

THE COMOC-MG SURGICAL TECHNIQUE FOR THE MANAGEMENT OF POSTPARTUM HAEMORRHAGE: CLINICAL EXPERIENCE FROM EAST AFRICA

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ABSTRACT

BACKGROUND: Postpartum hemorrhage (PPH) remains the leading cause of maternal mortality worldwide, accounting for approximately 30–50% of maternal deaths, with sub-Saharan Africa carrying a disproportionate burden. The risk is further heightened in caesarean deliveries, where PPH contributes to nearly one-third of maternal deaths in low- and middle-income countries. The COMOC-MG technique, (Compression of Myometrium and Occlusion of Uterine Artery -Mahesh Gupta) a modified uterine compression suture that integrates myometrial compression with bilateral uterine artery occlusion, offers a promising, efficient, and uterus-preserving intervention, with reported success rates of up to 98%.

METHODS: This is a study of a small cohort of high-risk patients who developed atonic PPH during caesarean delivery, conducted at Jacaranda Maternity Hospital in Nairobi, Kenya. All patients had failed initial management with uterotonics and tranexamic acid before undergoing the COMOC-MG technique. Data were obtained from operative records, including clinical characteristics, intraoperative findings, estimated blood loss, transfusion requirements, and outcomes.

RESULTS: Seven patients aged 25–37 years underwent the COMOC-MG technique at gestational ages of 37–41 weeks. Uterine atony was confirmed intraoperatively in six of seven cases; the remaining case involved gross atony complicated by a uterine myoma requiring concurrent myomectomy. Estimated blood loss ranged from approximately 700 mL to 2000 mL. Blood transfusion requirements varied from none (two patients) to six units of whole blood (one patient with confirmed PAS). The COMOC-MG technique achieved hemostasis in six of seven patients (85.7%), preserving the uterus in all but one case. One patient with confirmed placenta accreta spectrum and disseminated intravascular coagulation (DIC) required peripartum hysterectomy despite all conservative measures. All patients were discharged with favorable maternal outcomes; all seven neonates were born alive, with one requiring neonatal intensive care unit admission.

CONCLUSION: Our experience with the COMOC-MG surgical technique in a small patient cohort in East Africa suggests that it can effectively achieve hemostasis and preserve the uterus in most high-risk cases of atonic PPH during Caesarean delivery. The observed uterine preservation rate of 85.7% aligns with existing literature. However, the findings should be interpreted cautiously due to the small sample size, single-center design, and lack of a comparison group. The technique appears to be a low-cost and feasible option where resources are limited. Larger prospective studies are needed to confirm its efficacy, safety, and broader applicability.

KEYWORDS: modified B-Lynch suture, COMOC-MG, Postpartum hemorrhage, Maternal mortality, Uterine atony

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INTRODUCTION

Postpartum hemorrhage (PPH) defined as blood loss of ≥ 500 ml from the genital tract following childbirth remains the leading cause of maternal mortality (MM) globally, accounting for approximately 30% to 50% of all maternal deaths. Sub-Saharan Africa (SSA) bears a disproportionately high burden, with one of the highest maternal mortality ratios (MMRs) globally, closely linked to the prevalence of PPH^{1,2}. Alarming, women in Africa are 50 times more likely to die after caesarean delivery (CD) than their counterparts in high-income countries, with haemorrhage identified as a key contributor³. The prevalence of PPH in Africa is estimated at 25.7%, with severe PPH (defined as ≥ 1000 ml blood loss) also highest in the region at 5.1%, compared to just 1.9% in Asia⁴.

In terms of national trends, Kenya saw a decline in its maternal mortality ratio (MMR) from 708 to 342 per 100,000 live births between 2000 and 2017 (uncertainty interval [UI]: 253–476). Nigeria, with nearly 67,000 maternal deaths in 2017, has the fourth-highest MMR globally, accounting for 23% of global maternal deaths (917 per 100,000; UI: 658–1320). South Africa also reported progress, with its MMR decreasing from 160 to 119 per 100,000 live births over the same period (UI: 69–153)⁵.

Despite a 40% reduction in MM across SSA over the past decade, the region continues to experience disproportionately high maternal death rates (1). Global efforts to reduce PPH-related deaths have been slow, highlighting the urgent need for scalable and effective interventions, particularly in resource-limited settings⁶.

PPH remains a significant concern in low- and middle-income countries (LMICs), where the majority of PPH-related deaths occur despite the availability of clinical guidelines and advances in both medical and surgical treatments^{2,3}. A systematic review by the World Health Organization (WHO) revealed that approximately 73% of maternal deaths in LMICs are attributable to PPH, with over 40% of these occurring in SSA alone⁵.

Among the primary causes of PPH is uterine atony,

the failure of the uterus to contract effectively after childbirth¹. Cesarean delivery, particularly in emergency settings, significantly increases the risk of PPH compared to vaginal birth. As cesarean rates continue to rise globally, the incidence of PPH during and after cesarean delivery has become a growing concern. In LMICs, PPH is implicated in 32% of maternal deaths following CD⁷.

While some maternal deaths may be unavoidable due to pre-existing high-risk conditions, many are attributable to “failure to rescue”—the inability to manage complications effectively during or after surgery. In Africa, the rate of such failures after cesarean delivery is estimated to be 17 times higher than in high-income countries³.

Following childbirth, 5–10 IU of oxytocin is routinely administered intramuscularly. In cases where uterine tone remains poor, uterine massage, bimanual compression, and additional uterotonics are used sequentially. If bleeding continues despite these conservative measures, the COMOC-MG (Compression of Myometrium and Occlusion of Uterine Artery by Mahesh Gupta) technique is considered—typically within 4 to 5 minutes after placental delivery—based on ongoing blood loss and uterine contractility⁸. The COMOC-MG technique uses polyglycolic acid double strand suture with 80 mm long straight taper point needle and 50-mm half circle round bodied needle (Truglyde®, Healthium Medtech, India) (Figure 1) for timely intervention in managing atonic PPH during cesarean delivery.



Figure 1: Suture and needles used in COMOC MG technique.

This technique combines the concept of the B-Lynch suture with uterine artery ligation, providing enhanced hemostatic control. Unlike the traditional approach, COMOC-MG technique involves a single puncture on either side of the

uterus, preserving the uterine cavity's integrity. Importantly, it does not require reopening the uterine incision, which simplifies the procedure and shortens operative time.

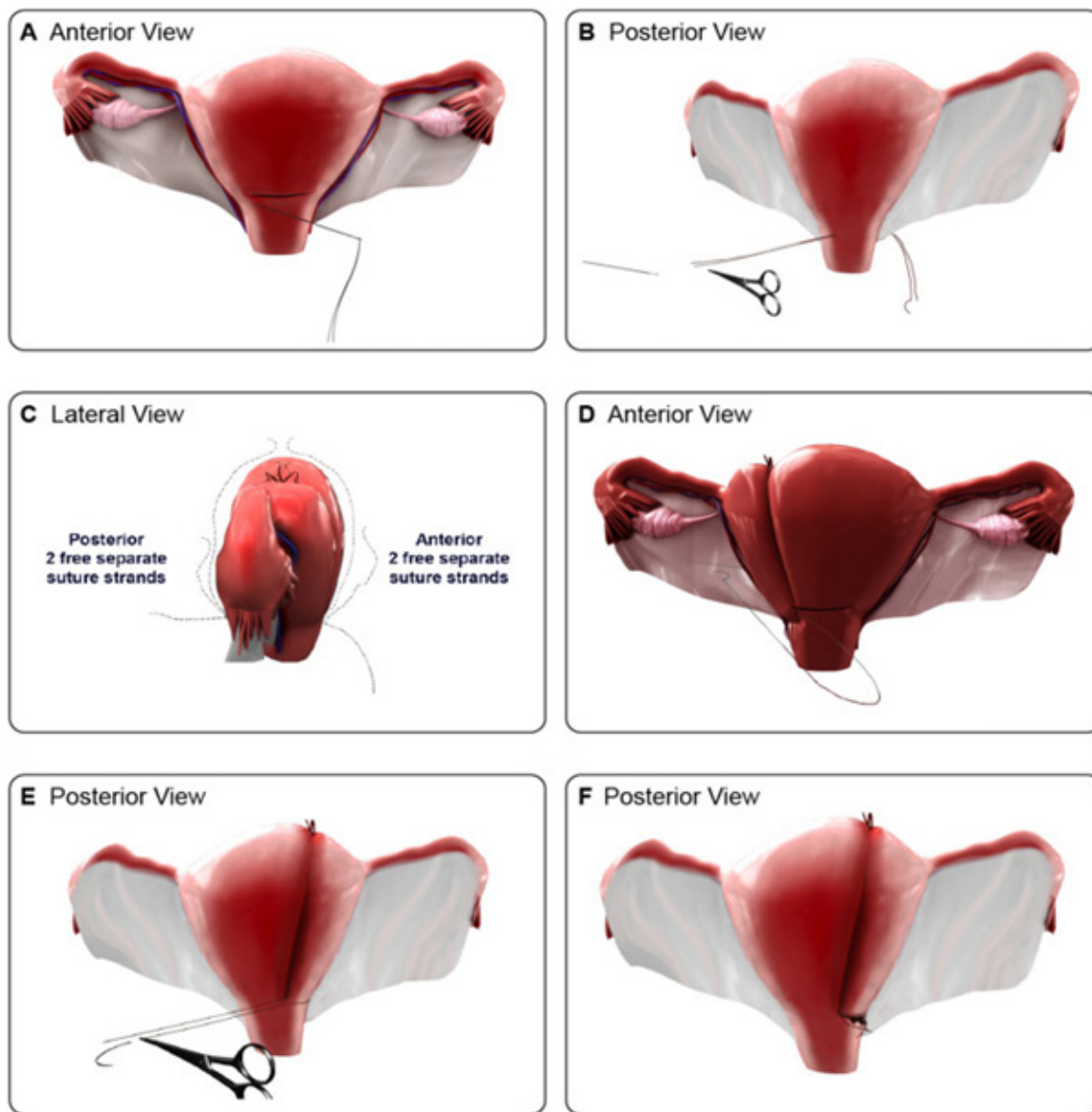


Figure 2: The COMOC-MG stitch is performed in a stepwise manner. (a) An approximately 80 mm straight taper-point needle is inserted into the uterus about 3 cm below and 3 cm medial to the lower edge of the uterine incision. (b) The loop around the eye of the needle is then cut, creating two free limbs posteriorly and two anteriorly. (c) From the resulting double strands, one strand is used to form a loop over the uterine fundus, similar to the Hayman suture, to provide uterine compression. (d) The second strand, mounted on a round-bodied needle, is passed through an avascular area just below the uterine incision at the same level on the posterior aspect. (e, f) Finally, both limbs of this second strand are tied firmly to occlude the uterine artery, thereby achieving effective hemostasis (Gupta, 2020). COMOC-MG stitch. Notes: a 80 mm long straight taper point needle is inserted into the uterus from 3 cm below and 3 cm medial to the lower cut edge of the uterus, b The loop around the eye of the needle is cut to obtain two free limbs

The COMOC-MG technique has demonstrated high success in preserving the uterus and fertility in cases of refractory atonic PPH³. Its simplicity, efficiency, and adaptability make it well-suited for use in settings with limited surgical resources. The technique requires minimal training, can be performed quickly, and avoids excessive intrauterine pressure postoperatively, thereby reducing the risk and associated complications.

Given its safety profile and effectiveness, the COMOC-MG technique should be considered the intervention of choice when medical therapy fails to control atonic PPH—particularly before resorting to radical procedures such as hysterectomy. It offers a reliable and fertility-preserving alternative to the B-Lynch or other modified compression sutures, making it a valuable addition for managing obstetric hemorrhage⁸.

Methods: This is a clinical experience from a small patient cohort on the use of the COMOC-MG technique for PPH, conducted at Jacaranda Maternity Hospital in Nairobi, Kenya. Seven consecutive high-risk obstetric patients who developed atonic PPH during cesarean delivery were included. All patients had failed initial conservative management with standard uterotonics (oxytocin, carboprost, misoprostol) and tranexamic acid, and subsequently underwent the COMOC-MG technique. Data were extracted from operative records and included patient demographics, obstetric history, gestational age, intraoperative findings, time to COMOC-MG application, estimated blood loss, transfusion requirements, and maternal and neonatal outcomes. No control group was used.

Experience from the seven cases

A total of seven patients, aged between 25 and 37 years, underwent cesarean deliveries at term gestations ranging from 37 to 41 weeks (Table 1). Risk factors identified across the cohort included multiple prior cesarean sections, placenta previa, moderate anemia, and coexisting uterine myomas. One of the most complex cases involved suspected placenta accreta spectrum (PAS) and

mild antepartum hemorrhage, managed via a scheduled elective cesarean section under high-risk surveillance.

Most patients had no trial of labor, and cesarean sections were primarily indicated due to prior uterine scars, placenta previa, delayed labor, poor progress, or failed induction. Neonatal birth weights ranged from 2300 g to 3755 g, and all neonates were born alive, with no perinatal complications in all patients except one case requiring postoperative neonatal intensive care unit admission following elective cesarean section for suspected PAS.

Intraoperative findings revealed a spectrum of placental separations: from difficult and adherent in PAS to slightly adherent in placenta previa, and easily separable in the remaining cases. Uterine atony was identified as the primary cause of intraoperative hemorrhage in six out of seven patients. Indications for COMOC-MG technique application included atonic postpartum hemorrhage (PPH) and gross atony in the presence of uterine myoma. All patients received standard uterotonic agents including oxytocin, carboprost, misoprostol, and tranexamic acid as part of hemorrhage management. Blood transfusion requirements varied from none to six units of whole blood or packed red cells, with some patients also receiving fresh frozen plasma (FFP).

One patient with confirmed placenta accreta spectrum underwent peripartum hysterectomy due to intractable bleeding despite all conservative measures. All patients were managed conservatively and discharged with favourable maternal and neonatal outcomes.

An especially critical case involved a patient presenting emergently with torrential vaginal bleeding and anuria. Intraoperatively, she was diagnosed with a grossly atonic uterus. She required extensive resuscitation and emergency laparotomy. Hemostasis was achieved using COMOC-MG technique by uterine compression and uterine vessel ligation. Approximately 300 mL of clots were evacuated, and the abdomen was closed in layers. The estimated blood loss was 2000 mL. Postoperatively, she was diagnosed with

massive obstetric hemorrhage, acute kidney injury (AKI), pre-eclampsia, and coagulopathy, requiring intensive multidisciplinary management.

Table.1: Details of the 7 patients where COMOC MG technique was used in managing PPH

Sr	Age No	Obstetric History	Gestational Age	Complications during pregnancy	Birth weight	Indication for CS	Placenta separation	Indication for COMOC-MG	Time between for uterine closure to COMOC-MG	Blood transfusion
1	37 yrs	G4P3L3	37 weeks	Placenta previa and Placenta accreta spectrum. Developed mild APH the night prior to the scheduled repeat elective C-section	2300 gm	APH	Difficult	Massive Hemorrhage	15 min	6 units of whole blood
2	25 yrs	G2P1L1	39 weeks	Nil	3100 gm	1 previous scar with Type 3 placenta previa	Slightly adherent	Atonic PPH	6 min	2 units of packed redcells
3	30 yrs	G2P1L1	40 weeks	Nil	3235 gm	Delayed second stage of labour	Easy	Atonic PPH	4 min	Nil
4	35 yrs	G5P3L2	38 weeks	Nil	3755 gm	Poor progress	Easy	Gross Atony with Uterine Myoma	15 min Myomectomy had to be done first	2 units of whole blood and 1 unit of packed red cells
5	30 yrs	G3P1L0	41 weeks	Nil	3600 gm	Failed induction of labour	Easy	Atonic PPH	4 min	Nil
6	35 yrs	G6P5L5	39 weeks	Anaemia (Hb-8 g/dl)	3100 gm	3 previous scars	Easy	Atonic PPH	6 min	4 units of whole blood
7	28 yrs	G1P0	37weeks	Anaemia (Hb-10g/dl) Pre-eclampsia with severe features	2235 gms	Fetal growth restriction with abnormal Umbilical artery Doppler velocimetry and a Pathological Non stress test	Easy	Atonic PPH	4min	2 units of FFPs with 3 units of whole blood/packed cells

Results

Seven patients aged 25–37 years underwent the COMOC-MG technique at gestational ages of 37–41 weeks. Risk factors included multiple prior caesarean sections, placenta previa, suspected placenta accreta spectrum (PAS), uterine myomas, and moderate-to-severe anemia (hemoglobin 8–10 g/dl). Uterine atony was confirmed intraoperatively in six of seven cases; the remaining case involved gross atony complicated by a uterine myoma requiring concurrent myomectomy. Estimated blood loss ranged from approximately 700 mL to 2000 mL. Blood transfusion requirements varied from none (two patients) to six units of whole blood (one patient with confirmed PAS). The COMOC-MG technique achieved hemostasis in six of seven patients (85.7%), preserving the uterus in all but one case. One patient with confirmed placenta accreta spectrum and disseminated intravascular coagulation (DIC) required peripartum hysterectomy despite all conservative measures. All patients were discharged with favorable maternal outcomes; all seven neonates were born alive, with one requiring neonatal intensive care unit admission.

DISCUSSION

Postpartum hemorrhage (PPH) imposes a significant economic burden on healthcare systems. A recent study conducted in Kenya, India, Nigeria, and Uganda found that the direct costs of hospital care for women with PPH can be as much as 2.8 times higher than for those without it ².

Women in psychological distress face an increased risk of MM, preeclampsia, and eclampsia. Additionally, anaemic women or those with lower hemoglobin levels upon hospital admission were found to develop PPH later ¹.

The World Health Organization (WHO) first issued guidelines for the prevention and treatment of PPH in 2012 and has since released multiple updates based on emerging evidence ⁶. These guidelines currently recommend 13 clinical interventions tailored to the type (minor, moderate, or severe) and context of PPH, including mode of delivery, birth setting, and timing of onset ².

A Delphi consensus study by Taylor et al. across the APORG network identified 28 effective and feasible strategies to reduce PPH associated with CD in Africa. Many of these interventions—such as access to second-line uterotonics, tranexamic acid (TXA), emergency blood products, and surgical measures like hysterectomy, uterine artery ligation, compression sutures, and balloon tamponade—remain underutilized across the continent. Additional recommendations include timely referrals, postpartum surveillance, simulation training, and the use of maternal early obstetric warning scores. While many of these measures are not costly, they are hindered by implementation gaps ³.

The International Federation of Gynecology and Obstetrics (FIGO) advises the routine use of uterotonics during the third stage of labor for all births. Oxytocin (10 IU IV/IM) is the first-line agent for both vaginal and cesarean deliveries. In settings where oxytocin is unavailable or unreliable, alternative uterotonics—ergometrine/methylegometrine (200 µg IM/IV), oral misoprostol (400–600 µg), or carbetocin (100 µg IM/IV)—are recommended for the prevention of PPH ⁹.

Intravenous oxytocin remains the first-line treatment for PPH. If unavailable or ineffective, intramuscular ergometrine, fixed-dose oxytocin-ergometrine, or prostaglandins (e.g., sublingual misoprostol, 800 µg) are appropriate alternatives. Isotonic crystalloids are preferred over colloids for initial fluid resuscitation. Early administration of IV TXA—ideally within 3 hours of birth—is strongly recommended. Bimanual uterine or external aortic compression should be used as a temporary measure in cases of uterine atony after vaginal birth ⁹.

In Kenya and South Africa, WHO guidelines are generally followed, while Nigeria often relies on the UK-based Royal College of Obstetricians and Gynaecologists (RCOG) protocols. Kenya and South Africa also use national guidelines, with healthcare providers receiving government-sponsored training such as BEmONC and ESMOE ⁵.

However, adherence to best practices is limited by several barriers. PPH is frequently undetected or

recognized too late due to reliance on visual blood loss estimation, which is known to be inaccurate and prone to underestimation². In South Africa, for example, clinicians often prioritize vital signs over blood loss for PPH detection, leading to delayed responses. Management is sometimes reactive, with a "wait and see" approach applied after initial treatment rather than immediate escalation⁶.

Limited human resources and inadequate care quality contribute to preventable maternal deaths after cesarean complications in resource-constrained settings. Postoperative monitoring is often insufficient, delaying the recognition of concealed or ongoing bleeding. In Kenya, Nigeria, South Africa, and Tanzania, TXA was often administered as a last resort. While oxytocin was widely available, second-line uterotonics were scarce, and TXA was only present in about 70% of hospitals. Carbetocin was the least available uterotonic, despite its proven benefits in low-resource settings and its inclusion on the WHO Model List of Essential Medicines. Blood component therapy is also limited across Africa, reducing the ability to manage severe hemorrhages and associated coagulopathies. A shortage of skilled personnel further exacerbates the situation, as confirmed by both the African Surgical Outcomes Study (ASOS) and survey data³. Other systemic challenges include delays in patient transfers due to ambulance shortages, inconsistent blood supplies (especially in Nigeria and South Africa), understaffing during emergencies, and a lack of accurate tools for measuring blood loss⁶.

To improve adherence to guidelines, the adoption of care bundles—sets of evidence-based interventions applied simultaneously or in rapid succession—has shown promise in standardizing care and improving outcomes⁶. One such intervention is the E-MOTIVE bundle, developed following WHO technical consultations. E-MOTIVE stands for:

- Early detection using a calibrated drape
- Massage of the uterus
- Oxytocic administration
- Tranexamic acid administration
- IntraVenous fluid resuscitation
- Examination and escalation if bleeding persists⁶

Prophylactic measures like the COMOC-MG technique, a modified B-Lynch suture have shown considerable promise in managing atonic PPH. In one study, 82% of patients achieved hemostasis with this technique, and only 2% required a hysterectomy¹⁰. Another study by Koirala et al. reported a 94.7% success rate, with just one case requiring cesarean hysterectomy due to ongoing bleeding¹¹.

The COMOC-MG technique significantly reduced total blood loss, the need for transfusions, and reliance on blood products^{12,13}. Its effectiveness highlights its potential as a low-cost, high-impact intervention in settings with limited access to comprehensive surgical or transfusion services^{12,14}. This cases in this study underscore the multifactorial risks contributing to hemorrhagic complications during cesarean sections, including prior cesarean delivery, placenta previa, placenta accreta spectrum disorders, uterine atony, and anemia. In six of seven cases, timely application of the COMOC-MG technique achieved hemostasis through uterine compression and simultaneous bilateral uterine vessel ligation, without resorting to hysterectomy. The single hysterectomy performed involved a confirmed placenta accreta spectrum complicated by disseminated intravascular coagulation (DIC), illustrating the importance of prompt surgical decision-making in life-threatening scenarios. While these results are encouraging, they should be interpreted cautiously given the small sample size, heterogeneous case mix, and absence of a control group. The findings are hypothesis-generating and support the feasibility of the technique in a resource-limited African setting, but do not provide sufficient evidence to recommend its routine adoption or to project population-level impacts on maternal mortality across sub-Saharan Africa without further rigorous evaluation.

Limitations

This study has important limitations. The very small sample size (n=7) limits statistical power and the reliability of conclusions about the effectiveness and safety of the COMOC-MG technique. As an

uncontrolled, retrospective single-centre case series from Nairobi, Kenya, it lacks a comparison group and may not be generalizable to broader sub-Saharan African settings. The retrospective design also introduces selection bias and potential incomplete data capture, particularly for subjective blood loss estimation. Additionally, patient heterogeneity from uncomplicated atony to placenta accreta spectrum with DIC limits attribution of outcomes to the technique. Long-term outcomes such as menstrual function, fertility, and uterine integrity were not assessed, highlighting the need for prospective, controlled, multi-centre studies.

Conclusion

Our experience with the COMOC-MG surgical technique in a small patient cohort in East Africa suggests that it can effectively achieve hemostasis and preserve the uterus in most high-risk cases of atonic PPH during Cesarean delivery. The observed uterine preservation rate of 85.7% aligns with existing literature. However, the findings should be interpreted cautiously due to the small sample size, single-center design, and lack of a comparison group. The technique appears to be a low-cost and feasible option where resources are limited. Larger prospective studies are needed to confirm its efficacy, safety, and broader applicability.

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REFERENCES

1. Glenzer MM, Correia M, Nhantumbo V, Barnes RF, Luis E, Boaventura I, et al. Postpartum hemorrhage in Sub-Saharan Africa—a prospective study in metropolitan Mozambique. *Journal of Thrombosis and Haemostasis* [Internet]. 2023 Dec 1 [cited 2025 Jul 24];21(12):3463–76. Available from: [https://www.jthjournal.org/article/S1538-7836\(23\)00672-4/fulltext](https://www.jthjournal.org/article/S1538-7836(23)00672-4/fulltext)
2. Williams EV, Goranitis I, Opong R, Perry SJ, Devall AJ, Martin JT, et al. A cost-effectiveness analysis of early detection and bundled treatment of postpartum hemorrhage alongside the E-MOTIVE trial. *Nat Med* [Internet]. 2024 [cited 2025 Jul 24];30(8):2343–8. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11333277/>
3. Anesthesia & Analgesia [Internet]. [cited 2025 Jul 24]. Available from: https://journals.lww.com/anesthesia-analgesia/fulltext/9900/cross_sectional_survey_to_assess_hospital_system.1032.aspx
4. Calvert C, Thomas SL, Ronsmans C, Wagner KS, Adler AJ, Filippi V. Identifying Regional Variation in the Prevalence of Postpartum Haemorrhage: A Systematic Review and Meta-Analysis. *PLoS One* [Internet]. 2012 Jul 23 [cited 2025 Jul 24];7(7):e41114. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3402540/>
5. Akter S, Forbes G, Miller S, Galadanci H, Qureshi Z, Fawcus S, et al. Detection and management of postpartum haemorrhage: Qualitative evidence on healthcare providers' knowledge and practices in Kenya, Nigeria, and South Africa. *Front Glob Womens Health* [Internet]. 2022 Nov 18 [cited 2025 Jul 24];3:1020163. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9715762/>
6. Forbes G, Akter S, Miller S, Galadanci H, Qureshi Z, Fawcus S, et al. Factors influencing postpartum haemorrhage detection and management and the implementation of a new postpartum haemorrhage care bundle (E-MOTIVE) in Kenya, Nigeria, and South Africa. *Implement Sci* [Internet]. 2023 Jan 11 [cited 2025 Jul 24];18:1. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9832403/>
7. Pingray V, Williams CR, Al-beity FMA, Abalos E, Arulkumaran S, Blumenfeld A, et al. Strategies for optimising early detection and obstetric first response management of postpartum haemorrhage at caesarean birth: a modified Delphi-based international expert consensus. *BMJ Open* [Internet]. 2024 May 8 [cited 2025 Jul 24];14(5):e079713. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11086283/>
8. COMOC-MG Stitch: Modification of B-Lynch Suturing Technique to Control Atonic Post-partum Haemorrhage | *The Journal of Obstetrics and Gynecology of India* [Internet]. [cited 2025 Jul 24]. Available from: <https://link.springer.com/article/10.1007/s13224-020-01345-1>
9. Escobar MF, Nassar AH, Theron G, Barnea ER, Nicholson W, Ramasauskaite D, et al. FIGO recommendations on the management of postpartum hemorrhage 2022. *Int J Gynaecol Obstet* [Internet]. 2022 Mar [cited 2025 Jul 24];157(Suppl 1):3–50. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9313855/>
10. Chaudhary HA, Shah BR. Clinical outcomes of COMOC-MG modified B-lynnch stitch technique for preventing postpartum haemorrhage in a tertiary care teaching hospital. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* [Internet]. 2024 Sep 26 [cited 2025 Jul 24];13(10):2700–5. Available from: <https://www.ijrcog.org/index.php/ijrcog/article/view/14427>
11. Koirala P, Ghimire A, Bista KD. B-Lynch Suture Management among Patients with Postpartum Hemorrhage in a Tertiary Care Centre: A Descriptive Cross-sectional Study. *JNMA J Nepal Med Assoc*. 2023 Feb 1;61(258):145–9.
12. Chaudhari TJ. Effectiveness of compression of myometrium and occlusion of uterine artery by COMOC-MG suture in management of atonic postpartum hemorrhage. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology* [Internet]. 2024 Mar 28 [cited 2025 Jul 24];13(4):971–7. Available from: <https://www.ijrcog.org/index.php/ijrcog/article/view/13941>
13. Hackethal A, Brueggmann D, Oehmke F, Tinneberg HR, Zygmunt MT, Muenstedt K. Uterine compression U-sutures in primary postpartum hemorrhage after Cesarean section: fertility preservation with a simple and effective technique. *Hum Reprod*. 2008 Jan;23(1):74–9.
14. El-Sokary M, Wahba K, El-Shahawy Y. Uterine salvage management for atonic postpartum hemorrhage using “modified lynch suture.” *BMC Pregnancy Childbirth*. 2016 Aug 27;16(1):251.