Journal of Medicine, Physiology and Biophysics
ISSN 2422-8427 An International Peer-reviewed Journal
Vol.46, 2018

The Effectiveness of the B-Lynch Uterine Compression Sutures for Treating the Uncontrollable Postpartum Hemorrhage Following Cesarean Section

Dr Muhammad Yasir[1] Dr Muhammad Sajjad[1] Dr Maryam Batool[2]
1.House Officer Bahawal Victoria Hospital, Bahawalpur
2.House Officer Services Hospital, Lahore

Abstract
Objective: To find out the safety and efficacy of B-Lynch suturing technique in controlling of massive intractable postpartum hemorrhage.**Study Design:** A prospective case controlled study.**Place and Duration of Study:** Gynecology Department of Services Hospital Lahore and Bahawal Victoria Hospital Bahawalpur from June 2017 to June 2018.**Methodology:** Forty two patients were selected by nonprobability consecutive sampling technique. Age of the patient, gestational age, parity, cesarean section (elective/emergency) and preoperative Hb were compared between two groups as baseline data. Outcome data included blood lost, pints of packed red cells transfused, days of hospital stay and postoperative Hb. Data was put in SPSS v.23 and analyzed by applying Chi-square test, Mann Whitney U-test and student's t-test, where appropriate. P-value more than 0.05 was considered insignificant.**Results:** The difference of age, gestational age, preoperative Hb, parity and the type of cesarean section was not statistically significant (p-value 0.270, 0.220, 0.184, 0.620 and 0.289, respectively). The difference in loss of blood, number of packed RBCs units transfused, number of days of hospital stay and hysterectomy was significantly more in Group O as compared to Group B (p-value being 0.037, 0.045, 0.018 and 0.030 respectively). Postoperative Hb was significantly lower in group O ($p<0.001$).**Conclusion:** The method of B-Lynch suture is simple, fast, effective and safe with no apparent adverse effects. This should be made available even in the settings of low resources and all the training centers around the country.
Keywords: Postpartum hemorrhage, cesarean section, B-Lynch suture.

Introduction

Many factors lead to mortality and morbidity in pregnant women, but according to The Confidential enquiry into Maternal Child Health Report of 2004, postpartum hemorrhage is still the major cause [1]. Almost 25-30% of the maternal deaths, in developing as well as developed countries, are caused by postpartum hemorrhage [2]. Postpartum hemorrhage is responsible for 125,000 to 140,000 maternal deaths each year, or one mother dying every fourth minute [3, 4]. Moreover, obstetric hemorrhage results in 64.7% of the severe maternal morbidity [5]. When majority of the obstetricians and midwives encounter massive intractable postpartum hemorrhage, the need for surgical intervention becomes inevitable. In many developing countries, the conventional and standard approach to encounter massive postpartum hemorrhage has been ligation of major blood vessels and hysterectomy, which could still lead to significant maternal mortality.

There are various methods to control the postpartum hemorrhage which vary according to the cause. But the general delay in the diagnosis as well as the treatment and failure of provision of standard medical management can lead to life threatening state in the situation of immense postpartum hemorrhage i.e. >1500ml. Christopher B-Lynch stated new method of the surgical management of postpartum hemorrhage. In 1997, he proposed a new suturing technique which was named after him as B-Lynch uterine compression suture [6]. Above mentioned report describes a technique in which a continuous suture is applied vertically to compress an atonic uterus with the purpose to avoid hysterectomy. When applied correctly, B-Lynch suturing technique is very successful and no significant problems or apparent complications have been published. Various other techniques have been advised till now including Cho's square sutures [24] and Hayman's [22] suture which are basically the modifications of B-Lynch sutures [7]. Other techniques include Pereira [20], Ouahba [23], Hackethal, Bhal and Nelson's [21] suturing techniques.

B-Lynch sutures are much useful because the technique of application is simple and safe, and its capacity to preserve uterus and fertility and lifesaving potential [8]. Some studies have been published indicating that B-Lynch suture technique is effective, lifesaving, and safe and free of short term as well as long term complications [9]. Holtsema et al. [10] suggested in their study conducted in 2004 that every obstetrician should keep the option of B-Lynch suture in case of intractable postpartum hemorrhage. B-Lynch suture is being used in various regions of the world for treating the postpartum hemorrhage, especially in the developing countries of Asia and Africa where the incidence of postpartum hemorrhage is high. B-Lynch suturing technique produces excellent results as it is simpler, easier and faster than the ligation of internal iliac artery and hysterectomy. Many obstetricians are eager to learn this new technique in order to improve their skills regarding maternal care. Many reviews have been published praising the advantages of this technique and showing its successful consequences [11-14]. There

have been few reports of B-Lynch uterine sutures in Thailand and some countries of Southeast Asia.

Regional data regarding the use of B-Lynch uterine compression sutures for the treatment of postpartum hemorrhage is lacking. The mortality rate due to postpartum hemorrhage is very high in Pakistan. This emphasizes the need to apply innovative techniques in place of conservative ligation of internal iliac artery and hysterectomy procedures for the treatment of postpartum hemorrhage. Current study is designed at finding the efficacy of B-Lynch suturing technique in controlling of massive intractable postpartum hemorrhage.

Material and methodology:

This is a case controlled study conducted in Gynecology Department of Services Hospital Lahore and Bahawal Victoria Hospital Bahawalpur from June 2017 to June 2018, after obtaining proper ethical approval from the hospital ethics committee. Sample size was calculated from the reference study conducted by Kaoiean S e al. [15]. Forty two patients were selected by nonprobability consecutive sampling technique. All the pregnant women who had reached full term or were near to term and were undergoing cesarean section were included in the study. Women who were undergoing spontaneous vaginal delivery, with postpartum intractable hemorrhage after spontaneous vaginal delivery and with gestational age below thirty weeks were excluded from our study.

Proper written consent was taken from all the participants or their attendants after explanation of the procedure and purpose of the study. Twenty four patients were in Group B and were treated with B-lynch compression suture technique while eighteen patients were in Group O who were treated with some other maneuver for the management of postpartum hemorrhage following cesarean section. The technique to apply B-Lynch uterine compression sutures was as followed [6]: After general anesthesia, patients were catheterized and placed in Lloyd Davies position; abdomen opened with Pfannenstiel incision; incision was made on lower segment of uterus and entered cavity; cavity evacuated, examined and mopped out; for a left handed or surgeon standing on left side, suture was applied as following: uterus was punctured 3 cm from right lateral edge and 3 cm from right lower margin of the uterine incision with No. 2 catgut suture, same suture passed through uterine cavity to emerge at the upper margin of the incision 3cm above and 4cm from lateral border, now visible catgut passed over to compress the fundus of uterus 3-4 cm from right corneal border, catgut passed posteriorly and vertically for entering posterior wall of uterus at the same level of upper entry point anteriorly, catgut was pulled with moderate strain aided by physical compression applied by the associate, suture passed back posteriorly over the same points as on the right side while the suture lying horizontally, catgut passed through posteriorly and then vertically over the uterine fundus to lie anteriorly in vertical position squeezing the fundus on left side same as on the right side and needle was passed through and out of uterine cavity 3cm anteriorly and 3cm below lower incision edge on the left side; two lengths of the suture pulled along with bimanual compression; vagina examined for control of bleeding; lower segment incision of uterus closed in two layers; peritoneum closed; and abdomen closed in reverse order, layer by layer.

Age of the patient, gestational age, parity, type of the cesarean section whether elective or emergency and preoperative hemoglobin concentration were compared between the two groups as baseline data. Outcome data which was compared between the two groups included milliliters of blood lost, number of pints of packed RBCs which were transfused, number of days of hospital stay and postoperative hemoglobin concentration. All the data was collected on a preformed performa by the researchers themselves. All the data was put in SPSS version 23 software and analyzed by applying Chi square test, Mann Whitney U test and student's t test, where appropriate. Age of the patient, gestational age, preoperative as well as postoperative hemoglobin concentration and total blood lost were mentioned as mean ± standard deviation. Parity, number of pints of packed RBCs which were transfused and number of days of hospital stay were mentioned as median and interquartile range. Type of cesarean section whether elective or emergency was mentioned as ratio. Confidence interval of 95% was taken. P value more than 0.05 was considered insignificant.

Results

The mean age, gestational age and preoperative Hb was 26.92 ± 3.75 years, 36.63 ± 3.35 weeks and 9.25 ± 1.62 g/dl in Group B and 28.28 ± 4.09 years, 37.78 ± 2.36 weeks and 9.94 ± 1.66 g/dl in Group O, respectively. The difference was not statistically significant (p value 0.270, 0.220 and 0.184, respectively). The difference in terms of parity and the type of cesarean section was not statistically significant (p value 0.620 and 0.289, respectively). Table-I

The average loss of blood was 1189.17 ± 882.68 ml and 1891.11 ± 1224.87 ml in Group B and Group O, with statistically significant difference (p = 0.037). The difference in number of units transfused and number of days of hospital stay was significantly more in Group O as compared to Group B. The differences were statistically significant with p value being 0.045 and 0.018, respectively. Postoperative Hb was 10.75 ± 1.42 g/dl in Group B and 9.17 ± 1.15 g/dl in Group O, with the difference being statistically significant (p <0.001). Only one patient needed hysterectomy in Group B while in Group O, five patients needed hysterectomy (p=0.030). Table-II

Table-I
Baseline Data

Factor	Group B (n=24)	Group O (n=18)	p-value
Age, years	26.92 ± 3.75	28.28 ± 4.09	0.270
Gestational Age, weeks	36.63 ± 3.35	37.78 ± 2.36	0.220
Parity, median (IQR)	3 (2 - 4)	3 (2 - 4)	0.620
C/S (elective/emergency)	15/9	14/4	0.289
Preoperative Hb (g/dl)	9.25 ± 1.62	9.94 ± 1.66	0.184

Data is put as mean ± S.D unless mentioned otherwise.

Table-II
Outcome Data

Factor	Group B (n=24)	Group O (n=18)	p-value
Blood Loss, ml	1189.17 ± 882.68	1891.11 ± 1224.87	0.037
Units of packed RBCs transfused	4 (4 - 5)	5 (3.75 - 7)	0.045
Hospital Stay, days	4 (3 - 4)	4.5 (3.75 - 6)	0.018
Postoperative Hb (g/dl)	10.75 ± 1.42	9.17 ± 1.15	<0.001
Hysterectomy, n (%)	1 (4.2)	5 (27.8)	0.030

Data is put as mean ± S.D unless mentioned otherwise on number (percentage).

Discussion

Of many obstetrical emergencies, most common one is postpartum hemorrhage. It is the principal reason of maternal mortality and morbidity [16]. The most common cause of postpartum hemorrhage is uterine atony. Routine management for uterine atony comprises of uterine massage, uterine revision and infusion of the uterotonics agents such as oxytocin, and most of the time this is enough to stop hemorrhage. Sometimes, routine management fails to obtain desired results. Angiographic embolization is another effective option which cannot be routinely carried out because of unavailability of interventional radiologist in many hospitals. T is the time when hemostatic surgery becomes inevitable to prevent life threatening hemorrhage. In this study we discussed the use of B-Lynch uterine sutures [6] which is very easy to perform. This suture can be applied during the cesarean section and does not require very high expertise as in artery ligation. Moreover, this procedure is free from the risks of damaging the blood vessels or the uterus [17, 18].

The basic concept of the B-Lynch sutures is to control the bleeding with surgical tamponade of uterus. B-Lynch was the first person to define uterine compression suture technique in 1997 [6]. Later on other researchers worked on the efficacy of this technique [7-11, 19]. Many other compression sutures techniques have been defined after since 1997 [20-23]. B-Lynch sutures are much beneficial because the technique of application is simple and safe, and it has ability to preserve uterus and fertility and lifesaving potential [8]. Some studies have been published indicating that B-Lynch suture technique is effective, lifesaving, and safe and free of short term as well as long term complications [9].

Holtsema et al. [10] suggested in their study conducted in 2004 that every obstetrician should keep the option of B-Lynch suture in case of uncontrollable PPH. B-Lynch suture is being used in various regions of the world for treating the PPH, especially in the developing countries of Asia and Africa where the incidence of postpartum hemorrhage is much high. B-Lynch suturing technique has produced outstanding results as it is simpler, easier and faster than ligation of internal iliac artery and hysterectomy. Multiple reviews have been published praising the advantages of this technique and showing its successful consequences [11-14].

Conclusion

The method of B-Lynch suture is simple, fast and effective as well as safe with no apparent adverse effects. There is satisfactory hemostasis following its application. B-Lynch suturing technique has the capability to preserve uterus as well as fertility. To preserve uterus, the application of uterine compression sutures should be within one to two hours. Therefore, the uterine compression sutures need to be the basic protocol for controlling postpartum hemorrhage in every operation theater where it is available. This can be made available even in the settings where the technical resources are very low and all the training centers all around the country.

Conflict of interest: No
Funding Source: No

References

1. Department of Health. Why mothers die: report on confidential enquiries into maternal deaths in the United Kingdom 2000–2002. Triennial report. RCOG Press, London, 2004.
2. World Health Organization. Attending to 136 million births, every year: make every mother and child count:

The World Report 2005. Geneva, Switzerland: WHO. 2005;3:62.
3. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin: Clinical Management Guidelines for Obstetrician-Gynecologists Number 76, October 2006: postpartum hemorrhage. Obstet Gynecol. 2006;108(4):1039.
4. Devine PC. Obstetric hemorrhage. InSeminars in perinatology 2009 (Vol. 33, No. 2, pp. 76-81). WB Saunders.
5. Baskett TF, O'Connell CM. Severe obstetric maternal morbidity: a 15-year population-based study. J Obstet Gynaecol. 2005;25(1):7-9.
6. B‐Lynch C, Coker A, Lawal AH, Abu J, Cowen MJ. The B‐Lynch surgical technique for the control of massive postpartum haemorrhage: an alternative to hysterectomy? Five cases reported. International J Obstet Gynaecol. 1997;104(3):372-5.
7. El-Hamamy E, B-lynch C. A worldwide review of the uses of the uterine compression suture techniques as alternative to hysterectomy in the management of severe post-partum haemorrhage. J Obstet Gynaecol. 2005;25(2):143-9.
8. Price N, B-Lynch C. Technical description of the B-Lynch brace suture for treatment of massive postpartum hemorrhage and review of published cases. Int J Fertility Women's Med. 2005;50(4):148-63.
9. Tsitlakidis C, Alalade A, Danso DC, B-Lynch C. Ten year follow-up of the effect of the B-Lynch uterine compression suture for massive postpartum hemorrhage. Int J Fertility Women's Med. 2006;51(6):262-5.
10. Holtsema H, Nijland R, Huisman A, Dony J, van den Berg PP. The B-Lynch technique for postpartum haemorrhage: an option for every gynaecologist. Eu J Obstet Gynecol Reprod Bio. 2004;115(1):39-42.
11. Vetere PF, Wayock CP, Muscat J, Sicuranza G. A novel approach to teaching placement of a B-lynch suture: description of technique and validation of teaching model. J Grad Med Edu. 2012;4(3):367-9.
12. Allahdin S, Aird C, Danielian P. B-Lynch sutures for major primary postpartum haemorrhage at caesarean section. J Obstet Gynaecol. 2006;26(7):639-42.
13. Saroja CS, Nankani A, El-Hamamy E. Uterine compression sutures, an update: review of efficacy, safety and complications of B-Lynch suture and other uterine compression techniques for postpartum hemorrhage. Archives Gynecol Obstet. 2010;281(4):581-8.
14. Kayem G, Kurinczuk JJ, Alfirevic Z, Spark P, Brocklehurst P, Knight M. Uterine compression sutures for the management of severe postpartum hemorrhage. Obstet Gynecol. 2011;117(1):14-20.
15. Kaoiean S. Successful use of the B-Lynch uterine compression suture in treating intractable postpartum hemorrhage after cesarean delivery in Rajavithi Hospital. J Med Assoc Thai. 2013;96(11):1408-15.
16. Mousa HA, Blum J, Abou El Senoun G, Shakur H, Alfirevic Z. Treatment for primary postpartum haemorrhage. Cochrane Database Syst Rev. 2014;2(2):CD003249.
17. Morel O, Malartic C, Muhlstein J, Gayat E, Judlin P, Soyer P, Barranger E. Pelvic arterial ligations for severe post-partum hemorrhage. Indications and techniques. J Visc Surg. 2011;148(2):e95-102.
18. Camuzcuoglu H, Toy H, Vural M, Yildiz F, Aydın H. Internal iliac artery ligation for severe postpartum hemorrhage and severe hemorrhage after postpartum hysterectomy. J Obstet Gynaecol Res. 2010;36(3):538-43.
19. WU CP, LUO LQ, LI L. B-lynch suture for postpartum haemorrhage. J Hainan Med Uni. 2010;6:032.
20. Pereira A, Nunes F, Pedroso S, Saraiva J, Retto H, Meirinho M. Compressive uterine sutures to treat postpartum bleeding secondary to uterine atony. ObstetGynecol. 2005;106(3):569-72.
21. Nelson GS, Birch C. Compression sutures for uterine atony and hemorrhage following cesarean delivery. Int J Gynecol Obstet. 2006;92(3):248-50.
22. Hayman RG, Arulkumaran S, Steer PJ. Uterine compression sutures: surgical management of postpartum hemorrhage. Obstet Gynecol. 2002;99(3):502-6.
23. Ouahba J, et al. Uterine compression sutures for postpartum bleeding with uterine atony. Int J Obstet Gynaecol. 2007;114(5):619-22.
24. Cho JH, Jun HS, Lee CN. Hemostatic suturing technique for uterine bleeding during cesarean delivery.