

EFFICACY OF THE NAUSICAA COMPRESSION SUTURES FOR POSTPARTUM HEMORRHAGE MANAGEMENT

Yasmeen M. Din,¹ Shamila Ijaz Munir,² Sodat Alqai,³ Sofia Iqbal⁴

Abstract

Background and Objective: Postpartum haemorrhage (PPH) is still the most important cause of maternal death in Pakistan. Over 125,000 maternal deaths have been reported each year due to PPH worldwide. Major causes of PPH include uterine atony and haemorrhage from the placental bed. The recent increase in the rate of cesarean section has increased the incidence of the Placenta previa accreta spectrum. Apart from medical measures, there are various conservative surgical interventions before imparting hysterectomy such as uterine compression sutures, hemostatic sutures, and stepwise devascularization of the pelvis which effectively control hemorrhage and save the mother from life-threatening morbidities. The Nausicaa compression suture is a novel technique that effectively controls PPH in patients with uterine atony, placenta previa, and accrete spectrum. The objective of this study is to determine the efficacy of Nausicaa compression sutures in patients with PPH undergoing cesarean section.

Methods: This study was conducted in the Obstetrics and Gynaecology department of Sir Ganga Ram Hospital, Lahore from 1st September 2020 to 30th June 2022. A total of 80 patients who had PPH during cesarean section due to uterine atony or placenta previa spectrum were enrolled after informed consent. Nausicaa compression suture was applied to the anterior, posterior, and both uterine walls where required. Successful procedures were those where only the Nausicaa compression suture was sufficient to control PPH.

Results: The average age of patients was 30.3 ± 4.2 years. There were 24(30%) primigravidas, 28(35%) G2P1+0 and 28(35%) were multigravidas. The mean gestational age of patients was 37 weeks. In 09 cases, Nausicaa sutures were applied to the anterior uterine wall while in 71 patients to both anterior and posterior uterine walls. Out of 80 patients, 62 patients were saved from interactable haemorrhage due to Nausicaa Compression sutures.

Conclusion: The Nausicaa compression suture is an effective and new suture to control postpartum hemorrhage in patients with placenta previa spectrum and atonic uterus. It is most effective when applied to anterior and posterior both uterine walls separately.

Key words: Post partum hemorrhage (PPH), Nausicaa Compression suture, Cesarean section.

How to cite: Din YM, Munir SI, Alaqai S, Iqbal S. Efficacy of the nausicaa compression sutures for postpartum hemorrhage management. JAIMC 2023; 21(3): 185-189

Post-partum haemorrhage (PPH) is still the important cause of maternal death.¹ PPH is the blood loss of more than 1000ml during caesarean section. Bleeding will be assessed by using surgical gauze. It complicates about 18% of all deliveries and accounts for 25% of maternal mortality.² Prevalence of death due

to PPH is 34% in Pakistan.³ Conservative management such as the use of uterotonic drugs, fundal massage, bimanual uterine compression, intrauterine gauze tamponade or intrauterine balloon catheter will minimise the bleeding in maximum cases of PPHs.^{3,4} However, the failure of these non-invasive methods has given rise to the invasive treatments, such as uterine artery ligation, internal iliac artery ligation or, hysterectomy. Postpartum hysterectomy is a life-saving surgery but its untoward effect is not only related to the unexpected loss of fertility but also conditions such as injury of the urogenital tract.^{5,6}

1-4. Gynae Unit- 3, SGRH, Lahore

Correspondence:

Dr Yasmeen Muhammad Din Javeed ; Senior Registrar, Gynae Unit-3 ,SGRH, Lahore.

Submission Date: 25-06-2023

1st Revision Date: 05-07-2023

Acceptance Date: 20-07-2023

Previous studies have described the efficacy of various sutures to manage PPH. These include the B-Lynch suture,⁵ the Cho suture,⁶ the Hayman suture⁷ and the Matsubara–Yano (MY)⁸ suture. Each of these has its merit, drawback and application technique. Uptil now, norandomised control trials (RCTs) or controlled trials have established the efficacy of these sutures for haemostasis securing.⁹ The rate of haemostasis is approximately 85%, ranges from 76% to 92%.¹⁰ In spite of the various benefits obtained from these uterine compression sutures there have been few reports of complications. Grotegut et al.¹¹ reported abrasion of uterine wall after B-Lynch application. The catastrophic uterine rupture during antenatal period following a previous B-Lynch suture have been reported in two cases.^{12,13}

The effectiveness of the Nausicaa compression suture has been proved over a significant time period and can be said to be established almost.^{14,16} The Nausicaa suture has many likely advantages. First, the procedure is easy to perform. Second, these compression sutures are tied off while the caesarean scar incision is open. The failure rate of this suture is minimal because haemostasis is directly confirmed¹⁵. Studies have shown that the Nausicaa technique is effective substitute to hysterectomy in the management of intractable PPH. It is helpful in cases where fertility is to be preserved and preventing extensive surgery in cases of PAS. One of the studies has described that 70% of obstetrical hysterectomies were avoided by these Nausicaa compression sutures. The Nausicaa sutures was 97.0% successful for achieving adequate haemostasis.¹⁵ Other studies narrated Nausicaa suture a substitute to obstetrical hysterectomy in patients with placenta accrete spectrum.¹⁶

The rationale of the study is to find out the efficacy of Nausicaa suture in securing hemostasis in patients with major postpartum haemorrhage in our set-up. Literature has reported its high efficacy but no local study has been found in this regard. So we want to get local evidence and if found effective we can opt this and train our doctors to apply this in PPH management there and then to save the patient from life-threatening morbidities and mortalities.

METHODS

It is a Quasi-experimental study conducted at Department of Gynaecology and Obstetrics Sir Gangaram Hospital Lahore for the duration of 22 months from 1st September 2020 to 30th June 2022. Total of 80 patients fulfilling the selection criteria were enrolled in this study after taking informed consent. All patients who had PPH during caesarean section due to uterine atony, placenta previa and vitally stable were included in this study. While patients having placenta increta/ percreta and intractable massive haemorrhage causing patient vitally unstable were not included in this study. After taking approval from the ethical board of the hospital and taking written informed consent, demographic data (name, age, parity, DOP), indication of caesarean section, and reason for PPH (uterine atony, placenta previa) was noted. Nausicaa sutures were applied with coated vicryl #1-0, 90cm, 40mm, ½ circle needle on the anterior, posterior or both uterine walls as required. PPH controlled or not or any additional intervention like a bilateral uterine artery or internal iliac artery ligation, hysterectomy needed or not. Successful procedure was labelled in which only Nausicaa compression suture was sufficient to control haemorrhage. Need for blood transfusion, ICU admission, and total duration of hospital stay noted on a pre-designed proforma.

Collected data were analysed statistically by using SPSS version 21. Quantitative variables like age, parity, duration of pregnancy, pre and post-op Hb., number of blood transfusions required, and total duration of hospital stay were presented as mean±SD. Qualitative variables like an indication of caesarean section, reason for PPH, and Nausicaa applied to anterior, posterior or both uterine walls were presented as frequency and percentages. Data was stratified for age, parity, duration of pregnancy, the indication of caesarean section, and reason for PPH.

RESULTS

The age of patients ranged between 20 years to 34 years with a average of 30.3±4.2 years. The majority

of patients (n=35, 43.7%) were aged between 31-35 years followed by 26-30 years (27.5%) and 20-25 years (20%), (Figure 1). There were 24 (30%) primigravidas, 28 (35%) were G2P1+0 and 28 (35%) were multigravidas. The gestational age of patients ranged from 32 weeks to 40+4 weeks with an average of 37.58 weeks. 28 (35%) patients were between 32 weeks to 36 weeks and 52 (75%) were between 37 to 40 weeks (Figure 4). 46 patients were operated on for indication of placenta previa. 6 patients had cesarean sections due to an indication of placenta accrete. 28 patients had other indications of LSCS such as fetal distress, repeat LSCS and multiple gestations. 30 patients had Nausicaa suture because of bleeding from the placental bed, 28 patients had uterine atony and 22 patients had bleeding from placental bed and uterine atony both. In 9 patients Nausicaa sutures were applied only to the anterior uterine wall, while in 71 patients Nausicaa suture was applied to anterior and posterior both uterine walls (Figure 3). In 62 patients Nausicaa suture was sufficient to control PPH, while 8 patients required hysterectomy due to intractable haemorrhage. 4 patients required a B-lynch brace suture, while 6 patients required bilateral uterine artery ligation in addition to Nausicaa compression sutures. The graphic presentation of this data is as follows

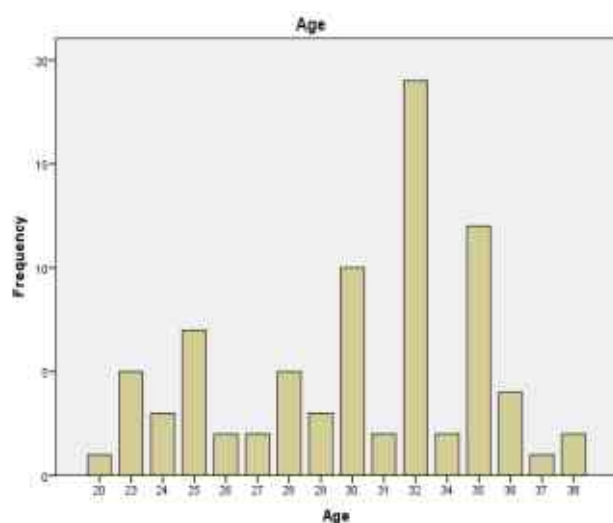


Figure 1: Bar Chart showing Age Distribution.

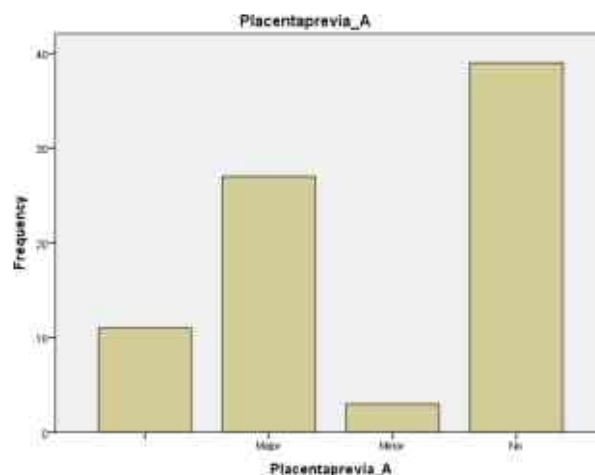


Figure 2: Bar Chart showing Degrees of Placenta Previa Distribution

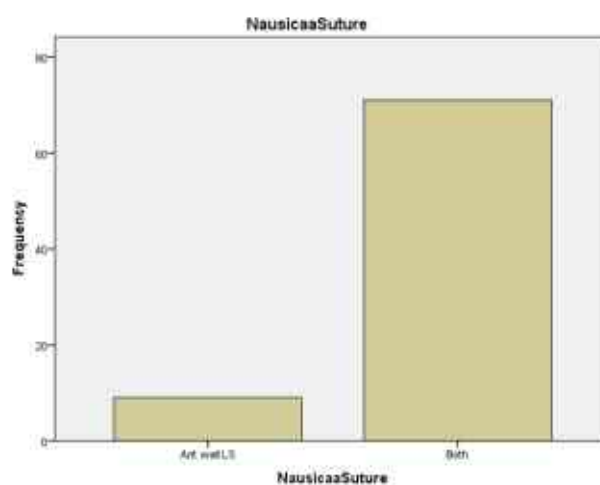


Figure 3: Bar chart showing Nausicaa Compression Sutures Application to Uterine Walls.

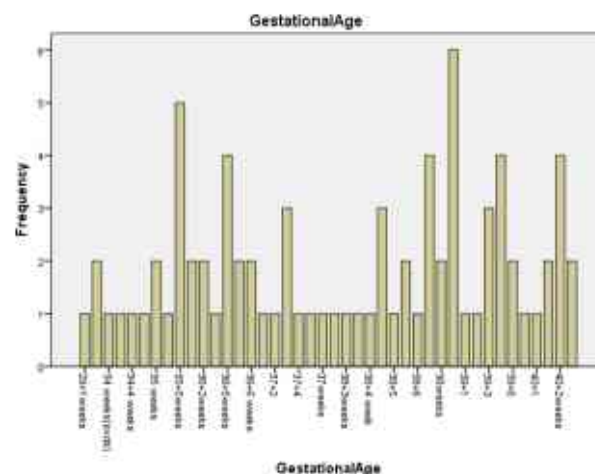


Figure 4: Bar Chart showing Gestational Age Distribution.

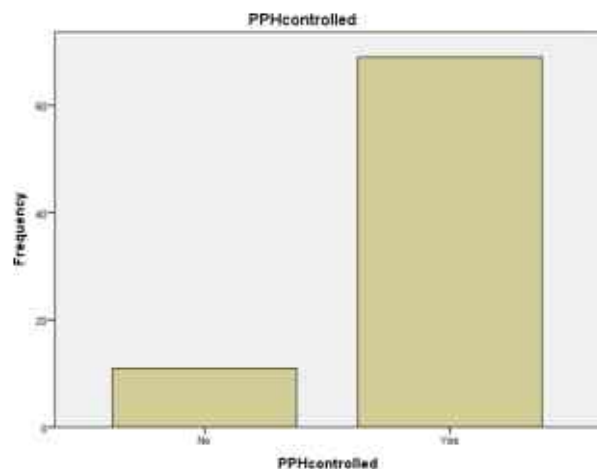


Figure 5: Chart for PPH Control due to the Nausicaa Compression Sutures

DISCUSSION

The incidence of PPH lies between 5% to 8% in places where some prophylaxis is practised but maybe as high as 18% where the physiological approach is the norm. PPH has contributed to 17% to 40% maternal deaths worldwide. Despite countries like Netherland has shown the incidence of PPH about 13%. In the USA maternal deaths due to PPH has been reported up to 19%. In under developed countries where blood is not readily available due to deficiency of resources, significant morbidity including hypotensive shock, acute renal failure, necrosis of the anterior pituitary gland partially or totally.¹⁷

Most of the uterine compression sutures applied were helpful in successfully managing PPH and decreasing the rate of hysterectomy, but they need careful evaluation. Some of them sutured the anterior and posterior uterine walls directly, obliterated the cavity and controlled the PPH effectively thereby. Complications resulting from these sutures were pyometra,¹⁸ uterine synechiae,¹⁹ uterine necrosis, partial ischaemic necrosis²⁰ and, in some cases hysterectomy was unavoidable due to slippage of suture at the uterine fundus or uterine avulsion takes place because knots were too tight.

We applied the new Nausicaa compression suture. The results from study shows that our Nausicaa compression suture is a form of prophylactic measures for PPH management conservatively and should be evaluated further for its prophylactic application to atonic uterus after spontaneous vaginal delivery.

During caesarean section it is easy to close the lower segment incision to minimize the blood loss, as the suture was applied at the lower uterine segment and placental bed separately, the risk of slippage of suture was very low. We used absorbable sutures instead of delayed, non-absorbable sutures, which eliminates risk of suture erosion or the suture popping out from the uterine cervical os afterwards. The key feature of this suture is that it is applied without suturing the both walls of the uterus together, so decreasing the risk of complications that usually follows the uterine compression suture. This needs to be clarified.

In conclusion, our new Nausicaa uterine compression suture is one of the several surgical treatments for PPH, and decreases the need for hysterectomy. As the preservation of fertility and avoidance of life threatening morbidities is the main concern in these operations, our Nausicaa compression suture decreases the trauma to the atonic and bleeding placental bed of the uterus and does not affect the woman's fertility. Therefore this suture should be tried where conservative management of PPH fails and any extensive surgery is required. In this study, there is scarce data on effective-ness and safety of this suture, and long-term follow-up is not sufficient. Many case series to confirm the benefits of this procedure is needed. New studies evaluate the possibility that the prompt use of this suture timely in the treatment of drastic postpartum haemorrhage will be helpful.

CONCLUSION

The Nausicaa compression suture is an effective technique to control postpartum haemorrhage in patients having placenta previa and atonic uterus. It is most effective when applied to anterior and posterior both uterine walls separately.

Conflict of interest

None

Source of Funding

None

REFERENCES

1. Zheng J, Xiong X, Ma Q, Zhang X, Li M. A new uterine

- compression suture for postpartum haemorrhage with atony. BJOG 2011;118:370–374.
2. Zhang ZW, Liu CY, Yu N, Guo W. Removable uterine compression sutures for postpartum haemorrhage. BJOG: An International Journal of Obstetrics & Gynaecology. 2015 Feb 1;122(3):429–33.
3. Bibi S, Danish N, Fawad A, Jamil M. An audit of primary post partum haemorrhage. Journal of Ayub Medical College Abbottabad. 2007;19(4):102–6.
4. Mousa HA, Blum J, Abou El Senoun G, Shakur H, Alfirevic Z. Treatment for primary postpartum haemorrhage. Cochrane database of systematic reviews. 2014 (2).
5. 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. BJOG 1997; 104: 372–5
6. Cho JH, Jun HS, Lee CN. Hemostatic suturing technique for uterine bleeding during cesarean delivery. ObstetGynecol 2000;96:129–31
7. Hayman RG, Arulkumaran S, Steer PJ. Uterine compression sutures: surgical management of postpartum hemorrhage. ObstetGynecol 2002;99:502–6
8. Matsubara S, Yano H, Taneichi A, Suzuki M. Uterine compression suture against impending recurrence of uterine inversion immediately after laparotomy repositioning. J ObstetGynaecol Res 2009;35:819–23
9. MallappaSaroja 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 haemorrhage. Arch GynecolObstet 2010;281:581–8
10. Matsubara S, Yano H, Ohkuchi A, Kuwata T, Usui R, Suzuki M. Uterine compression sutures for postpartum hemorrhage: an overview. ActaObstetGynecolScand 2013;92:378–85
11. Kayem G, Kurinczuk JJ, Alfirevic Z, Spark P, Brocklehurst P, Knight M, et al. Uterine compression sutures for the management of severe postpartum hemorrhage. ObstetGynecol 2011;117:14–20
12. Kaya B, Tuten A, Daglar K, Onkun M, Sucu S, Dogan A, Unal O, Guralp O. B-Lynch uterine compression sutures in the conservative surgical management of uterine atony. Archives of gynecology and obstetrics. 2015 May 1;291(5):1005–14.
13. S. Liu, M. Mathur & S. Tagore (2014) Complications and pregnancy outcome following uterine compression suture for postpartum haemorrhage: A single centre experience, Journal of Obstetrics and Gynaecology, 34:5, 383–386, DOI: 10.3109/01443615.2014.895309
14. Makino S, Takeda S. Uterine Compression Sutures for Atonic Bleeding. In Compression Sutures for Critical Hemorrhage During Cesarean Section 2020 (pp. 11–16). Springer, Singapore.
15. Shih JC, Liu KL, Kang J, Yang JH, Lin MW, Yu CU. ‘Nausicaa’ compression suture: a simple and effective alternative to hysterectomy in placenta accreta spectrum and other causes of severe postpartum haemorrhage. BJOG: An International Journal of Obstetrics & Gynaecology. 2019 Feb;126(3):412–7.
16. HUANG KY. Uterus Preservation Versus Cesarean Hysterectomy in Management of Placenta Accreta Spectrum: A Multicentre International Study.
17. El-Refaey H, Rodeck C. Post-partum haemorrhage: definitions, medical and surgical management. A time for change. British medical bulletin. 2003 Dec 1; 67(1):205–17..
18. Ochoa M, Allaire AD, Stitely ML. Pyometria after hemostatic square suture technique. ObstetGynecol, 2002; 99: 506–9.
19. Wu HH, Yeh GP. Uterine cavity synechiae after hemostatic square suturing technique. ObstetGynecol, 2005; 105: 1176–8.
20. Treloar EJ, Anderson RS, Andrews HS, Bailey JL. Uterine necrosis following B-Lynch suture for primary postpartum haemorrhage. BJOG, 2006; 113: 486–8.