Research Report

Conservative Surgical Management of Postpartum Hemorrhage (PPH) Using 'Surabaya Method' (Modified B-Lynch Compression Suture)

Manajemen Bedah Konservatif pada Perdarahan Pascapersalinan dengan Menggunakan Metode Surabaya (Jahitan Kompresi Modifikasi B-Lynch)

Agus Sulistyono, Elli Saur Mauli Gultom, Erry Gumilar Dachlan, Prajitno Prabowo

Fetomaternal Division of Department of Obsterics and Gynecology
Medical Faculty of Airlangga University/
Dr. Soetomo Hospital
Surabaya

Abstract

Objective: To evaluate the efficacy of PPH management by conservative surgical management using B-Lynch Method and Surabaya method (Modified B-Lynch compression suture) as an alternative to hysterectomy in PPH due to uterine atony.

Method: Eighty-four cases of PPH from 2786 deliveries were recruited in period of July 1, 2007 - August 31, 2008. The study was perfomed in Ob/Gyn Dept. Dr. Soetomo Hospital Surabaya, Indonesia. Its management consisted of 72 cases succeed with medical (uterotonics) and mechanical technique (tamponade technique) and the remain of 12 failed cases was done by conservative surgical technique that preserving uterus. The surgically therapy on these 12 cases were proceeded by B-Lynch technique on 4 cases and another 8 cases with Surabaya Method in which the technique was done by performing brace suturing way with 3 longitudinally stitches using chromic catgut no 2 and round needle.

Result: From 12 cases showed that all 8 cases with Surabaya Method technique were success to stop bleeding, but 2 cases were failed from B-Lynch Method and hysterectomy were done. Two out of 8 cases Surabaya Method and 1 B-Lynch technique case were ended with death which possible causes were HELLP syndrome, DIC and multiple organ failure complication in severe preeclampsia, although actually the bleeding had already been stopped.

Conclusion: The present study showed that Surabaya Method was effective to stop bleeding in PPH conservative surgical management with uterus preserving. Beside simple, effective and easy to implement, the advantage of Surabaya Method was quick.

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Keywords: PPH conservative management, Surabaya Method, B-Lynch technique

Abstrak

***Tujuan**: Untuk mengevaluasi efikasi manajemen perdarahan pascapersalinan dengan manajemen bedah konservatif menggunakan metode B-Lynch dan metode Surabaya (jahitan kompresi modifikasi B-Lynch) sebagai tindakan alternatif histerektomi pada perdarahan pascapersalinan karena atoni uteri.*

***Metode**: Sampel terdiri atas 84 kasus perdarahan pascapersalinan dari 2.786 persalinan periode 1 Juli 2007 - 31 Agustus 2008. Studi dilakukan di Departemen Obstetri dan Ginekologi RS Dr. Soetomo Surabaya Indonesia. Tujuh puluh dua kasus berhasil dihentikan dengan menggunakan uterotonika dan teknik tamponade, sedang 12 kasus yang gagal dikerjakan teknik bedah konservatif dengan mempertahankan uterus. Terapi bedah pada 12 kasus tersebut dikerjakan dengan metode B-Lynch pada 4 kasus dan 8 kasus dengan metode Surabaya di mana metode Surabaya berupa penjahitan keliling dengan 3 jahitan longitudinal dengan menggunakan catgut no. 2 dan jarum bundar.*

***Hasil**: Dari 12 kasus, 8 kasus dengan metode Surabaya berhasil menghentikan perdarahan sedangkan 2 kasus dengan metode B-Lynch gagal yang akhirnya dilakukan histerektomi. Dua dari 8 kasus dengan metode Surabaya dan 1 dengan metode B-Lynch berakhir dengan kematian dengan kemungkinan penyebabnya adalah sindroma HELLP, DIC dan kegagalan multi organ sebagai komplikasi dari preeklampsia walaupun sebenarnya perdarahan berhasil diberhentikan.*

***Kesimpulan**: Metode Surabaya efektif dalam menghentikan perdarahan pada kasus perdarahan pascapersalinan dalam mengonservasi uterus. Selain sederhana, efektif dan mudah untuk dilakukan, waktu yang diperlukan dalam pengerjaan metode Surabaya adalah lebih cepat.*

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***Kata kunci**: manajemen konservatif perdarahan pascapersalinan, metode Surabaya, penjahitan teknik B-Lynch*

Correspondence: Agus Sulistyono, Department of Obsterics and Gynecology Airlangga University, Jln. Prof. Mustopo No. 6, Surabaya, Tel: 081565422027, email: agussulsby@yahoo.com

INTRODUCTION

Postpartum hemorrhage (PPH) is an unpredictable and a sudden life-threatening event. The definition of PPH depends on the delivery type. Traditionally, it is defined as a blood loss more than 500 ml following vaginal delivery and more than 1000 ml during a cesarean section. Major haemorrhage is defined as a blood loss greater than 2500 ml or the transfusion of 5 or more units of blood or treatment of coagulopathy. Because of inaccurate and subjective assessment in blood loss estimation make underestimate by as much as 50%, there is another definition that defines more than 10% decrease in hematocrit from before and after delivery. Due to these varied definitions, the exact incidence of PPH is difficult to determine, however, rough estimates suggest that PPH complicate 4 - 6% of all deliveries.[1-3]

The PPH can be categorized as early or primary PPH, those occurring within 24 hours of delivery and late or secondary PPH, infrequent condition, those occur more than 24 hours to 6 weeks post delivery.

Early PPH is more common, involves greater blood loss and morbidity. There are 4 T's etiology of PPH: which are Tone, inability of the uterine myometrium to contract effectively, Tissue, retained of products of conception, placental tissue and amniotic membranes or invasive placentation, Trauma, laceration of lower genital tract or upper genital tract, and Thrombosis, abnormal coagulation that may be hereditary or acquired in origin. The most common cause of early PPH is uterine atony. The predisposing factors for uterine atony include uterine over distension, prolonged oxytocin use, rapid or prolonged labor, multiparity, chorioamnionitis, placenta previa, use of uterine-relaxing agent, previous PPH, Breech extraction, fetal demise, uterine inversion, upper or lower genital tract laceration, retained placenta, leiomyomata and clotting disorders.[1,4]

Unlike usual hemostasis that depend on intrinsic vasospasm and formation of blood clot locally, the most important for achieving placental site hemostasis were contraction and retraction of myometrium to compress the formidable number of relatively large vessels and obliterate their lumens. The cornerstone of effective treatment of PPH remain rapid diagnosis, realistically estimation of the amount of blood loss that occurred and prompt interventions. The initial management of PPH include avoidance of massive hemorrhage by active management of the third stage of labor, fundal massage, giving uterotonics drugs such as oxytocin, ergometrine, prostaglandin as a prophylaxis to ensure maintenance of well contracted uterus. The second is bimanual compression and uterine packing for hemorrhage from uterine atony when medical therapy failed to stop bleeding. The packing method is being popular again, especially in rural area remote from hospital or performing to minimalized blood loss while waiting for referring the patient or operative management. Fortunately, this methods often success to stop bleeding and prevent further intervention.[5] The simple packing method using condom (Sayeba Me-thod) was simple, cheap and effective to stop bleeding due to uterine atony.[6] If this methods fail, the third step is surgical management, laparotomy conserving the uterus by vascular ligation (uterine, ovarica or hypogastric arteries) and uterine compression suture (B-Lynch, Hayman, square technique suture) or hysterectomy as a last resort.[4]

Selective arterial embolization also had been shown effective in the management of PPH.[7] The disadvantage of this technique may not available in emergency situation and tended to be offered mainly in specialized centres and was suitable to hemodinamically stable cases.

In Dr. Soetomo Hospital Surabaya, Indonesia, we introduce a more simple and faster uterine compression technique, Surabaya's Modification B-Lynch surgical technique (Surabaya Method).

METHOD

The study was performed: in Department of Obstetrics and Gynecology. Dr. Soetomo Hospital Surabaya, Indonesia, between July 1, 2007 - August 31, 2008. There were 2786 deliveries, with 84 cases of PPH, 72 cases were managed by medically and mechanically (tamponade), 12 cases by surgical management with preserving uterus (B-Lynch compression suture technique = 4 cases and Surabaya method = 8 cases).

The Surabaya Method was performed by brace suturing techniques with 3 paralel longitudinal stitches using chromic catgut no 2 with a curve rounded needle straightened manually. The uterus was exteriorized and assistant was pulling out the uterus to make low uterine segment thinner and easier to introduce needle from anterior to posterior low uterine segment wall. The first stitch was introduced into uterine low segment ± 2 cm below Cesarean incision and medial of the lateral border or at a same plane in PPH following vaginal delivery. The needle was inserted at the ventral wall and let through posterior wall of the uterine isthmus. The second stitch with new thread was performed with same technique at contralateral site and the third also with a new thread was done between the first and the second stitches. The assistant performed manual compression to the uterine fundus to make anteflexed-inferior position while the operator tightened the threads and tied the uterine fundus 3 cm medial from left and right lateral border, and the third was tied between them. The second assistant observed the vagina, if there is no bleeding the abdomen wall was closed but if the bleeding persist, further surgical intervention needed.

Figure 1. Surabaya Method (Modified B-Lynch suture).

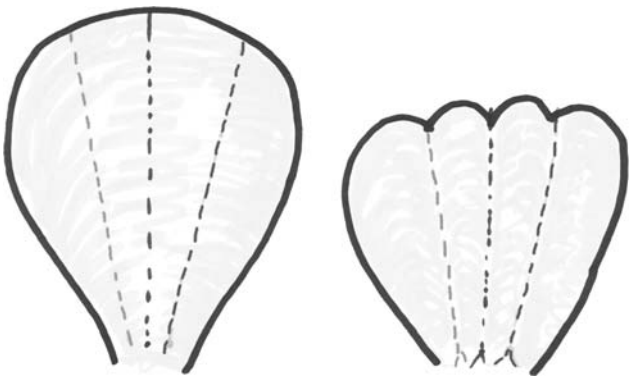

Figure 2. Surabaya Method illustration.

The technique of Surabaya method (step by step)

- Exteriorize the uterus, after vaginal delivery incision is not needed in lower uterine segment (LUS) or the recent lower segment (LS) Cesarean section was sutured.
- The assistant stretched up the uterus to make LUS thinner.
- The 1st stitch was placed ± 2 cm below LS incision or at same plane after vaginal delivery and ± 2 cm medial of the lateral border (Figure 2).
- The needle was inserted from ventral to dorsal wall of the LUS.
- The 2nd stitch was performed using the 1st stitch contra-laterally (Figure 2).
- The 3rd stitch was performed between 1st and 2nd stitches (Figure 2).
- The assistant compressed the uterus anterior-inferiorly to make uterus in ante-flexed position.
- The operator tied the 1st, 2nd and 3rd threads at the fundus while assistant continued to compress the uterus.
- Before closing the abdomen, the second assistant checked whether the bleeding had stopped or not.
- This technique using "Chromic catgut no. 2" with a curve needle which had been straightened.

Tabel 1. Summary results of the study.

Age	Diagnosis	Mode of delivery	PPH Management	Estim blood loss (cc)	Hb pre-op (g%)	Blood Transf (cc)	Hb post op (g%)	Baby (g)	Disch (days)	BC/ NBC
29	G4P3-3 twins, live/IUFD, arrest of descent	CS → atony	B-Lynch→ failed → SVH → bleeding stop	1500	4	W:1050	6.8	2100, AS:0 and 2700, 8/9	6, no complication	N
32	G2P01-1, 24/25 abruptioplac	Hysterotomy → atony	B-Lynch → bleeding stop	1000	6.3	W:700 P:450 F:450	10.8	700, AS:0	9, no complication	N
27	G2P0-10, eclampsia, HELLP syndr, IUFD	OD → failed → CS → atony	B-Lynch → bleeding stop	1000	14.1	F:450 T:1500	9.4	2000, AS:0	+ day 7, due to eclampsia, HELLP syndr	N
40	G2P1-1, 40 wks, DM, post CS	CS → atony	B-Lynch→ failed → TAH SOD → bleeding stop	5000	4.8	W:2450	12.2	3000, AS:8-9	12, no complication	B
28	P1-1, 3 hrs pp vaginally, atonia ut	Condom tamponade, fail	Surabaya method → bleeding stop	3100	5	W:2450	11	–	7, no complication	N
35	P1-2, prev CS, twins, PIH, HELLP syndr, atony, card. arrest, extra perit. hemorrh	CS → atony, bleeding extra perit	Surabaya method → bleeding stop	4000	1.7	W:2450 F:1500	12.9	2800, 7/8 and 2800, 7/8	+day 3, due to: PIH, HELLP syndr, DIC, MOF	N
35	G2P1-1, 37/38, breech, sec. arrest	CS → plac adhesiva → bleeding	Surabaya method → bleeding stop	700	–	–	9.9	3000, 8/9	5, no complication	N
36	P11-1, post CS, PRM, atony, condom tampon	CS → atony → condom tampon → failed	Surabaya method → bleeding stop	4000	3.9	W.1400 P:500 F:500	11.1	3700, 8/9	11, no complication	N
31	G2P1-1, 36/37, twins, AFL, severe PE , induction of labor ' fail	CS → atony	Surabaya method → bleeding stop	1000	13.9	P:500 F:1500	8	2200, 5/7 1700, 0	+ D7, Acute Fatty Liver	N
20	G1P00, 35/36, eclampsia, Fetal Distress, failed induction	CS → atony	Surabaya method → bleeding stop	1000	13	–	9	2000, 5/7	7, no complication	N
30	G2P1-1, 35, APB, Fetal Distress	CS → atony	Surabaya method → bleeding stop	500	11.9	–	11.8	2100, 1/3	9, no complication	N
37	G4P3-3,40/41, PIH, Neglected labor, Fetal distress	CS → atony	Surabaya method → bleeding stop, Tubectomy bilateral	1500	–	W:1400	8	3800, 7/8	6, no complication	N

Table 2. Averages (mean) of the results of the study.

	B-Lynch Method		Surabaya Method	
	average	**range**	**average**	**range**
Age of the patients (years)	32	27 - 40	31.5	20 - 37
Parities (children)	1.5	0 - 4	1.9	1 - 4
Estimated blood loss (ml)	2125	1000 - 5000	1975	500 - 4000
Hemoglobin count (g%)	7.3	4 - 14.1	8.2	1.7 - 13.9
Blood transfusion :				
• Whole blood(ml)	1050	0 - 2450	962.5	0 - 2450
• Packed Red Cell (ml)	112.5	0 - 450	125	0 - 500
Blood components :				
• platelets (ml)	225	0 - 450	125	0 - 500
• FFP (ml)	487.5	0 - 1500	437.5	0 - 1500

RESULT

Table 3. Mode of delivery.

	B-Lynch Method		Surabaya Method	
	Number	**Percent (%)**	**Number**	**Percent (%)**
Normal vaginal delivery	0	0	1	12.5
Caesarean delivery	3	75	7	87.5
Hysterotomy	1	25	0	0

Table 4. Type of referral and place of delivery.

	B-Lynch Method		Surabaya Method	
Type of patients:				
• Non referral (book-cased)	1	25%	0	0%
• Refferal (Non book-cased)	3	75%	8	100%

Table 5. Literature review conservative surgical management on PPH.

Author	Technique	Year	Number of cases	Success rate	Comment
B-Lynch, et al*	B-Lynch	1997	5	5 (100%)	
Fergusson, et al*	B-Lynch	2000	2	2 (100%)	
Dacus, et al*	B-Lynch	2000	4	4 (100%)	
Vangsgaard, et al*	B-Lynch	2000	1	1 (100%)	
Wergeland, et al*	B-Lynch	2002	5	5 (100%)	
Kalu, et al*	B-Lynch	2002	1	1 (100%)	
Mazhar, et al*	B-Lynch	2003	2	2 (100%)	
Smith, et al*	B-Lynch	2003	7	6 (85.71%)	
Pal, et al*	B-Lynch	2003	6	6 (100%)	
Chaudary, et al*	B-Lynch	2003	1	1 (100%)	
Holtsema, et al*	B-Lynch	2004	7	7 (100%)	
Grotegut, et al*	B-Lynch	2004	1	1 (100%)	
Hillaby, et al*	B-Lynch	2004	1	1 (100%)	
Allahdin, et al	B-Lynch	2006	11	8 (72%)	
Treloar, et al	B-Lynch	2006	1	1 (100%)	Myometrial necrosis
Danso, et al*	B-Lynch + Bakri Balloon	2002	1	1 (100%)	The uterine sandwich
Nelson, et al	B-Lynch + Bakri Balloon	2007	5	5 (100%)	The uterine sandwich
Hayman, et al*	Modif B-Lynch	2002	3	3 (100%)	
Malibary, et al*	Modif B-Lynch	2004	1	1 (100%)	
Nelson, et al	Modif B-Lynch	2005	5	5 (100%)	
Bhal, et al	Modif B-Lynch	2005	11	10 (91%)	
Surabaya Method Sulistyono, et al	**Modif B-Lynch**	**2009**	**8**	**8 (100%)**	**The quickest (< 5 minutes)**
Cho, et al	Multiple square suture	2000	23	23 (100%)	
Ochoa, et al	Cho multiple square suture	2002	1	1 (100%)	Pyometria (endo metritis), Asherman syndrome
Tjalma, et al	Multiple longit suture	2004	1	1 (100%)	
Pereira, et al	Multiple longit and transverse suture	2005	7	7 (100%)	Not penetrate uterine cavity
Wu, et al	Cho multiple square	2005	1	1 (100%)	Uterine synechiae
Hackethal, et al	U-sutures	2007	7	7 (100%)	
Ouahba, et al	Multiple transverse and oblique	2007	20	19 (95%)	6 pregnant / 8 tried to conceive

** From: B-Lynch C, 2006. Conservative Surgical Management. In A Text Book of Postpartum Hemmorhage 1st ed. UK: Sapiens: 287-98.*[4,7-16]

DISCUSSION

There were 84 PPH cases from 2786 deliveries (3.02%) during this study. Twelve patients were managed by uterine brace suturing, 8 patients (66.6%) performed by Surabaya Method and the rest (33.3%) by B-Lynch suture technique. The average of patient age managed by Surabaya Method was 31.5 year (20 - 37 years) and B-Lynch technique was 32 year (27 - 40 years old). The parities was 1.9 (para 1 - 4) and B-Lynch was 1.5 (1 - 4). With the young maternal age and low parities, especially case no 5 and 10, Surabaya Method was very useful for conserving uterus. Average of estimated blood loss was 1975 ml (500 - 4000 ml) in Surabaya Methods and 2125 ml (1000 - 5000 ml) from B-Lynch method. Hb count was 8.2 g% (1.7 - 13.9 g%) in Surabaya Method and 7.3 g% (4 - 14.1 g%) from B-Lynch technique. It was very important to perform laparotomy with quick in - quick out surgical technique and this was achieved by Surabaya Method with duration of surgery not more than 5 minutes in this study. The average of blood transfusion from Surabaya method were 962.5 ml (0 - 2450 ml) whole blood, 125 ml (0 - 500 ml) platelets and 437.5 (0 - 1500 ml) Fresh Frozen Plasma and in B-Lynch method were 1050 ml (0 - 2450 ml) whole blood, 225 ml (0 - 450 ml) platelets and 487.5 ml (0

- 1500 ml) FFP. Only 1 spontaneous vaginal delivery of PPH cases and was performed by Surabaya Method after failed from non surgical management. Seven of 8 (87.5%) cases were PPH following Cesarean Section, 6 cases failed with uterotonics and 1 case failed from tamponade all B-Lynch methods were following Cesarean Section. All of 8 cases were referred from other hospital in Surabaya Method, 1 booked case from B-Lynch method.

Surabaya method was succeed to stop bleeding in all of 8 cases (100%). Even though 2 of them died with possible cause of underlying disease which had already started early before they were refer to our hospital, the procedure has stop the bleeding successfully. In the process which occur 3 days after the procedure, where she got severe preeclampsia complicated by HELLP syndrome, DIC and developed to multiple organ failure before she died. This patient was diagnosed G2P1-1, twins pregnancy, severe preeclampsia, HELLP syndrome and C section was done at Naval Hospital and PPH due to uterine atonia, after failed with uterotonics agents the patient was referred to Dr. Soetomo Hospital. In the operating theatre the patient had a cardiac arrest with Hb count was 1.7 g% and after successful resusitation, Surabaya Method was performed, and the bleeding was stopped. On the second day, DIC and multiple organ failure were developed and she died on the third day after surgical management. The second mortality occured on the day 7 because of acute fatty liver. Patient was referred from William Booth Hospital with diagnosis of G2P1-1, 35/36 wks, Twins, severe preeclampsia + HELLP syndrome + Acute Fatty Liver. After failed of labor induction, C-Section was performed. PPH due to uterine atony and uterotonics injection was given, but the uterus still not contracted, bleeding still occur, so Surabaya Method was performed and the bleeding stopped. Unfortunately due to acute fatty liver complication of severe preeclampsia, she died 7 days post operation. In B-Lynch Method, there was 1 mortality case on the day 7 with possible cause was eclampsia and HELLP syndrome. This patient was referred to Dr. Soetomo Hospital with the diagnosis G2P0-10, IUFD, eclampsia and HELLP syndrome. The patient was failed by labor induction and C-Section was done, but unfortunately the uterus was atony and B-Lynch brace suturing technique was success to stop bleeding. On the following days, the HELLP syndrome worsen and the patient die on the days 7.

There were no complication observed in 6 other Surabaya Method and 3 B-Lynch Method patients and all of the women assume normal menstruation afterwards. Nowadays, 2 patients chose progestogen injection for contraception, 3 combination oral contraception, 2 patient bilateral tubectomy and 2 patient without contraception.

From references (Table 5.), the cumulative number of cases achieving control of PPH (success rate) of B-Lynch Technique was 51 from 55 cases (92.73%). The success rate of Modified B-Lynch Technique was 19 from 20 cases (95%), Surabaya Method was 8 from 8 cases (100%) and other compression suture was 59 from 60 cases (98.33%).

Although statistical analysis couldn't be included over the present study, we suggest strongly in management of PPH to conserving uterus, to apply such as easier, faster, more simple and effective technique as alternative option to stop bleeding in sort of emergency situation. This procedure of Surabaya method appears to meet the criteria.

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