Original Article

B-lynch Suture: Safe Alternative to Emergency Obstetric Hysterectomy

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Abstract

Objective: to assess the success and safety of uterine compression sutures as an alternative to hysterectomy for severe postpartum hemorrhage (PPH) due to uterine atony at the time of caesarean delivery.

Study Design: cross sectional study.

Place and Duration: study was carried out in the department of obstetrics and gynecology, unit 1, Allied Hospital and PMC Faisalabad.

Duration of study: from January 2010 and December 2013.

Methodology: there were total 39534 deliveries during the study period. Out of which, 1500 patients had PPH more than 1000ml with an incidence of 3.79%. Eighty eight had severe to massive PPH who failed to respond to conservative approach. Fifty two women underwent hysterectomy without having any conservative surgical management and B-Lynch suture was performed on 36 patients to control intractable PPH unresponsive to conservative therapy.

Main outcome measures: hysterectomy, immediate post-operative complications, future menstruations or pregnancy.

Results: in 61.11% (22) the B-Lynch suture was the only intervention, whereas in 38.88 % (14) it was combined with uterine vessel ligation. The B-lynch with or without uterine artery ligation resulted in control of bleeding with uterine preservation in 83.33% (30) of the women. Hysterectomy was done in 16.66% (6) cases. Regarding follow up, 33.3 % (10 /30) patients had no complaints regarding

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menstruation, 6.66 %(2/30) women delivered by LSCS 3 years after B-lynch, 10% (3/30) remained ammenorrohic up to 2 years. Hysteroscopic examination of ammenorrohic patients showed no uterine abnormality in 6.66%(2) women who later on resolved spontaneously, while intra uterine adhesions were found in one woman in whom IUCD was placed and she started having scanty menstruation. **Conclusion:** the B-Lynch brace suture is a simple, safe, rapid and successful procedure.

Keywords: B- Lynch suture, hysterectomy, postpartum hemorrhage, uterine atony

Introduction

WHO estimates that 5, 29000 women die each year from pregnancy related causes and most of these deaths occur in developing countries.[1]

Postpartum hemorrhage (PPH) still remains among the top five causes of maternal death in both the developing and the developed world.[2,3].

PPH creates grave obstetrical crisis and presents challenge to the obstetricians and appears major contributor to maternal mortality and morbidity.[4] It has been estimated that worldwide, over 125,000 women die of PPH each year[4] and 30% of these maternal deaths occur in underdeveloped nations.[5] Post partum hemorrhage denotes excessive bleeding more than 500ml in vaginal delivery and 1000ml in Caesarian section.[6] PPH when occurs within 24 hours of delivery is called primary while after 24 hours to 6 weeks post partum known as secondary PPH.

Uterine atony is the most common cause (75-90%) of primary PPH .This occurs in approximately 4% of vaginal deliveries and 6% of cesarean deliveries.[2] According to the World Health Organization, 10.5% of live births are complicated with PPH while 2-5% of deliveries may lead to PPH with a blood loss of more than 1000ml within the first 24 hours.[7]

The conventional management starts with simple massage of the uterus and use of pharmacologic agents such as oxytocin, syntometrine and prostaglandins. When these medical or conservative methods fail to handle the severe hemorrhage, a number of surgical procedures attempted including compression suture technique, stepwise devascularization of the uterus, uterine, internal iliac artery ligation and ultimately resorting to hysterectomy.[8]

The B-Lynch suture / uterine suture or B-Lynch brace suture is a form of compression suture used in emergency to control severe postpartum hemorrhage. It is used to mechanically compress an atonic uterus with some stitch material like vicryl or chromic cat gut .It was named after Christopher B-Lynch who was the first to develop and describe the technique in 1997.[9] Initial B-Lynch suture was used to compress the uterus like a brace with two longitudinal sutures along its long axis[9]. Later on many modifications were introduced to make it simple and quick, such as Hayman's and Cho's Square modification of the B-Lynch Suture.[9]

Our rationale of study was to see safety and success of the suture to reduce the incidence of emergency obstetric hysterectomy in order to preserve fertility of patients and reduce morbidity associated with emergency obstetric hysterectomy. Statistics on efficacy, safety and success of these compression suturing techniques are mostly limited to the small

case series and long-standing follow-up information is still deficient in our country.

Methodology

We included all cases whether elective or emergency caesarean deliveries during which patients developed severe postpartum hemorrhage due to uterine atony. All cases were assessed for risk factors of uterine atony. After ethical review committee permission, all women were counseled and written informed consent was taken from all of them prior to surgical procedure. Having exclusion of retained products of conception and genital tract trauma, a step-wise approach to management of postpartum hemorrhage due to uterine atony, was initiated progressing from less invasive therapies (uterine massage, uterotonic drugs) to more invasive approach such as application of B - Lynch compression suture, proceeding to uterine artery ligation and eventually resorting to obstetric hysterectomy. Patients strictly monitored in immediate post-operative period in recovery unit for 48 hours then in ward for up to five days for any post-operative complications. After discharge from hospital, they were followed for up to 6- 30 month for future menstruation or pregnancy.

Before applying B – Lynch suture ,Bimanual compression is first tried to atonic uterus to assess the potential chance of success of the B-Lynch suturing technique by observing vaginal bleeding, if it is reduced then compression suture was applied, otherwise abandoned the procedure and obstetric hysterectomy was opted. A no. 1 vicryl on long straight needle was used to transfix the uterus from front to back, just above the reflection of the bladder and is then tied at the funds of the uterus. Two sutures on each side of uterine funds were applied. Sometimes more than two sutures if the uterus appeared to be broad or more than two sutures seemed to be necessary to obtain adequate compression. If patient did not respond completely to B-Lynch suture, then in next step uterine artery ligation was done before opting to obstetric hysterectomy.

Results

There were total 39534 deliveries during study period .Out of whom 1500 patients were detected with PPH more than 1000ml with an incidence of 3.79% .

Mean age was 30 years +/-5yr; mean gestational age was 37+6 +/-1.79.Mean parity was 4.0 +/- 2.2, (Table I).

Table I. Statistics of study variable (n=36)

Variable	Mean +/- SD	95% CI	Median	IQR (max-min)
Age (year)	30.00 +/- 5.254	+/- 1.72	29.50	7.75
Gestational age (weeks)	37.85(37+6) +/-1.79	+/- 0.58	37.86	1.90
Parity	4.08 +/- 2.21	+/- 0.72	04.00	3.50

Majority 47.2 % (17) sutures were applied in 26 – 32 years age groups while least 16.6%(06) were needed in 19-25 years age group. Effectiveness or success with variable occurred 100% (6) in 19 -25 years age group followed by 82.3% in 26-32 years age group.

Maximum (61.1%) belong to Para 2 –5 followed by Para 6 –8 and Para 0-1. Success of B lynch in these group was 90.9%, 66.6% and80.0% respectively. Regarding gestational age, majority 69.4 % (25) belong to 37-39 weeks. Maximum success 88 .0% (

Table II. Descriptive study of variables and success (n=36)*

Variable	Number (%age)	Success no. (%age)
Age		
• 19 - 25	06(16.67)	06(100)
• 26 - 32	17(47.22)	14(82.35)
• 33 - 39	13(36.11)	10(76.92)
Parity		
• 0-1	05(13.88)	04(80.00)
• 2-5	22(61.11)	20(90.90)
• 6-8	09(25.00)	06(66.66)
Gestational age (weeks)		
• <37	06(16.67)	04(66.66)
• 37-39	25(69.44)	22(88.00)
• 40-41	05(13.89)	04(80.00)
Booking status		
• Booked	8(22.22)	07(87.50)
• Unbooked	22(61.11)	18(81.81)
• Referral	06(16.67)	05(83.33)
Type of surgery		
• Emergency	29(80.56)	24(82.75)
• Elective	07(19.44)	06(85.71)
Type of surgical procedures		
• B lynch only	36(100)	22(61.11)
• B lynch + uterine artery ligation	14(38.89)	08(22.22)
• Hysterectomy following failure of B lynch + uterine artery	06(16.67)	06(16.67)

22) with B-Lynch remained at 37-39 weeks of gestation Minimum 16.6 % (06) were seen in patients having gestational age of less than 37 weeks. Type of surgery elective/emergency also affects success of B-Lynch suture revealing 85.7%, 82.7% respectively.

Considering the success of B-Lynch suture it remained 61.1 %(22) alone & and in combination with uterine artery ligation in 22.2 %(8). It resulted in control of bleeding with uterine preservation in a total of 83.3% (30) cases while appeared failed in16.6 %(6) in whom Hysterectomy was done. Age, parity, gestational age, booking status, type of surgery and type of surgical procedure are shown in table II.

Regarding complications, they were less in B-lynch group, as compared to hysterectomy group (Table III).

Considering the follow up 33.3 %(10 /30) patients had no complaints regarding menstruation, 6.6 %(2/30) women delivered by LSCS 3year after b-lynch, 10.0 % (3/30) remained ammenorrohic up to 2years. Hysteroscopy examination showed no uterine abnormality in 6.6 %(2/30) women who later on resolved spontaneous menstruation, while hysteroscopy revealed intra uterine adhesion in 3.3 %(1/30) woman in whom IUCD was placed and she started having scanty menstruation. While remaining patients had no follow up. On the whole B-Lynch

Table III. Comparison of complications of two groups.

Name of procedure	No. of patients	Temperature and high grade fever No. (%)	Mild to moderate No. (%)	UTI No. (%)	Bladder and uterine injuries	Paralytic ileus N0. (%)	Infertility N0.(%	Psycho sexual N0.(%)
B-Lynch with/ without uterine artery ligation and obstetric hysterectomy	36	0	3(8.3)	0	0	1(2.7)	3(8.3)	0
Direct obstetric hysterectomy	52	5(9.6)	8(15)	6(11.5)	3(5.7)	4(7.6)	52(100)	6(11)

comparison suture is found to be a successful procedure for control of PPH due to uterine atony, after Caesarean Section as compared to Emergency obstetric hysterectomy and with lesser complications too.

Discussion

In Pakistan, about 30,000 women die each year due to pregnancy related causes. Although Maternal mortality has been reduced from 230 (120-430) in 2005 to170 (93-320) per 100,000 live births in 2013 according to WHO & UNICEF.[10]

Maternal mortality still seems to be high. Hemorrhage, hypertension, unsafe abortion, infection and obstructed labor are among the direct causes leading to maternal death. Hemorrhage and hypertensive disorders are major contributors to maternal deaths.[11] It is normal to expect 200-300ml of blood loss at the time of delivery and labeled as PPH when it is more than 500 ml. Severe PPH (SPPH) is defined when blood loss is more than 1000ml and becomes life threatening when it is > 2500 mls.

Maternal morbidity and mortality rises not only with amount of blood loss but also with delay in diagnosis and management. Uterine atony, degree of retained placenta including placenta accreta and its variants, and genital tract lacerations all lead to cases of PPH but uterine atony is the commonest cause of primary postpartum hemorrhage.[3]

Prophylactic Oxytocic use reduces the risk of PPH by about 60% [12,13] .In spite of Oxytocic use reported, the incidence of PPH ranges between 5% to 11% and it may rise as high as 18% where active management of third stage of labour may not be the routine.[13] In current study incidence of severe PPH came out to be 3.79% appearing to be less than quoted in study.[13] While more than1.74% shown in another study.[14] The reason of the difference might be that assessment of blood loss not unanimous and most of the time measurement of blood loss is rough estimate .

PPH is not only a serious obstetric problem which is associated with conditions such as acute renal failure, necrosis of the anterior pituitary gland, appreciable morbidity as well as loss of fertility with its psychosocial effects.

Christopher B-Lynch[9] was the first who successfully controlled the massive hemorrhage by applying brace suture to compress the uterus in a series of five cases .It was beginning of revolutionary suture technique for preservation of fertility but resulted in many potential complications. So this was followed by modifications in uterine compression suture techniques described by many authors .[3, 15, 16, 17]

Since then people keep on using B-Lynch and its variants because of rapidity, simplicity and safe alternative modality to hysterectomy in order to reduce immediate and long term complications associated with emergency obstetric hysterectomy.

Currently suture technique is gaining popularity because of new adaptations of the B-Lynch brace suture adopted by different authors[12,15,16,17,18,19] for control of PPH as these alterations minimize its previously reported potential complications such as failure to preserve the uterus, suture erosion, and partial and total uterine necrosis as presented in different studies [20,21,22,23,24], pyometria[25] , synechia and Ashermann's syndrome.[26,27]

Keeping in mind the adaptations and alterations, authors adopted a simple technique of B-Lynch compression suture modified and described by

Hayman et al[15]. We were fortunate enough that in majority of younger women without any post operative complication obstetric hysterectomy was avoided. Amazingly, it is renowned in the present series that it appeared to be 100% successful in younger age group and almost 91% in Para 2-5. Thus, fruitfully preserving fertility with less surgical morbidity so fulfilling the aim of B-lynch compression suture. The same was also stressed by Smith KL[28] and Baskett TF who optimistically considered B-Lynch suture as an alternative to hysterectomy for severe postpartum hemorrhage.

By reviewing the case series of different studies it is concluded that B-lynch suture results are 100% with small series.[1] While large series revealed that compression sutures have been used with variable success, ranging from 72 to 95%.[6, 28, 29, 30] Our series is also not a small one that's why our success rate falls in between the above range revealing encouraging situation as these women would otherwise be considered for hysterectomy.[28,31,32]

In current study the overall success rate remained 83% in avoiding hysterectomy which is in accordance with 80-82% in different studies.[28,33]

We did hysterectomy in 16.6% which was comparable to the range 2.67-28% in different studies.[31, 34, 35]

We used other surgical methods along with B- Lynch similar to studies[34, 36,] but contrary to studies[1,4] where the surgeons proceeded to hysterectomy once the B-Lynch procedure failed to control bleeding. We recommend that once the B-Lynch suture fails we might try other surgical methods in combination with the B-Lynch techniques, because by using added procedure further obstetric hysterectomies can be prevented as revealed by the mentioned study and other studies.[29, 36]

The patients were reviewed 6 weeks postpartum and period remained uneventful in 95 % of cases in current study which was found in the range of 82 to 93.3% presented in different studies.[31,33,34]

Our cases were followed until 24 to 30 month to report complications and no significant post operative complication were noted. Late morbidity developed was amenorrhea in 10 %(3 women) that was resolved spontaneously in two, While one remain ammenorrohic till intrauterine adhesions were broken hysteroscopically and IUCD was placed .The follow up carried out in one study[26] was 24 month where they detected accumulation of menstrual blood in the cavity as a result of uterine synechia.

Sentilhes et al[37] reported successful pregnancies following B-Lynch suture combined with other uterine-sparing procedures, Though many of our patient did not come for follow up however left over did not have any menstrual or fertility problems.

In current study three(10%) patients delivered by Caesarean Section had no uterine abnormality except slight depression on the funds of uterus that resembles to bicornuate uterus, While Nalini Neelam[34] reported75% post B -Lynch cases delivered by Caesarean Section with normal uterine anatomy.

Conclusion

The B-Lynch suture is a life-saving procedure. It is a simple, safe and rapid technique as compared to hysterectomy. It has comparatively low morbidity to control severe PPH especially in low resource setting. Other procedure such as uterine artery

ligation may be tried along with B-lynch suture before opting for obstetric hysterectomy.

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