the bleeding then I proceed to the next step which was the classic b lynch or the new modified b lynch. Then patient observed about 5 minutes both abdominally and vaginally to see if the bleeding continued or stopped. If the compression sutures classic or modified failed to control bleeding hysterectomy done according to the conditions, amount of bleeding.

After securing hemostasis the abdominal wall closed in layers. Then the patients transferred to the ICU unit or to the emergency unit of the department according to the blood loss and the data of the vital signs.

Satisfactory results: stoppage of the bleeding with the compression sutures alone

Unsatisfactory results: when compression sutures required additional step like hysterectomy.

Postoperative follow up:

Vital signs

Urine output

Kidney function tests

Blood loss: hemoglobin and hematocrit concentration

On discharge: When the clinical conditions of the patients become stable for 48 hours; patients allowed to go home with a discharge card with full data about the condition in labour and the periods of return visits.

Steps of the modified b lynch

Before doing the suture a compression test done to evaluate the effectiveness of compression on the stoppage of bleeding; this done by bimanual compression if bleeding stopped with bimanual compression I proceeded to the next step. Vicryl suture number one introduced two centimeters

below the suture line on the left side (and suture line closed) and running out two centimeters above the suture in the same side Suture; then suspended high over the fundus and then needle passed transversely just above the level of the uterosacral ligament in the fibrous raphe of the midline. (a modification)

The number one vicryl suture suspended over the fundus in the left side and needle introduced above the suture line to come out just below the suture line anteriorly. Free ends then tied together in the midline after strong traction to gain effective compression then two horizontal sutures above and below the suture line added as follows:

Vicryl suture number one passed around the vertical suture transversely and a turn made around each vertical arm in the posterior aspect of the uterus. Then the horizontal suture traversed the broad ligament in an avascular area and tied to the other end over the lower segment anteriorly.

The horizontal sutures serve important features first securing the vertical sutures in place and second more compression in the lower segment so effective in cases of placenta accreta and bleeding from the lower uterine segment.

The advantage of the new technique

The first advantage was that the cavity not entered and intrauterine adhesion would be less. The second advantage was that the vertical sutures fixed posteriorly in the median fibrous raphe at the posterior wall of the uterus just above the uterosacral ligament so fixation would be more secure, central and with less bleeding.

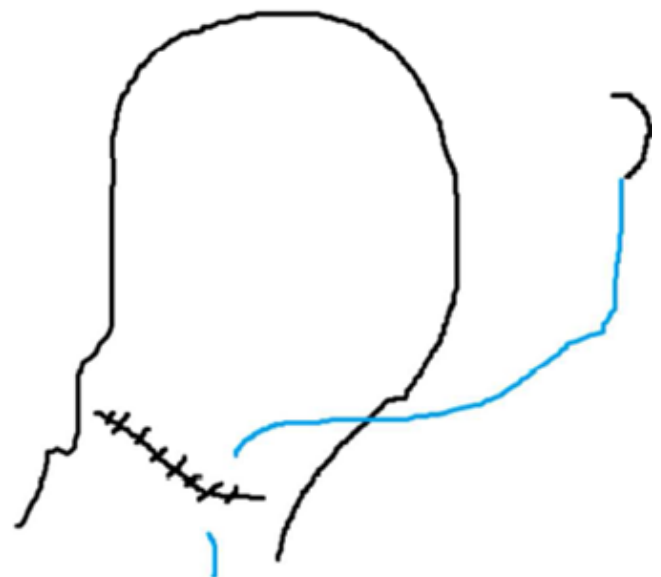


Figure 1: illustrating diagram showing the needle pass along the lower uterine segment.

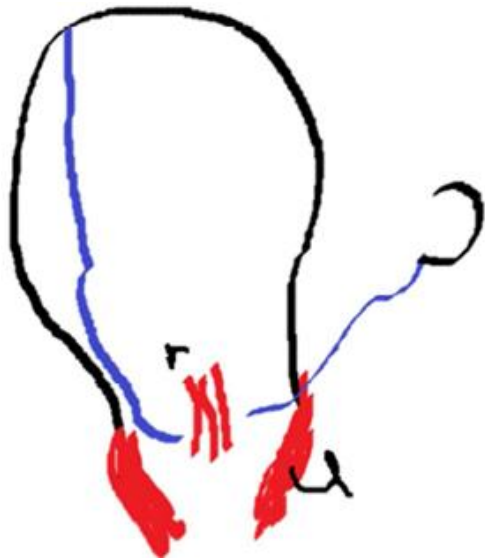


Figure 2: illustrating diagram showing needle pass across the median posterior raphe at the posterior uterine wall just above the uterosacralligaments.

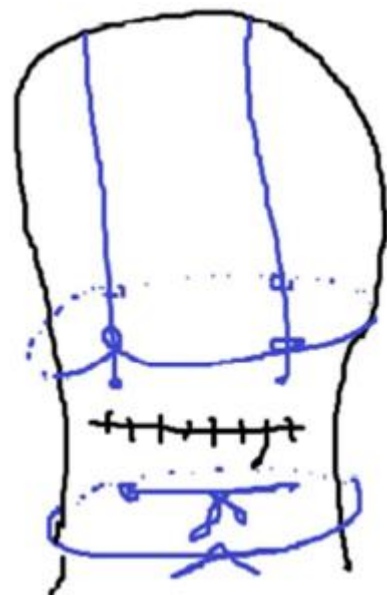


Figure 4: illustrating diagram after completion of the horizontal compression.

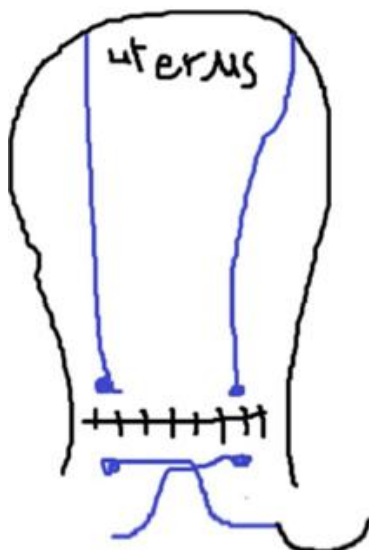


Figure 3: Illustrating diagram after completion of the vertical compressionsutures.



Figure 5: horizontal compression sutures above the suture line anteriorly.



Figure 6: horizontal suture applied below the suture line

3. Results

The modified b lynch group showed high success rate (thus avoiding hysterectomy and internal iliac ligation) in all of the cases except one (95%) as shown in(table 1) . In comparison group 2 showed 6 failure rates out of 20 with success rate (70 %) with 6 cases required either hysterectomy (table 2).The modified technique especially important in bleeding from the lower segment (cases of placenta previa) as it added more compression to the lower segment without penetration by the needle.

Table 1: 4linic- epidemiological data of cases in group one (modified B lynch)

number	cause	presentation	Blood transfusion	hysterectomy	Hospital stay
1	abruption	cephalic	2		2
2	abruption	cephalic	2		2
3	atonic	cephalic	2u		2
4	atonic	transverse	2u		2
5	atonic	cephalic	2		3
6	atonic	cephalic	2u		2
7	atonic	cephalic	2		2
8	atonic	breech	2u		2
9	previa	breech	4u		2
10	previa	cephalic	2		2
11	Prolonged 2 nd stage	cephalic	4u		4
12	Prolonged 1 st stage	cephalic	4u		2
13	PROM	cephalic	2u		2
14	atonic	cephalic	2u		1
15	atonic	cephalic	2		1
16	Placenta previa	cephalic	3		2
17	Placenta previa	breech	4	hysterectomy	3
18	Placenta previa	breech	2		3
19	Placenta previa	breech	2		2

20	Placenta previa	cephalic	4		3
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Table 2: clinico- epidemiological data of cases in group two (classic B lynch).

number	cause	presentation	Blood transfusion	hysterectomy	Hospital stay
1	atonic	cephalic	2		2
2	atonic	cephalic	2		2
3	atonic	cephalic	2u		2
4	atonic	transverse	4u	hysterectomy	4
5	atonic	cephalic	2		3
6	atonic	cephalic	2u		2
7	atonic	cephalic	2		2
8	atonic	breech	2u		2
9	previa	breech	4u	hysterectomy	2
10	previa	cephalic	2		2
11	Prolonged 2 nd stage	cephalic	4u	hysterectomy	4
12	Prolonged 1 st stage	cephalic	4u	hysterectomy	2
13	PROM	cephalic	2u		2
14	atonic	cephalic	2u		1
15	atonic	cephalic	2		1
16	Placenta previa	cephalic	2		2
17	Placenta previa	breech	4units	hysterectomy	3
18	Placenta previa	cephalic	2		3
19	Placenta previa	transverse	4 units	hysterectomy	2
20	Placenta previa	cephalic	2		3

Table 3: Success rate among the two groups

item	Group one (modified cross B lynch)	Group two (classic B lynch)	P value
Total number	20	20	
success	19(90%)	14(70%)	0.03

4. Discussion

Although uterine atony is the indication for use of modified B-Lynch suture, but it has been shown in many case reports that this suture is also useful in controlling bleeding in cases of placenta previa and placenta accreta. The first description of uterine compression sutures was published in 1996 as a single case report from Zurich, 22 that was followed by the famous report of five consecutive cases utilizing the B-Lynch suture in 1997. In 2000, Cho et al described a hemostatic multiple square suture to approximate the anterior and posterior uterine wall. In 2002, Hayman et al proposed a uterine compression suture that involved two vertical apposition sutures together with two transverse horizontal cervico- isthmic sutures.⁽²²⁾

In 2005, Hwu et al described the use of two parallel vertical compression sutures placed in the lower segment to control bleeding from placenta praevia.⁽¹⁴⁾ These sutures compressed the anterior and posterior uterine wall without penetrating the full thickness of the posterior wall. Another modification was the Pereira suture reported in 2005, which consisted of longitudinal and transverse sutures applied with superficial intra-myometrial bites only^(15, 16, 17).

Bahl technique entailed two sutures instead of one, with the knots tied in the anterior-inferior margin of the lower uterine segment, without any difference in the compression effects compared to the original B-Lynch suture. It can be seen that the principle, namely, compression of the uterine body, remains the same for all types of compression sutures.⁽²⁹⁾

In the literature, some series have described compression sutures solely used for placenta praevia/accreta,^(34, 36, 37, and 38) While others detailed their use exclusively for atonic uteri^(24, 25, and 26) and still others referred to application of the technique to all etiologies^(21, 31).

Apart from compressing the uterine body in uterine atony, the original paper on the B-Lynch suture also advocated its use for placenta praevia. It was proposed that the sutures would exert longitudinal compression and achieve evenly distributed tension over the uterus, including the lower segment⁽³⁹⁾

In addition, for cases of major placenta praevia, B-Lynch also described the use of additional independent figure-of-eight sutures placed either anteriorly, posteriorly, or both on the lower segment prior to suture application. The classic B-Lynch compression sutures are more invasive because it entered the uterine cavity and take bites more lateral near the high vascular areas.⁽³⁹⁾

In Hackethal modification, an absorbable Vicryl 0 thread and an XLH needle whose curve straightened manually for suturing. To perform an interrupted single U-suture, the needle inserted at the ventral uterine wall, led through the posterior wall and then passed back to the ventral wall where the thread joined with a flat double knot.

While the lead surgeon was tying the suture, the assisting surgeon performed bi-manual uterine compression. The number of sutures required depended on the size of the

uterus and the persistence of bleeding. In general 6–16 U-sutures in horizontal rows along the uterus starting at the fundus and ending at the cervix. Thus, approximately 2–4 cm of tissue compressed within each suture.⁽⁴⁰⁾

The more suture bites associated with bleeding and distortion of the uterine anatomy. In my modification (presented work) no entry into the uterine cavity so intrauterine adhesion would be less. The vertical sutures done after closure of the uterine wall then sutures suspended in the median raphe in the posterior wall of the uterus and this allowed sutures to be taken in fibrous tissue with less bleeding, the other advantage was the more support of the vertical sutures in the midline without sliding laterally.

The new modification entailed adding additional horizontal sutures tied around the vertical one above and below the suture line. The horizontal sutures passed in an avascular area in the broad ligament make more tension around the vertical one and served to make more pressure in the lower segment so the technique easily applied to other indications like placenta previa and accreta.

The postpartum hemorrhage remains a significant cause of maternal morbidity and mortality, but with simple surgical modification to the compression sutures conservative surgery saved patient life and uterus for future fertility.

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6. Conflict of interest

No conflict of interest to declare about this work

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