

## Exploring the Powers of Observation Pertaining to Post Partum Haemorrhage Conservative Management using Compression Sutures – Worldwide Benefits on Maternal Mortality (1997– 2017)

**Christopher B-Lynch**

**Correspondence:** Professor Christopher B-Lynch  
Emeritus Consultant Obstetrics & Gynaecological Surgeon,  
Milton Keynes General Hospital, NHS Foundation Trust 2010,  
Oxford Deanery, UK  
Email: christopherbl@aol.com

### Introduction and Scientific Review

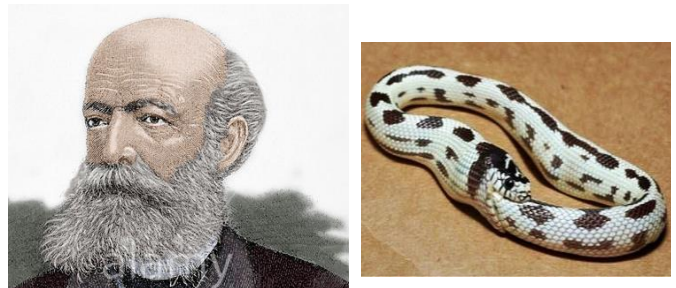
Postpartum haemorrhage (PPH) is a serious medical problem. Around 14,000,000 million cases occur annually worldwide. The reported case-fatality rate is 1% with an estimated number of 140,000 deaths happening each year, making postpartum haemorrhage the third highest direct cause of maternal deaths.<sup>1</sup>

The appliance of the science of observation has created innovation in lifestyle activities and medical development for many years. Sir Isaac Newton, Friedrich von Stradonitz, Alexandra Fleming and Edwin Hubble are some of the most notable examples of scientists that made major breakthroughs in science using the powers of observation.

Sir Isaac Newton, 1666: Developed the theory of gravity based on seeing an apple falling to the ground.



Friedrich Von Stradonitz, 1864: Developed the ring like structure of benzene molecule by dreaming of a snake holding its own tail



Alexander Fleming, 1928: Discovery of Penicillin by observing the lack of growth of bacteria in certain areas of a petri dish contaminated by mould.



Edwin Hubble, 1923: While examining a smudge of light named Andromeda, noticed that it contained a cluster of discrete stars providing the existence of Galaxies other than the Milky Way



Before the science of observation was applied to postpartum haemorrhage, there were a number of cases of women throughout history that died as a direct result of the complication. The deaths of Jane Seymour, Mumtaz Mahal and Princess Charlotte are notable examples.



Jane Seymour, 1537: King Henry VIII instructed caesarean section. Seymour died on 12th October, 1537 from RPOC and massive PPH.

Mumtaz Mahal, 1630: Wife of Emperor Shah Jahan, died from massive PPH. The Taj Mahal building, located in Agra, India, was erected in memory of her death after giving birth to her 14th child.



Princess Charlotte Augusta of Wales, 1817: Died from Massive PPH following obstructed labour and complicated instrumental delivery. Obstetrician, Sir Richard Croft's management was criticised, leading him to take his own life. This episode caused three generations to be lost; the princess, her male heir and an obstetrician.

In 1752, William Smellie, a physician and instructor in obstetrics in Great Britain, published a three-volume collection of patient accounts titled, *A Treatise on the Theory and Practice of Midwifery*. Smellie attempted to understand the seriousness of the consequences of postpartum haemorrhage, having written, "this hazardous haemorrhage, seized with convulsion which often terminates with death".

In 1997, a British obstetrician, gynaecologist and now professor, Christopher Balogun-Lynch, applied the science of observation to save the life of a patient dying from atonic uterus postpartum haemorrhage. Assessing the situation, Dr. B-Lynch noted that the uterus contracted and bleeding stopped if he manually compressed the uterus. He devised a single suture that simulates the 'brace' and 'belt' that many men of age would use to suspend their trousers.

The powers of observation have significantly improved the medical approach to postpartum haemorrhage. *Conservative surgical management*, in particular, has been shown to reduce the mortality and morbidity rate.

## Methods and Solutions

The B-Lynch suture aims to exert continuous vertical compression on the vascular system. In the case of placenta previa postpartum haemorrhage, a transverse lower segment compression suture is also effective.

In outlining the steps involved in The B-Lynch Longitudinal Compression Suture

### METHOD A

We assume that the surgeon is right handed and standing on the right hand side of the patient.

A laparotomy is always necessary to exteriorise the uterus. A small lower segment transverse incision is made or recent LSCS suture removed to check the cavity for retained placental fragments and swab out.

The patient is tested for the potential efficacy of the compression suture. The patient is placed in the Lloyd Davies or semi-lithotomy position (frog leg). An assistant then stands between the patient's legs and intermittently swabs the vagina to determine the presence and extent of the bleeding. The uterus is then exteriorised and bimanual compression performed. To do this, the bladder peritoneum is reflected inferiorly to a level below the cervix (if it has been taken down for a prior LCSC it is pushed down again).

The whole uterus is then compressed by placing one hand posteriorly with the end of the fingers at the level of the cervix and the other hand anteriorly just below the bladder reflection. If the bleeding stops on applying such compression, there is good chance



that the application of the B-Lynch suture will work and stop the bleeding.

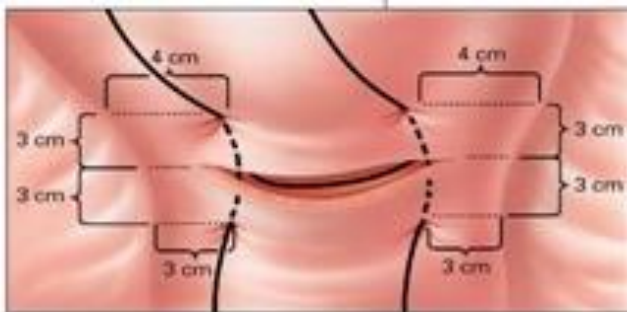
Even in the presence of coagulopathy, bimanual compression will control diffuse bleeding points.

Given that the test criteria for the B-Lynch suture placement are met, the uterus remains exteriorised until application of the suture is complete. The senior assistant takes over in performing the compression and maintains it with two hands during the placement of the suture by the principle surgeon.

## METHOD A: B-Lynch Longitudinal Compression Suture<sup>1</sup>

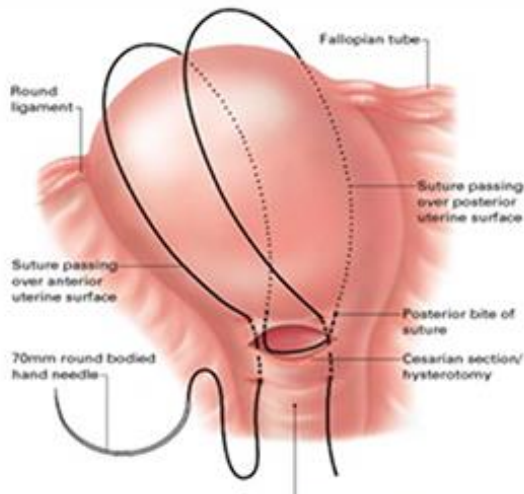
1. First stitch relative to the low transverse caesarean section/hysterotomy wound:

With the bladder displaced inferiorly, the first stitch is placed 3cm below the caesarean section/hysterotomy incision on the patient's left side and threaded through the uterine cavity to emerge 3cm above the upper incision margin approximately 4cm from the lateral border of the uterus.



(a)

© Mr. C. P. L. ...



## The Fundus:

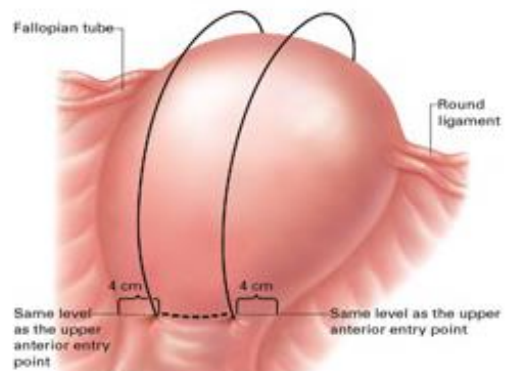
The suture is now carried over the top of the uterus and to the posterior side.

Over the fundus, the suture should be more or less vertical and lying about 4cm from the cornu.

It does not tend to slip laterally toward the broad ligament because the uterus has been compressed and the suture milked through.

2. The Posterior Wall:

The spot on the posterior uterus where the suture is placed through the uterine wall is actually easy to surface mark posteriorly. It is on the horizontal plane at the level of the uterine incision at the insertion of the uterosacral ligament, as seen as two dimples.



(b)

3. Early Role of the Assistant:

The assistant is compressing the uterus as the suture is fed through the posterior wall into the cavity. This will enable progressive tension to be maintained as the suture compresses the uterus.

The assistant compression will also help to pull the suture material through to achieve maximum compression, without breaking it, at the end of the procedure.

Furthermore, it will prevent the suture from slipping and causing trauma to the uterus. The suture now lies horizontally on the cavity side of the posterior uterine wall.

4. The Fundus

As the needle pierces the uterine cavity side of the posterior wall, it is then placed over the posterior wall bringing the suture over the top of the fundus and onto the anterior right side of the uterus.

The needle re-enters the cavity exactly in the same way as it was on the left side. That is 3cm above the upper incision and 4cm from the lateral side of the uterus through the upper incision margin, into the uterine cavity and then 3cm below the lower incision margin.

#### 5. Later role of the assistant

The assistant maintains the compression as the suture material is milked through from its different portals to ensure uniform tension and no slipping.

The two ends of the suture are put under tension and a double throw knot is placed for security to maintain tension after the lower segment incision has been closed by either the one or two layer method.

#### 6. Relation to the Hysterotomy Incision

The tension on the two ends of the suture material can be maintained while the lower segment incision is closed or the knot can be tied first, followed by closure of the lower segment. If the latter option is chosen, it is essential that the corners of the hysterotomy incision be identified and a stay-suture in place before the knot is tied. This ensures that when the lower segment is closed, there is no escape of the angles of the incision.

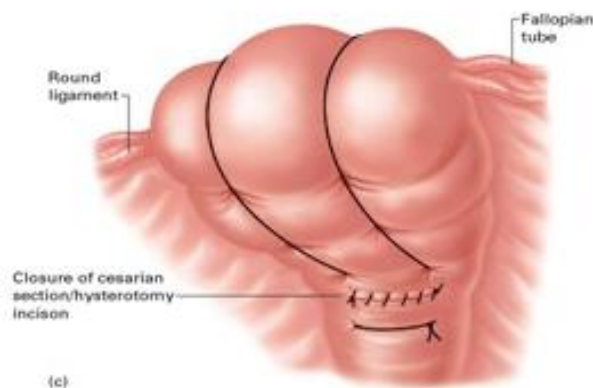
*Either procedure works well.*

#### 7. Post Application and Hysterotomy Closure

It is probable that the maximum effect of suture tension is about 24 to 48 hours.

There is no need for delay in closing the abdomen after the application of the suture.

The assistant standing between the patient's legs swabs the vagina again and can confirm that the bleeding is controlled.



## Clinical Points

- User friendly absorbable suture material (No 1 vicryl, 90cm length) mounted on 70mm half-circled Ethigard blunt needle.
- Basic surgical competence required.
- Uterine cavity checked, explored and evacuated.
- Suture bends maintain even and adequate tension without uterine trauma.
- Allows free drainage of blood, debris and inflammatory material.
- Simple, effective, and cost saving technique.
- Fertility preserved and proven.
- Mortality avoided.
- Worldwide application and successful reports confirm efficacy.
- Potential for prophylactic application at caesarean section when signs of imminent PPH will develop, e.g. placenta accrete or where blood transfusion is declined, e.g. placenta previa surgery on a Jehovah's witness patient.
- Low risk of Ashman's syndrome developing

## METHOD B: Transverse Compression Suture<sup>3</sup>

### 1. Preparation

Vicryl No 1 suture (90cm length) mounted on a 70mm half-circle blunt needle. Lower segment manual compression transversely will test bleeding control and compliance of suture technique.

The assistant checks vagina to report bleeding control and the uterus is exteriorised. Any remaining placenta tissue is removed.

Bladder displaced inferiorly and maintained by traction.

### 2. Procedure

The needle perforates the uterus 3cm above the upper incision margin and posteriorly behind the vascular bundle. It then enters the cavity and is pulled through, lying on the posterior wall of the uterus and exits 3cm below the lower incision margin posteriorly behind the vascular bundle on the same side.



This picture demonstrates the occlusion of the vessel that supply the lower segments; uterine at the top and vaginal artery below.

The suture then runs superiorly and transversely picking up 1cm tissue of the anterior uterine wall to reach the vascular bundle posteriorly in the opposite side. The needle then perforates the uterus and enters the cavity.



This picture demonstrates occlusion of the vessels that supply the lower segments on the opposite side.

Both limbs of sutures are milked through with sufficient tension to allow bleeding control. Before the suture is tied, the lower segment incision is closed by either one or two layer technique. The lower segment is compressed transversely to ascertain control of bleeding is achieved, the

transverse suture is tied after closure of the hysterotomy incision.



This picture demonstrates occlusion of vessel to the lower segment and transverse compression at the end of the procedure.

The bladder should be displaced and maintained by traction throughout the procedure. The ureter should also be identified either by palpation or direct vision. Normally they are not in the vicinity. The abdomen is closed in a routine manner and the vagina is then checked once more for bleeding control.

### Clinical Points

- Transverse compression suture applied to the lower segment for abnormal placentation effectively controls bleeding.
- Between 2006-2010, twelve patients were treated without complications. Four patients became pregnant; on follow up, three patients had spontaneous vertex delivery with normal placenta location. One patient had Caesarean section delivery for obstetric reasons.
- One patient had interval sterilization finding that there were no problems with the bladder or uterus.
- The rest of the patient follow-up data were unremarkable.
- Recommended as efficient and effective in troublesome bleeding control from placenta previa surgery.

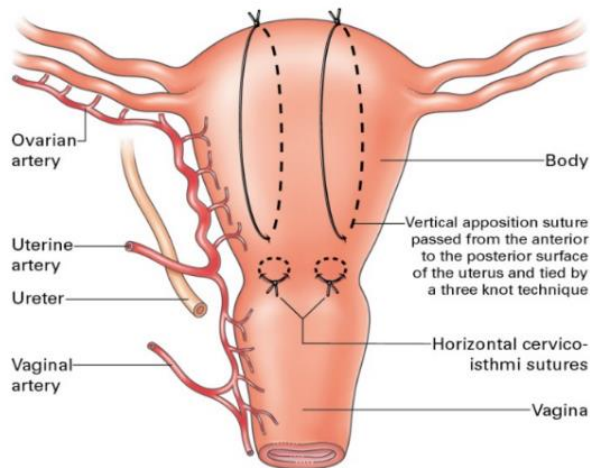


## METHOD C: Other Common Methods of Uterine Compression Suturing

### Hayman Method<sup>4</sup>

#### Clinical Points

- Lower uterine segment or uterine cavity not opened or explored.
- Uterine cavity not explored under direct vision.
- Probably quicker to apply.
- No feedback data on fertility outcome.
- Morbidity feedback data limited.
- Uterine ischaemia possible because of excessive tension
- Unequal tension leads to segmented ischaemia secondary to slippage of suture.
- Ashman's Syndrome likely.

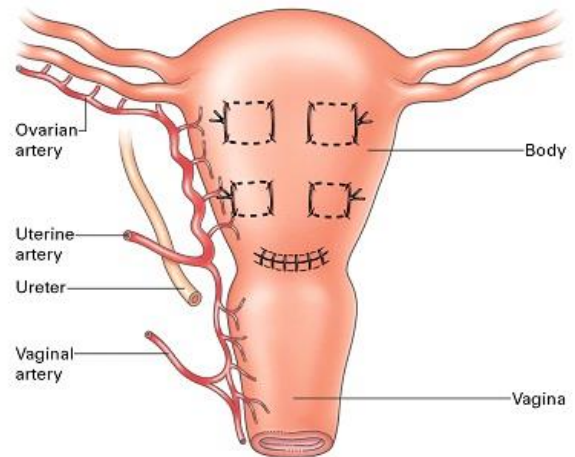


© Mr.C.B-Lynch'05

### CHO Method<sup>5</sup>

#### Clinical Points

- Multiple full thickness square sutures applied, probably time consuming – if many square sutures required.
- Uterine cavity drainage restriction – Pyometra risk.<sup>6</sup>
- No feedback data on fertility outcome.
- Morbidity feedback data limited
- Rhythmic contraction not facilitated and involution impeded
- The production of multiple uterine synechae.
- Ashman's Syndrome likely.
- Possibly not suitable for placenta accreta PPH.



© Mr.C.B-Lynch'05

## Conclusion

The B-Lynch variety of uterine compression suture methods continue to be applied by institutions worldwide and are the most popular and effective solutions to managing postpartum haemorrhage. The workshop training sessions have made a significant contribution to ensure successful application of the procedures by practicing obstetricians and gynaecologists, as well as being beneficial to learning medical students and the future generation of doctors in this field. Current data suggests that over 2,000,000 women have benefited from uterine compression suture for PPH since its invention 20 years ago. The transverse compression suture technique, published in the *NJOG* of November 2014, is proving valuable to clinicians worldwide.

## References

1. Estimates developed by WHO, UNICEF and UNFPA. Maternal mortality in 2000. Geneva: Department of Reproductive Health and Research, World Health Organization; 2004. 2.
2. B-Lynch C, Coker A, Lawal A H, Abu J, Cowen M J; C BL. The B-Lynch surgical technique for the control of massive postpartum haemorrhage: an alternative to hysterectomy? Five cases reported Br J Obstet Gynaecol 1997: 104 372–375.
3. B-Lynch C, Meyer KK, Javaid TA, B-Lynch Transverse Compression Suture for PPH Placenta Previa Bleeding, 2014 NJOG Vol 9, No. 2, Issue 18 Jul-Dec; 18 (2):1-2
4. Hayman R G, Arulkumaran S, Steer P J. Uterine compression sutures: surgical management of postpartum hemorrhage. *Obstet Gynecol.* 2002;99:502–506.
5. Cho J H, Jun H S, Lee C N. Hemostatic suturing technique for uterine bleeding during cesarean delivery. *Obstet Gynecol.* 2000; 96:129–131.
6. Ochoa M, Allaire A D, Stitely M L. Pyometria after hemostatic square suture technique. *Obstet Gynecol.* 2002;99:506–509

## Acknowledgements

To the late Professor Louis Keith, (Northwestern University, Chicago, USA) for his contribution to the content of this manuscript.