

“A Stitch in Time, Saves Life”; Should B-Lynch Suture be the First Line Surgical Option for Control of Massive Primary PPH due to Refractory Uterine Atony? An Experience at D.H.Q Hospital Faisalabad

Fauzia Naureen Bhutta, Muhammad Mustafa Kamal Bhutta, Jameel Bhutta, Robina Ali, Sumera Tahir, Mehmood Aleem

ABSTRACT

Objective:

To see the effectiveness of B-Lynch brace suture as first line surgical option to control massive primary postpartum hemorrhage due to uterine atony refractory to medical treatment.

Study Design: Quasi experimental. **Place and duration of study:** This research work was done in D.H.Q Hospital Faisalabad from 2002-2004. During the study period 21 women underwent B-Lynch Brace suture to halt bleeding resulting from refractory uterine atony. Data was collected in prospective manner on a specialized proforma from attending house officers and postgraduate trainee registrars. The B-Lynch technique was used. Postoperatively the patients were kept in high dependency area within labor room for 24-48 hours. Follow up was done in O.P.D after discharge. **Materials & Methods:** The women who had severe/persistent primary postpartum hemorrhage due

to uterine atony were initially resuscitated and simultaneously managed with ecbolics as per unit protocol (i-e; 40 units oxytocin in 1000cc Normal Saline infusion, inj. methergin (withheld women with specific contraindications for methergin), inj. F2 alpha in each uterine cornu, and per rectal misoprostol. However those women who remained unresponsive to the medical treatment, underwent B-Lynch Brace suture as first line surgical option. **Results:** The success rate was 85.7% (n18) in terms of control of hemorrhage and hysterectomy was averted in 95% (n20) of women. Whereas in two women it needed to be integrated with stepwise uterine de-vascularization procedures. **Conclusion:** B-Lynch suture is effective as first line surgical option to arrest postpartum hemorrhage due to refractory atonic uterus. **Key words:** Refractory uterine atony, massive primary PPH, B-Lynch Brace suture.

Article Citation: Bhutta FN, Bhutta MMK, Bhutta J, Ali R, Tahir S, Aleem M. “A Stitch in Time, Saves Life”; Should B-Lynch Suture be the First Line Surgical Option for Control of Massive Primary PPH due to Refractory Uterine Atony? An Experience at D.H.Q Hospital Faisalabad. APMC 2015;9(2):71-78.

INTRODUCTION

Obstetric Hemorrhage remains the most common cause of maternal death in both developed and developing countries.¹

Corresponding Author:

Dr. Fauzia Bhutta
Senior Registrar, Gynecology
D.H.Q Hospital, Faisalabad
Tel. +92 334-9089194
E-mail: dr.fauzia22pk@yahoo.com

It's the leading cause of severe maternal morbidity. PPH, as defined by W.H.O is, the postpartum blood loss of 500 ml or more after vaginal birth and 1000ml or more, following cesarean section, within 24 hours of delivery.¹

A major PPH occurs when blood loss exceeds 1 L and it complicates 5% of deliveries.¹

Massive post-partum hemorrhage is defined as blood loss > 2 L and has been associated with hypo volemic shock and severe maternal

morbidity and mortality. It complicates 1:1000 births.^{1,8}

A recent multi centre survey by the WHO revealed, that severe anemia (50.0%), post-partum hemorrhage (48.5%) and pre-eclampsia (9.5%) were the most prevalent causes of maternal deaths in Pakistan⁵.

Visual estimation of excessive blood loss is notorious for under-estimation^{7,10}, and if it goes unrecognized, severe obstetric morbidity may ensue requiring admission in I.C.U, with an cascade of multiple deadly sequelae to follow: metabolic acidosis, multiple organ failure, myocardial dysfunction, renal failure, septicemia, disseminated intravascular coagulation, iatrogenic complications secondary to massive blood transfusions, prolonged surgery & anesthesia, sterility, lifelong psychological trauma and sometimes family disruptions and loss of a young maternal life.

Of various causes of PPH, uterine atony (*loss of uterine tone*) is the most common, seen in 70-80% of cases^{4,7,12-14}. Others include *trauma* (to genital tract, 8%), *tissue* (retained products of conception 5%) and *thrombin* (Coagulopathy 2%)^{13,14,15}. Risk factors for uterine atony include, over distended uterus, prolonged /obstructed labor, operative delivery, choroamnionitis, pre-eclampsia. The conventional first line therapy for uterine atony is the bi-manual uterine massage, urethral cathetrization to empty bladder and medical treatment that include oxytocin infusion, ergometrine Inj., prostaglandin F2 alpha, prostaglandin E2 and prostaglandin E1 (Misoprostol).

At term gestation the uterine blood flow rate is 500-700ml/min and so a woman may die in no time, if living ligatures of uterus i-e; uterine smooth muscles fail to contract leading to torrential hemorrhage from opened up venous sinuses of placental bed.

In refractory cases, uterine tamponade followed by surgical interventions (either of conservative surgical interventions or hysterectomy) should be resorted to immediately, before the *point of no return* is reached²⁵. The hysterectomy being a clinical dilemma in young women and the decision should be made at consultant level. However no delay in resorting to a less morbid B-

Lynch Brace suture should happen at the level of duty registrar faced with such scenario.

The purpose of this study was to see the effectiveness of B-Lynch Brace suture.

MATERIALS & METHODS

Place of study:

This was a prospective quasi experimental study carried at D.H.Q Hospital Faisalabad (August 2000-August 2002) where 21 women with life threatening PPH were managed by B-Lynch suture.

Inclusion Criteria

It included all the patients who were delivered inside the hospital or those who were referred here with PPH due to atonic uterus refractory to medical treatment.

Exclusion Criteria

All those patients with primary PPH due to causes other than uterine atony were excluded from the study.

Method

The demographic data of study population, obstetric & gynecological history, obstetric risk factors identified for uterine atony in index pregnancy, medical and surgical interventions required to control hemorrhage, need of blood transfusion and primary and secondary outcome measures were entered in a proforma. Primary outcome measures were, where satisfactory hemostasis was achieved in terms of control of PPH, total units of blood transfused, length of operating time, re-exploration, post-operative morbidity and total hospital stay.

When dealing with postpartum hemorrhage refractory to medical treatment, a prompt resort to surgical intervention i-e; B-Lynch, was done and in selected cases proceeded to stepwise uterine de-vascularization, uterine artery ligation(UAL), hypo gastric artery ligation (HAL) or obstetric hysterectomy as last resort.

RESULTS

A total of sixty cases of primary postpartum hemorrhage were encountered during the study period of 2 years. Uterine atony was the cause in 40 (66.7%); among which 21/40 of women (52.5%) were refractory to medical treatment and included in study. The mean age of study

population was 23 years (Table I). And 43.7 % were primi-para (Table II). All of these primipara were unbooked and in 25 % of these the presenting diagnosis was obstructed labor after prolonged and injudicious augmentation outside hospital by traditional (unskilled) birth attendants (T.B.As). Most of them (12 out of 21 i-e; 57%) were delivered by emergency lower segment caesarean section (LSCS) after having obstructed labor, fetal distress, chorio-amnionitis, good sized baby and abruptio placentae. In cases of primary PPH due to atonic uterus, medical treatment instituted immediately as per unit protocol. In all patients necessary resuscitative measures were done, hypo-volemia was corrected by I.V fluids and blood transfusions, antibiotics given and medical treatment instituted. In all of them before resorting to surgical intervention i-e; B-Lynch suture, consent for hysterectomy was taken.

B-Lynch was applied as first line option in 21 cases and found successful in 18/21 (85.7%). Whereas B-Lynch suture was integrated with, uterine de-vascularization in two women (9.5%) and one woman (4.7%) underwent obstetric hysterectomy after failure of hemostasis by B-Lynch Brace suture (Table IV).

As Regards the mean length of operative time of various surgical procedures adopted, it was 60 minutes (range 30-90 minutes) in B-Lynch Brace suture in 57.6 % of cases versus 110 minutes (range 90-120 minutes) in alternative more complex surgical interventions (Table V).

Post-operatively intensive and vigilant monitoring were done. Post-operative complications were analyzed which were minor and occurred in 17/18 patients. (Table VI). Post-operative morbidity include mild to moderate dull abdominal pain (66%), paralytic ileus (55%), pyrexia (50%) and wound infection in 13% (Table VI).

Table 1: The percentage distribution of mean age in study group

Age (Years)	Frequency	Mean Age	% Distribution
< 20 years	8	18.8	37.5
20-30 years	5	27.4	31.25
> 30 years	5	36.4	31.25
Total	18	27.5	100

As shown in above table in 68.1 % of cases of uterine atony, where B-Lynch suture was applied, the mean age of presentation was 23 years.

Table 2: Percentage distribution of parity in all patients with refractory atonic uterus:

Para	Frequency	% Distribution
0	9	42.8
1	4	19.1
2	3	14.28
3	2	9.53
4 and above	3	14.28
Total	21	100

As shown in the above table 42.8 % of patients were nulli-para (primary para) i.e. presenting in their first pregnancy.

Table 3: Percentage distribution of risk factors for uterine atony refractory to medical treatment

Risk Factors	Frequency (total n=21)	% distribution
Un-booked status	17	80.9
Primipara	10	47.6
Pre-eclampsia / PIH	7	33
Multiple pregnancy	2	9.5
Obstructed labour	4	19
Chorio-amnionitis	5	23.8
Abruptio-placentae	5	23.8
Previa	2	9.5
Home delivery	4	19
vaginal delivery	7	33.4
Emergency LSCS	14	66.6
Retained placenta	3	14
Adherent placenta	2	9
Macrosomic baby	3	14
IUD	4	19
Anemia	17	71.4

Table 4: Type of operative management

	B-Lynch Successful (n = 18)	Hysterectomy / B-lynch With HAL (n = 3)
Operative time (min.) Mean (range)	60 (30-90 min.)	110 min. (90-120)
Estimated blood loss (ml.) Mean (range)	2500 ml. (1000-3000)	3500 ml. (1500-5500)
Blood Transfusion (units) Mean (range)	5 (5-10)	8 (8-12)
Hospital stay days Mean (range)	5 (3-8)	8 (7-10)
Intra operative hypo-Tension. (%)	11.5 %	66 %
Re-exploration (%)	Nil.	Nil.
Injury to bladder (%)	Nil.	Nil.
Febrile Morbidity. (%)	50 %	70 %
Pelvic Hematoma. (%)	Nil	Nil
Wound Infection (%)	11 %	33 %
Deep venous thrombosis (%)	Nil	Nil
Maternal Mortality (%)	Nil	Nil

Comparative Clinical correlates, operative & post-operative complications.

Table 5: Outcome measures for B-lynch brace suture

	YES %	NO %
PPH Controlled	85.7 % (n = 18)	4.7 % (n = 1)
Combined with uterine de-vascularization	9.5 % (n = 2)	85.7 % (n = 18)
Hysterectomy	4.7 % (n = 1)	95.2 % (n = 20)

Table 6: Length of operation time & type of surgery

Time	B-Lynch Brace Suture (n = 18)	Hysterectomy / uterine de-vascularization (n = 3)
30 min.	n = 3 (14.3 %)	
60 min.	n = 12 (57.6%)	
90 min.	n = 3 (14.3%)	
120 min.	Nil	n = 3 (14.2%)
Mean time (range)	60 min. (30-90)	110 min (90-120)

Table 7: Percentage distribution of post-operative complications after B-lynch brace suture application

Maternal Morbidity	Frequency (total n = 18)	(%) distribution
Pyrexia	8	44.4
Paralytic ileus	10	55
Abdominal pain	12	66
Wound infection	2	11
Re-exploration	Nil	0
Secondary PPH	Nil	0
Secondary amenorrhea	Nil	0
Visceral injury	Nil	0
Urinary retention	1	5.5
Prolonged catheterization for 7 days	4	22
ATN	1	5.5
DVT	Nil	Nil



Figure 1: B-lynch operation

DISCUSSION

As regards efficacy of B-Lynch Brace suture in the arrest of life threatening primary postpartum hemorrhage due to uterine atony, there are no randomized trials. The real life threatening situations preclude execution of trials and the evidence of comparative success or failure rates of various available fertility sparing surgical interventions being derived from case reports, case series and/or systemic reviews that have been published over the last one and half decade. Recently UK Obstetric Surveillance System (UKOSS) was the first ever population based study in U.K that addressed the efficacy, the success and failure rates of B-Lynch only, as well as other modifications of, the brace suture²¹.

The index study had reported an experience with classical /original B-Lynch suture in 21 women with massive primary PPH due to uterine atony refractory to conventional uterotonics. In all these women, pre-operatively consent for emergency hysterectomy was taken and then B-Lynch brace suture was applied as first line surgical modality to arrest hemorrhage as well as to conserve uterus.

As was seen in current study, the uterine atony was recognized as the commonest (n =40/60, in 66.7%) and the sole cause of massive primary PPH. This was in consistence with the earlier findings of Bowman and Zelop where atony was responsible for 2/3rd of cases of obstetric hysterectomy as well as to that of UKOSS (2007-2009) where it was the underlying cause in 61% of cases and an indication for peripartum hysterectomy in 53% of women refractory to medical treatment. Even modern obstetrics was not found immune to uterine atony and still it remained the top most reported cause of PPH with reported rates ranging from 64% to 90% in recently published literature^{4,29,31}. Furthermore, as reported by Laas E et al, in France 22%-33% of uterine artery embolization (UAEs) procedures were performed after vaginal births, following medically unresponsive atonic PPH. Moreover many authors have reported their immediate resort to uterine compression sutures as first line option at the time of cesarean section²³. The rising trends of atonic PPH have been demonstrated as a cause of concern in various latest studies from the developed world.

The risk factors for refractory uterine atony identified in our study included : unbooked status of women (80%) , anaemia (80%), obstructed labor, injudicious use of *oxytocin* by community birth attendants , pre-eclampsia , chorioamnionitis, in utero death of baby, abruption , placenta previa , macrosomic baby, multiple pregnancies. The obstructed labor was the presenting diagnosis in 25% of primipara with atonic PPH in current study, in which labor was augmented by unskilled/traditional birth attendants at peripheral centers. This was in consistence with findings of international authors, who have quoted pre-eclampsia, chorio-amnionitis, prolonged/ obstructed labors, liberal use of oxytocin causing desensitization or exhaustion of uterine muscle receptors, as significant and independent risk factors for refractory uterine atony^{7,14,22}. Women treated with magnesium sulphate or selective serotonin reuptake inhibitors (SSRI) being also at risk of refractory uterine atony²².

The mechanical methods to control hemorrhage include, uterine tamponade by either Rush, Bakri, Sangstaken blackmoore balloon or the Belfort – Dildy Obstetric (B.D.O) Tamponade System. Uterine packing with gauze or sponge, being an effective alternative to these tamponade techniques, in the low resource settings.⁸ The second line surgical options include B-Lynch Brace suture (Uterine compression suture), uterine artery embolization, and pelvic de-vascularization. Hysterectomy being the last and definitive option^{13,14,16-19}. The choice to opt for any of above interventions is guided by individual clinical situation & setting, fertility wishes of the woman and the surgical expertise of the surgeon facing the nightmare of primary PPH as well as the availability of technological resources as back up e.g. ; blood bank / hematologist, interventional radiologist and multidisciplinary team.

There are no standardized guidelines to guide which surgical technique should be the first line surgical option in women with refractory uterine atony or coagulopathy.^{14,16,21,25} It has been proven that delay in initial care is an independent predictor of severe blood loss¹². Moreover, blood bank facilities may not cope with the urgent need of massive blood transfusion once the postpartum hemorrhage is massive or complicated with

coagulopathy or D.I.C. B-Lynch suture was considered as being a simple, less morbid first line surgical approach for expediting hemostasis.

The success rate for B-Lynch suture at our institution was 85.7%. This was lesser than that of original study by B-Lynch et al⁷ (100%); and 91.7%, as reported by Scottish systemic review¹³ and more than that for HAL (Hypogastric artery ligation), i.e; 65% as reported by S K Chattopadhy. However our results were consistent with that reported by the Scottish Confidential Audit of severe maternal morbidity, where in 40/52 (81%) women, hysterectomy was averted⁶. Quite interestingly a further endorsement came through UKOSS²¹, where hysterectomy was avoided in 75% of cases. Published literature so far, has reported a 97% success rate (range 76%-100%) of B-Lynch suture in achieving hemostasis.

In the majority of cases, B-Lynch sutures were applied by the duty registrar with no waste of time, after the test of potential success (i.e; bimanual compression after exteriorizing uterus from abdominal wound) was fulfilled. Technically speaking, this was easy to apply during caesarean sections and following vaginal births and far less complicated or time consuming than either HAL or hysterectomy.

One drawback of B-Lynch suture, as suggested by Hayman was, it required to convert an unscarred uterus to a scarred uterus⁹. Despite the fact it helped to visualize the uterine cavity, to curette it under direct vision or put ligatures in placental bed, opening of uterine cavity may not seem mandatory in all cases¹², especially in early gestations.

As regards failure of B-Lynch, as quoted by Karoshi M, "Failures can and do occur in rare instances, especially when the suture is incorrectly placed for use or for an inappropriate indication". Another reason of failure is too much delay.

The low failure rate in current study (hysterectomy in 4.5%, 1/21) in comparison to UKOSS²¹ (hysterectomy in 25%), which was greater than that reported in earlier studies^{7,21} may result from either a bias due to small sample size in current study and/or a set of clinically different group of patients (adherent placentae)²¹. However a more logic explanation seemed the timing of surgical intervention. In current case

series, surgical intervention was prompt when once uterine atony was declared refractory. Conversely, in UKOSS a delay of 2-6 hours was observed owing either due to reluctance of clinicians to opt for laparotomy after vaginal birth and/or to resort to balloon tamponade or uterine packing instead of B-Lynch.²¹ Whereas in index study, failure in terms of resort to other alternative surgeries (uterine artery ligation, stepwise pelvic devascularisation and lastly hysterectomy) was seen in 15% (3/21) of women who underwent B-Lynch. This finding was consistent with that of 18% failure rate reported by Baskett et al²⁹.

Uterine synechae, Asherman's syndrome, partial or total ischemic uterine necrosis, suture erosion, fundal defect, pyometra, intra-abdominal adhesions and endometritis have been reported in literature^{23,25}. However in current series none of such complication happened.

CONCLUSION

On the basis of data derived from the our experience with B-Lynch it can be concluded that B-Lynch suture technique has proved invaluable as first line surgical option in the control of massive PPH due to atonic uterus as an alternative to hysterectomy.

REFERENCES

1. Royal College of Obstetrics and Gynecology. Prevention and management of post-partum hemorrhage. Green Top Guidelines No. 52 2011.
2. Centre of maternal and child enquiries. Saving mothers lives: Reviewing maternal deaths to make motherhood safer. 2006-2008. The eighth report of CEMD. UK. BJOG; 2011;118(I):1-203
3. Batool SA, Tajjamul A, Bhutta S. WHO Multi country survey on maternal & newborn health. (2010-2011)
4. NHS Scotland. Scottish confidential audit of severe maternal morbidity. 7th annual report 2011. www.healthcareimprovementScotland.org.
5. B-Lynch, C. Coker A., Lawal A, H. Abu J. The B-Lynch surgical technique for the control of massive post-partum hemorrhage:

- an alternative to hysterectomy? 5 cases reported. *B J OG* 1997;104:372-5.
6. FIGO Guidelines. Prevention and treatment of post-partum hemorrhage in low resource settings. *IJOG* 2012; 117:108-118.
 7. Mousa HA, Alfirevic Z. Treatment for primary postpartum Hemorrhage. *Cochrane Data Base Systemic review* 2007;(1) CD003249
 8. Smith JR. Postpartum Hemorrhage. 2011. <http://www.emedicine.com/med/topic3568.htm>.
 9. Andre Lalonde. Prevention and treatment of postpartum hemorrhage in low resource settings. *Int J Gyn Obs* 2012; 117(2): 108-118.
 10. Varatharajan L, Chandraharan E, Sutton J, Lowe V, Arulkumaran S. Outcome of the management of the massive postpartum hemorrhage using the algorithm, "Hemostasis". *IJG* 2011;113(2):152-54.
 11. Chandraharan E. Postpartum Hemorrhage and Hematological management. *Obstet Gynecol Reprod Med* 2012;22(5):113-117.
 12. Sentilhes L, Glomez A, Razzouk K, Resh B, Verspyck E, Marpeau L. B-Lynch suture for massive persistent hemorrhage following stepwise uterine devascularization. *ACTA Obstet Gynecol Scand* 2008; 87:1020-6.
 13. Kayem G, Jennifer J, Kurinczuk JJ, Zarko, Knight M, et al. On behalf of UKOSS. Uterine compression sutures for the management of severe post-partum hemorrhage. *Obstet & Gynecol* 2011;117(1):14-20.
 14. Wetta A, Jeff M, et al. Risk factors for uterine atony requiring treatment after vaginal delivery *AJOG* 2013;209(1):51.
 15. Doumouchsis, Stergios K, Sabaratnam A. Systemic review of conservative management of postpartum hemorrhage: What to do when medical treatment fails. *Obstet & Gynecol. Survey* 2007; 62(8): 540-547.
 16. Ouahba, Piketty M, Huel C, Azarian M, Fraud O, Luton D, et al. Uterine compression suture for postpartum bleeding with uterine atony. *BJOG* 2007;114:619-22.
 17. Marasinghe JP, Condous G. Uterine compression sutures for the post-partum bleeding with atony; modifications of the B-Lynch suture. *Aust NZ Obstet Gynecol.* 2009;49: 67-70.
 18. Zelop CM, Harlow BL, Frigoletto FD Jr, Safon LE, Saltzman DH. Emergency peripartum hysterectomy. *Am J Obstet Gynecol* 1993;168:1443-8.
 19. Hequet D, Lubrono S, Barranger E. Trends in the rate of invasive procedure after addition of intra-uterine temponade test to a protocol for management of severe PPH. *ACOGC* 2013; 208(5):419-20.
 20. Knight M, Collaghan WM. Trends in PPH in high resource countries. A review and recommendation from international PPH Collaborative group. *BMC Pregnancy Childbirth* 2009;9:55.
 21. Lutorrski JE, Byrne BM, Devore D. Increasing trends in in atonic PPH in Ireland: an 11 year population based study. *BJOG* 2012;119:306-14.
 22. Bhal K, Bhal N, Mulik V, Shankar L. The uterine compression suture- a valuable approach to control major hemorrhage at lower segment cesarean section. *J Obstet Gynecol.* 2005;25:10-14.
 23. Marasinghe JP, Condous G. Uterine compression sutures for the post-partum bleeding with atony; modifications of the B-Lynch suture. *Aust NZ Obstet Gynecol.* 2009;49: 67-70.
 24. A Hackethal, D Brueggmann, F Oehmke. Uterine compression U-sutures in primary post partum hemorrhage after cesarean section: Fertility preservation with a simple and effective technique. *Hum Reprod* 2008;23(1):74-79.
 25. Nelson WL, O'Brien JM. The uterine sandwich for persistent uterine atony: combining B-Lynch suture and intra-uterine Bakri Balloon. *Am J Obstet Gynecol* 2007;196:9-10.
 26. Sentilhes L, Glomez A, Razzouk K, Resh B, Verspyck E, Marpeau L. B-Lynch suture for massive persistent hemorrhage following stepwise uterine devascularization. *ACTA Obstet Gynecol Scand* 2008; 87:1020-6.
 27. Zwart JJ, Dijik PD, van Roosmalen J. Peripartum hysterectomy and arterial embolization for major obstetric hemorrhage:

- a 2 year study nationwide cohort study in the Netherlands. Am J Obstet Gynecol 2010;202:150.1-7.
28. Karoshi M. The B-Lynch suture, and a bit of this and a bit of that. Int J Gynecol Obstet. 2010;108(3):184-6.
29. Thomas F. Baskett MB. Uterine compression sutures for PPH. Efficacy, Morbidity & subsequent pregnancy. Obstet Gynecol 2007;110:68-71.
30. Loic Sentilhes, Gromez A. Trichot C et al. Fertility after B-Lynch and stepwise uterine devascularization. Fertility Sterility 2009;91,(3) : 934-9.
31. Cui H, Na Q et al. Analysis of emergency obstetric hysterectomy: The change of indications and application of intra operative interventions. Zhonhua F Chan Zah 2015;50(13):177-82.
32. Jens Fuglsang. Later reproductive health after B-Lynch sutures:a follow up study after 10 years' clinical use of the B-Lynch suture. Fert ster 2014;101(4):1194-9.

AUTHORS

- **Dr. Fauzia Naureen Bhutta**
Senior Registrar, Gynecology
D.H.Q Hospital, Faisalabad
- **Dr. Muhammad Jameel Bhutta**
Professor Otorhinocology
Allied/D.H.Q Hospital, Faisalabad
- **Dr. Muhammad Mustafa Kamal Bhutta**
Medical Officer, Surgery
Mayo Hospital, Lahore
- **Prof. Dr. Robina Ali**
Professor of Obstetrics & Gynecology
PMC / D.H.Q Hospital, Faisalabad
- **Prof Dr. Sumaira Tahir**
Professor of Obstetrics & Gynecology
PMC / Allied Hospital, Faisalabad
- **Prof. Dr. Mehmood Aleem**
Professor & Head of Obstetrics & Gynecology
PMC / Allied Hospital, Faisalabad

ACKNOWLEDGEMENTS:

1. Prof. Dr. S. Arulkumaren
2. Dr. Tony Hollingworth

Submitted for Publication: 08-12-2014

Accepted for Publication: 09-04-2015

AUTHORSHIP AND CONTRIBUTION DECLARATION

Name of Author	Contribution to the paper	Author's Signatures
Dr. Fauzia Naureen Bhutta	Main Author	
Dr. Muhammad Mustafa Kamal Bhutta	Data collection, writing of observations results and follow up of patients	
Prof. Dr. Muhammad Jamil Bhutta	Discussion section of article	
Prof. Dr. Robina Ali	Supervision of surgical intervention and case records;	
Prof. Dr. Sumera Tahir	Devise of protocol proforma for quasi experimental surgical intervention	
Prof. Dr. Mehmood Aleem	Supervision of surgical intervention	