

Fertility preserving Surgical Management of Post Partum Haemorrhage: A Case Series**Sushma Berwal¹, Megha Tripathi², Monika³, Unmesh S. Santpur⁴**¹Senior resident, Department of Obstetrics and Gynaecology, PGIMS, Rohtak.²Associate Professor, Department of Obstetrics and Gynaecology, Ananta Institute of Medical Sciences and Research Centre, Rajsamand.³Assistant Professor, Department of Obstetrics and Gynaecology, Ananta Institute of Medical Sciences and Research Centre, Rajsamand.⁴Professor, Department of Obstetrics and Gynaecology, Ananta Institute of Medical Sciences and Research Centre, Rajsamand.

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Abstract:

Conservative surgical management of postpartum haemorrhage (PPH) comprises fertility-preserving procedures aimed at achieving haemostasis and avoiding hysterectomy. These techniques are widely regarded as simple, safe, and effective, with effectiveness defined by successful control of bleeding following surgical intervention. This case series represents the use of various conservative surgical techniques in reducing blood loss and managing PPH to prevent hysterectomy. It includes case reports of 10 patients with intractable PPH unresponsive to standard medical management. Uterine compression sutures and stepwise uterine devascularization (bilateral uterine artery ligation, bilateral ovarian artery ligation, and bilateral internal iliac artery ligation) were employed in the fertility preserving management of PPH until adequate haemostasis was achieved. In this series, we found that the conventional approach to manage postpartum haemorrhage (PPH) begins with the administration of uterotonics, bimanual compression, progressing to more invasive interventions such as compression sutures, bilateral uterine artery ligation, bilateral internal iliac artery ligation, and, if necessary, hysterectomy. With prompt and skilled intervention, the majority of morbidity and mortality related to postpartum haemorrhage (PPH) can be prevented, highlighting the importance of expert care in its management.

Keywords: Bilateral Internal iliac artery ligation, Bilateral Ovarian artery ligation, Bilateral Uterine artery ligation, Caesarean section, Postpartum haemorrhage, Uterine compression sutures.

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Introduction

Postpartum hemorrhage is defined as blood loss >500 ml during normal vaginal delivery and >1000 ml following the cesarean section with signs and symptoms of hypovolemia [1]. It is the world's leading cause of maternal morbidity and mortality. It accounts for 8% of maternal deaths in developed countries and 20% in developing countries [2]. The early diagnosis of PPH relies on a thorough assessment of patient risk factors, accurate measurement of bleeding, and clinical monitoring of vital signs to assess the impact of blood loss.

Causes of postpartum hemorrhage are atonicity of uterus (most common) and associated risk factors are large for gestational age babies, polyhydramnios, multifetal gestation, augmentation of labor, adherent placenta, hypertensive disorders, anemia, high parity, non-progress of labor,

instrumental delivery, etc [3]. Other causes of PPH are trauma to birth canal, retained bits of tissue/placenta, coagulation disorders [4].

PPH is classified as primary PPH which occurs within 24 hours of birth, and secondary PPH which occurs 24 hours after birth to 12 weeks postpartum [5]. Postpartum hemorrhage can lead to severe anemia requiring blood transfusion, shock, acute respiratory distress syndrome, disseminated intravascular coagulation, multisystem organ failure, hysterectomy, and death [6].

Interventions to treat PPH are both medical (uterotonics) and surgical (compression sutures, stepwise devascularization and hysterectomy) [7]. Adjunctive therapies in management of PPH are IV fluids, blood and blood products. Conservative medical management (uterotonics, bimanual

compression) is used as first-line treatment. Conservative surgical management is used as a second-line treatment when medical management fails. Despite efforts to identify patients who are at increased risk for postpartum hemorrhage, this life-threatening complication often occurs in women who have no identifiable risk factors. Conservative measures may prove effective in some cases; however, it is essential to carefully consider the associated benefits and risks before proceeding.

This study was conducted in department of Obstetrics and Gynecology at a tertiary care centre between time period of 6 months (1.5.2025-30.10.2025). We present a series of cases involving patients with postpartum hemorrhage who were treated with fertility preserving surgical approaches in diverse clinical situations.

Case Series

Case 1: A 24-year-old, primigravida patient with preterm gestation (34 weeks 3 days), booked (outside) with eclampsia in shock came to emergency department. On admission, her BP was 60/30 mmHg, and pulse was 142/min and FHS not

found on doppler. Initial treatment with CPR was given in emergency and then patient was shifted to ICU. Previous blood reports and USG were available (USG suggestive of IUGR). USG was done at our centre for confirmation of FHR status which was absent (IUD). Then patient was induced with tab misoprostol 50 mcg per vaginal which was repeated every 6 hourly for 2 doses, but induction was failed, and patient was taken for emergency LSCS. IUD female child of weight 2.1kg was delivered. Uterus was atonic, blood loss was 1200 ml. Injection oxytocin was given by I/M and I/V route followed by tab misoprostol (800 mcg) followed by injection tranexamic acid 1 gm followed by injection carboprost (3 doses). Atonicity was present despite all the medical management and after that proceeded for surgical management. Compression sutures were applied along with B-Lynch sutures, bilateral uterine artery ligation was done. Haemostasis was achieved. Patient again shifted to ICU and receive 2-unit PRBC and 2-unit FFP. Patient did well in post-op period.

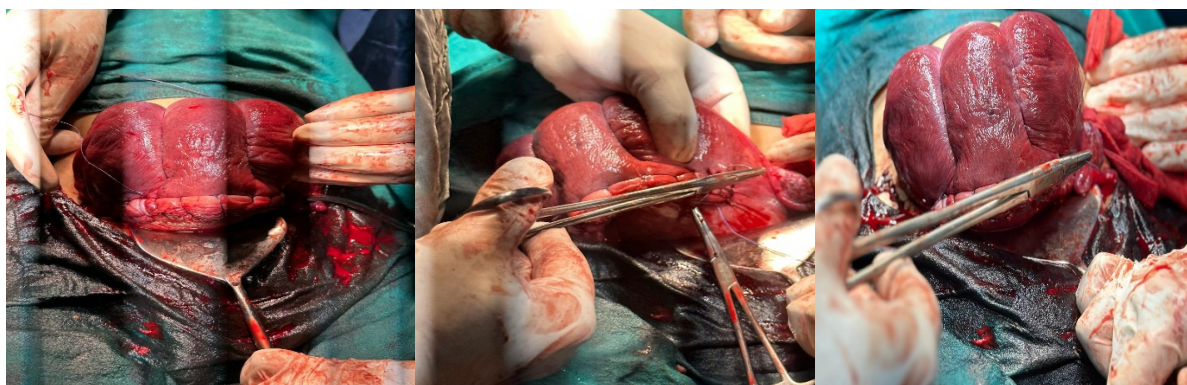


Figure 1: B-Lynch Compression Sutures (Anterior View), Fig 2-Uterine artery ligation (Left) Fig 3-B-Lynch compression sutures (Posterior View)

Case 2: A 31-year-old, Primigravida, with 36weeks 6 days of gestation (IVF conceived), with regular ANC visits, presented with mild labour pains, and labour induction was done with misoprostol (25mcg) tablet. Following a period of observation, a per vaginal examination revealed the presence of thick meconium. As a result, the decision was made to proceed with an emergency LSCS. A female child of weight 3.1 kg was delivered, and polyhydramnios was present, placenta was removed by controlled cord traction. Uterus was atonic and bleeding was present (blood loss-1300

ml). Initial methods of resuscitation were given (I.V. fluids) and after trying all medical methods (injection oxytocin, injection tranexamic acid, tab misoprostol, injection carboprost and injection methyl ergometrine) uterus was still flabby for which compression sutures with bilateral uterine vessels ligation done. Still uterus was atonic and bleeding was present, for which bilateral internal artery ligation was done. Haemostasis was achieved. Patient received 2 unit packed red cells during intra-op. Patient recovered well post-op.

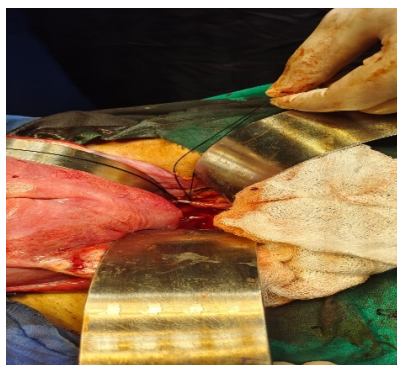


Fig 4- Internal Iliac Artery Ligation (Left)



Fig 5- B-Lynch Sutures



Fig 6- Haemostasis achieved

Case 3: A 25-year-old, unregistered patient, G2P1L1 with twin pregnancy, with previous caesarean section delivery presented at 35 weeks 2 days gestation with labour pains referred from CHC along with blood reports suggestive of anaemia (Hb – 8.2 gm%), and USG report suggestive of one anencephaly baby and one normal baby. Vitals were within normal limits. Emergency caesarean section was done. Adhesions were present and adhesiolysis done. First baby (normal healthy) delivered as cephalic (male child, weight – 2.01kg), cried immediately after birth and

second baby (anencephaly baby) delivered as breech (female child, weight – 1.62kg), not cried immediately (poor APGAR score) and died within 1 hour of birth. Placenta was removed. Uterus was atonic and bleeding was present. Injection oxytocin, injection carboprost, injection methyl ergometrine was given. Bilateral uterine artery ligation was done and horizontal cervico-isthmic sutures were taken. Haemostasis achieved. Patient received 3 units packed red cell transfusion. Patient recovered well in post-operative period.



Fig 7- Bilateral Uterine Artery Ligation

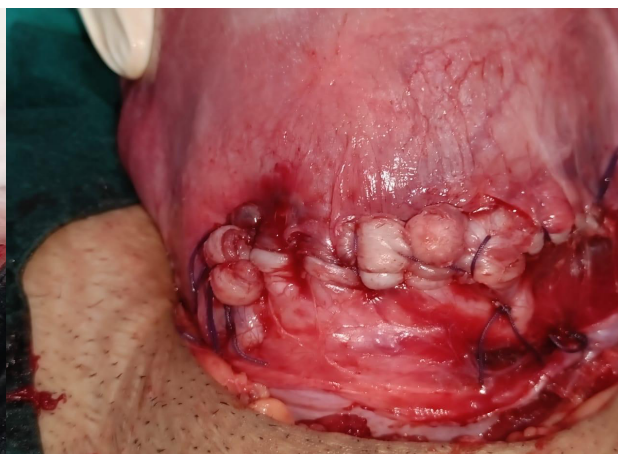


Fig 8- Cervico-Isthmic sutures

Case 4: A 28-year-old, Gravida 2 Para 1 Live 1, unregistered patient with 38 weeks 2 days gestation, with previous caesarean section in view of severe oligohydramnios, came in labour. She was referred from other private hospital in view of severe preeclampsia with previous caesarean section. Antihypertensives were given, and emergency caesarean section was done. Some adhesions were present, and they were separated. A male child of weight 2.9 kg was delivered. Placenta was adherent and was removed in bits. Uterus was

atonic and bleeding was present. Blood loss was 1100 ml in 15 minutes. Initial resuscitation was given, and medical management was also given (injection oxytocin, tab misoprostol (800mcg), 3 doses of injection carboprost). Sutures were taken over placental bed. Modified B-Lynch sutures were also taken. Bilateral uterine artery ligation was done and descending cervical arteries were also ligated. Haemostasis was achieved. Patient received 2 unit packed red cells. Patient recovered well post-operative period.

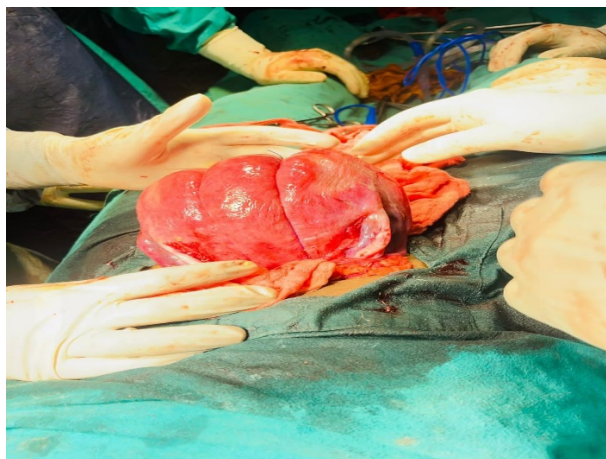


Fig 9- Modified B-Lynch Sutures

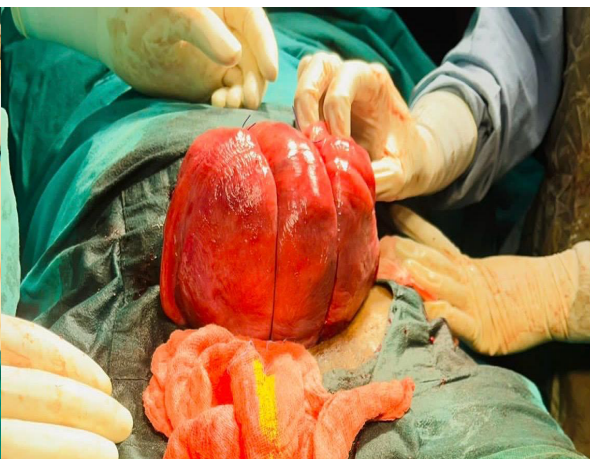


Fig 10- Modified B-Lynch Sutures

Case 5: A Primigravida, 22-year-old patient came to emergency with 38 weeks 4 days of gestation. She was an unregistered patient and referred from other hospital in view of obstructed labour. On per vaginal examination, head station was '0', caput was present, membranes were absent, vagina was hot and dry. Patient was taken for emergency LSCS. a male child of weight 3.320kg was delivered by "Patwardhan technique". Baby cried after birth and APGAR score was within normal limits. Placenta with membranes delivered out completely. Profuse bleeding was present. Initial resuscitative measures and medical treatment was given followed by compression sutures. Bilateral uterine artery ligation was done but bleeding was not controlled then further proceeded to bilateral internal artery ligation. Bleeding was controlled after internal artery ligation followed by abdomen closure. Intra-operatively, 2-units PRBC was given along with FFP. Patient was shifted to ICU for further observation. Patient recovered well postoperatively.

Case 6: A 23-year-old primigravida patient with 39 weeks of gestation, unregistered patient came to emergency with labour pains. Vitals were within normal limits. On per vaginal examination, cervix was fully dilated, head station was at +3. Patient was shifted to labour room. A healthy female child of weight 3.09 kg was delivered. Bleeding was present per vaginum. Placenta with membranes

were delivered out completely, still bleeding was present. On exploration, cervical tears were present at 5'o clock (2.5 cm) and 8'o clock position (1 cm) and bled profusely. Intermittent sutures were taken on both the tears with catgut 1-0. Episiotomy also extended which was repaired. Haemostasis was achieved. Uterine packing was done which was removed after 24 hours. Patient received 1 unit packed red cells. Patient recovered well.

Case 7: A 29-year-old, Gravida 3 Para 2 Live 2, unregistered patient with HIV+, with 36 weeks 6 days gestation, with previous 2 caesarean section came with labour pains. On examination, BP-148/96 mmHg and pulse rate – 100/min, pallor was present. On per vaginal examination, cervical os was 4 cm dilated. Haemoglobin was 7.6 gm%. Patient was taken for emergency LSCS with 2 units of PRBC. During caesarean section adhesions were present and adhesiolysis was done. a male child of weight 2.4 kg delivered. Placenta was removed. Uterus was atonic and bleeding was present. Placenta was removed in bits. Medical management was given (injection oxytocin, injection carboprost, tab misoprostol) were given, but bleeding was still present. B lynch sutures were applied. B/L uterine artery ligation done and cervico-isthmic sutures were taken. Haemostasis achieved. Patient received total 3 unit packed red blood cells. Patient recovered well post operatively.

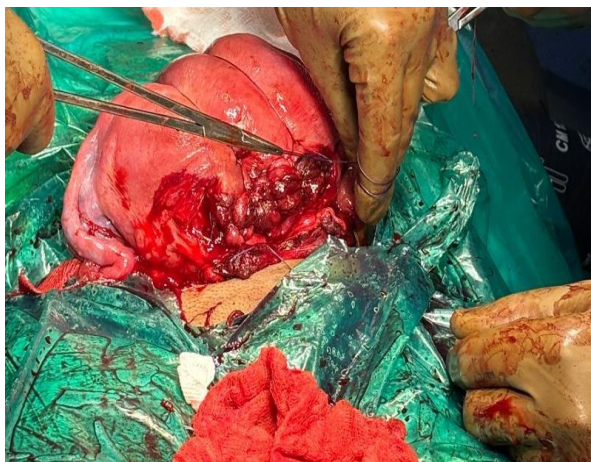


Fig 11-B-Lynch Sutures



Fig 12- Cervico-Isthmic Sutures

Case 8: A 27-year-old, Gravida 3 Para1 Abortion 1 Live 1 with previous one caesarean section, at 38 weeks of gestation came with complaint of labour pains from 2-3 hours and leaking per vaginum from 6-7 hours. Vitals were within normal limits. Patient was taken for emergency LSCS. A female child of weight 2.9 kg was delivered and cried immediately after birth. Placenta with membranes delivered out completely. Excessive bleeding was present after placenta removal. Uterus was atonic. Initial measures were taken followed by medical management, but bleeding was not controlled. Hayman's sutures were applied, and bilateral uterine artery ligation was done due to which bleeding was reduced. Abdomen closed in layers. 2-unit PRBC was given (one during intra-op and another one during post-op period). Patient recovered well post-op.

Case 9: A 25-year-old, Gravida 2 Para 1 Live 1 with previous one caesarean section, at 37 weeks 4

days of gestation unregistered patient came to emergency with complaint of pain abdomen from 8-9 hours. Patient was referred from other hospital. On examination BP – 104/60 mmHg and pulse rate were 108/ min, and on per abdominal examination scar tenderness was present. Patient was taken for emergency LSCS. On opening of abdomen, adhesions were present and adhesiolysis was done. Uterine scar dehiscence was present, and baby was partially lying outside the uterine cavity. A 2.9 kg male child was delivered and required urgent resuscitation. Placenta was removed. Uterus was atonic and bleeding was present. Medical management was given (injection oxytocin, injection tranexamic acid, tab misoprostol, injection methyl ergometrine). Ruptured scar of uterus was stitched in two layers by vicryl 1. Compression sutures were applied. Blood loss was 1000 ml. Patient received 1 unit packed red blood cells. Patient recovered well post operatively.

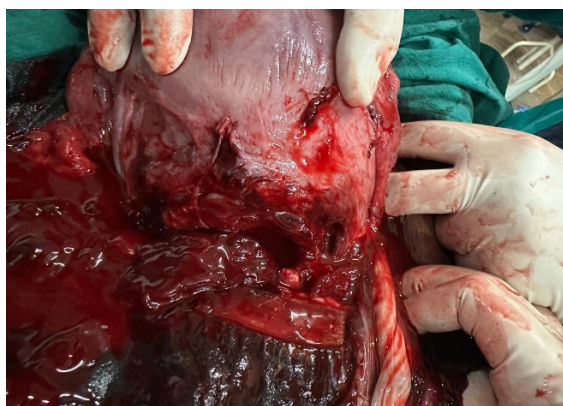


Fig 13-Rupture Uterus

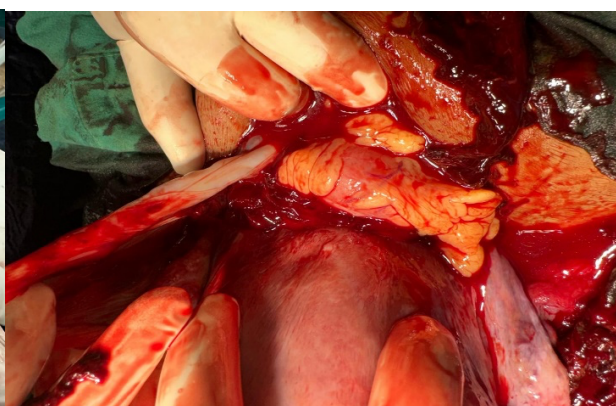


Fig 14-Rupture Uterus

Case 10: A Primigravida unregistered patient, 20-year-old at 38 weeks 4 days of gestation, came to the emergency with complaint of labour pain for 15-16 hours. Patient was referred from other hospital in view of obstructed labour. Patient was taken for emergency LSCS. A male child of weight

3.6 kg was delivered as cephalic. Baby cried immediately after birth. Uterus was atonic and bleeding was present. Initial measures were given to prevent bleeding followed by medical management but still bleeding present. Compression sutures were applied. Systemic

devascularisation was done; blood loss was 1700 ml. Patient received total 4-unit PRBC and 4-unit FFP (intra-op and postop). Patient was shifted to ICU. Patient recovered well postoperatively.

Discussion:

Postpartum haemorrhage (PPH) is a life-threatening condition, but it is often successfully managed with medical treatments, making surgical intervention necessary in only a small percentage of cases. When surgery is required, procedures that are both effective and fertility-preserving are ideal [8]. Uterine compression suture is performed most often in caesarean section and is also recommended as the first procedure in laparotomy to control bleeding. The Royal College of Obstetricians and Gynaecologists guideline recommends that all obstetricians be trained in performing this surgical technique [9]. Compared to internal iliac artery ligation, the uterine and ovarian artery ligations are easier and faster to perform and lead to fewer complications [10].

A total of ten women with postpartum haemorrhage (PPH) were included in the study. The mean maternal age was 25.5 years (range: 20–31 years). Half of the women were primigravida (50%), while the remaining were multigravida (50%). Five women (50%) delivered preterm (<37 weeks), and five (50%) delivered at term. Lower segment caesarean section (LSCS) was the predominant mode of delivery, accounting for 90% of cases, whereas only one woman (10%) had a full-term normal vaginal delivery. At least one high-risk factor was present in 80% of cases. The most common risk factor was a previous caesarean section (50%), followed by hypertensive disorders of pregnancy (20%), moderate anaemia (20%), IVF conception (10%), and obstructed labour (10%). Atonic PPH was the most frequent type, observed in 80% of women, while traumatic PPH accounted for 20% of cases. In terms of severity, 60% had mild PPH and 40% had moderate PPH; no cases of severe PPH were recorded.

Regarding conservative surgical management, bilateral uterine artery ligation was the most commonly employed procedure (80%), followed by uterine compression sutures including B-Lynch, modified B-Lynch, and Hayman's sutures (70%). Bilateral internal iliac artery ligation was required in 30% of cases, while cervico-isthmus sutures were used in 20%. Surgical repair of genital tract trauma or uterine rupture was performed in 20% of women. Uterine preservation was achieved in all cases, with no patient requiring peripartum hysterectomy.

Here, we share our experience with fertility preserving uterine surgeries, designed as uterine-salvaging techniques for managing PPH.

Remarkably, 100 percent of our patients responded well to this procedure, avoiding the need for additional surgical interventions.

In this study authors found that the conventional approach to manage postpartum haemorrhage (PPH) begins with the administration of uterotonics, bimanual compression, progressing to more invasive interventions such as compression sutures, bilateral uterine artery ligation, bilateral internal iliac artery ligation, and, if necessary, hysterectomy. With prompt and skilled intervention, the majority of morbidity and mortality related to postpartum haemorrhage (PPH) can be prevented, highlighting the importance of expert care in its management. The cases discussed above presented with postpartum haemorrhage (PPH) under various scenarios, all of which were successfully managed with conservative surgical approaches at our centre, preventing the need of Obstetric hysterectomies.

Conclusion:

In this study, all cases of PPH were managed successfully. The essential approach to managing postpartum haemorrhage (PPH) is the early detection of excessive bleeding, preventing it from becoming life-threatening, promptly identifying its underlying cause, and initiating targeted interventions. Obstetric hysterectomy in young patients has significant emotional and physical consequences, profoundly affecting their well-being and quality of life. The decision-making process must be rapid and comprehensive, carefully weighing all potential risks and benefits, and considering the advantages and drawbacks of proceeding with a hysterectomy. Conservative management, supported by blood products and uterotonics, plays a crucial role in the effective management of PPH. In this study, atonic PPH was most common among all the causes. All the cases were managed by B-Lynch sutures, bilateral uterine artery ligation, compression sutures and bilateral internal iliac artery ligation. The introduction of B-Lynch brace suturing technique has revolutionized the management of massive postpartum haemorrhage, providing a highly effective alternative to hysterectomy and significantly improving patient outcomes.

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List of Abbreviations:

• AMTSL	• Active Management of Third Stage of Labour
• ANC	• Antenatal Care
• APGAR	• Acute Respiratory Distress Syndrome
• BP	• Blood Pressure
• CHC	• Community Health Centre
• CPD	• Cephalo-pelvic Disproportion
• CPR	• Cardio-Pulmonary Resuscitation
• DIC	• Disseminated Intravascular Coagulation
• FFP	• Fresh Frozen Plasma
• FHR	• Fetal Heart Rate
• FTND	• Full Term Normal Delivery
• GPAL	• Gravida Para Abortion Live
• ICU	• Intensive Care Unit
• IUD	• Intra Uterine Death
• IUGR	• Intra Uterine Growth Retardation
• IVF	• In Vitro Fertilisation
• LSCS	• Lower Segment Caesarean Section
• MSL	• Meconium-Stained Liquor
• OBG	• Obstetrics and Gynaecology
• PPH	• Post Partum Haemorrhage
• PRBC	• Packed Red Blood Cells
• USG	• Ultrasonography

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• Labour Room and Operation Theatre Team	• Management of patients