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Original Research Article

Clinical outcomes of COMOC-MG modified B-lynch stitch technique for preventing postpartum haemorrhage in a tertiary care teaching hospital

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ABSTRACT

Background: Postpartum haemorrhage (PPH) remains a leading cause of maternal morbidity and mortality worldwide. Effective management often involves uterotonic drugs, but surgical interventions like the B-Lynch suture are crucial when medical treatments fail. The COMOC-MG modified B-Lynch stitch technique offers promising improvements in controlling atonic PPH. This study aimed to evaluate the clinical outcomes of the COMOC-MG modified B-Lynch stitch technique in managing PPH among high-risk obstetric patients undergoing caesarean sections at a tertiary care teaching hospital.

Methods: A prospective study was conducted from January 2021 to June 2022 at C.U. Shah Medical College and Hospital, Surendra Nagar. Fifty antenatal women undergoing emergency or elective lower segment caesarean section (LSCS) with identified high-risk factors for PPH were included.

Results: Participants were predominantly aged 26-30 years (52%), with 40% primigravidae and 60% multigravida. The majority of patients (94%) experienced no maternal complications, and only 6% required ICU admission. Fetal distress (36%) was the leading indication for LSCS. Anaemia was the most prevalent high-risk factor (22%). However, 88% did not require postoperative blood transfusions. Haemoglobin levels decreased significantly from a mean of 9.90 g/dl preoperatively to 8.70 g/dl postoperatively (p<0.05). The prophylactic COMOC-MG modified B-Lynch suture alone was successful in 82% of cases, with only 2% requiring hysterectomy.

Conclusion: The COMOC-MG modified B-Lynch stitch technique is effective in preventing PPH in high-risk caesarean section patients, demonstrating low complication rates and favourable maternal outcomes. These findings support the technique's use in managing atonic PPH and highlight the importance of comprehensive obstetric care.

Keywords: B-Lynch suture, COMOC-MG, Caesarean section, Fetal distress, Postpartum haemorrhage

INTRODUCTION

Postpartum hemorrhage (PPH) remains one of the most critical challenges in obstetric care, continuing to be a leading cause of maternal morbidity and mortality worldwide. PPH is defined as blood loss exceeding 500 ml following a vaginal delivery or 1000 ml after a caesarean section, and it can quickly become lifethreatening if not managed promptly and effectively. The

global incidence of PPH varies, affecting approximately 1-5% of all deliveries, underscoring the urgent need for efficient and reliable interventions.⁴ According to the World Health Organization (WHO), PPH is responsible for around 70,000 maternal deaths globally each year, highlighting its significant impact on maternal health.⁵ The management of PPH often requires a multifaceted approach, combining medical, mechanical, and surgical strategies.⁶ Medical treatments typically include uterotonic

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drugs such as oxytocin, misoprostol, and ergometrine, which stimulate uterine contractions to reduce bleeding. ^{1,3} However, in cases where medical management is insufficient, surgical interventions become imperative. Among these, the B-Lynch suture technique, introduced by Christopher B-Lynch in 1997, has been a revolutionary step in the surgical management of PPH. ⁷ This uterine compression suture is designed to control bleeding by applying pressure to the uterine walls, thereby reducing the need for more invasive procedures such as hysterectomy. ⁸ Over the years, various modifications of the B-Lynch technique have been developed to enhance its efficacy and safety. One such modification is the COMOC-MG technique, which has shown promise in recent studies. ⁹

The COMOC-MG modified B-Lynch stitch technique incorporates specific adjustments aimed at improving haemostatic control and minimizing complications. These modifications include variations in suture material, placement, and tension, which collectively contribute to more effective management of atonic PPH. ¹⁰ Despite its potential, comprehensive clinical evaluation of the COMOC-MG technique in diverse patient populations and settings remains limited.

This study aims to evaluate the clinical outcomes of patients treated with the COMOC-MG modified B-Lynch stitch technique at a tertiary care teaching hospital. By focusing on a tertiary care setting, this study seeks to provide valuable insights into the technique's effectiveness and safety in a high-volume, resource-intensive environment. The primary outcomes of interest include the success rate in controlling PPH, the need for additional surgical interventions, amount of blood loss, and any associated complications.

Understanding the clinical implications of the COMOC-MG technique is crucial for several reasons. First, it may offer an improved method for managing PPH, potentially reducing the incidence of severe maternal outcomes.

Second, as a less invasive option compared to hysterectomy, it aligns with the goals of preserving fertility and reducing recovery time for affected women. Lastly, evaluating this technique within a teaching hospital provides an opportunity to assess its applicability in an educational setting, where future obstetricians are trained. In summary, this study addresses a critical gap in the current literature by providing robust data on the clinical outcomes of the COMOC-MG modified B-Lynch stitch technique. By doing so, it contributes to the ongoing efforts to enhance maternal health care and reduce the global burden of postpartum haemorrhage.

METHODS

Study design

This prospective study was conducted in the Department of Obstetrics and Gynecology at C.U. Shah Medical

College and Hospital in Surendra Nagar. The study spanned from January 2021 to June 2022.

Study objectives

To evaluate the effectiveness of the elective (prophylactic) COMOC-MG modified B-Lynch suture in preventing postpartum haemorrhage (PPH) during emergency or elective caesarean sections in patients with high-risk factors.

To assess the postoperative reduction in haemoglobin and hematocrit levels compared to preoperative values.

To quantify the amount of blood loss and determine the necessity for blood transfusions postoperatively. To investigate the incidence of obstetric hysterectomy following the application of the COMOC-MG modified B-Lynch stitch technique and evaluate the need for supplementary pharmacological interventions to prevent PPH due to uterine atony.

Study population

The study population comprised inpatients scheduled for lower segment caesarean section (LSCS) who met the predetermined inclusion criteria and were selected accordingly.

Study procedure

Fifty antenatal women undergoing emergency or elective lower segment caesarean section (LSCS) with identified risk factors were selected for inclusion in the study. The risk factors considered included anaemia, abruptio placentae, eclampsia, multiple gestation, placenta previa, prolonged labour.

Following the extraction of the baby and closure of the uterus during the caesarean section procedure, a prophylactic COMOC-MG modified B-Lynch suture (Healthium Medtech Limited, Bengaluru, Karnataka, India) was applied (Figure 1).

This technique is based on a dual mechanism aimed at reducing or ceasing bleeding by surgically compressing the myometrium and occluding branches of the ascending uterine artery. ¹⁰⁻¹²

Ethics approval

This study was conducted following approval from the Institutional Ethical Committee-Human Research of C. U. Shah Medical College (approval number: CUSMC/IEC(HR)/DI/27/2021/Final Approval/53/2022).

The research adhered to good clinical practices (GCP) and the principles outlined in the declaration of Helsinki. Informed consent was obtained from all participants prior to their enrolment in the study.

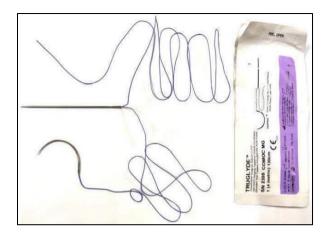


Figure 1: COMOC-MG modified B-Lynch suture.

Preoperative and 24-hour postoperative complete hemogram assessments were conducted, with particular attention given to the decrease in haemoglobin levels. The necessity for additional pharmacological or surgical interventions, as well as the requirement for blood transfusions, was thoroughly evaluated.

Inclusion criteria

Women undergoing emergency or elective lower segment caesarean section (LSCS) with identified risk factors were selected for inclusion in the study. The risk factors considered included anaemia, abruptio placentae, eclampsia, multiple gestation, placenta previa, prolonged labour.

Exclusion criteria

Patients who were not willing to provide informed consent.

Study outcomes

Effectiveness of COMOC-MG modified B Lynch stitch technique, Hemoglobin/Hematocrit Reduction, success rates of other surgical methods with COMOC-MG, Blood Loss Quantification, Hysterectomy Incidence

Sample size calculation

50 high risk pregnancies meeting the inclusion criteria were studied from January 2021 to June 2022.

Success rate

In this study, success rate means no complication after the use of surgical intervention and cases in which PPH is controlled after the use of surgical intervention.

Statistical analysis

The qualitative data was summarized using frequency and percentage tables, while quantitative data was presented as

mean values with corresponding standard deviations. Paired t-tests were employed to compare pre- and post-operative haemoglobin and hematocrit values, assessing changes over time with statistical significance.

RESULTS

In this study involving 50 patients, the age distribution revealed that 12% of participants were below 20 years old, while 36% fell within the age range of 21 to 25 years, and the majority, comprising 52%, were aged between 26 and 30 years. Regarding parity, 40% of patients were primigravidae, while 60% were multigravida.

Maternal complications were infrequent, with each of the following complications observed in only 2% of patients: arrhythmia, hypotension, and pulmonary edema. Notably, the vast majority of patients, accounting for 94%, did not experience any maternal complications. Concerning maternal outcomes, 94% of patients did not require ICU stay, while 6% necessitated admission to the intensive care unit, as elucidated in Table 1.

Table 1: Demographic and clinical characteristics of study participants.

| Characteristics | Number of patients (n=50) |
|-----------------------------|---------------------------|
| Age (in years) | |
| <u>≤</u> 20 | 06 (12%) |
| 21-25 | 18 (36%) |
| 26-30 | 26 (52%) |
| Parity | |
| Primigravidae | 20 (40%) |
| Multigravida | 30 (60%) |
| Maternal complications | |
| Arrhythmia | 1 (2%) |
| Hypotension | 1 (2%) |
| Pulmonary edema | 1 (2%) |
| No complications | 47 (94%) |
| ICU stay (maternal outcome) | |
| No | 47 (94%) |
| Yes | 3 (6%) |

%: percentage

The Figure 2 presents the indications for lower segment caesarean section (LSCS) among the study participants. Fetal distress emerged as the most common indication, accounting for 36% of cases, followed by not willing for vaginal birth after caesarean (VBAC) due to a previous caesarean section, which constituted 26% of cases.

Biophysical Profile (BPP) due to oligohydramnios and previous two LSCS procedures were also notable indications, each representing 14% and 10% of cases, respectively. These findings underscore the diverse array of factors necessitating LSCS in the study population, with fetal distress being the predominant indication.

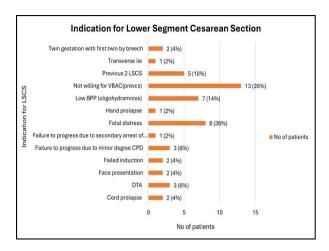


Figure 2: Indication for lower segment caesarean section (LSCS).

Table 2 delineates the distribution of high-risk factors. Pregnancy-induced hypertension (PIH) including eclampsia emerged as the most prevalent high-risk factor, affecting 26% of patients, followed closely by prolonged labour and anaemia, each accounting for 22% of patients. These findings highlight the diverse spectrum of high-risk factors present in the study population, emphasizing the importance of careful management and monitoring in obstetric care.

Table 2: High risk factors (n=50).

| High risk factor | Number of patients |
|---------------------------|--------------------|
| Anaemia | 11 (22%) |
| Abruptio placentae | 2 (4%) |
| PIH (Including eclampsia) | 13 (26%) |
| Multiple pestation | 7 (14%) |
| Placenta previa | 6 (12%) |
| Prolonged labour | 11 (22%) |

PIH: Pregnancy-induced hypertension

Table 3 presents the volume of intraoperative blood loss and the need for blood transfusions. The distribution of intraoperative blood loss shows that the majority of patients experienced significant bleeding, with 26% experiencing a blood loss of 350 ml, followed closely by 24% with a blood loss of 300 ml.

Additionally, 88% of patients did not require postoperative blood transfusions, while 12% received one unit of blood postoperatively.

In terms of intraoperative blood transfusions, most patients did not require any transfusions (30%), while 40% received one unit, and smaller proportions received two units (18%), three units (10%), or four units (2%). These findings highlight the intraoperative blood loss experienced by the study participants and the varying transfusion needs observed postoperatively.

Table 3: Blood loss and blood transfusion (n=50).

| T7 1 C | | |
|--|--------------------|--|
| Volume of intraoperative blood loss (ml) | Number of patients | |
| 150 | 1 (2%) | |
| 200 | 3 (6%) | |
| 225 | 6 (12%) | |
| 250 | 4 (8%) | |
| 300 | 12 (24%) | |
| 350 | 13 (26%) | |
| 400 | 11 (22%) | |
| Need for intra-operative blood transfusion | | |
| (number of units) | | |
| 0 | 15 (30%) | |
| 1 | 20 (40%) | |
| 2 | 9 (18%) | |
| 3 | 5 (10%) | |
| 4 | 1 (2%) | |
| Need for post-operative blood transfusion | | |
| (number of units) | | |
| 0 | 44 (88%) | |
| 1 | 6 (12%) | |

ml: millitre, %: percentage

The Table 4 compares the pre-operative and post-operative haemoglobin and haematocrit levels among the study participants. The mean pre-operative haemoglobin level was 9.90 g/dl (standard deviation=1.42), which decreased significantly to a mean of 8.70 g/dl (standard deviation=0.81) post-operatively (p<0.05). Similarly, the mean pre-operative haematocrit level was 33.6% (standard deviation=1.83), which also significantly decreased to a mean of 31.84% (standard deviation=1.49) post-operatively (p<0.05). These findings indicate a statistically significant reduction in both haemoglobin and haematocrit levels following cesarean section, highlighting the impact of surgery on blood loss and the need for postoperative monitoring and potential interventions to manage blood loss.

Table 4: Comparison of pre-operative and postoperative haemoglobin and haematocrit.

| | Pre- operative | Post- operative | P value |
|-------------|-------------------|--------------------|---------|
| | Mean (SD) | | |
| Haemoglobin | 9.90 (1.42) | 8.70 (0.81) | P<0.05 |
| Haematocrit | 33.6 (1.83) | 31.84 (1.49) | P<0.05 |

SD: Standard deviation

Table 5 summarizes the success rates of prophylactic measures implemented to prevent atonic postpartum hemorrhage (PPH) among the study participants. All 50 patients included in the study received the COMOC-MG modified B-Lynch suture as part of the measures to prevent atonic postpartum hemorrhage (PPH). Of these, 4 patients (8%) underwent bilateral uterine artery ligation in addition to the prophylactic COMOC-MG modified B-Lynch suture. One patient (2%) required a peripartum

hysterectomy. Additionally, another 4 patients (8%) received a combination of the prophylactic COMOC-MG modified B-Lynch suture along with 30 units of oxytocin injection and 0.2 mg of Methergin intramuscularly. The majority of patients, 41 out of 50 (82%), were managed solely with the prophylactic COMOC-MG modified B-Lynch suture.

Table 5: Success by prophylactic COMOC-MG modified B lynch suture.

| Measures to prevent atonic PPH | Number of patients (n=50) |
|--|---------------------------|
| B/L uterine artery ligation done+Prophylactic COMOC- MG modified B-lynch suture | 4 (8%) |
| Peripartum Hysterectomy | 1 (2%) |
| Prophylactic COMOC-MG modified B-lynch suture | 41 (82%) |
| Prophylactic COMOC-MG modified B-lynch suture+30 u of inj. Oxytocin+inj. Methergin i.m 0.2 mg | 4 (8%) |

B/L: Bilateral, inj: injection, i.m: intramuscular

DISCUSSION

Our study provides valuable insights into the clinical outcomes associated with caesarean section procedures and the effectiveness of the COMOC-MG modified B-Lynch stitch technique in preventing postpartum hemorrhage (PPH). The demographic profile of our study participants, with a majority (52%) aged between 26 and 30 years and a balanced representation of primigravidae (40%) and multigravida (60%), aligns with the typical reproductive age and parity distributions reported in previous research. 13,14 This demographic context underscores the relevance of our findings to a broad spectrum of obstetric populations. The infrequency of maternal complications observed in our cohort is noteworthy. Only 2% of the patients experienced arrhythmia, another 2% experienced hypotension, and 2% experienced pulmonary edema, while the vast majority (94%) did not encounter any complications. This aligns with findings from a similar retrospective study by Duhan L et al, which also reported a lower incidence of complications. 15 These results reflect the overall success of comprehensive obstetric care and the effectiveness of preventive measures implemented during the antenatal and intrapartum periods. Furthermore, the low incidence of ICU admissions postoperatively (6%) indicates favourable maternal outcomes and highlights the importance of meticulous perioperative management in optimizing patient recovery. The indications for caesarean section identified in our study further illustrate the diverse clinical scenarios necessitating surgical intervention. Fetal distress, identified in 36% of cases, emerged as the most common indication, consistent with existing literature. 16,17 Additionally, other studies have cited prolonged labour and preeclampsia were common reasons for caesarean section. 18,19 This finding emphasizes the critical role of caesarean section in ensuring optimal maternal and fetal outcomes in high-risk situations. Our study also identified anaemia (22%) as the most prevalent high-risk factor among the participants, underscoring the significance of preoperative assessment and optimization of maternal health. This finding is consistent with previous studies, which reported anaemia prevalence rates of 95.23% and 44.3% among high-risk obstetric populations. ^{13,20} These results underscore the importance of early identification and management of anaemia to prevent adverse maternal and neonatal outcomes. Comparing our findings with existing literature, our study corroborates the wellestablished association between caesarean section and intraoperative blood loss. ^{21,22} Despite this, the majority of patients did not require postoperative blood transfusions, perioperative highlighting the effectiveness of management strategies in mitigating the need for transfusion and minimizing the risk of postoperative anaemia. This is particularly noteworthy given the known implications of postpartum anaemia on maternal morbidity and recovery.

The success rates achieved through prophylactic measures to prevent atonic PPH, notably employing the COMOC-MG modified B-Lynch stitch technique, are highly promising. The majority of patients (82%) received only the prophylactic COMOC-MG modified B-Lynch sutures, and only 2% required peripartum hysterectomy. These results align with a similar study by Koirala et al, which reported a success rate of 94.7% for the B-Lynch suture in controlling atonic PPH, with only one case requiring a caesarean hysterectomy due to persistent bleeding despite the application of the B-Lynch suture.16 This emphasizes the efficacy of the COMOC-MG modified B-Lynch suture in reducing maternal morbidity and avoiding the need for emergent surgical interventions. Our findings reinforce the utility of this technique as a critical intervention in managing atonic PPH and improving maternal outcomes. This study's primary strength lies in its prospective design and targeted focus on high-risk obstetric patients, providing detailed insights into the effectiveness of the COMOC-MG modified B-Lynch stitch technique in managing postpartum hemorrhage (PPH). However, limitations include the relatively small sample size and the single-center setting, which may restrict generalizability of the findings to broader populations. The absence of a control group limits the ability to compare the modified technique's efficacy directly with other interventions. Future multicentre randomized controlled trials with larger sample sizes are warranted to validate these findings and further explore the COMOC-MG technique's potential benefits.

CONCLUSION

In conclusion, our study demonstrates the effectiveness of the COMOC-MG modified B-Lynch stitch technique in preventing PPH among high-risk obstetric patients undergoing caesarean sections. The low incidence of maternal complications and the favourable outcomes observed underscore the importance of comprehensive obstetric care and the implementation of effective prophylactic measures. Future research should continue to explore the optimization of these interventions to further improve maternal and neonatal health outcomes.

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Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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