

# Efficacy of B-Lynch Brace Suture in Postpartum Haemorrhage

Shabnam Tariq,<sup>1</sup> Sarosh Wazir,<sup>2</sup> Ghazala Moeen<sup>3</sup>

## Abstract

**Introduction:** Massive uncontrolled haemorrhage after childbirth is the leading cause of maternal death in developing countries. Postpartum haemorrhage is traditionally defined as blood loss of more than 500 ml after vaginal delivery and more than 1000 ml after caesarean section, but intra-operative estimation of blood loss is inaccurate. Uterine atony alone accounts for 75 – 90% of PPH.

**Objectives:** To estimate the effectiveness and safety of B-Lynch brace Suture in the management of primary postpartum haemorrhage (PPH). If at all, to assess the complications due to this procedure during the next three days.

**Study Design:** Case series descriptive study.

**Setting:** Study was carried out in the department of Gynaecology and obstetrics, Unit II, Jinnah Hospital, Lahore.

**Duration of Study:** The study was completed in six months from 8 – 6 – 2006 to 8 – 12 – 2006.

**Subjects and Methods:** Total sixty patients were included in this study. Condition of the uterus and condition of the cervical os was assessed. B-Lynch suture was applied in suitable cases.

**Results:** Mean age of the patients was found to be  $28.8 \pm 4.9$ . Distributions of successfulness of B-Lynch suture showed 57 (95%) successful patients. 10% were stated in the state of shock. 11.7% with eclampsia and 53.3% were presented with fetal distress.

**Conclusions:** B-Lynch compression suture is easy to apply and should be considered primary treatment in cases of severe atonic PPH when oxytocic agents failed, and before resorting to hysterectomy.

**Keywords:** Postpartum haemorrhage, uterine atony, B-Lynch Suture.

## Introduction

The World Health Organization (WHO) defines primary postpartum haemorrhage as bleeding in excess of five hundred millilitres in the first twenty four hours following delivery.<sup>1</sup> The American College of Obstetricians and Gynaecologists has suggested a clinically more relevant definition of postpartum haemorrhage may be a haematocrit drop of ten percent or haemoglobin that requires immediate transfusion.

The baseline incidence of postpartum haemorrhage has been estimated at 4 to 6 percent of all pregnancies. Death rate is 2 per year in UK and 125,000 per year worldwide.<sup>2</sup>

There are two main categories of postpartum haemorrhage (PPH): atonic (90 percent of cases) is due to failure of the uterus to contract; traumatic (10 percent of cases) is due to damage to genital tract.<sup>3</sup> Postpartum haemorrhage can also occur in women with bleeding disorders. There are various management options for the control of PPH: medical which includes prostaglandins and oxytocin and surgical which includes uterine artery ligation, internal iliac artery ligation, Sengstaken Blakemore tubing and B-Lynch Brace Suture (a technique introduced in 1997).

---

S. Tariq<sup>1</sup>  
Senior Registrar, Obstetrics and Gynaecology Department,  
Unit II, Jinnah Hospital, Lahore – Pakistan

S. Wazir<sup>2</sup>  
Obstetrics and Gynaecology Department, Jinnah Hospital  
Lahore – Pakistan

Ghazala Moeen<sup>3</sup>  
Paediatric Gynaecologist, Incharge Maternal and Child  
Health (MCH) Department, Children Hospital and Institute  
of Child Health Lahore (CH and ICH), Pakistan

Postpartum haemorrhage remains among the five main causes of maternal death in developing and developed countries and uterine atony is the most common cause (75 – 90%) of primary PPH. Uterine compression sutures running through the full thickness of both uterine walls (posterior as well as anterior) have recently been described for surgical management of titanic PPH. Christopher B-Lynch was first to highlight this revolutionary principle and other uterine compression suture techniques have since been described by Hayman and Cho.<sup>4</sup>

The B-Lynch suturing technique involves a pair of vertical brace sutures around the uterus essentially to appose anterior and posterior uterine walls. It was designed for the control of massive postpartum haemorrhage avoiding difficult and hazardous surgery while preserving the patient's uterus and fertility. Although B-Lynch used gauge 2 chromic catgut for the uterine brace sutures, polyglactin has been used by others.<sup>5</sup>

The B-Lynch Brace Suture is a valuable addition to the surgical treatment of Postpartum haemorrhage because of its simplicity of application, relative safety, life saving potential and its capacity of preserving the uterus and thus fertility.

Satisfactory haemostasis can be assessed immediately after application.<sup>6</sup> B-Lynch Brace Suturing is an invaluable procedure for the control of atonic primary postpartum haemorrhage following caesarean delivery.<sup>7</sup> Compression suture placed into the postpartum uterus may provide a simple first surgical step to control bleeding when routine oxytocic measures have failed.<sup>8</sup>

Primary PPH is one of the top five causes of maternal mortality in both developed and developing countries.<sup>9</sup> Many trials and overviews have demonstrated that routine oxytocics administration in the 3<sup>rd</sup> stage of the labour can reduce the risk of PPH by more than 40%.<sup>10</sup> Numerous medical and surgical procedures are used to control PPH like oxytocics such as prostaglandins E<sub>2</sub>, F<sub>2</sub>, alpha, misoprostol, surgical compression by B-Lynch, selective artery embolization or ligation, and obstetric hysterectomy.<sup>11</sup> Prostaglandin i.e. 15 – methyl analogue of prostaglandin F<sub>2</sub> alpha is used to control severe PPH caused by uterine atony that is not responsive to oxytocin, ergometrine or uterine massage.<sup>3</sup> PGE<sub>2</sub> and PGF<sub>2</sub> alpha produce strong uterine contraction.<sup>12</sup> An analogue of PGF<sub>2</sub>a,<sup>15</sup> MF<sub>2</sub> alpha tromethamine has been shown to be more effective uterotonic.<sup>13</sup> The usual dose is 0.5 mg injected transabdominally into myometrium on each side of fundus.

Alternatively a transcervical injection at 9 and 3'o'clock position can be given to help uterine contraction.<sup>2</sup> The rationale for the use of prostaglandin in PPH due to uterine atony arises from the fact that cessation of uterine bleeding after delivery occurs basically by vessel wall constriction and thrombosis. The outside pressure caused by contraction of myometrial fibers, lying in between vessels penetrating the myometrium is most important and prostaglandins act by this mechanism. It is precisely well known that concentrations of prostaglandins in amniotic fluid and its metabolites in maternal circulation increase during labour.<sup>14</sup> What is usually less well appreciated is that levels of prostaglandin metabolites reach peak value in maternal circulation after rather than before birth. The administration of 15 – methyl PGF<sub>2</sub>a appears very effective for the treatment of severe atonic postpartum haemorrhage, and has very few side effects. It represents a dramatic life saving medical therapy for this obstetric problem. Moreover in cases of severe postpartum of haemorrhage unresponsive to conventional treatment, its use and efficacy avoids the need of major surgery thus decreasing the maternal morbidity and mortality related to such procedures.<sup>15</sup> The non-availability of operative facilities and expert obstetricians and personnel make the medical management of PPH more appropriate according to settings.

Compression sutures were first described by Christopher B-Lynch and hence they are often called the "B-Lynch" suture.<sup>16</sup> In 1997, B-Lynch et al<sup>17</sup> described the use of uterine compressions used to treat uterine atony in five cases of massive obstetric haemorrhage. The objective of this technique is to compress the uterus without occluding either the uterine arteries or the uterine cavity. Several subsequent publications reporting six more cases have attested to its efficacy.<sup>18,19</sup> Key points in the technique are:

The abdomen is opened via a Pfannensiel incision (although a modified Cohen's procedure would be just as appropriate). Bimanual compression is applied to check that this arrests bleeding, before the suturing is performed. A lower – segment incision in the uterus is made or re-opened to allow the suturing to be performed. The uterine cavity is not crossed. Vicryl or Dexon sutures are used. The sutures must be pulled tight to achieve appropriate compressions.

The net effect of the brace suture is to compress the uterus (as in bimanual compressions). The anterior and posterior walls are apposed by vertical brace sutures using a delayed absorbable suture material, resulting in continuous compressions of uterus.<sup>16</sup>

Simple modification of this technique makes this procedure less complex to perform i.e. using two separate vertical compression sutures instead of one to increase the tension applied.<sup>17</sup>

## Patient's and Methods

### Objectives of the Study:

To estimate the effectiveness and safety of B-Lynch brace suture in the management of primary postpartum haemorrhage (PPH).

If at all to assess the complications due to this procedure during the next three days.

Hypothesis: B-Lynch brace suture is highly efficacious in the management of PPH.

It was Case Series descriptive study. It was carried out in the department of Obstetrics and Gynaecology, Unit II, Jinnah Hospital Lahore. Study was completed in six months from 8-06-2006 to 8-12-2006. Sixty patients were included in this study. The sampling technique was purposive-non probability sampling. The patients of all ages, parity and cases having PPH were included in the study. PPH due to causes like injuries to the birth canal and patients having blood dyscrasias were excluded from the study.

### Method

Prior to applying B-Lynch Suture,<sup>6</sup> under general anaesthesia, the patient is catheterized and placed in the Lloyd Davis Position (modified lithotomy position) to assess the control of bleeding subjectively by swabbing. The abdomen is opened by Pfannensteil's incision or if the patient has had caesarean section following which she bled, the same incision is reopened. On entering the abdomen either a lower segment incision is made or sutures of a recent cesarean section are removed. Bimanual compression is first tried to assess the potential chance of success of the B-Lynch suturing technique. For this procedure chromic catgut No. 2 on rounded needle is used. The uterus is punctured at about 3cm from the right lower edge of the uterine incision and 3cm from the right lateral border. The thread is passed through the uterine cavity to emerge at the upper incision margin 3 cm above and approximately 4 cm from the lateral border. The catgut is passed over the uterine fundus approximately 3 – 4 cm from the right cornual border. The catgut is passed posteriorly to puncture the uterine cavity at the same level as the upper anterior entry point. The chromic catgut is pulled under mode-

rate tension and is passed posteriorly through the same surface marking as for the right side, the suture lying horizontally. The catgut is passed vertically over the fundus compressing the fundus on the left side as occurred on the right. The needle is passed in the same fashion on the left side through the uterine cavity and out approximately 3 cm anteriorly and below the lower incision margin on the left side. The two lengths of catgut are pulled taut assisted by bimanual compression to minimize trauma and aid compression. The vagina is now checked for bleeding. If good hemostasis is secured and whilst the uterus is compressed by an assistant, the principal surgeon ties the two lengths of catgut to secure tension. The lower transverse uterine incision is now closed in the normal way.

Background history of the patient including age and parity was assessed. History of current pregnancy like preterm delivery, full term delivery was known. Current position including general condition of the cervical os was assessed. Certain investigations like complete blood count, PT, APTT, platelets were sent. B-Lynch suture was applied in suitable cases and follow-up was done. All this information was collected through a specially designed proforma. The collected information was entered into computer software (SPSS version 10) and analysed through its statistical programme. The variables analysed included some of the demographic details (age, parity and socio economic status), history of index pregnancy (duration, symptoms and mode of delivery) and immediate features around the delivery (person conducting the delivery, place of delivery and time since delivery) these are described as simple statistic, giving means and standard deviations for numerical data. After the application of the B-Lynch suture, the outcome of the cases in terms of stoppage of bleeding, time taken for stoppage, condition of the uterus, contracted or not and the general positions of the subject were described as types and proportions and any difference observed are subjected to Chi-Square test as the outcome is qualitative in nature.

### Results

There were total 60 patients included in the current study. Age distribution showed 2 patients (3.3%) less than or equal to 20 years. 16 patients (26.7%) were between 21 – 25, 26 patients (43.3%) between 26 – 30 years, 10 patients (16.7) between 31 – 35 years and 6 patients (10%) were more than 36 years. Mean age was found to be  $28.8 \pm 4.9$  (Table 1).

**Table 1:** Distribution of cases by age (n = 60).

Age (Year)	Number	Percentage
≤ 20	02	03.3
21 – 25	16	26.7
26 – 30	26	43.3
31 – 35	10	16.7
≥ 36	06	10.0
Total	60	100.0
Mean ± SD	28.8 ±	4.9

47 patients (78.3%) were Para 4 or less and 13 patients (21.7%) were Para more than 4.

32 patients (53.35%) were gravida less than 4 while 7 patients (11.7%) were gravida 4 and 21 patients (35%) were gravida more than or equal to 5.

46 patients (76.7%) had no abortion, 3 patients (3%) had one abortion and 11 patients (18.3%) had 2 – 3 abortions.

**Table 2:** Distribution of cases by condition of the patient (n = 60).

Condition of the Patient	Number	Percentage
Shock	06	10.0
Eclampsia	07	11.7
Fetal distress	32	53.3
Stable	12	20.0

19 patients (31.7%) had blood loss between 500 – 1000 cc while 40 patients (66.7%) had blood loss between 1001 – 2000 cc and 1 patient (1.6%) had blood loss more than 2000cc. Mean blood loss was 1418.33 ± 392.07 (Table 3).

**Table 3:** Distribution of cases by amount of blood loss (n = 60).

Blood loss (cc)	Number	Percentage
500 – 1000	19	31.7
1001 – 2000	40	66.7
> 2000	01	01.6
Total	60	100.0
Mean ± SD	1418.33 ±	392.07

**Table 4:** Duration of second stage of labour (n = 60).

Time (Minutes)	Primigravidas (n = 22)		Multigravidas (n = 38)	
	No.	%	No.	%
< 60	20	90.9	–	–
> 60	2	9.09	–	–
< 30	–	–	30	79.0
> 30	–	–	8	21.0
Total	22	100	38	100.0
P values	Chi-square value is 14.7 (p < .05)		Chi-square value is 12.7 (p < .05)	

**Table 5:** Distribution of cases by successfulness of B-Lynch suture in PPH.

Success	Number	Percentage	95% CI
Yes	57	95.0	85.1 – 98.6%
No	03	05.0	1.3 – 14.8%
Total	60	100.0	–

24 patients (40%) had gestational age less than 38 week, 26 patients (43.3%) were at gestational age 38–40 weeks and 10 patients (16.8) were at gestational age more than 40 weeks with mean gestational age of 37.95 ± 2.28 weeks.

Out of 60 patients, 6 (10%) percent were presented in a state of shock, 7 patients (11.7%) with eclampsia and 32 (53.3%) were presented with fetal distress. 12 patients (20.0%) were stable (Table 2).

In primigravidas, duration of first stage of labour was prolonged in 13 patients (59.1%) and in multiparas duration of first stage of labour was prolonged in 20 patients (52.6%).

Duration of second stage of labour was prolonged in 2 primigravidas (9.09%) and 8 (21%) multiparas. (Table-4)

51 (85%) caesarean sections were carried out as well as B-Lynch Suture applied by Trainee Registrars, 8 (13%) by Senior Registrars and 1 (2%) by Consultants.

Success rate of B-Lynch suture was 95% with CI of 85.1 – 98.6% (Table 5).

## Discussion

Postpartum haemorrhage denotes excessive bleeding (more than 500ml in vaginal delivery). It may occur before, during or after the delivery of the placenta. Actual measured blood loss during uncomplicated vaginal delivery averages 700 ml, and blood loss may often be underestimated.<sup>16</sup>

In my study done at Jinnah Hospital, Lahore, total 60 patients were included. All of them had post-partum haemorrhage. Uterine massage and utero tonics were applied as the first line procedure, if uterus failed to contract; B-Lynch Brace suture was applied.

Maximum number of patients who presented with post-partum haemorrhage were of age group 26 – 30 years. Forty seven (78.3%) patients out of 60 were Para less than or equal to four. Twenty one (35%) of patients were gravida more than or equal to five. Forty six (76%) patients had no abortion. Twenty six patients (43%) presented at 38 – 40 weeks gestation. Only one patient (1.6%) had blood loss more than 2000 cc. In a significant number of patients either the first or the second stage of labour was prolonged. Most of the cases in which post-partum haemorrhage occurred during C-section were done by trainee registrar and B-Lynch suture was also applied by them. Results were very encouraging. Only three patients underwent hysterectomy out of 60. So in majority of the cases uterus as well as fertility was preserved. Success rate of B-Lynch suture was 95% (57 patients). 95% CI was 95.1 to 98.6%.

In one study B-Lynch suture during emergency caesarean section was applied. The average ages of patients were 20 years. All of them received 5 units of oxytocin by intramuscular injection. None of the seven women (100%) required any other means of surgical intervention. None of them required blood transfusion. There were no complications during the procedure follow-up. All women resumed normal menstruation.<sup>20</sup>

In current study all the women received 5 units of oxytocin by intramuscular injection, 3 patients (5%) had caesarean hysterectomy, 3 patients (3%) required blood transfusion. There were no complications during the procedure follow-up which give results similar to the above study.

According to five case reports it was required that the B-Lynch suturing technique may be particularly useful because of its simplicity of application, life saving potential, relative safety and its capacity of preserving the uterus and thus fertility. Satisfactory haemostasis can be assessed immediately after application.

This suturing technique has been successfully applied with no problems to-date and no apparent complications (100% successful).<sup>21</sup>

In this study B-Lynch suture was very simple to apply (applied by the registrars) safe and had life saving potential. There were no apparent complications. 95% successful which give results similar to above case reports.

In a study at the Department of Obstetrics and Gynaecology. Mother and Child health Centre, PIMS, Islamabad, 28 years old lady had an emergency caesarean section at 32 weeks for sudden onset of heavy vaginal bleeding lower segment was highly vascular and bled more than 1000 mls during the operation despite ecbolics, hemostatic sutures to the placental bed in the lower uterine segment and pressure pack. B-Lynch was applied successfully. One unit of blood was transfused per operatively. Patient remained well and was discharged on 5<sup>th</sup> postoperative day.<sup>22</sup>

In present study postoperative recovery was good in all the patients (100%), no mortality occurred.

In the observational study of 11 consecutive patient of major primary postpartum haemorrhage had the B-Lynch suture at the time of caesarean section performed at a teaching hospital in Scotland. The patients were aged between 25 and 38 years old (mean 31 years), gestational age at which the procedure was performed ranged from 34 to 41 weeks (mean 28 weeks). All cases had the B-lynch sutures performed for major primary PPH caused by uterine atony at the time of caesarean section. Only three patients (28%) required hysterectomy.<sup>23</sup>

In my study mean age was  $28.8 \pm 4.9$  years, gestational age ranged from 32 – 41.6 weeks, comparable with above mentioned study. 3 patients (5%) required hysterectomy.

In another case series B-lynch suture was performed on 22 patients to control intractable PPH at caesarean section that did not respond to uterotonic agents. In 12 instances, the B-lynch suture was the only intervention, whereas in 10 it was combined with vessel ligation. The procedure resulted in control of bleeding with uterine presentation in 77% of cases. In those cases where the etiology of PPH was uterine atony, the B-lynch suture was successful in 85% of the cases.<sup>24</sup>

In my study B-lynch suture was 95% successful, results are close to the above study.

In a study at Jinnah Hospital, Lahore there were 45 patients who had B-lynch brace suture applied for postpartum haemorrhage. The ages of patients ranged from 20 – 35 years and parity from 1 – 6. Gestational

age was from 34 – 41 weeks. 36 (80%) woman had PPH due to uterine atony while 9 (20%) had PPH due to placental causes. The estimated blood loss was 1000 – 1500 cc in 15 patients (33.3%), 1500 – 2000 cc (62.2%) and 2 patients (4.4%) had blood loss more than 2000 cc. suturing technique has been applied successfully in 44/45 patients with failure rate of 2.2%.<sup>25</sup>

In present study age of the patients ranged from 19 – 40 years. Parity 0 – 9, gestational age between 32 – 41.6 weeks. Less than 1500 cc blood loss occurred in 31.7% patients, 66.7% had blood loss between 1000 – 2000cc and one (1.7%) had blood loss more than 2000 cc. Failed rate in my study was 5% and all the data very close to above quoted study. This technique is particularly useful when preserving the uterus and retaining fertility potential is extremely vital. Satisfactory homeostasis can be assessed immediately after its application. No apparent complication has been reported so far.

## Conclusion

My review of 60 cases found that the B-lynch compression suture is easy to apply and should be considered primary treatment and also in cases of severe atonic PPH when oxytocin agents failed, and before restoring to hysterectomy. The suturing technique has been successfully applied with no problems to-date and no apparent complications. The B-lynch suture is a valuable addition to the surgical treatment of postpartum haemorrhage because of its simplicity if application, relative safety, life saving potential and its capacity of presenting the uterus and thus fertility. Satisfactory haemostasis can be assessed immediately after application. I suggest that B-lynch suture is a simple procedure and should be tried before more complex interventions are used. The management of postpartum haemorrhage is an emergency situation, which requires swift action and a systematic approach. Knowledge, skill and appropriate use of management strategies can save lives, may help to avoid major surgery and at times be valuable to preserve uterus and hence fertility.

## References

1. Chein PFW. Third stage of labour and abnormalities. Edmonds DK. Dewhurst' textbook of obstetrics and

2. gynaecology for post-graduates. 6<sup>th</sup> ed. London: Blackwell Science Ltd, 1999.
2. Collier J, Longmore M, Brown TJ, editors. Postpartum haemorrhage: Oxford Hand book of Clinical Specialities. 5<sup>th</sup> ed. New York: WB Saunders, 1999: 138.
3. Campbell S, Less C, editors. Obstetrics emergencies. Obstetrics by Teb teachers. 17<sup>th</sup> ed. London: Arnole, 2000: 308.
4. Allam MS. B-lynch and other uterine compression suture techniques. *Int J Gynaecol Obstet* 2005; 89: 236-41.
5. Joshi VM, Shrivastava M. Partial ischemic necrosis of the uterus following a uterine brace compression suture. *BJOB* 2004; 111: 279-80.
6. Faruqi NJ, Javed I, Yousuf F, Sabick A, Alam AN, Nosheen S. B-lynch suture for the management of postpartum haemorrhage – a local experience. *Ann King Edward Med Coll* 2007; 10: 370-3.
7. Pal M, Biswas AK, Battacharya SM, B-lynch brace suturing in primary postpartum haemorrhage during caesarean section. *JObstet Gynaecol Res* 2003; 129: 217-20.
8. Roohi M, Ali R, primary atonic postpartum haemorrhage *Professional Med J* 2004; 11: 181-5.
9. Mousa HA, Alfirevic Z. Treatment for primary postpartum haemorrhage. (Cochrane review). *Cochrane database syst. Review*. 2003; 1: CD003249.
10. Nordstrom L, Fogelstam K, Fridman G, Larsson A, Rydhstroem H, Routine oxytocin in the third stage of labour: a placebo controlled randomized trial. *Br J Obstet Gynaecol* 1997; 104: 781-6.
11. Gulmezoglu AM, Forna F, Villar J. Prostaglandins for prevention of PPH. *Cochrane database syst rev*. 2004; (1): CD000494. (Update software).
12. Peyser MR, Kupfermine MJ, Management of severe postpartum haemorrhage by intrauterine irrigation with prostaglandin E<sub>2</sub>. *Am J Obstet Gynaecol* 1990; 162: 694-6.
13. Tramoni G, Clement HJ, Rudigoz RC, Viale JP, Prostaglandin F<sub>2</sub> Alpha: French guidelines for uterine atony management. *Int J Obstet Anesth* 2006; 15: 180-1.
14. Keirse MJNC. Biosynthesis and metabolism of prostaglandins within the human uterus in early and late pregnancy. In: Wood C, editor. *The role of prostaglandins in labour*. London: Royal Society of Medicine. 1985: 25.
15. Jacobs MM, Arias F, Intra myometrial prostaglandin F<sub>2a</sub> in the treatment of severe post partum haemorrhage. *Obstet Gynaecol* 1980; 55: 665.
16. Chandrahan E, Arulkumaran S, Management algorithm for atonic postpartum haemorrhage. *JPOG*; 2005: 106-12.
17. B-lynch C, Coker A, Lawal AH. The B-lynch surgical technique for the control of massive postpartum haemorrhage: an alternative to hysterectomy? Five cases reported. *BJOB* 1997; 104: 372-5.

18. Dacus JV, Busowski MT, Busowski JD, Surgical treatment of uterine atony employing the B-lynch technique. *J Mat Fetal Med* 2000; 9: 194-6.
19. Ferguson JE, Bourgeois FJ, Underwood PB. B-lynch suture for postpartum haemorrhage. *Obstet Gynaecol* 2000; 95: 1020-22.
20. Vochanni M, Virkud A, Peophyalctic B-lynch suture during emergency caesarean section of women at high risk of uterine atony: a pilot study. *Int J Gynaecol Obstet* 2007; 7: 232-5.
21. B-lynch C, Coker A, Lawal AH, Abu J, Coqwn MJ. The B-lynch surgical technique for the control of massive postpartum haemorrhage: an alternative to hysterectomy? Five cases reported. *Br J Obstet Gynaecol* 1997; 104: 372-5.
22. Mazhar SB, Yasmin S, Gulzar S. Management of massive postpartum haemorrhage by "B-lynch" brace suture. *J Coll Physicians Surg Pak* 2003; 13: 51-2.
23. Allahdin SS, Aird C, Danielian P, B-lynch sutures for major primary postpartum haemorrhage at caesarean section. *J Obstet Gynaecol* 2006; 26: 639-42.
24. Wolhmuth CT, Gumbs J, Quebral – Ivie J, B-lynch suture: a case series. *Int J Fertil Women Med* 2005; 50: 164-73.
25. Faruqi NJ, Javed L, Yousaf F. B-lynch suture for the management of postpartum haemorrhage – a local experience *Ann King Edward Med Coll* 2004; 10: 370-3.