Assessment Of The Effect Of B-Lynch Suture As a Prophylactic Procedure For Prevention Of Postpartum Hemorrhage During Cesarean Section In High-Risk Cases

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Synopsis

Since its first report in 1997, the B Lynch technique has been utilized all over the world. However, before the procedure can be applied successfully, the uterus must first be compressed longitudinally and left to the right, with absorbable sutures set at the anterior and posterior lower uterine segments.

Impact statement

What is already known on this subject?

PPH is the commonest cause of maternal mortality and responsible for 1/4 of the maternal deaths all over the world.

What do the results of this study add?

Blood transfusions, postnatal hospital stays, paralytic ileus, uterotonic use, and PPH were statistically less common in the B-Lynch group. was notably lower in the B-Lynch group compared to the control group. The B Lynch group was uncomplicated to work with and didn't require any more time than normal for CS.

What are the implications of these findings for clinical practice and/or further research?

The B Lynch treatment works well for managing atonic uteri, particularly in younger women who are experiencing reproductive problems.

Abstract

Objectives: to evaluate the effect of B-Lynch suture as a prophylactic procedure for prevention of atonic PPH during cesarean delivery in high risk cases.

Methods: 150 pregnant women between the ages of 35 and 40 weeks were divided into two groups at random. The first group, consisting of 75 patients who went through prophylactic B Lynch, was called the cases study. The second group, consisting of 75 patients, was called the control group. This group did not receive prophylactic B Lynch. Following fetal delivery, all patients in the

two groups received an injection of 10 IU of oxytocin.

Results: Blood transfusions, postnatal hospital stays, paralytic ileus, uterotonic use, and PPH were statistically less common in the B-Lynch group. was notably lower in the B-Lynch group compared to the control group. The B Lynch group was uncomplicated to work with and didn't require any more time than normal for CS.

Conclusion: The B Lynch treatment works well for managing atonic uteri, particularly in younger women who are experiencing reproductive problems.

Keywords: B Lynch uterine compression suture, Postpartum hemorrhage, Uterine atony , Conservative management.

Introduction

In fact, the definition of Postpartum hemorrhage (PPH) is somewhat arbitrary and problematic PPH can be defined as blood lossof > 1000 ml after cesarean delivery (1). Traditionally, the classification of PPH has depended on the timing of the start of bleeding in relation to the delivery where hemorrhage within the 1st 24 h of delivery is termed early or primary PPH, while bleeding that occurs afterwards but within 6 weeks of delivery is termed late or secondary PPH(2).

World health organization (WHO) has documented that PPH is the commonest cause of maternal mortality and responsible for 1/4 of the maternal deaths all over the world (1) the highest prevalence rates of PPH was reported in Africa (27.5%), while the lowest was reported in Oceania (7.2%), with an overall rate worldwide of ~10.8%. on the other hand, the rate in both Europe & North America was about 13% (3).

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Primary PPH is considered as a disorder of one or more of the 4 processes: uterine atony, retained clots& placental debris, genital lesions& trauma, in addition to coagulation disorders uterine atony alone is responsible for approximately75–90% of cases of PPH, whereas causes of secondary PPH include: uterine infection, retention of placental fragments, as well as abnormal involution of the placental site (4). Many factors may precipitate hemorrhage such as advanced maternal age, preeclampsia, obesity, prolonged labor, multiple pregnancies, birth weight more than4kg however ,early detection along with proper treatment of such factors is a corner stone for an adequate management of PPH (5) .

If medical management fails to control PPH, surgery might be used the surgical methods used include uterine artery ligation, ovarian artery ligation, internal iliac artery ligation, selective arterial embolization, B Lynch suture and hysterectomy (6) if PPH is catastrophic and not responding to other measures, hysterectomy usually become the last option (7).

The B Lynch procedure has been used all over the world since the original report in 1997 prior compression is required so as to expect successful application the whole uterus is compressed in longitudinal way and left to the right using absorbable sutures fixed at the anterior& posterior lower uterine segment. (8) , (9).

Patients and Methods

A Randomized controlled prospective study on 150 pregnant women attending Beni Suef university hospital and Fayoum public hospital for caesarian delivery with high risk factors for atonicity.it will be started on January 2018 and ended in December 2018.

Inclusion criteria:

- Maternal Age (years): range from 21yrs to 35yrs,

- Gestational Age (weeks): range from 35wks to 40wks,
- Parity: from primigravida to 4th parity,
- Risk Factors for atonic PPH included past history of Atonic PPH, over distension of the uterus (polyhydraminos, multiple pregnancy and fetal macrosomia).

Exclusion criteria:

- Other causes of PPH as placenta accrete spectrum (PAS) .
- Medical disorders with pregnancy e.g HTN, DM, epilepsy, cardiac, etc…
- **The patients were divided into 2 groups**

Group 1(75 patients) : underwent a prophylactic B- Lynch.

Group 2(75 patients): didn't undergo a prophylactic B-Lynch.

The choice of each patient for being in group 1 or group 2 according to sequence of their attendance where 1st ,3rd ,5th ,7th ,9th ,……etc. will be in group1 while 2nd ,4th ,6th ,8th ,10th ,…..etc. will be in group2.

Intervention :

Full history taking including Personal history, Present history, Obstetric history , Past history & Family history .

Clinical examination including General examination & vital signs , Abdominal examination including Leopold's maneuvers & obstetric ultrasound . Routine laboratory investigations including CBC , Coagulation profile & RH.

Every patient underwent spinal anesthesia using a conventional procedure. Prior to anesthesia, each patient received a 500 mL crystalloid IV bolus. The anesthetists were directed to provide 10 IU of oxytocin to every patient in both groups as soon as the fetus was delivered, as a standard procedure to prevent postpartum hemorrhage for all patients.

Colloid infusion was used throughout the procedure to replace lost blood, or if necessary, IV crystalloids continued to be administered at a rate of 1 liter every eight hours until the following morning.

The cesarean section surgical technique was unified. The typical technique, which calls for a transverse lower segment cesarean section, uterine delivery (exteriorization), and uterine closure in two layers, was given to the surgeons. The uterus was then examined for early indications of PPH, such as weak uterine tone or delayed involution and uterine enlargement (fundus above umbilicus without uterine fibroid).

Cutting through the newly made CS incision or the bottom region of the uterus after the bladder has been dissected to access the uterine cavity.

After the uterus is removed, the interior is carefully inspected for the existence of any tears and/or retained pregnancy products, which could be further causes of PPH.

According to the genuine B-Lynch publication, the technique entails placing an absorbable suture 3 cm from the right lower border of a uterine incision and 3 cm from the right lateral border. This suture is then threaded through the uterine cavity to emerge from the superior incision margin 3 cm over and approximately 4 cm from the lateral edge. The suture is then turned over to squeeze the fundus approximately 3–4 cm from the right cornual edge. The suture is pulled under a medium tension, assisted by manually operated compression carried out by a second person. The entire length of the suture is moved back posteriorly via the same surface, marking as for the right side, the suture lying horizontally.

Postoperative follow up : vital signs and CBC 24 hours after surgery.

Hemoglobin reduction was estimated mainly by contrasting full blood picture before & 6 hours after the surgery in both groups.

Primary outcome : prevention of PPH.

Secondary outcome: included occurrence

of severe anemia, need for blood transfusion ,side effect(e.g paralytic ileus) and postnatal hospital stay.

Results

In the current study, 186 cases were assessed for eligibility amongst 150 cases were randomized equally into B-lynch and control groups. No loss of follow up was in.

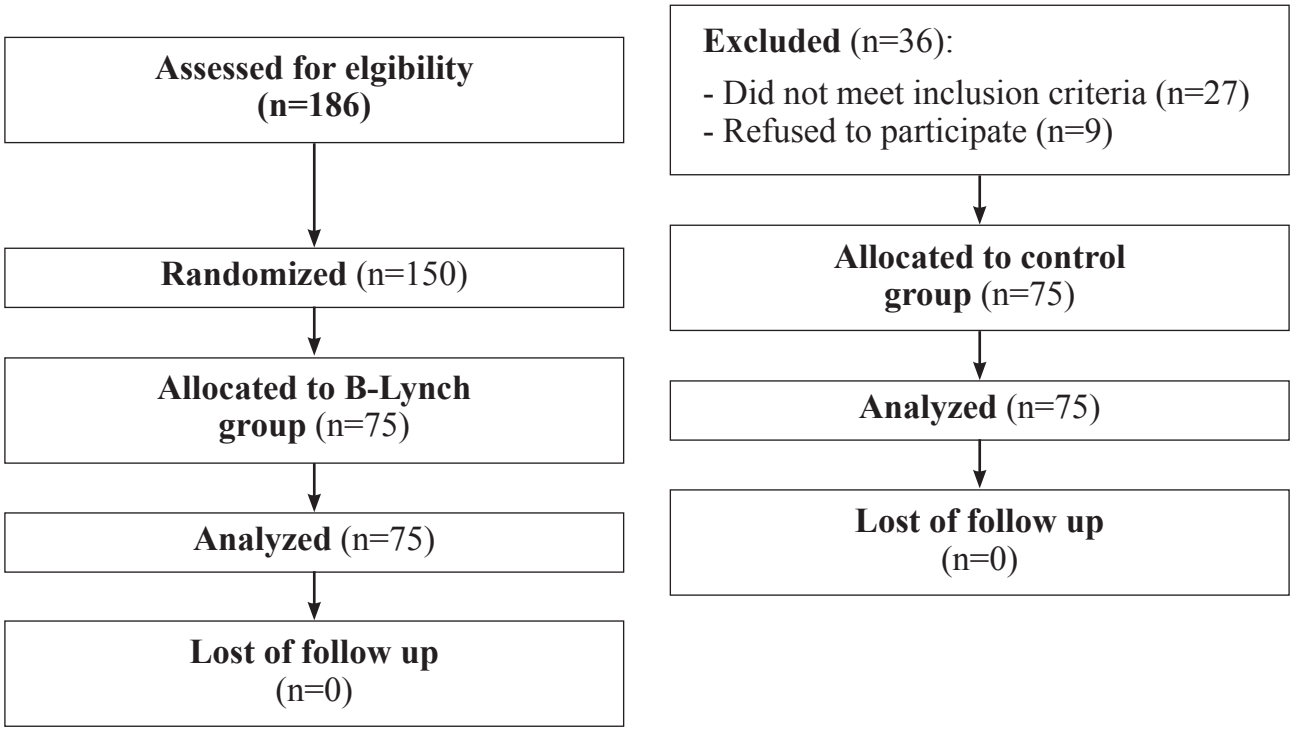

Fig (1): Consort flow chart of study population

Table (1): Demographic characteristics among the studied groups

Items	Measure	B-Lynch (N=75)	Control (N=75)	P
Age (years)	**Mean±SD**	27.6±3.6	27.1±3.5	^0.374
	Range	21.0–35.0	21.0–34.0	
BMI (kg/m²)	**Mean±SD**	26.8±1.3	26.7±1.6	^0.840
	Range	24.5–29.7	23.7–30.0	
Parity	**Mean±SD**	1.8±1.3	1.9±1.1	^0.585
	Range	0.0–4.0	0.0–4.0	
GA (weeks)	**Mean±SD**	38.5±1.2	38.4±1.1	^0.491
	Range	35.0–40.0	35.0–40.0	
	Atonic PPH	43 (57.3%)	47 (62.7%)	#0.351
	Fetal macrosomia	17 (22.7%)	16 (21.3%)	
	Multiple pregnancy	11 (14.7%)	5 (6.7%)	
	Polyhydraminos	4 (5.3%)	7 (9.3%)	

^Independent t-test, #Chi square test

No significant statistical difference between the studied groups regarding **demographic characteristics**. In B-lynch and control groups Mean±SD of age was 27.6±3.6 and 27.1±3.5 respectively, of BMI was 26.8±1.3 and 26.7±1.6, Parity was 1.8±1.3 and 1.9±1.1 respectively, while GA was 38.5±1.2 and 38.4±1.1 respectively.

Table 2: Hemoglobin (gm/dL) among the studied groups

Variable	Measure	B-Lynch (N=75)	Control (N=75)	^P
Pre operative	**Mean±SD**	11.2±0.5	11.3±0.5	0.306
	Range	10.1–12.3	9.8–12.6	
Post operative	**Mean±SD**	9.5±0.7	9.2±0.8	**0.032***
	Range	7.8–11.6	6.6–10.7	
Reduction	**Mean±SD**	1.7±0.6	2.1±0.6	**<0.001***
	Range	0.2–3.0	0.9–4.0	
Value of B-Lynch				
Value		**Mean±SE**	**95% CI**	
Reduction difference		0.4±0.1	0.2–0.5	

^Independent t-test, CI: Confidence interval, *Significant

There was no discernible variation in preoperative hemoglobin levels across the groups under investigation, as indicated by Table 2. The B-Lynch group's postoperative hemoglobin level was noticeably greater than the control group's. The B-Lynch group's hemoglobin drop was noticeably less than that of the control group. The mean±standard deviation of hemoglobin decrease was 1.7±0.6 in the B-lynch group and 2.1±0.6 in the control group.

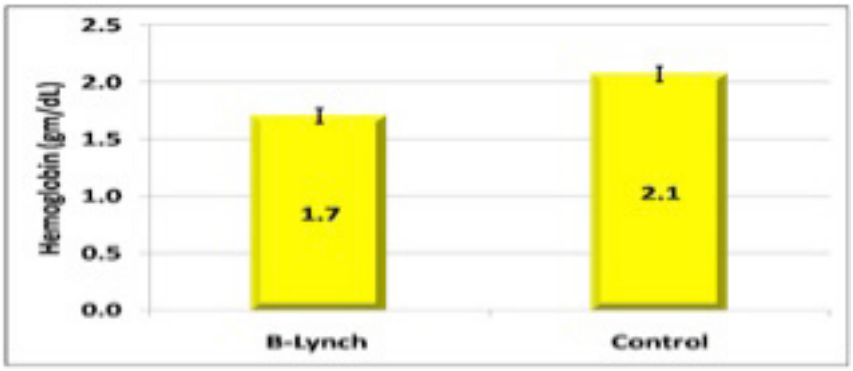

Figure (2): Hemoglobin reduction among the studied groups

Table (3): Hematocrit (%) among the studied groups

Variable	Measure	B-Lynch (N=75)	Control (N=75)	^P
Pre operative	**Mean±SD**	38.0±2.0	38.4±2.0	0.160
	Range	33.4–42.4	34.3–43.3	
Post operative	**Mean±SD**	5.6±1.4	6.8±1.2	**<0.001***
	Range	2.7–7.9	4.0–10.8	
Reduction	**Mean±SD**	32.4±2.4	31.6±2.2	**0.046***
	Range	27.9–38.3	25.8–35.6	
Value of B-Lynch				
Value		**Mean±SE**	**95% CI**	
Reduction difference		0.7±0.4	0.1–1.5	

^Independent t-test, CI: Confidence interval, *Significant

Table (3) revealed that there was no discernible variation in preoperative hematocrit across the groups under investigation. The B-Lynch group had a considerably greater postoperative hematocrit than the control group. The B-Lynch group's hematocrit drop was noticeably less than that of the control group. Mean±SD of hematocrit decrease in the B-lynch and control groups were 32.4±2.4 and 31.6±2.2, respectively.

Table (4): Maternal complications and side effects among the studied groups

Conditions	B-Lynch (N=75)	Control (N=75)	P	RR (95% CI)
Blood loss > 1000 mL	0 (0.0%)	6 (8.0%)	0.028*	--
Uterotonics	3 (4.0%)	13 (17.3%)	0.008*	0.231 (0.069 – 0.777)
Blood transfusion	1 (1.3%)	8 (10.7%)	0.034*	0.125 (0.016 – 0.975)
Severe anemia <7.0 gm/dL	0 (0.0%)	3 (4.0%)	0.245	--
Paralytic ileus	6 (8.0%)	17 (22.7%)	0.013*	0.353 (0.147 – 0.846)
Hysterectomy	0 (0.0%)	0 (0.0%)	--	--
Post-operative hospital stay	50.9±2.6	53.1±3.1	**<0.001***	

#Chi square test, *Significant, RR: Relative risk, CI: Confidence interval

Table (4) demonstrated that: **PPH, uterotonic usage, paralytic ileus and blood transfusion** were statistically significant between groups. The B-Lynch group experienced a considerably shorter postnatal hospital stay compared to the control group. The mean±standard deviation of postnatal hospital stays was 50.9±2.6 and 53.1±3.1 in the B-lynch and control groups, respectively.

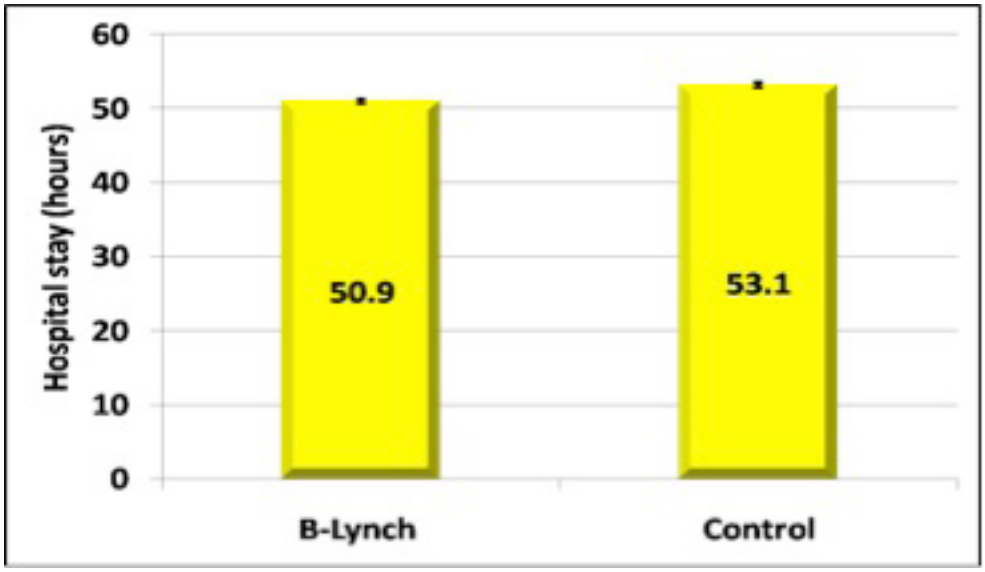

Figure (3): Postnatal hospital stay among the studied groups

Discussion

After conventional uterotonic medication demonstrated to be unsuccessful, five patients in Christopher B. Lynch's initial case series underwent the B Lynch treatment for major PPH. (10) While uterine atony is typically a justification for using the B Lynch procedure, it has been demonstrated in multiple studies that the suture was also helpful to mitigate blood loss in cases of placenta praevia and placenta accreta. Interestingly, no immediate or long-term issues were identified of the five cases; four had primary PPH and one case had secondary PPH nine days following an elective CS (11).

It is remarkable that a number of variables, such as hemodynamic instability, the extent and length of the hemorrhage the expertise of the surgeon and team, and the availability of blood and blood supplies, affect the likelihood of successful completion of the B Lynch suture.The success rates may vary because some patients had uterine compressing sutures applied at the last minute of PPH, while others had them performed beforehand. Additionally, publication bias may result from refusal to disclose unsuccessful instances, which could mask the true success rates (12).

There is a fine balance involved in the timing of the uterine compressing sutures. Placing B Lynch sutures as soon as a uterotonic drug fails may reduce bleeding, but it may also increase the chance of some uncommon consequences, including as uterine necrosis (13). It has been demonstrated that the B Lynch method, in addition to its many benefits—such as its relative easy and straightforward nature of application, short application time, minimal blood loss, reduced need for blood transfusions, and low skill level—is a valuable addition to surgical treatment for PPH and an important benefit in young patients with maintaining future fertility (14).

In cases of placenta previa, the B Lynch suture is a more effective means of stopping bleeding in conjunction with BUAL because bleeding frequently originates from vasculature at the placental site in the lower region of the uterus, which cannot be controlled just by the compression act (15). The exact location of compressing sutures is determined by the surgeon during the laparotomy; if uterine atony persists after using uterotonic drugs, compression sutures are advised because waiting an hour to place them increases the likelihood that a hysterectomy will be necessary. (16) Lynch suture is recommended as a straightforward method that ought to be attempted prior to using more complicated interventions; PPH care is an emergency that requires prompt attention as well as a methodical management (17).

Remarkably, based on the number of techniques performed in a cohort series, the incidence of adverse effects following the B Lynch suture has seemed to increase. One patient experienced a septic condition resulting from pyometra in an ischemic uterus, which required a hysterectomy six weeks postpartum (18).

It is preferable and more accurate to examine data from "only B Lynch" cases, devoid of any other hemostatic surgical procedures, in order to ascertain the true relationship between the B Lynch suture and the outcome of pregnancy. A study described a case that was the fifth instance of a successful pregnancy following a prior CS and a B Lynch operation because of PPH; the case arose from atony and was unrelated to any other surgical occlusion (19).

In the previous published "only B Lynch" cases, three patients experienced repeated CSs without PPH or other problems, and only one patient (20) had regions of adhesions between the wall of the uterus and the stomach. The current trial, which included 150 patients split into 2 groups, sought to avoid atonic PPH in high-risk situations. The first group of 75 patients, known as the cases study, went through prophylactic B Lynch, while the second group of 75 patients, known

as the control group, did not undergo prophylactic B Lynch. All patients in both groups received an injection of 10 IU of oxytocin right after the fetus was delivered; the B Lynch group's procedure was straightforward and easy to carry out.

Preoperative Hb in the B_Lynch group Mean ± SD 11.2±0.5 gm/dl and in the control group Mean ±SD 11.3±0.5, and postoperative Hb in the B_Lynch group Mean ±SD 9.5±0.7 gm/dl and in the control group Mean ±SD 9.2±0.8 gm/dl did not vary significantly between the groups under study. The B_Lynch group had considerably higher postoperative Hb than the control group, and the B_Lynch group had significantly lower Hb decrease than the control group. The mean ±SD of the Hb drop was 1.7±0.6 in the B_Lynch group and 2.1±0.6 in the control group, respectively.

The B Lynch group experienced fewer maternal problems, such as the need for blood transfusions, paralytic ileus, and uterotonic use. The mean±standard deviation of the postnatal hospital stay was 50.9±2.6 hours in the B Lynch group and 53.1±3.1 hours in the control group. Our research indicates that in high-risk situations, the B-Lynch suture is an important technique for preventing atonic PPH.

Instead of measuring blood loss visually, professionals should use clinical indicators, or signs and symptoms. In order to manage persistent PPH, a multidisciplinary strategy that addresses the source of blood loss in addition to maintaining hemodynamic stability is required. For the prevention of PPH, oxytocin (10 IU, IV/IM) is the suggested uterotonic medication. The standard course of treatment for PPH is uterine massage. It is advised to employ surgical interventions if bleeding persists after uterotonics and other accessible conservative treatments (such as uterine massage and balloon tamponade) have been tried. When medical management fails to treat PPH, surgical procedures such as internal iliac artery ligation, compression sutures, and hysterectomy should be considered.

utilizing B-lynch sutures, a straightforward and affordable procedure with the added benefits of requiring less application duration, blood loss and skill when fertility concerns are present. The mother's fertility prospects does not seem to be impacted by this surgery.

Conclusion

The B Lynch operation is a useful tool for managing PPH since it can save the uterus in cases of severe PPH and avoid bleeding and transfusion-related complications in cases of mild to moderate refractory PPH.

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