PROPHYLACTIC SR SUCTION CANNULA APPLICATION FOR HIGH-RISK WOMEN FOR ATONIC PPH-AN INTERVENTIONAL STUDY

By

Dr. RAGHAVENDRA. LOKUR

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Dr.S.R.MUDANUR

PROFESSOR

DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

BLDE (Deemed to be University)

SHRI B.M.PATIL MEDICAL COLLEGE

HOSPITAL & RESEARCH CENTRE, VIJAYAPUR

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ABBREVATIONS

S.No	ABBREVATION	EXPANSION
1	PPH	POST PARTUM HEAMORRHAGE
2	TXA	TRENAXAMIC ACID
3	AMTSL	ACTIVE MANAGEMENT OF THIRD STAGE OF LABOR
4	FIGO	INTERNATIONAL FEDARATION OG GYNAECOLOGY AND OBSTETRICS
5	WHO	WORLD HEALTH ORGANIZATION
6	RCOG	ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGY
7	PIH	PREGNANCY INDUCED HYPERTENSION
8	ICM	INFORMATION CLASSIFICATION AND MANAGEMENT
9	Hb	HAEMOGLOBIN
10	Gm	GRAM
11	Kgs	KILOGRAMS
12	Cms	CENTIMETERS
13	BMI	BODY MASS INDEX
14	SD	STANDARD DEVIATION
15	APTT	ACTIVATED PARTIAL THROMBOPLASTIN TIME
16	PROM	PREMATURE RUPTURE OF MEMBRANES

17	STH	SUB TOTAL HYSTERECTOMY
18	IUB	INTRA UTERINE BALLOON TAMPONADE
19	NASG	NON PNUEMATIC ANTI SHOCK GARMENT
20	IAP	INDIAN ACADEMY OF PAEDIATRICS
21	B/L	BILATERAL
22	NAD	NO ABNORMALITY DETECTED
23	SPSS	STATISTICAL PACKAGE FOR SOCIAL SCIENCE
24	P VALUE	PROBABILITY VALUE
25	FFP	FRESH FROZEN PLASMA
26	SR	SUCTION RETRACTION

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INTRODUCTION

INTRODUCTION

According to a WHO assessment, the maternal mortality rate (MMR) has decreased globally during the past 25 years by around 44%. Around 99% of the global burden was carried in 2015 by developing areas, particularly sub-Saharan Africa and Southern Asia. This demonstrates unequivocally that the Maternal Mortality Rate is not decreasing in less resource countries[1]. Postpartum haemorrhage was the main factor in 29.6% of maternal deaths in India, and the majority of cases involved atonic PPH[2]. Atonic PPH has been linked to various risk factors, including prolonged, obstructed labour, unintentional bleeding, and large newborns. Unpredictable abrupt significant bleeding makes it challenging to coordinate skilled personnel, suitable blood, and transportation to better medical facilities in low resource environments[2]. In settings with limited resources, simpler procedures can be used, such as uterine massage, uterotonic medicines, uterine packing, and balloon tamponade. In tertiary care facilities, procedures such internal iliac ligation, stepwise devascularization, B-Lynch suturing, and uterine artery embolization are available. When more basic techniques fail, these more advanced ones are out of reach for every expectant mother. Due to hypovolemic shock, patients occasionally died while being moved to higher centres. Sometimes, women only lived for 1-1.5 hours following the first sign of bleeding[3]. It is startling

how quickly some women get multi-organ dysfunction syndrome and coagulation failure as a result of hemorrhagic shock[3]. In low resource nations, maternal mortality is not decreasing as a result of these complications[3]. The SR PPH Cannula, a straightforward, safe, and economical procedure, was employed to resolve these issues. The SR cannula works by applying negative pressure to the uterine cavity[2].

AIMS AND OBJECTIVES OF STUDY

To know the efficacy of the SR suction cannula in the prevention of post partum of haemorrhage in high risk pregnancy.

OBJECTIVES:

- • To present a successful, easy, and minimally intrusive method for preventing excessive blood loss in high-risk pregnant people who are susceptible to PPH.
- By acting quickly, one can prevent hysterectomy, consumption coagulopathy and protect reproductive potential.
- Both preventive and therapeutic measures.
- Affordable, available, and simple to use.
- Atonic PPH can be effectively handled.
- As a temporary measure to move the patient to the centre of management

REVIEW OF LITERATURE

1) **Bela Makhija et al. (2014)[10]** The nine patients in this study had either caesarean sections or vaginal deliveries and had primary PPH that was resistant to standard medical care. Negative pressure between 400 and 600 mmHg was used in the cavity for 20 to 30 minutes with a suction cannula. They discovered that hysterectomy was avoided in 8 out of 9 cases where haemorrhage was successfully controlled. A life-saving hysterectomy was performed on one patient after the surgery failed to stop the bleeding. Thus, this method prevents PPH while simultaneously protecting the woman's reproductive capabilities and avoiding hysterectomy and all of its associated risks.
2) **Manju Meena, et al. (2018)[2].** 25 women with various atonic PPH risk factors who gave birth naturally or via caesarean section were given a cannula with 650 mmHg of negative pressure for 10-15 minutes. For three hours, negative pressure was applied repeatedly for ten minutes every hour. After the last suction process, the cannula was taken out after an hour. The suction bottle's blood collection was measured and recorded. Within 4 minutes of starting the operation, there was a complete halt of bleeding along with contraction and firm uterine retraction From 50 ml to 350 ml of blood was collected in the suction container. They discovered this surgery to be a viable, affordable, and

fertility-preserving method that can prevent laparotomies and serve as the first line of defence against atonic PPH.

3) **Samartha Ram Hemmanur, et al. (2019)[1].** 22 women with various atonic PPH risk factors who gave birth naturally or via caesarean section were the subject of the study. Negative pressure of 650 mmHg was applied with suction cannula into the uterine cavity and kept there for 10 to 15 minutes. For three hours, negative pressure was applied repeatedly for ten minutes every hour. After the last suction process, the cannula was taken out after an hour. The suction bottle's blood collection was measured and recorded. Within 2-3 minutes of the treatment starting, they discovered contraction and firm uterine retraction in all women. Between 50 and 200 millilitres of blood were collected in the suction container. So they discovered A particularly efficient physical technique that supports the body's normal physiological process of contraction and retraction is the prophylactic use of SR Post Partum Hemorrhage suction cannula in high risk women for atonic PPH. This method reduces blood loss and prevents fatal atonic PPH.

4) **Mary E, et al. (2020)[12.]** A new intrauterine device that controls aberrant postpartum uterine bleeding and postpartum haemorrhage by inducing uterine myometrial contraction with low-level vacuum enrolled 107 people in a multicenter research. The device's efficiency and safety are assessed. The outcomes observed were time to stop bleeding, rate of blood transfusion, and device usability scored by each investigator using

the device. 94% of these people had successful treatment, according to the findings. Within a median of 3 minutes following connection to suction, conclusive control of aberrant bleeding was documented in those 100 participants. 35 patients required a transfusion of 1-3 units of red blood cells, while 5 participants required 4 or more units. With the potential to reduce severe maternal morbidity and death, intrauterine vacuum-induced haemorrhage control may offer a novel quick and efficient treatment option for abnormal postpartum haemorrhage.

5) **Dommety Swetha, et al. (2020)[11].** research of the Couvelaire uterus that causes atonic postpartum bleeding. As this uterus likely to bleed in postoperative period, the treatment of choice is obstetric hysterectomy. In such cases, the women lose their fertility function. In this case, they have successfully used samartha ram post partum haemorrhage suction cannula to achieve contraction and retraction and saved the uterus.

POST PARTUM HEMORRHAGE

The most feared obstetric emergency, postpartum hemorrhage, complicates between 1%-20% deliveries. It contributes significantly to maternal morbidity and mortality. Every year, 1,27,000 women worldwide die from postpartum haemorrhage. India current maternal mortality ratio (MMR) stands

at 167 deaths per 100,000 live birth. [1]

Postpartum hemorrhage is defined as any quantity of bleeding from or into the vaginal tract after the baby is born up until the end of the puerperium that negatively impacts the patient's overall health as seen by an increase in pulse rate and a decrease in blood pressure.

Blood loss above 500 ml with a vaginal birth and over 1000 ml during a caesarean delivery are considered PPH. Any blood loss that could cause hemodynamic instability should be regarded as a PPH for clinical purposes.

Depending upon the amount of blood loss, PPH can be

- ♦ Minor (< 1 Liter)
- ♦ Major (> 1-2 Liter) or
- ♦ Severe (> 2 Liter).[1]

TYPES OF PPH:

Primary postpartum hemorrhage- Within the initial 24 hours following delivery, primary or immediate PPH develops. Uterine atony causes about 70% of cases of acute PPH. The failure of the uterus to adequately contract after the baby is born is known as atony of the uterus.

Secondary postpartum hemorrhage- PPH that develops between 24 hours after the baby is delivered and 6 weeks postpartum is referred to as secondary or late PPH.

Various causes for secondary post partum hemorrhage are-Retained foetal products of conception, infection, or both are the main causes of late PPH.[3]

BACKGROUND

All women who carry a pregnancy beyond 20 weeks' gestation are at risk for PPH and its sequelae. PPH continues to be a major cause of maternal mortality elsewhere, despite the fact that rates of maternal mortality have significantly decreased in the developed countries.[3]

Along with embolism and hypertension, PPH typically rates among the top 3 causes of maternal death in industrialised nations. Maternal mortality rates in a number of developing nations exceed 1000 women per 100,000 live births. According to World Health Organization data, PPH causes more than 100,000 maternal fatalities annually, or 60% of all maternal mortality in underdeveloped nations. [3,4]

The American College of Obstetricians and Gynecologists estimates that there are 140,000 maternal deaths annually, or one woman every four minutes.

Poor care is frequently cited as a key contributing factor in fatalities. For every maternal death, there are over 80 "near-miss" cases when women have life-threatening complications, frequently with persistent morbidity.

Renal impairment, Sheehan Syndrome, and other long-term morbidity, Blood transfusions increase the risk of blood-borne illnesses[3].

Maternal death from PPH has been linked to a number of factors, including inadequate postoperative pulse and blood pressure measurement, lack of routine postpartum bleeding monitoring, failure to recognise that bleeding was

occurring, and failure to notice abnormal vital signs like oxygen saturation and Respiratory Rate, even when it was known that the mother had suffered a significant bleed. Other elements that results in inadequate care include are

- Deficiency of a sufficient prenatal examination.
- Avoiding or refusing to receive therapy for thyroid, anaemia, etc.
- Unsatisfactory health.
- Malnutrition.
- Avoiding and not utilising any government facilities provided to the woman throughout the pregnancy.
- Inattention from the husband and in-laws throughout the pregnancy
- A failure to recognise the warning signs and symptoms of deterioration and the importance of careful observation for early detection.
- Vital indicators are either inconsistently or never checked
- Vital sign changes weren't noticed.
- Lack of understanding of how changes in vital signs may have consequences
- Uncertainty over when to call for help causes delays in alerting medical personnel to indicators of deterioration.
- Medical staff's failure to respond promptly to notifications or their improper responses

- The physician and nursing staff's inconsistent ability to handle patients who are deteriorating
- A delay or failure to request guidance or supervision in a timely manner
- Poor handover and communication of seriously ill patients.[4]

SURGICAL ANATOMY OF UTERUS

The uterus is a fibromuscular organ that varies greatly in shape, weight, and size in response to both estrogenic stimulation and prior parturition. It consists of a lower fibrous cervix and a higher muscular corpus. The corpus is significantly bigger than the cervix in a woman of reproductive age, but their diameters are equivalent before menarche and after menopause. An endometrial cavity with a triangular form and a substantial muscular wall are located within the corpus. The fundus, a portion of the corpus, rises above the fallopian tube insertions or the top of the endometrial cavity.[5]

In contrast to the gastrointestinal tract, the muscle fibres that make up the majority of the uterine corpus are organised in a more complicated configuration. Because the fibres from either half of the uterus cross diagonally with those from the other side, this pattern illustrates how the uterus developed from paired paramesonephric primordia.[5]

The endometrium is a special type of mucosa that lines the uterus. It has

a specific stroma as well as columnar gland-forming epithelium. This layer's outermost layer changes cyclically throughout the menstrual cycle. Although a deeper basal layer of the endometrium is still there and has the ability to produce a new lining, this layer loses after each cycle as a result of the spasm of hormonally sensitive spiral arteries within the endometrium of the uterus. The basal endometrium receives separate arteries, which accounts for its preservation during menstruation.[6]

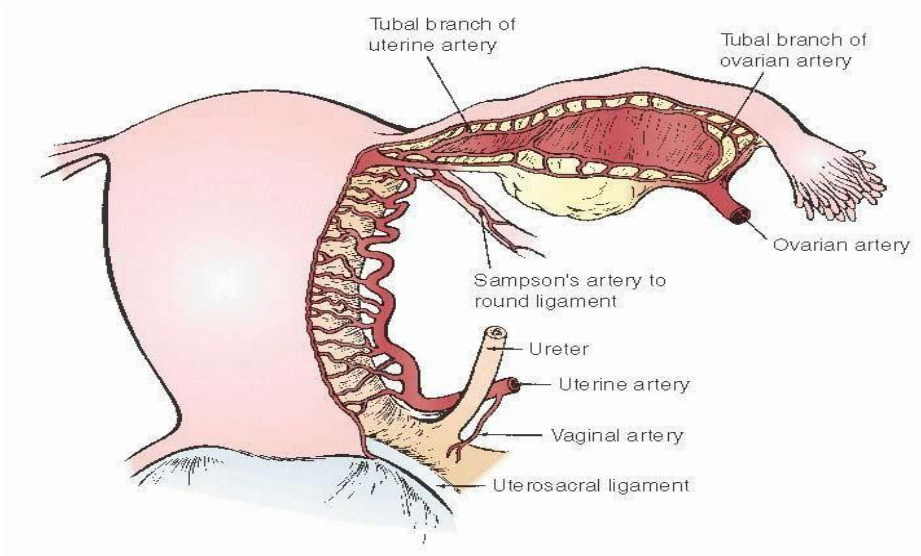

FIGURE NO 1: SURGICAL ANATOMY OF UTERUS

Source: Williams 26th edition obstetrics

The uterine adnexa, ovarian, and uterine artery collateral circulation: Before advancing next to the uterine wall and anastomosing with the medial end of the ovarian artery, the uterine artery crosses the ureter in the cardinal ligament. It then gives cervical and vaginal branches.[7]

The cervix is divided into two parts:

1)**Portio supravaginalis**- which lies above the vagina and below the corpus,

and

2)**Portio vaginalis** - which is the portion that protrudes into the vagina. Only a little (10% or less) portion of the cervical wall is smooth muscle; the majority of the tissue is thick, fibrous connective tissue. The myometrium is connected to the muscle of the vaginal wall by the small amount of smooth muscle that exists around the cervix. During an intrafascial hysterectomy, this smooth muscle and the surrounding fibrous tissue can be readily separated from the fibrous cervix. It surrounds the fibrous cervix in a circular pattern, and the pubocervical fascia, cardinal ligament, and uterosacral ligament all insert into it. [5]

Nonkeratinizing squamous epithelium covers the portio vaginalis. The name "plicae palmatae" refers to the series of V-shaped folds that the columnar mucus-secreting epithelium that lines its canal forms. Contrary to earlier theories, these do not result in tubular racemose glands, but rather compound clefts in the endocervical canal. [5]

The internal os delineates the top border of the cervical canal, where the endometrial cavity is reached once the cervical canal widens. The transition from the squamous to the columnar epithelium of the portio vaginalis occurs at the lower margin of the endocervical canal, also known as the external os.

The majority of the corpus is directly attached to the peritoneal serosa, and the uterus has little adventitia. There is no serosa because the bladder encloses the front part of the uterine cervix.

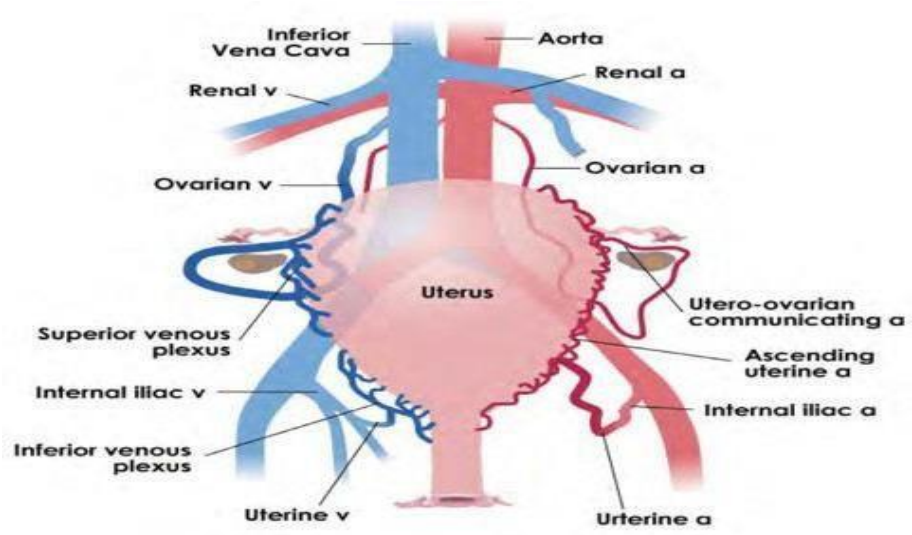

FIGURE 2: BLOOD SUPPLY OF UTERUS.

source :williams 26th edition obstetrics

The internal iliac arteries uterine and vaginal branches, together with the ovarian arteries, supply blood to the genital organs. These vessels are connected by a continuous vascular arcade that runs along the lateral adnexal, vaginal, and uterine borders.

The ovarian arteries, which emerge from the anterior surface of the aorta just below the level of the renal arteries, supply blood to the upper adnexal tissues. The renal vein is on the left and the vena cava is on the right, respectively, where the accompanying plexus of veins empties. The arteries and veins travel a long distance, known as the retroperitoneal trip, before reaching the cephalic part of the ovary. They link with the upper end of the marginal artery of the uterus after passing along the mesenteric surface of the ovary. The gonad is supplied by the ovarian artery, which runs through the ovary's hilum. It also supplies the fallopian tube through a number of small arteries that pass through the

mesosalpinx, including a prominent fimbrial branch.[6,7]

The uterine artery starts at the internal iliac artery. Although it occasionally grows separately from the internal pudendal artery or the vaginal artery, this is not always the case. It joins to the uterus close to the point where the corpus and cervix combine, though the exact location primarily depends on the individual and the amount of upward or downward traction being provided to the uterus. Each uterine artery is accompanied by a large uterine vein that drains the corpus and cervix.[6,9]

The uterine artery enters the side of the marginal artery that travels down the side of the uterus as it reaches the organ's lateral boundary (after crossing the ureter and emitting a small branch to this organ). Blood is transported both upward, toward the corpus, and downward, near the cervix, via this connection. The marginal artery finally crosses the cervicovaginal junction and sits on the side of the vagina because it continues along the lateral portion of the cervix.[7,9,10]

ETIOLOGY OF PPH:

Primary postpartum hemorrhage is commonly due to abnormalities of one or more of the following processes (Anderson and Etches 2008)

Table 1:Common risk factors for postpartum hemorrhage[10,11,12,13]

TONE	TRAUMA	TISSUE	COAGULOPATHY
• Prolonged labour • Precipitate labour • Dysfunctional labour • Grand Multiparity Multiple pregnancy Polyhydramnios Macrosomia • Abnormalities: Fibroids • Intra-uterine infection • Uterine relaxing agents like MgSo4 general anaesthetic/ Tocolytics (terbutaline)	• Operative delivery • Cervical / vaginal Lacerations	• Retained placental tissue • Abnormal placentation • Morbidly adherent placenta	• Pre-eclampsia • HELLP Syndrome • Placental Abruption • FDIU>4/52 • Amniotic Fluid • Embolism • Sepsis • Bleeding Disorders • Drugs (aspirin heparin)

The majority of blood loss associated with childbirth occurs within the first hour of delivery, and early postpartum uterine atony is the most common cause of bleeding.

Tone: Myometrial fibre contraction and retraction is how postpartum bleeding

is managed. Blood flow to the placental location is blocked as a result of the blood vessels kinking caused by this. Uterine atony, the main cause of PPH, is the failure of this mechanism as a result of disorganised myometrial function. Uterine atony may be caused by retained placental tissue and infection. The leading factor in postpartum bleeding is uterine atony.[12]

Trauma: Even if the delivery is appropriately supervised, damage to the birth canal, which comprises the uterus, cervix, vagina, and perineum, may still occur. Due to all of these organs' increased vascularity during pregnancy, there is significant bleeding.[12,13]

The common sites of hemorrhage is from

- Episiotomy: Blood loss could be 200 mL or more. The volume of blood loss can be significantly larger when arterioles or big varicose veins are cut or damaged. Thus, bleeding veins should be rapidly stopped to preserve blood.
- Vulva, vagina, and cervix,
- Ruptured uterus
- Uterine inversion
- Puerperal hematomas

Tissue: Part of or the entire placenta being retained in the uterus prevents contraction and retraction, maintains the blood sinuses open, and causes PPH. There is bleeding from the location where the placenta split from the uterine wall. The placenta's remaining portion prevents adequate retraction, and

bleeding continues until the remaining organ has detached and been evacuated. 13

Thrombin: When clotting mechanism fails, as occurs with conditions known as coagulopathies, a bleeding disorder results. Pregnant women may experience any of the hemorrhagic blood dyscrasias, which sporadically result in PPH. [14]

Causes of secondary postpartum hemorrhage

- Subinvolution of the placental site
- Retained products of conception
- Placenta accreta
- Infection
- Endometritis, Myometritis, Parametritis
- Infection or dehiscence of cesarean scar

PPH MANAGEMENT

- **Assessment:** includes focused management, efficient team management, acknowledgment, communication, resuscitation, monitoring, and research. PPH can have several causes, but the most important ones to consider are uterine atony, tissue, tonus, and trauma.[16]
- **Recognition:** It is now known that visual estimates of blood loss are incorrect. Weighting linen, drapes, pads, and swabs should be used to assess blood loss wherever possible. Remember that the increased blood volume during pregnancy causes the clinical indications of hemorrhagic shock to appear later in newly delivered women.[16]

- **Communication**: Includes the engagement of haematologists and anaesthetists in clinical care, early notification of senior obstetric and midwifery personnel, and cooperation between all multidisciplinary team members. The message must include the woman and her supporters.[15, 17]
- **Resuscitation:** The ABC method is used for initial resuscitation, and the clinical situation directs advanced resuscitation.
- PPH incidence has been seen to be rising, and all maternity doctors should be on the alert for PPH. [17]
- **Minimum observations -** Include taking periodic vital signs, monitoring blood loss continuously, knowing how much blood has been lost in total, checking oxygen saturation, and setting up an IV access.[16,17]
- **Prevention-**

- "The main strategies for preventing PPH are thought to include anticipating risk factors and actively managing the third stage of labour, including the use of uterotonics as a preventative measure. " A series of interventions carried out during the third stage of labour became the primary strategy for PPH prophylaxis during the second half of the 20th century (WHO, 2012).[18]
- "Active Management of the Third Stage of Labor" is the name given to this strategy nowadays (AMTSL). The International Confederation of

Midwives (ICM), the International Federation of Gynecology and Obstetrics (FIGO), and the World Health Organization all support AMTSL in joint policy statements (ICM-FIGO, 2006; WHO, 2003), demonstrating the severity with which PPH is recognised by specialists.[17,18]

- The clinical management of the third stage of labour can be approached in one of two ways: expectantly or actively. Although occasionally a third strategy is employed, combining certain elements of both active and expectant treatment. [17]

- **Expectant Management of the Third Stage of Labour**

The interval between the baby's delivery and the placenta's delivery is referred to as the third stage of labour. The third stage of labor expectant management is often referred to as conservative or physiological management. [17] The "hands off" philosophy underpins expectant management. It depends on the uterus' normal contractions, which are induced by an increase in oxytocin levels in the body, to separate the placenta from the uterine wall. Capillary haemorrhage and the sharing effect of uterine muscle contraction cause the placenta to detach."[19]

The placenta is released spontaneously, occasionally through the use of gravity or the mother's pushing, as soon as there are signs of placental separation. While breastfeeding and other forms of nipple stimulation can be

used to raise oxytocin levels, they are not a necessary part of expectant management.

Rogers, et al. summarizes expectant management as follow:

- No prophylactic uterotonic is administered.
- The umbilical cord is not clamped or cut before the cord pulsation has ceased but ideally clamping or cutting is performed after the placenta is delivered.
- The placenta is expelled by maternal effort.

ACTIVE MANAGEMENT OF THIRD STAGE OF LABOUR

MECHANISM OF CONTROL OF BLEEDING: [19]

Numerous torn sinuses that have free blood flow from uterine and ovarian veins must be destroyed after placental separation. The arterioles are actually constricted as they traverse tortuously through the interlacing intermediate layer of the myometrium, causing the occlusion to occur. The main method of hemostasis is this live ligature. However, thrombosis happens to obstruct the torn sinuses, a situation that is made easier by pregnancy hypercoagulable state. Additionally, myotamponade, the apposition of the uterine walls after placenta evacuation, helps to reduce blood loss.

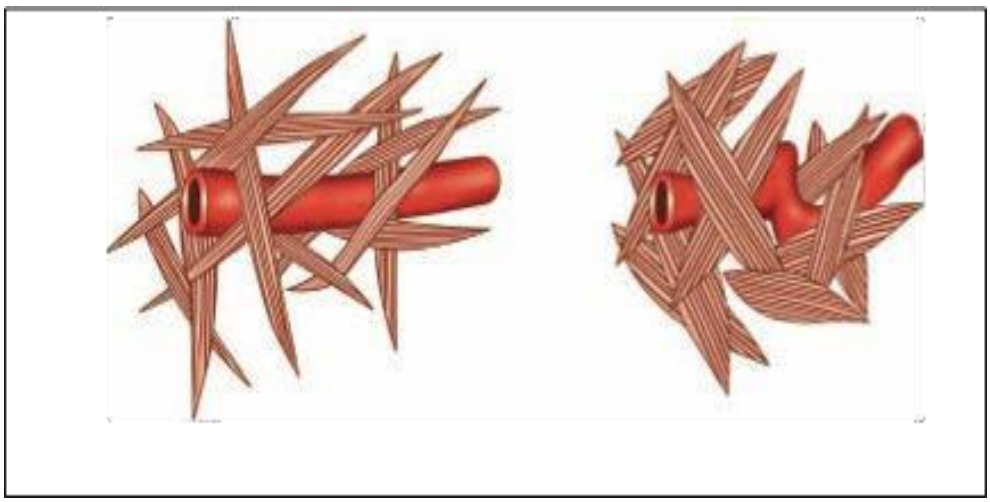

FIGURE 3: Mechanism of control of bleeding

Source: williams obstetrics 26th edition

Any programme of intervention aimed at lowering PPH-related deaths should include active management of the third stage of labour (AMTSL), which reduces the incidence of PPH, the amount of blood lost, and the need for blood transfusions. Data support the routine use of AMTSL by all skilled birth attendants, wherever they practise.

AMTSL typically consists of the following:

- **WHO AMTSL[18]**

(1) giving oxytocin or similar uterotonic medication within a minute of the infant's birth.

a) Oxytocin- is most widely used prophylactically and is typically administered following placenta or baby delivery. The half-life of oxytocin is only around 10 minutes, despite the fact that it activates on the uterus quickly—within a minute when given intravenously and within two minutes when given intramuscularly. Oxytocics were given to assure successful uterine contractions. Misoprostol 600 mg orally is another option, as is a combination of oxytocin 5 IU and

ergometrine 0.5 mg per ampoule IM. Uterotonics must be stored properly.

b) Ergometrine or methylergometrine: Contrary to oxytocin's sporadic contractions, its injection results in a strong, prolonged uterine contraction. After the effects of oxytocin have worn off, ergometrine can be used to provide a persistent contraction. Ergometrine is now only used in therapy rather than as a general form of prophylaxis due to its unfavourable adverse effect profile.

c)Misoprostol: Misoprostol is an appealing medication for usage in low-resource countries due to its long half life and orally administration. Additionally, it is safe for use by asthmatic women because it has no effect on blood pressure or the airways. oral or sublingual doses of 400 or 600 g for prophylaxis.

(2) Controlled cord traction. Ergometrine, when administered as a third-stage package, may lessen minor PPHs, shorten the third stage, and prevent retained placenta.

(3) Uterine massage following delivery of the placenta.

- **FIGO AMTSL :** Apart from above 3 points it includes Fundal massage following placental delivery[19]
- **RCOG AMTSL:** Apart from above 3 points it includes Early cord clamping.

TABLE 2:Various degrees of shock

Clinical findings in hypovolemia and varying degrees of shock[20]			
Blood volume loss	**Bp systolic change**	**Symptoms and signs**	**Degree of shock**
500–1000 mL (10–15%)	Normal	Palpitation, tachycardia, dizziness	Compensated
1000–1500 mL (15–25%)	Slight fall (80-100)	Weakness, tachycardia, sweating	Mild
1500–2000 mL (25–30%)	Moderate fall (70-80)	Restlessness, pallor, oliguria	Moderate
2000–3000 mL (35–45%)	Marked fall (50-70)	Collapse, air hunger, anuria	Severe

Blood loss estimation in PPH

Five categories of blood loss measurement techniques were established:[22]

- Visual estimation
- Direct measurement,
- Gravimetric,
- Photometry,
- and miscellaneous methods.

Visual Estimation: blood loss is underestimated by 30-50%.

- The most widely used technique for estimating blood loss during labour is visual estimation.
- It has long been recognised that visually estimating blood loss is imprecise, erroneous, and frequently underestimated, which causes delayed diagnosis and treatment.[22]

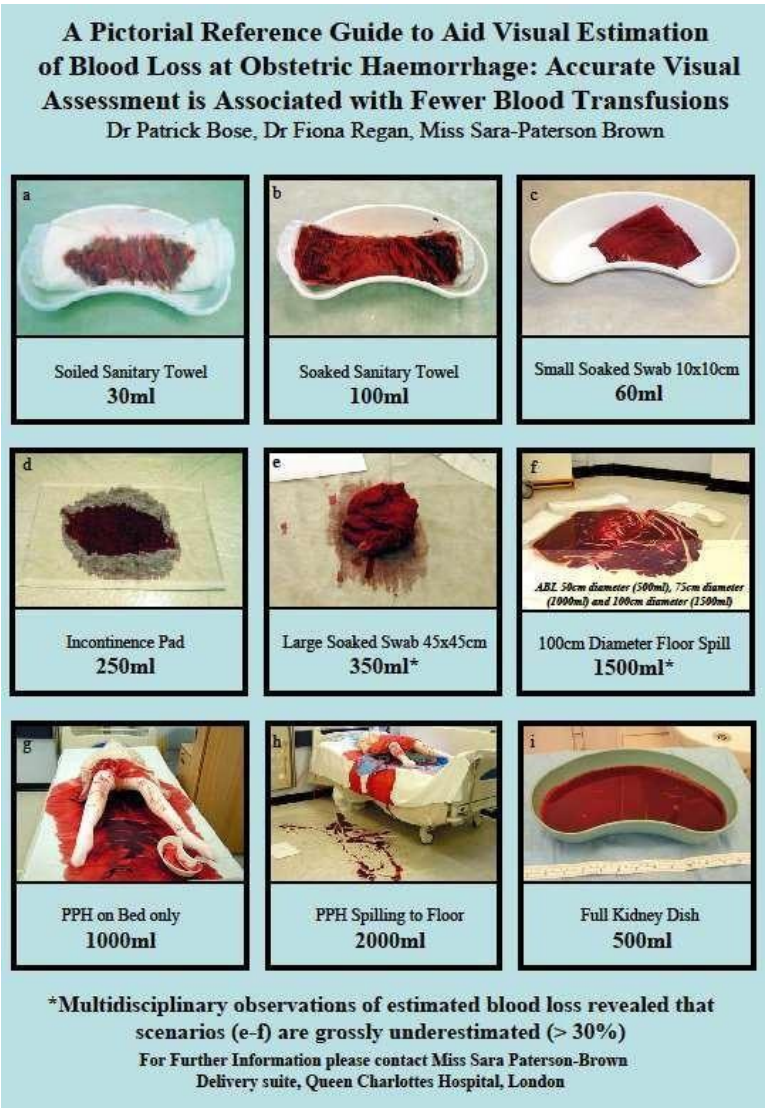

FIGURE 4: Visual estimation of blood loss in Obstetric Hemorrhage

Direct measurement of blood loss:

Direct measurement is one of the oldest methods of accurately determining blood loss.

To aid with direct collection, several researchers use a variety of drapes with built-in bags.

A calibrated conical drape BRASS V DRAPE:

- For assessing blood loss objectively (error is reduced by 15 to 33%)
- When there are few resources available, BRASS V DRAPE is used.
- The precision was said to be enhanced by the visible separation of the amniotic fluid and blood.
- By removing the foreign contaminant from the fluid that was captured in the pouch, the accuracy will be improved. This process required a number of stages and several hours. The total amount of blood lost was calculated as the sum of the blood in the sponges and the measured amount in the drape.

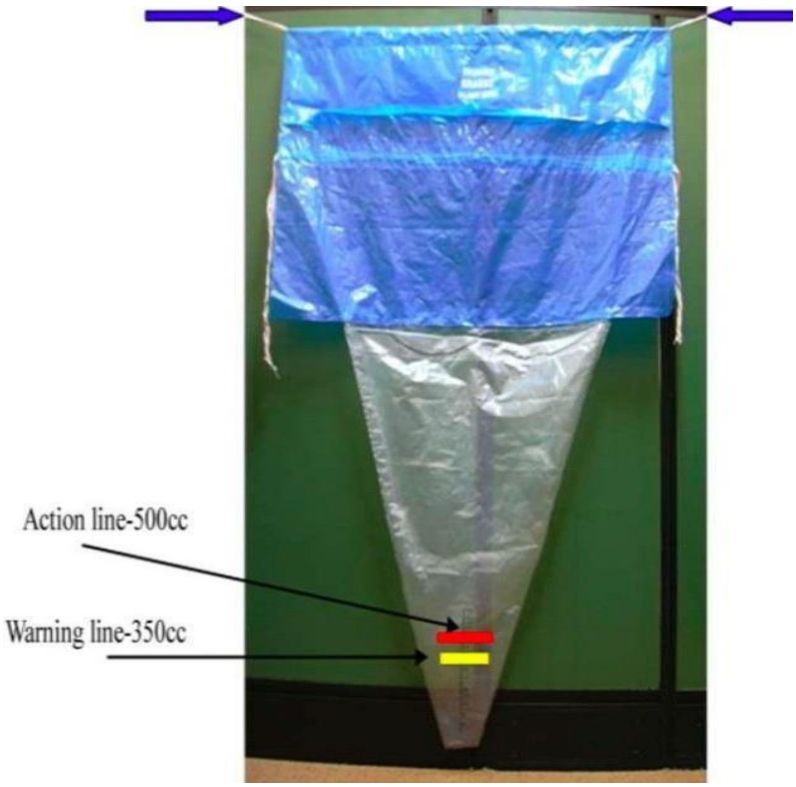

FIGURE NO 5: BRASS V DRAPE

Gravimetric analysis

There are numerous gravimetric (weight measuring) techniques that can be used to calculate blood loss.[22,23]

Comparison of measurements:

Although visual estimating is frequently employed to estimate blood loss at birth, studies have repeatedly shown that it is erroneous. However, when there is a significant amount of blood, visual assessment is the most erroneous. Through simulation, instruction, and evaluation of blood loss at various points throughout a particular occurrence, accuracy may be increased. This is the most important scenario in the clinical setting. The development of a rapid, visible blood loss threshold akin to the kanga saturation method might be clinically

valuable.[22]

The earliest way of measuring blood loss directly during childbirth is likely the direct measure of blood loss method. It only need a graduated container for measuring and collection containers. Anywhere, at any time, a woman can give birth. Blood must still be approximated even if it is found on gloves, a provider's gown, linens, or other items. One drawback is that it is impossible to completely avoid other fluids, like amniotic fluid or urine. The outcomes can be incorrect if those fluids are unintentionally collected. It's possible that not all of the blood was collected, and that certain linens, like those under the mother's buttocks or behind, were stained.[22,23]

Unfortunately, weight does not discriminate between blood and other types of fluid, such as amniotic fluid or urine; the only thing required to weigh blood is an accurate scale. To quantify blood, gather all contaminated sheets, pads, towels, or swabs, and then subtract the dry weight of the items. A key priority would be to know the weight of all commonly used things that might get blood on them or be used to mop up blood. This method accounts for items that might have been splashed, potentially making it more accurate than utilising a collection vessel alone. The outcomes would be impacted by other fluids accidentally collected. The final findings may vary depending on the weights of the preweighed objects. A rapid weight must also be performed to prevent excessive evaporation loss. This approach is simple to teach, but it requires a lot of time and effort. The final findings may vary depending on the weights of the

preweighed objects. A rapid weight must also be performed to prevent excessive evaporation loss. This approach is simple to teach, but it requires a lot of time and effort.

The majority of the many methods provided are either useless or unreliable. Although the validity of the estimated blood loss approach has not been proven, it has potential. While putting radioactive material into moms who are in labour is not possible nor acceptable, radioactive tagging of RBCs may be accurate. RBC tagging may not always indicate that a decrease in blood volume is entirely due to blood loss. Shunting into the portal system and pooling in the extremities could both affect blood volume. [53]

Specific gravity and hemoglobin are unreliable indicators of blood loss. Before delivery, an ultrasound of the inferior vena cava would be necessary to measure the size of the vena cava. The supine posture reduces cardiac output by compressing the inferior vena cava, therefore maternal positioning would also be crucial to take into account. This method is impractical to use because ultrasound measurement would require expensive equipment and skill to measure the inferior vena cava accurately.

INITIAL MANAGEMENT OF PPH[23]

- Early detection of PPH is followed by quick resuscitation care and a simultaneous investigation of the source of the bleeding, according to the initial treatment guidelines.

Following the identification of PPH, management comprises four steps,

all of which must be followed at once:

(1) Communication

(2) Resuscitation,

(3) Stopping the bleeding,

(4) Monitoring & observation.

JOINT STATEMENT & ACTION PLAN LAUNCHED IN 2004 BY ICM/FIGO[24]

For the management of PPH, an algorithm has been proposed.

H-A-E-M-O-S-T-A-S-I-S

General medical.

H : Request Assistance for help

A : Assess and Evaluate (vitals, blood loss) and revive

E : Establish the cause, examine the ecbolics (syntometrine, ergometrine, and bolus syntocinon), and make sure there is blood available.

M : massage and rub the uterus

O : Prostaglandins (i/v , rectal , intra-myometrial), oxytocin infusion, and specific surgical

S : Moving to the operation room, excluding trauma and retained products, bimanual compression, and antishock clothing if a transfer is necessary

T : Exclude tissue and trauma before proceeding with tamponade balloon and uterine packing

A : Application of uterine compression sutures

S : Systematic pelvic devascularization (uterine artery,ovarian artery ovarian and internal iliac artery)

I : Intervention radiologist, uterine artery embolization if appropriate.

S : Subtotal or total abdominal hysterectomy

Volume replacement

- Choosing a crystalloid versus a colloidal fluid
- Crystalloid of choice – Ringer Lactate(RL)
- Crystalloid 3- 5ml (Crystalloid)/ ml of blood loss to maintain urine output at > 30 ml /hour
- Until cross-matched blood is available, a loss of 1 litre of blood must be replaced with 4 to 5 litres of crystalloids (NS or RL) or colloids.

  When there is a class III or class IV haemorrhage, basic life support should be given by a CAB.

C – Circulation: It's important to maintain and recover circulatory blood volume. Infuse 2-3 litres of liquid in the first hour to be given, followed by 1 litre of crystalloid solution, in 15-20 minutes.

A - Verify Airway's patent status.

B - Breathing: Consult an anesthesiologist and an intensivist if respiration is insufficient.[25]

Shock Index(SI):

Heart rate/ Systolic Blood Pressure

Normal value -0.5-0.7

In significant Hemorrhage-0.9- 1.1

A better indicator for determining acute blood loss is a change in SI [26]

The golden hour of resuscitation

- "The golden hour" of resuscitation: Golden hour is the time by which resuscitation must be initiated to ensure better survival.
- SBP falls by 30 mmHg,
- HR rises by 30 beats/min,
- RR to 30 breaths/min,
- Hct drop by 30%,
- Urine output <30 ml/hr [26,27]

"Rule of 30" - if moderate shock leading to severe shock.

She is likely to have lost at least 30% of her blood volume and is in moderate shock leading to severe shock.

Management of women at risk for PPH[26]

Planned vaginal birth

- When a woman is determined to be in labour, confirm the labour management plan.
- Establish intravenous access (16 gauge cannula)
- Send a sample for an antibody and blood group screening.
- Active control of the third stage
- This might involve keeping a 40-unit oxytocin infusion ready to start when necessary.

Planned caesarean section delivery

- Possibly connected to placenta previa or other conditions that carry a greater risk of haemorrhage
- A skilled obstetrician and gynecologist should be present in person in the operating room.
- Anaesthesia should be administered by a skilled consulting anaesthetist.

Red cell antibody-positive women should gather and keep when they go into labour or before since blood provision is slower in this situation.

- Insert two large bore intravenous access (at least 16 gauge)
- Warming intravenous fluids can help prevent hypothermia. By using a temperature-controlled fluid warming device, such as a

blood warmer.

- Check to see whether there are any pressure-infusion devices in the theatre.

Suspected abnormal adherence and position of the placenta [26,27]

Make plans to receive assistance from a separate qualified gynaecologist, urologist, or vascular surgeon.

Before surgery, speak with an interventional radiologist and opinion to ascertain whether embolization is possible and feasible, if necessary. There must be perioperative communication to the women's blood bank.

Management of Post Partum Hemorrhage if placenta is not expelled[27]

- Use uterine massage to be done to remove clots and repeat inj. oxytocin, such as 10 unit intramuscularly or 10 unit intravenously. If you have a retained placenta, stay away from ergometrine or Syntometrine, as they generate tonic uterine contractions that could postpone evacuation.
- bladder has to be emptied/ catheterised
- Controlled cord traction repeated again
- Insert IV cannula access (16 gauge cannula)
- To determine whether the placenta has separated (trapped) or is still adherent, perform a portable ultrasound (if you haven't already) and/or a vaginal examination. Remove the placenta and any blood clots if they are stuck.

With rapid PPH >1500 mL

- If you require a midwife, anaesthesia, or both, call for help (MET call/Pink Alert).
- Make sure to bring the "large transfusion" box into the room.
- Stop the bleeding using methods include applying pressure to reduce bleeding, removing any current clots, and performing a vaginal check to rule out causes other than atony.
- Provide 8–12 liters of oxygen with a re breathing mask. I.V access x 2 using 16 gauge cannula.
- Arrange immidiate pathology testing for Blood Grouping and typing, Full Blood Count (FBC), Coagulation Screen (INR, APTT, fibrinogen)
- Emergency O Negative red cells should be ordered over the phone from the blood bank if an emergency blood transfusion is necessary.
- A senior obstetrician and gynecology/anesthetist should communicate with the hemologist to make further arrangements for appropriate blood and blood product assistance in the event of substantial blood loss.
- Adequate intravenous fluids should be used to revive, e.g. sodium chloride 0.9 %, Hartmann’s solution (crystalloid) or colloid volume expander (Gelofusine, Albumin 4% or 20%).

- When utilising crystalloid, 3:1 resuscitative intravenous fluid is needed for every unit of blood loss.
- Use a pressure infusion device to give intravenous fluids in order to revive the patient more quickly.
- Disseminated intravascular coagulation and associated problems are made more likely by hyperthermia. Pre warming resuscitation with intravenous fluids, such as using temperature controlled blood heaters and warm air blankets and other warmers, can prevent this.
- Avoid hypotension by replacing sufficient amounts of liquids in response to measured continuous blood loss.
- Give a second intravenous bolus of 10 units of oxytocin .
- Prepare the woman for the operating room for manual placenta removal under anaesthesia following sufficient pre-operative Resuscitation .
- Monitor maternal observations for clinical shock symptoms, such as tachycardia, tachypnea, low blood pressure, weakness , sweating, restlessness, and nausea, and do Resuscitation if necessary.
- Use a pulse oximeter to monitor oxygen saturation.
- Think of using prophylactic antibiotics in theatre.
- Think about the likelihood of a placenta that is abnormally adherent. Whenever bleeding is rapid or a woman has hemodynamic instability.

- Give the task of continuing resuscitative measures to two individuals (a midwife or theatre nurse and an anaesthetist, for example).
- By inserting a fist in the anterior fornix of the vagina and pressing up the uterine fundus with the other hand, you can manually compress the uterus (see diagram)
- Aorto-caval compression should be used if everything else fails.

PPH after delivery of the placenta [30]

- If the uterus is not contracted:

Management as above for retained placenta Ensure the uterus is contracted.

- Continue massaging the uterus to induce a contraction and evacuate any clots that may be present. Put on sterile gloves and perform a vaginal examination to remove clots if the uterine fundus feels bulky and uterine massage does not evacuate them.
- Insert an indwelling catheter.
- Give a bolus of 250 micrograms of ergometrine intravenously or intramuscularly. Alternately, re-bolus the oxytocin by 10 units intramuscularly or intravenously (if concerned about maternal hypertension).
- Set up and start an Oxytocin infusion. 40 units of oxytocin per 1000 mL of sodium chloride or Hartmann's solution 0.9 %.
- Verify if the placenta is complete.
- If there is no reaction to the oxytocin infusion and there are no

medical conditions that would prevent the administration of ergometrine, repeat the procedure with 250 micrograms intravenously or 250 micrograms intramuscularly of ergometrine after two to three minutes.

- Think about misoprostol 800 to 1,000 micrograms per rectum OR
- Prostaglandin F2α (dinoprost) at a dose of 1 mg administered intravenously; repeat up to a maximum of 3 mg. Look for other causes if bleeding persists despite a uterus that is tightly contracted:
- Place the woman in lithotomy with sufficient analgesia and anaesthesia.
- To ensure appropriate exposure, make sure there is enough lighting, help, and equipment.
- It could be required to transport the woman to the operating room for an anaesthetic examination.
- Examine the Vulva , vagina , cervix, and perineum for injuries.
- Take uterine rupture into account.
- Suture and mend as necessary.
- Take coagulation abnormalities into account.
- In addition to full blood count, check D-dimer, coagulation studies including INR, APTT, fibrinogen
- Treat coagulation abnormalities With appropriate components which may include fresh frozen plasma (FFP), platelets and

cryoprecipitate.

- If disseminated intravascular coagulation (DIC) is present, take the underlying cause into account.
- Consult a haematologist to determine the best blood products to use as supports.
- If DIC is secondary to sepsis, also consult with microbiologist.

If bleeding persists:

- Contact the theatre and anaesthetist if not already done
- Ensure adequate consultant obstetric / specialist support available [27]
- Consider repeating ergometrine
- Transfer woman to theatre. In theatre management
- Consider intramyometrial injection of 1mg of Prostaglandin F2α (dinoprost). Can be repeated up to a maximum dose of 3mg.
- Consider exploration of uterine cavity under anaesthesia
- Think about uterine tamponade with the Bakri balloon
- Think about packing the uterus and vagina.
- By inserting a fist in the anterior fornix of the vagina and rubbing up the uterine fundus with the other hand, you can bimanually compress the uterus.
- If the bleeding stops, continue the compression for at least 30 minutes.
- If uterotonics and mechanical compression techniques

fails, decide whether to perform-

- B-lynch brace suture
- Hysterectomy
- Angiography and embolisation
- Ligation of the internal iliac vessels. [27,31]

MEDICAL MANAGEMENT[32]

First line of therapy -

Uterotonic agents like

- Oxytocin
- Ergot alkaloids (ergometrine,methyl ergonovine)
- Prostaglandins (dinoprostone,misoprostol)

Second line of therapy.

- Hemostatic drugs
- Surgical intervention
- Radiological embolization.

OXYTOCIN[32]

- Oxytocin is a synthetic form of the nanopeptide produced in the posterior pituitary.
- It induces cyclic contraction of the myometrium's (upper) active segment, which narrows the spiral arteries and reduces blood flow through the uterus.

- The clinical action is prompt and happens in 3 to 5 minutes.
- Oxytocin is dosed at 10 to 40 U/L .
- Although side effects are extremely rare, they can cause nausea and vomiting .
- Dilutional hyponatremia, the only significant side effect, may develop after extended use.
- Rapid IV infusion is attributed to tachycardia and hypotension.

CARBOPROST[32,33]

- It is a synthetic prostaglandin analogue of PGF2α that increases uterine contractility and constricts blood vessels.
- IM dosing, initial- 250 mcg; if needed, may repeat at 15- to 90- minute interval, maximum total dose, 2 mg (8 doses).
- A successful clinical response is attained within 30 minutes in 75% of patients.
- Clinical response might be improved by using oxytocin concurrently.
- The adverse effects that have been recorded include hypertension, bronchospasm, diarrhoea, and nausea.
- Patients with hepatic or cardiovascular problems, asthma, or drug hypersensitivity are advised to use the medication with caution.

METHYL ERGOTAMINE[32,33]

- It is an ergot alkaloid that is semi-synthetic.
- The upper and lower portions of the uterus contract Titanically as

a result of widespread smooth-muscle activity.

- It is available as 0.2mg tablets & is used 0.2mg 3 to 4 times/day in the puerperium for 2 to 7 days.
- The tablet's activity begins within five to ten minutes.
- The IM dosage starts working 2 to 5 minutes after administration.
- Although side effects are extremely rare, they might occasionally cause nausea and vomiting.
- If ephedrine (a vasoconstrictive substance) has already been administered, this medication should be used with the utmost caution in patients with hypertension or preeclampsia.

MISOPROSTOL[32,34,35]

- An analogue of synthetic prostaglandin E1.
- Originally designed for oral consumption.
- Alternative methods of delivery Buccal, vaginal, sublingual, and rectal.
- Standard management with 600mcg Misoprostol lowered maternal mortality by 81%.
- Acute PPH rates and mean blood loss were much lower when misoprostol was taken orally.
- When Oxytocin, another injectable uterotonic like Ergometrine, or a fixed-dose combination of Oxytocin and Ergometrine cannot be used, the WHO advises the use of Misoprostol.

- It is advised that the qualified healthcare provider give Misoprostol 600mcg orally as soon as the baby is born if there isn't anyone there to actively manage the third stage of labour.[35,36]

CARBETOCIN[32,34,35,36]

- It is an eight amino acid long analogue of oxytocin (a nanopeptide) and thus has a similar action. Carbetocin Primarily agonizes peripherally expressed oxytocin receptors.
- Carbetocin has been approved for use immediately following an elective cesarean when a local or spinal anesthesia has been administered. Since the uterus cannot contract on its own following incision during a cesarean section , exogenous administration of oxytocin or an analog is necessary to restore uterine tone and prevent PPH.
- Approved globally for medical use since last 2 decades
- Recently introduced in India
- Long acting synthetic analogue of oxytocin with agonist properties.
- Molecular structure different from oxytocin can lead to
  - Enhanced stability (avoid the cleavage of aminopeptidase and disulfide compounds)
  - Lower affinity for vasopressin V2 receptors
- Rapid onset of action(within 1-2 hours)
- Prolonged duration of action(approximately 1hour)

- Safety profile compared to oxytocin
- Indication- Prevention of PPH due to uterine atony
- One vial contains 100mcg of carbetocin in 1ml
- A single dose of Carbetocin 100 mcg administered after the delivery of the baby is sufficient to maintain adequate uterine contraction, preventing uterine atony and excessive bleeding with efficacy comparable to hours of oxytocin infusion.

MECHANICAL METHODS

Mechanical procedures used to treat atonic and non-atonic PPH include

Uterine massage,

Uterine packing and

Tamponade

Uterine massaging should begin as soon as PPH is diagnosed, according to WHO and FIGO.

Due to worries about potential risks, the WHO no longer recommends uterine packing.

Uterine Fundal massage: A hard clockwise motion is applied to the uterus while the left hand is cupped around it.

Bimanual Uterine compression: Bimanual compression involves placing one hand (formed into a fist) in the vagina and the other compressing the uterus while applying downward pressure with the other hand.

For atonic PPH that is unresponsive to uterotonics or in situations where uterotonics are not available, the WHO does prescribe intrauterine balloon tamponade (IUB). The use of an IUB may lessen the need for invasive operations, but the evidence for this is limited to case reports. In nations with greater resources, uterine balloons such the Sengstaken tube, Bakri, and Rüsch balloons are accessible, but their cost makes them unaffordable for usage in low-resource settings. The literature refutes worries about higher infection rates associated with IUB use. Vaginal lacerations have been recommended to be managed using intra-vaginal tamponade, however this has not been sufficiently investigated. IUB is a diagnostic tool that can also tell whether a laparotomy is necessary. Last but not least, a technique known as the "uterine B-lynch" involves using IUB in addition to B-lynch or other compression sutures.[40,41]

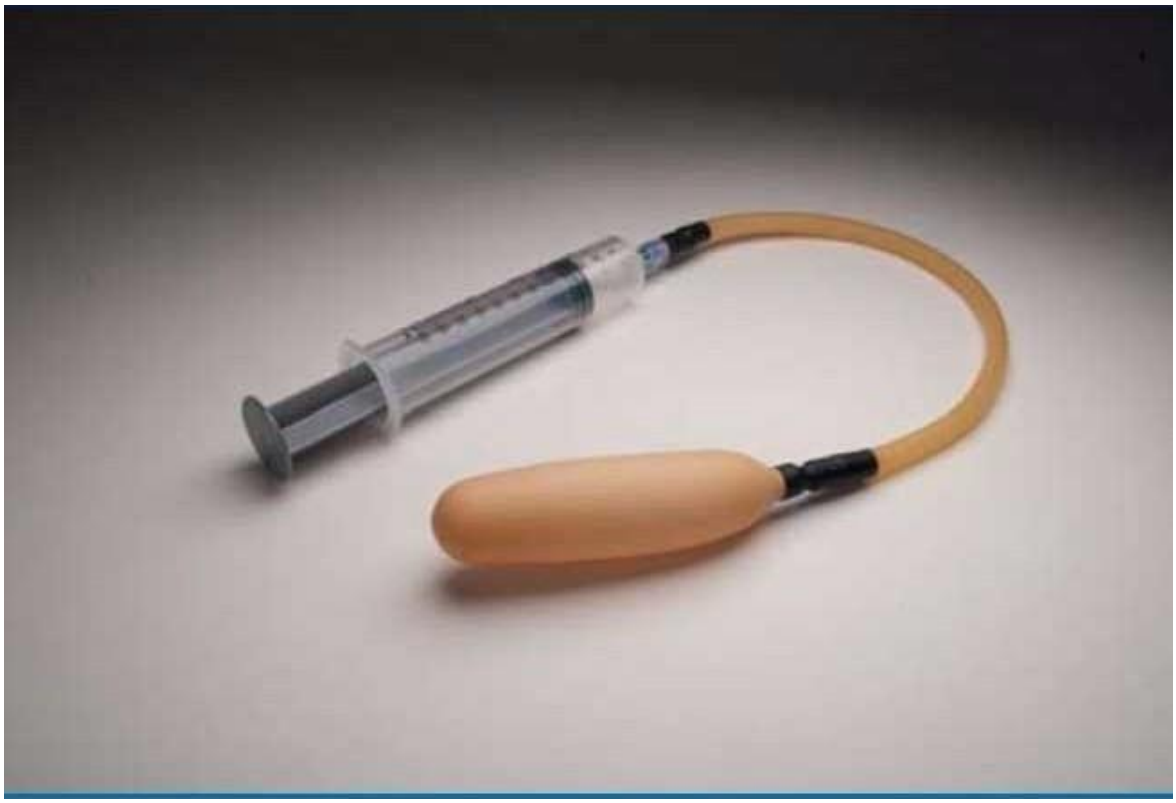

FIGURE 6: Balloon tamponade

The non-pneumatic anti-shock garment (NASG), bimanual uterine compression, external aortic compression, and other temporary treatments are advised for intractable atonic and non-atonic PPH. While maintaining blood supply to the surrounding organs, external aortic artery compression drastically lowers blood flow to the pelvic organs. Traditionally, it has been done manually by placing pressure with a closed hand on the abdominal aorta that is just above the umbilicus and slightly to the patient's left. A leather belt-attached hand-made spring device called the external aortic compression device (EACD) was recently employed as a first aid temporising technique. Use of EACD was linked to considerably lower.

In one study, the device reduced the time to uterine haemorrhage stopping; nevertheless, more research is required to determine the device's efficacy.[39,40]

Non-pneumatic anti shock garment(NASG).[40]

A low-tech first-aid tool called the NASG is used to stabilise women who are experiencing hypovolemic shock as a result of postpartum bleeding. It is a neoprene-made, lightweight compression garment for the lower body. By reversing shock and reducing blood loss, the NASG performs a special function in haemorrhage and shock management, stabilising the lady until final care can be provided.

The NASG raises blood pressure by reducing vascular volume and

raising vascular resistance in the compressed area of the body, but unlike its predecessors, it does not exert pressure high enough to cause tissue ischemia. It can be applied by people with little training for obstetric haemorrhage of any origin and doesnot compete with the use of other PPH care methods. It greatly lowers bleeding, hastens shock recovery, and lowers mortality. The WHO, FIGO, and RCOG all support using the NASG as a temporary solution for PPH, and the latter group also suggests that it might be helpful when moving patients from midwife led to consultant led facilities. Additionally, it can play a part as haemorrhaging women are transported from rural regions to metropolitan treatment facilities or while they are awaiting operations.

FIGURE 7 : Non-pneumatic anti shock garment.

TEAM OF INTERVENTIONAL RADIOLOGY -

Prior to surgical intervention, it is advised to try arterial balloon occlusion and UAE since they can stop serious blood loss, eliminating the

need for blood transfusions and hysterectomy. An interventional radiology team with experience performs these treatments. Placement of occlusive balloons in the internal iliac or uterine arteries, which are inflated in the case of PPH, is frequently used as a preventative measure for known placenta accretaIf bleeding persists despite inflation, embolization can be done using specialised catheters or balloon catheters by inserting microparticles, polyvinyl alcohol, gel foam, or coils that block the uterine arteries blood supply. When resources are available, UAE is advised as a conservative therapeutic approach for various bleeding etiologies. Despite case studies showing excellent clinical success rates (95%), low complication rates (4.5%), and tentative evidence of fertility preservation, it is not routinely used. When compared to other hemostatic procedures, placenta accreta has the comparative advantage of shorter operating times for UAE, less operational blood loss, and a higher success rate. These procedures need to be used with sufficient knowledge because they have been associated with complications such uterine necrosis, thromboembolic events, or fistulas.[41]

Surgical techniques for controlling postpartum haemorrhage [43,44]

Conservative surgical techniques

1. A poorly sutured placental bed
2. B Lynch brace suture (Modifications)
3. Trans vaginal uterine artery ligation
4. Trans abdominal uterine artery ligation

5. Ligating the ovarian artery
6. Ligation of the internal iliac artery

Radical surgery

1. Subtotal hysterectomy

2. Total Hysterectomy

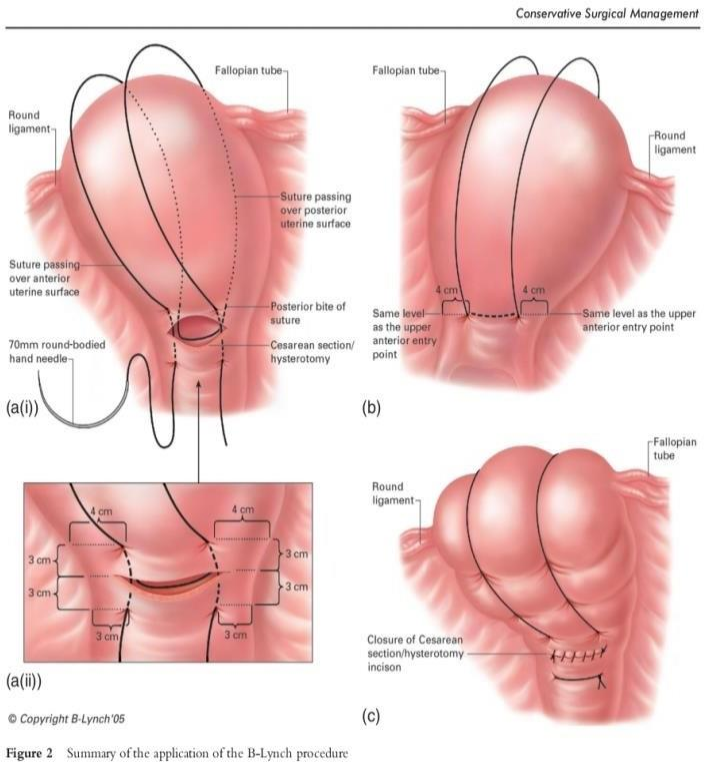

Figure 2 Summary of the application of the B-Lynch procedure

FIGURE 8: VARIOUS COMPRESSION SUTURE

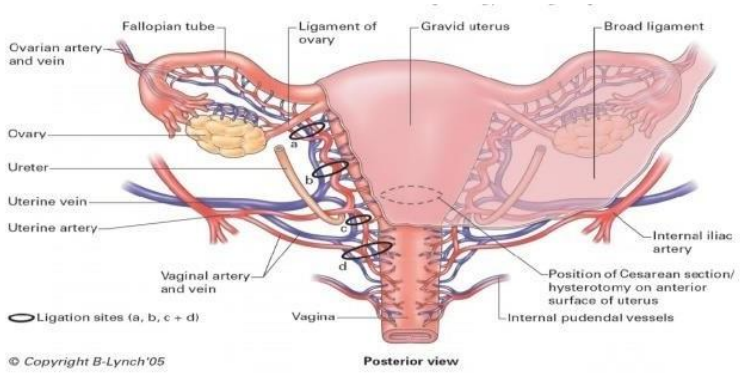

Figure 7 Placement of ligatures in the process of stepwise devascularization, including ligature of the descending uterine and vaginal arteries

FIGURE 9: STEPWISE DEVASCULARIZATION OF DESCENDING UTERINE ARTERY & VAGINAL ARTERY

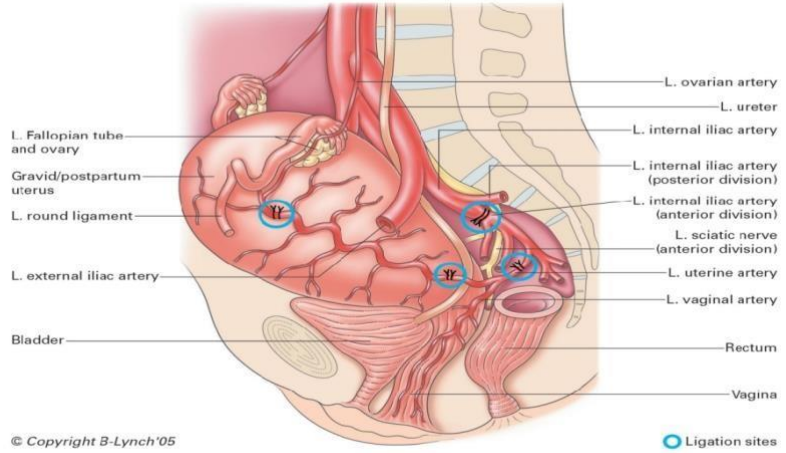

Figure 8 The complex vascular distribution to the pelvic organs. In this procedure of stepwise devascularization, the patient must be in the Lloyd Davis or modified lithotomy position, with one of the assistants able to access and swab the vagina to assess bleeding control

FIGURE 10: COMPLEX VASCULAR DISTRIBUBATION OF PELVIC ORGANS

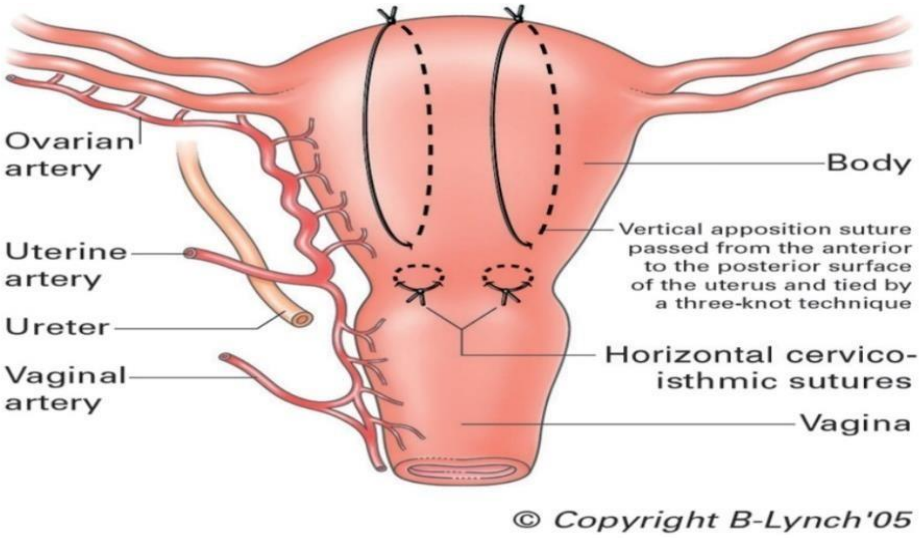

Figure 5 The Hayman uterine compression suture without opening the uterine cavity[11]

FIGURE 11: HAYMAN UTERINE COMPRESSION SUTURES

Indications for conservative surgery[45,46]

- Patient is generally stable.
- Fertility is an issue
- Young age
- primigravida
- if Blood loss is gradual
- Good support and Adequate blood products, anaesthetist, OT staff.

  Skilled Ob/gyn

UTERINE COMPRESSION SURGICAL SUTURES[48]

Christopher B-Lynch of Milton Keynes in the UK made the first idea for this strategy in 1997 when he presented a report on 5 cases in which compression of the uterus was achieved after a caesarean section. The suture compresses the upper segment but leaves the lower segment open, requiring that the uterus be opened. The B-Lynch suture compression techniques [47,48] Llyod Davis or the frog position are required for 48. The uterus needs to be exposed. Testing for potential effectiveness with bimanual compression Lower section transverse incision is performed. Examined, investigated, and cleared of uterine cavityUtilize Vicryl 1. Suture appropriately, maintaining consistent tension (no shouldering), and allowing for free drainage of inflammatory and blood components.

Check the vaginal swab and tool for bleeding control. If the uterus has not already been opened (for example, during a caesarean section), a simpler suture, such as square suturing, can be placed.

The square suture may, however, totally cut off the blood supply to the uterine muscle contained within the square, resulting in ischemic necrosis and other problems.

Cho square haemostatic sutures [50]

A straight 10 cm needle is used to cover the entire uterus with several square sutures. Possibly time-consuming if numerous sutures are necessary. Pyometra risk due to uterine cavity drainage limitation. the potential for

numerous uterine synechiae to form.

uterine compression suture HAYMAN.[51]

Not opened is the lower uterine section or cavity. The uterine cavity is not visible. Probably easier to use. Segmented ischemia as a result of suture-shouldering slippage and venous blockage is caused by unequal tension. There are no statistics on fertility outcomes.

A key rule is to avoid sutures that apply compression both vertically and horizontally and instead utilise sutures that deliver compression transversely, such as the many horizontal sutures described by Hackethal et al. or horizontally, such as the simpler loop suture described by Hayman et al.

LIGATION UTERINE ARTERY [52]

If a conventional compression suture does not work, ligation of the uterine arteries is a common and successful alternative. The uterine arteries provide 90% of the blood flow to the uterus. To ligate the artery at the cervical isthmus above the bladder flap, big objects are inserted through the uterine wall. A wide ligament is sutured, allowing 2-3 cm of myometrium to pass through. Approximately 2 cm above the placement of the lower segment caesarean section incision is where the suture will be inserted.

Ligating the ascending uterine artery branch and avoiding ureter in the suture. Such closure appears to have no negative effects on subsequent pregnancies, most likely because a compensatory collateral circulation forms from other vessels, particularly the ovarian arteries.

INTERNAL ILLIAC ARTERY LIGATION[53,54]

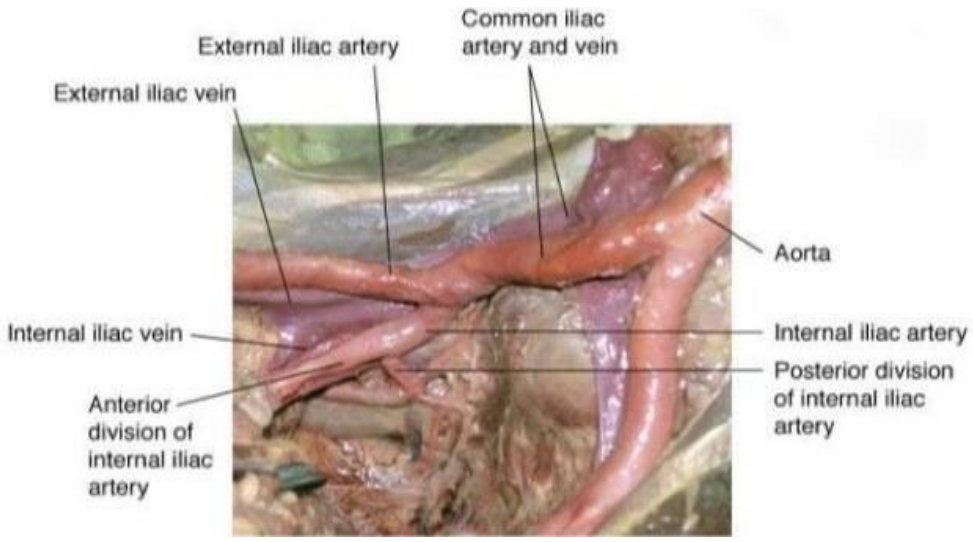

FIGURE 12: Surgical anatomy and relations of internal iliac artery

A bilateral ligation resulted in a 50% drop in blood flow and an 85% reduction in pulse pressure. technically challenging initially. It is crucial to recognise the common, internal, and exterior iliac arteries.

The deep and lateral to the artery hypogastric vein, which could be ruptured as tools are passed beneath it, could cause massive, potentially fatal bleeding.

The artery is double-ligated with an absorbable suture (Vicryl 1/0), not split. The same ligation operation is then performed on the opposing side.[54]

UTERINE ARTERY EMBOLISATION[55,56]

Abruptio placenta with uterine atony may occur before or after hysterectomy for PPH for refractory atonic uterus bleeding from the vaginal angle or the lateral wall of the pelvis frequently or continuously. Diffuse bleeding without clearly identifiable vascular bed. Uterine artery rupture

where the internal iliac artery may be ripped at the uterine artery's origin. when severe cervical laceration has developed after a challenging instrumental delivery.

A vascular interventional radiologist carries out the procedure under moderate sedation. The radial or femoral arteries can be accessed most frequently by the wrist or groin, respectively. The target artery is then reached with a needle puncture after the skin over it has been made anaesthetized. The guidewire and access sheath are then inserted into the artery. To choose the uterine vasculature for future embolization, a guiding catheter is frequently employed and placed into the uterine artery using x-ray fluoroscopy guidance.

Once the catheter has been positioned at the level of the uterine artery, a contrast angiography is done to verify the location of the catheter before the embolizing agent (spheres or beads) are released. Due to the increased risk of failure associated with unilateral uterine artery embolizations, this is done bilaterally from the point of initial puncture. With both uterine arteries occluded, the uterus is kept from necrotizing because of the strong collateral circulation. The treatment typically takes little more than an hour to complete and can be carried out in a hospital, surgical centre, or office environment. However, many patients are discharged the same day, with some staying in the hospital for a single day admission for pain management and observation. If access was gained through a femoral artery puncture, an occlusion device can be used post-procedure to speed healing of the puncture site, and the patient is asked to remain with the leg extended

for several hours.

If the radial artery was used to achieve access, the patient will be able to get up from the operating table and leave right away. The treatment keeps the uterus in place without requiring surgery and prevents many of the difficulties that come with it.[56,57]

PERIPARUM HYSTERECTOMY[58-67]

In many ways, the only option for treating severe postpartum haemorrhage is emergency peripartum hysterectomy, which is an obvious indicator of severe maternal morbidity. In some nations, the prevalence of peripartum hysterectomy is rising as a result of rising caesarean birth rates and related rises in placenta previa and/or accreta in subsequent pregnancies.

Indication for hysterectomy is hemorrhage associated with abnormal placentation, uterine atony, uterine trauma, uterine rupture and sepsis.

Similar to abdominal hysterectomy in gynaecology, obstetric hysterectomy technique involves several anatomical and physiological changes during pregnancy that could provide surgical challenges.

1. The neighbouring pelvic tissues are edematous and friable, and the uterine and ovarian arteries are swollen and distended, frequently noticeably so.

2. Depending on the urgency and speed required, an abdominal incision via the Pfannenstiel or lower midline may have been used. Because it offers better exposure, the midline incision is favoured by many surgeons.

3. Maneuvers to obtain hemostasis depend on the cause of the hemorrhage.

In cases of uterine rupture, Green-Armytage clamps or sponge forceps can be used to compress the bleeding edges of torn uterine muscle. The uterus should be eventrated from the abdominal wound. The structures of the adnexa on each side are pulled laterally by an assistant, and the surgeon applies straight clamps adjacent to the top sides of the uterus to include the round ligament, the Fallopian tube and the utero-ovarian ligament. This serves to control the collateral blood flow to the uterus from the ovarian arteries. Using transillumination, the avascular spaces in the broad ligament, roughly opposite the level of a transverse lower segment cesarean incision, should be identified and a catheter passed through on each side to encircle the lower uterine segment just above the cervix. This should be twisted tightly and closed around the lower uterine segment with a clamp, thereby compressing the uterine arteries. These two maneuvers, if properly applied, should occlude the main collateral ovarian and uterine artery supply to the uterus.

4. The vascular pedicles are thick and edematous and should be double clamped. Remove the proximal clamp first and apply a free tie, and then replace the distal clamp with a transfixing suture. The proximal free tie should ensure that there is no hematoma formation in the base of the pedicle.

5. If the cervix and paracolpos are not involved as the source of hemorrhage, subtotal hysterectomy should be adequate to achieve hemostasis, the objective of the intervention. Additionally it is safer, faster, easier to perform and less likely to injure the bladder or ureters than total hysterec- tomy. However, if the lower segment and para- colpos are involved in the hemorrhage, such as in

cases of placenta previa, total hysterectomy will be necessary for hemostasis.

6. The ureters should be avoided by placing all clamps medial to those used to secure the uterine arteries.

7. It may be difficult to identify the cervix, particu- larly when the hysterectomy is being performed at full cervical dilatation. If a uterine incision has been made, a finger can be placed through this and hooked up to identify the cervical rim. It is safest to enter the vagina posteriorly, identify the rim of the cervix and then proceed anteriorly.

8. The bladder is particularly vulnerable in cases pre- viously delivered by cesarean section, as it may be adherent to the lower uterine segment and cervix. It is therefore essential to check the integrity of the bladder intraoperatively. This can be done by manipulating the bulb of the Foley catheter to see if it is visible through the bladder wall. The bladder also can be filled with a colored fluid such as methylene blue or sterile milk taken from the neonatal nursery. The latter is preferable as it does not cause permanent staining of the tissues. Accordingly, after repair of any bladder injury, it is easier to check its integrity by instillation of milk into the bladder. Tears in the bladder should be repaired with two layers of 3/0 polyglactin (Vicryl) or equivalent suture. Otherwise, No. 1 polyglactin (Vicryl) or equivalent is used through- out the procedure.

9. If the integrity of the ureters is in doubt, and after any extensive repair of bladder injury, postoperative cystoscopy can confirm that they are intact by observing urine coming from each ureteric orifice; this test may be facilitated

by giving intravenous indigo carmine and waiting 10–15 minutes.

10. Within the context of the emergency situation and the available resources, it is best to diagnose and deal with any bladder or ureteric injury at the time of the hysterectomy. If lower urinary tract injuries are not diagnosed until the postoperative period, clinical morbidity is increased, diagnostic and surgical management is more complex, and litigation more likely

11. In rare cases following hysterectomy traumatized tissues at the base of the pelvis may continue to bleed despite ligation of obvious bleeding pedicles. This bleeding is usually, but not always, associated with DIC. In these cases the application of a pelvic pressure pack can be life-saving and provide hemostasis, either permanent or temporary, until hematological stability and /or vascular embolization is achieved[39]

12. Perioperative antibiotic prophylaxis should be continued for 24–48 hours. Thromboprophylaxis with heparin should be instituted as soon as one is satisfied that hemostasis is secure.

13. Detailed, timed postoperative notes should be made to include the preoperative events, indica- tions for hysterectomy and the surgical details.

14. After the initial postoperative recovery, the woman should receive a comprehensive outline of events from an experienced obstetrician. Many women are emotionally traumatized by the rapid sequence of major complications, culminating in the loss of her uterus; a sympathetic explanation and supportive follow-up are necessary.

MATERIALS AND METHODS

- Patients who were admitted in the Department of OBSTERTICS & GYNAECOLOGY in B.L.D.E. (DEEMED TO BE UNIVERSITY) Shri B.M. Patil Medical College Hospital and Research Centre, Vijayapura with the diagnosis of high-risk pregnancy prone for atonic PPH and fulfilling the inclusion and exclusion criteria.

- The patients were informed about study in all respects and informed written consent were obtained.

STUDY PERIOD: NOVEMBER 2020 TO APRIL 2022

STUDY DESIGN: A PROSPECTIVE INTERVENTIONAL STUDY

METHOD OF COLLECTION OF DATA

INCLUSION CRITERIA

- Multigravida
- Polyhydromnios
- Severe anemia
- Multiple gestation
- Severe PE
- Antepartum eclampsia

- Imminent eclampsia
- Placenta previa

EXCLUSION CRITERIA

- Patient with traumatic PPH
- Patient with scarred uterus (LSCS, Other surgeries)

Sample size calculation:

Sample size - 128

With anticipated Proportion of Time taken to stop bleeding for high-risk women for Atonic PPH 88% [2] (<4 mins), the study required a sample size of 64 per group (i.e a total sample size of 128, assuming equal group sizes) to achieve a level of significance of 95% (two-sided) and with 8% absolute precision, for detecting a true difference in means between two groups.

Formula used

- $n=\frac{z^2\ p*q}{d^2}$

Where Z= Z statistic at α level of significance

d^2= Absolute error

P= Proportion rate

q = 100-p

Statistical Analysis

- The data obtained were entered in a Microsoft Excel sheet, and statistical analysis were performed using a statistical package for the social sciences (Version 20).
- Results were presented as Mean (Median) ±SD, counts and percentages, and diagrams.
- For normally distributed continuous variables between two groups were compared using independent t-test. For not normally distributed variables Mann Whitney U test was used. Categorical variables between the two groups were compared using the Chi-square test.
- $p<0.05$ were considered statistically significant.

METHODOLOGY:

Patients were selected for the study based on inclusion and exclusion criteria and divided into two groups.

Group A- The prophylactic SR suction cannula were applied with 10 units oxytocin IM injection for high-risk women prone to atonic PPH.

Group B- 10 units oxytocin IM injection was given for high-risk women prone to atonic PPH without application of SR suction cannula.

This study was to measure the amount of blood loss and compare between group A and group B.

After the delivery of the baby and placenta, patient were kept in the lithotomy position, under a good source of light, a wide blade vaginal speculum was applied, and 1.5-2Cm of the anterior cervix is grasped with a sponge holder.

After the delivery of the baby and placenta, the assistant applies mild traction on the cervix with a sponge holder, and the obstetrician inserts left two fingers into the cervix. The right-hand inserts the cannula into the uterus taking the guidance of the left fingers. Left palm supporting the fundus per abdomen, bimanually feels the cannula and its position. The size of the cannula were selected according to the fundal height. This precaution helps to avoid perforation. After application of negative pressure for 15 minutes, the suction machine were put off, but The cannula were held in this position, and negative pressure of 650mmHg were applied by putting on the suction cannula system was kept undisturbed. The suction cannula were put on for 15 minutes every 15 minutes for 1hour.

METHODS OF MEASUREMENT OF BLOOD LOSS

GROUP A: The blood collected in the suction bottle were measured and recorded.

GROUP B: The blood collected in conical calibrated BRASS V DRAPE were measured and recorded[8].

CANNULA REMOVAL: When the negative pressure were applied, the soft cervical tissues get sucked into the perforations of the cervical portion of the cannula and become adherent. For the same reason, Cannula should not be removed immediately after stopping negative pressure. The cannula can be removed easily after gentle separation of these adhesions with finger

manipulation. Rough separation of adhesions results in cervical injury and bleeding. The cannula were removed 10 minutes after the last suction in all women, which gave time for tissue recoiling.

RESULTS

In this study a total of 128 patients who met the inclusion criteria in women admitted in labour room with diagnosis of high risk pregnancy in BLDE (DU), Shri B M PATIL MEDICAL COLLEGE , HOSPITAL & RESEARCH INSTITUTE, Vijayapura from November 2020 to April 2022 were included And divided into 2 groups i.e group-A and group-B. In group-A of 64 patients applied with SR suction cannula for 15 minutes each time with 650 mmHg of pressure along with 10 Units of oxytocin I.M and In group-B 64 cases only 10 Units oxytocin I.M was given 1 minutes after delivery of the baby . The data was arranged in Microsoft excel sheet and analyzed statistically.

AGE	NO. OF PATIENTS WITH SR CANNULA	NO. OF PATIENTS WITHOUT SR CANNULA
<20 years	11(17.18%)	7(10.93%)
21 to 30 years	49(76%)	54(84.37%)
>30 years	4(6.25%)	3(4.68%)
Total	64(100%)	64(100%)

TABLE 3 : Age distribution of study participants

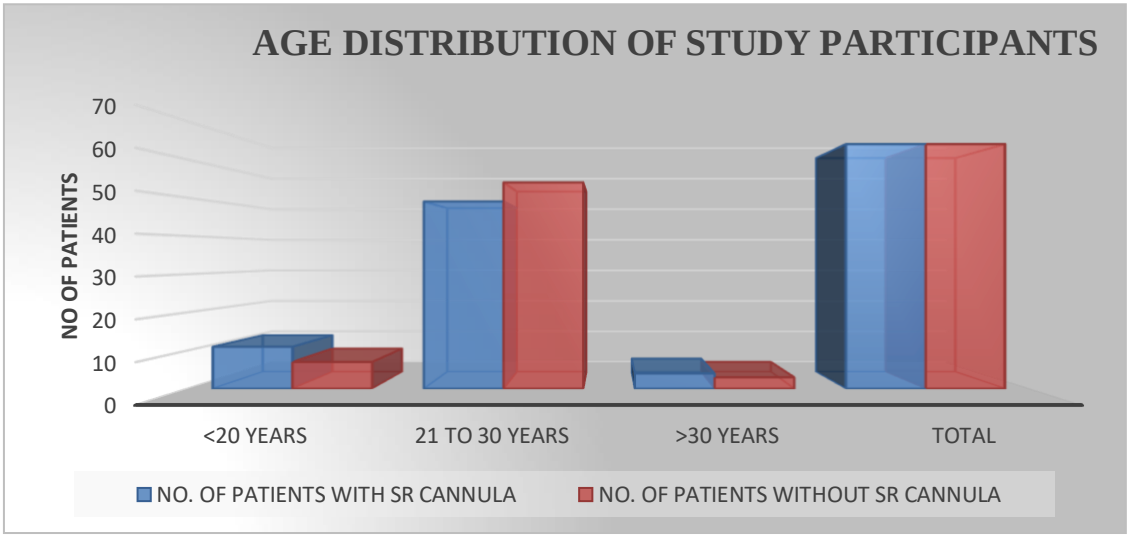

FIGURE 13 : Bar chart showing age distribution of subjects

It is observed that in our study the maximum no. of patients belonged to the age group of 21-30 years is in group-A 76%(N-49) and in group -B 84.37%(N-54), followed by <20 years In group-A 17.18%(N-11) and in group-B 10.93%(N-7) and others as shown in the table.

FREQUENCY OF APPLICATION	NO OF PATIENTS	PERCENTAGE(%)
1	7	10.9
2	16	25.0
3	24	37.5
4	17	26.6
Total	64	100.0

TABLE 4 : Frequency of application distribution of SR cannula

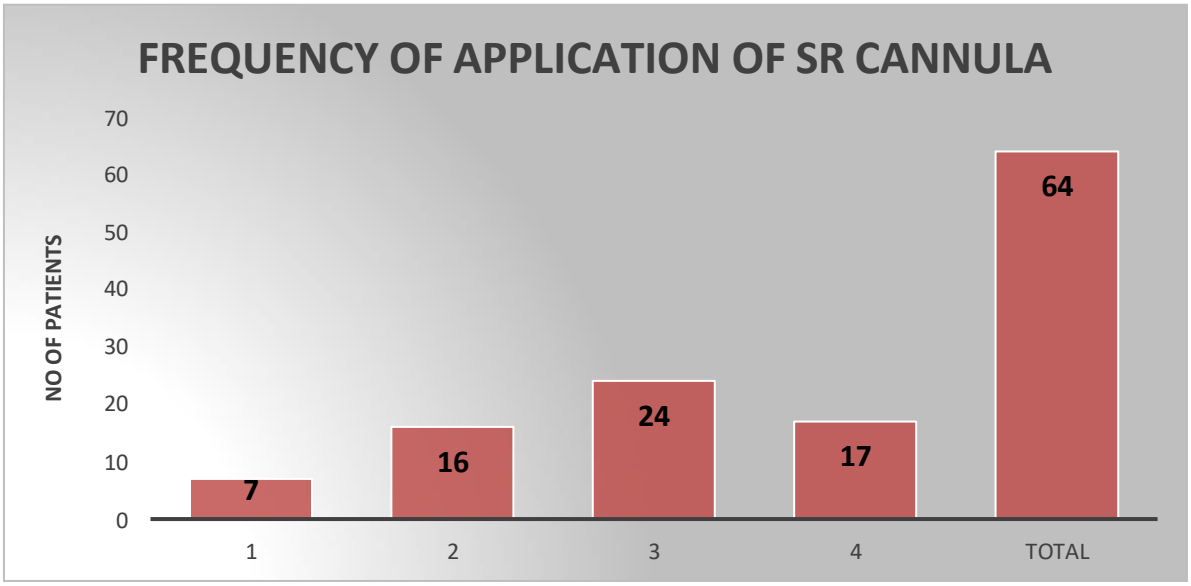

FIGURE 14 : Bar chart showing frequency of application of SR cannula distribution

In the study 37.5%(N-24) cases were applied with SR cannula for 3 times, 26.6%(N-17) cases were applied for 4 times, 25%(N-16) cases were applied for 2 times and 10.95%(N-7) cases were applied for 1 time.

GRAVIDA	NO OF PATIENTS WITH SR CANNULA	NO OF PATIENTS WITHOUT SR CANNULA
PRIMIGRAVIDA	22(34.37%)	17(26.56%)
G2	20(31.25%)	19(29.68%)
G3	14(21.87%)	19(29.68%)
G4&>	8(12.50%)	9(14.06%)
TOTAL	64(100%)	64(100%)

TABLE 5 : Gravida distribution of study participants

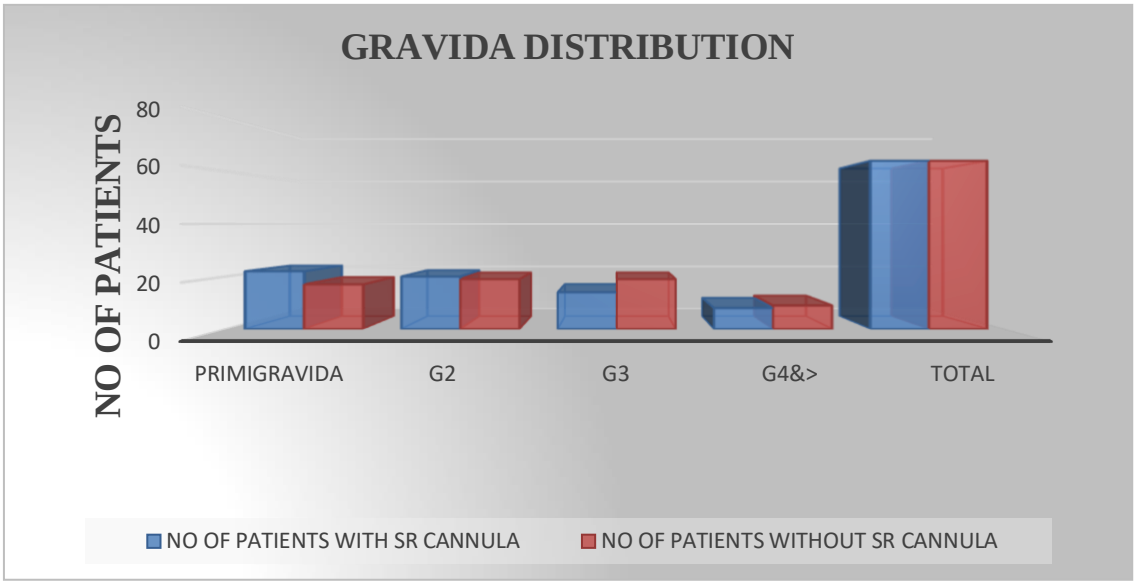

FIGURE 15 : Bar chart showing gravida distribution of study participants

In this study 34.4%(N-22) cases were Primigravida,31.25%(N-20) were G2, 21.87%(N-14) were G3 and 12.50%(N-8) were G4& above in group-A And in group-B, 26.6%(N-17) cases were Primigravida,29.7%(N-19) were G2, 29.7%(N-19) were G3 and 14.1%(N-9) were G4 & above.

GESTATIONAL AGE	NO OF PATIENTS WITH SR CANNULA	NO OF PATIENTS WITHOUT SR CANNULA
37-38	26(40.62%)	31(48.43%)
39-40	35(54%)	30(46.87%)
>40	3(4.68%)	3(4.68%)
TOTAL	64(100%)	64(100%)

TABLE 6: Gestational age distribution of subjects

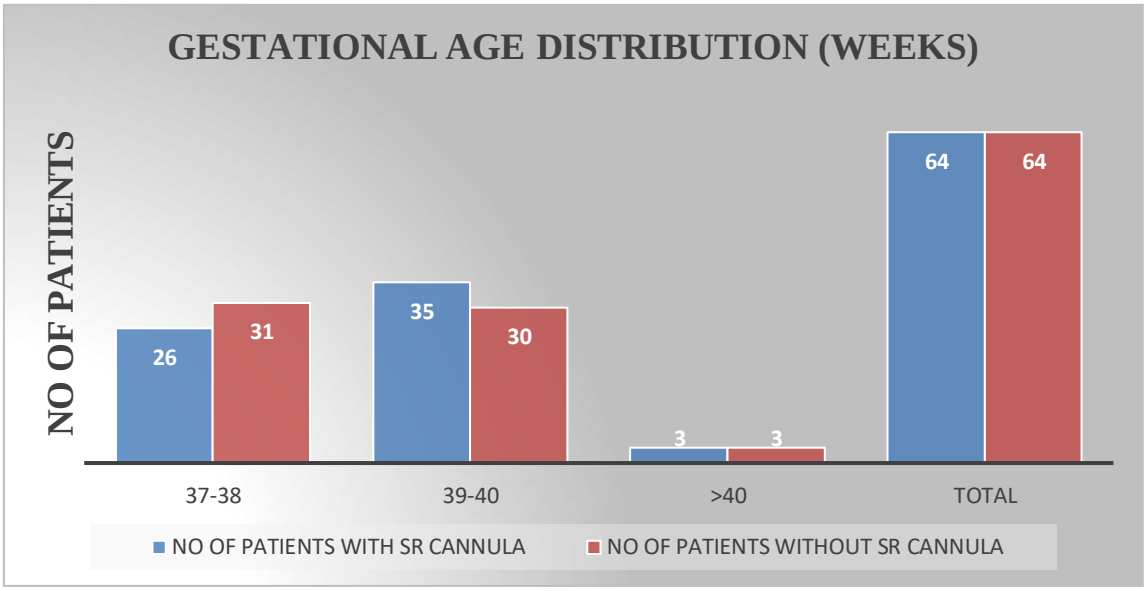

FIGURE 16: Bar chart showing gestational age distribution

In this study in group-A, 54%(N-35) cases were between 39-40 weeks of gestational age, 40.62%(N-26) were 37-38weeks and 4.68%(N-3) were >40weeks. In group-B, 48.43%(N-30) were 39-40 weeks, 48.43%(N-31) were 37-38weeks and 4.68%(N-3) were >40weeks.

AMOUNT OF BLOOD LOSS	NO OF PATIENTS WITH SR CANNULA	NO OF PATIENTS WITHOUT SR CANNULA
300-350	0	14 (17.18%)
250-300	0	39 (60.93%)
200-250	0	11 (21.8%)
150-200	2 (3.12%)	0
100-150	22 (34.37%)	0
50-100	40 (62.50%)	0
TOTAL	64 (100%)	64 (100%)
P VALUE <0.001 STATISTICALLY SIGNIFICANT		

TABLE 7: Blood loss distribution among the subjects

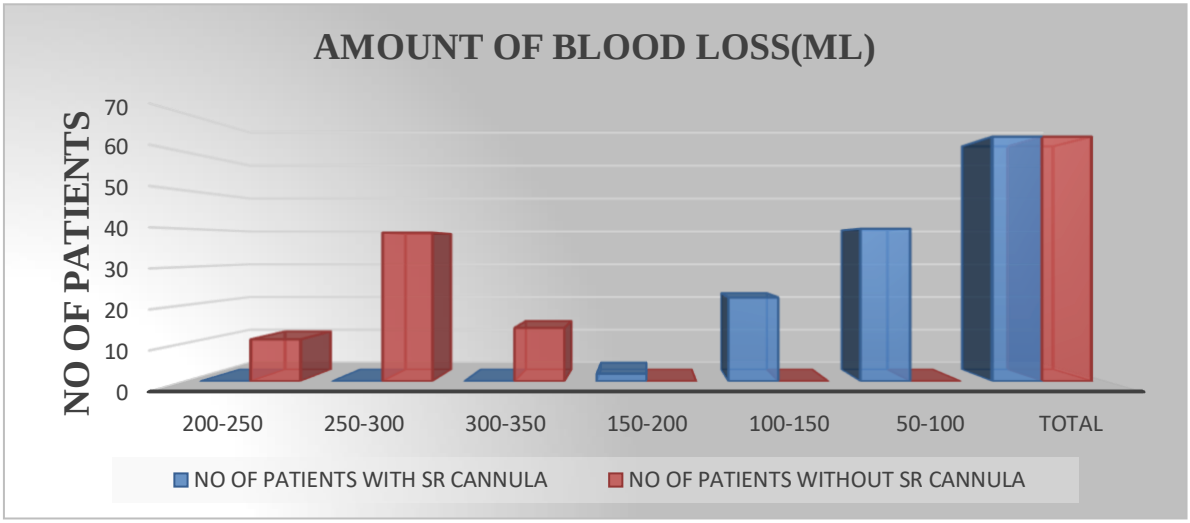

FIGURE 17: Bar chart showing blood loss distribution

In this study in group-A majority of the subjects i.e 62.55%(N-40) had blood loss of 50-100ml, 34.37%(N-22) cases had blood loss of 100-150ml only 3.12%(N-2) had 150-200ml blood loss but In group-B majority of the cases 60.93%(N-39) cases had blood loss of 250-300ml and 21.8%(N-14) had blood loss 300-350ml of blood loss and 17.18%(N-11) had 200-250 ml of blood loss. When compared the blood loss in both groups, group-A cases had the minimal blood loss with statistical p-value of <0.001 which is statistically significant.

TIME TAKEN TO STOP BLEEDING (MINUTES)	NO OF PATIENTS WITH SR CANNULA	NO OF PATIENTS WITHOUT SR CANNULA
2	38 (59.37%)	10 (15.62%)
3	26 (40.62%)	28 (43.75%)
4	0	25 (39.06%)
5	0	1 (1.56%)
TOTAL	64 (100%)	64 (100%)

TABLE 8: Time taken to stop bleeding distribution of participants

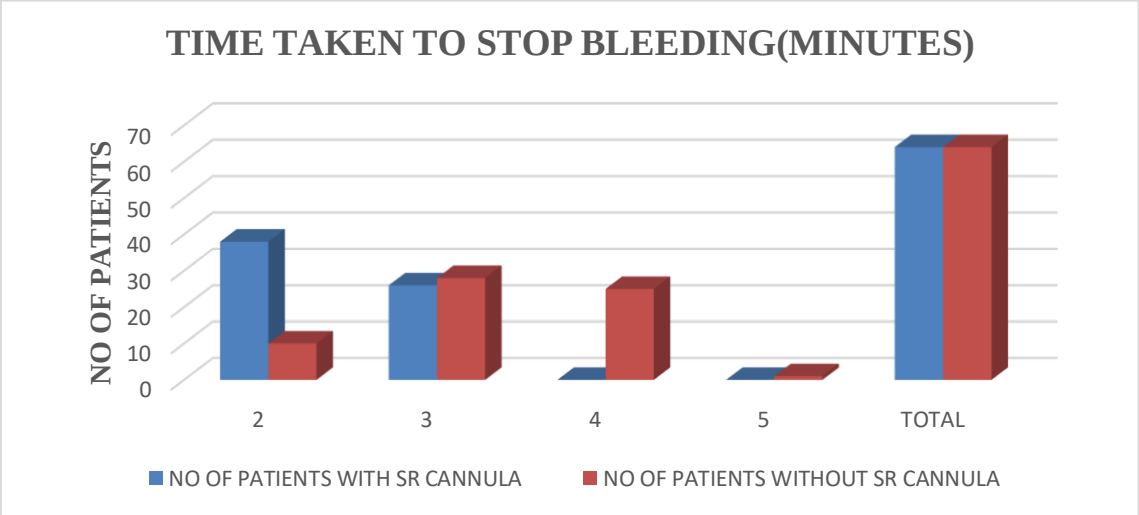

FIGURE 18: Bar chart showing time taken to stop bleeding in subjucts

In this study in group-A 59.37%(N-38) patients took only 2 minutes to stop the bleeding, and 40.62%(N-26) patients took 3 minutes to stop bleeding after the application of SR suction cannula In case of group-B majority of cases i.e 39.06%(N-25) took 4 minutes to stop the bleeding and 1.56%(N-1) took 5 minutes to stop bleeding 43.75%(N-28) cases took 3 minutes to the bleeding and 15.62%(N-10) cases took 2 minutes to stop the bleeding. When compared group-A with group-B all of the cases taken less than 3 minutes to stop the bleeding. In case of group-B most of the cases took more than 4 minutes.

HIGH RISK FACTORS	NO OF PATIENTS WITH SR CANNULA	NO OF PATIENTS WITHOUT SR CANNULA
ANTEPARTUM ECLAMPSIA	1(1.56%)	1(1.56%)
GESTATIONAL THROMBOCYTOPENIA	4(6.25%)	1(1.56%)
GESTATIONAL HTN	10(15.62%)	11(17.12%)
GRAND MULTI-GRAVIDA	1(1.56%)	0
MILD ANEMIA	4(6.25%)	4(6.25%)
MILD PE	1(1.56%)	1(1.56%)
MODERATE ANEMIA	9(14.06%)	4(6.25%)
MULTI-GRAVIDA	16(25%)	26(40.625%)
MULTI-GRAVIDA WITH MODERATE ANEMIA	1(1.56%)	0
MULTI-GRAVIDA WITH SEVERE PE	1(1.56%)	1(1.56%)
POLYHYDROMNIOS	7(10.93%)	7(10.93%)
SEVERE ANEMIA	2(3.125%)	3(4,68%)
SEVERE PE	7(10.93%)	2(3.125%)
IMMINENT ECLAMPSIA	0	3(4,68%)
TOTAL	64(100%)	64(100%)

TABLE 9: High risk factors distribution in participants

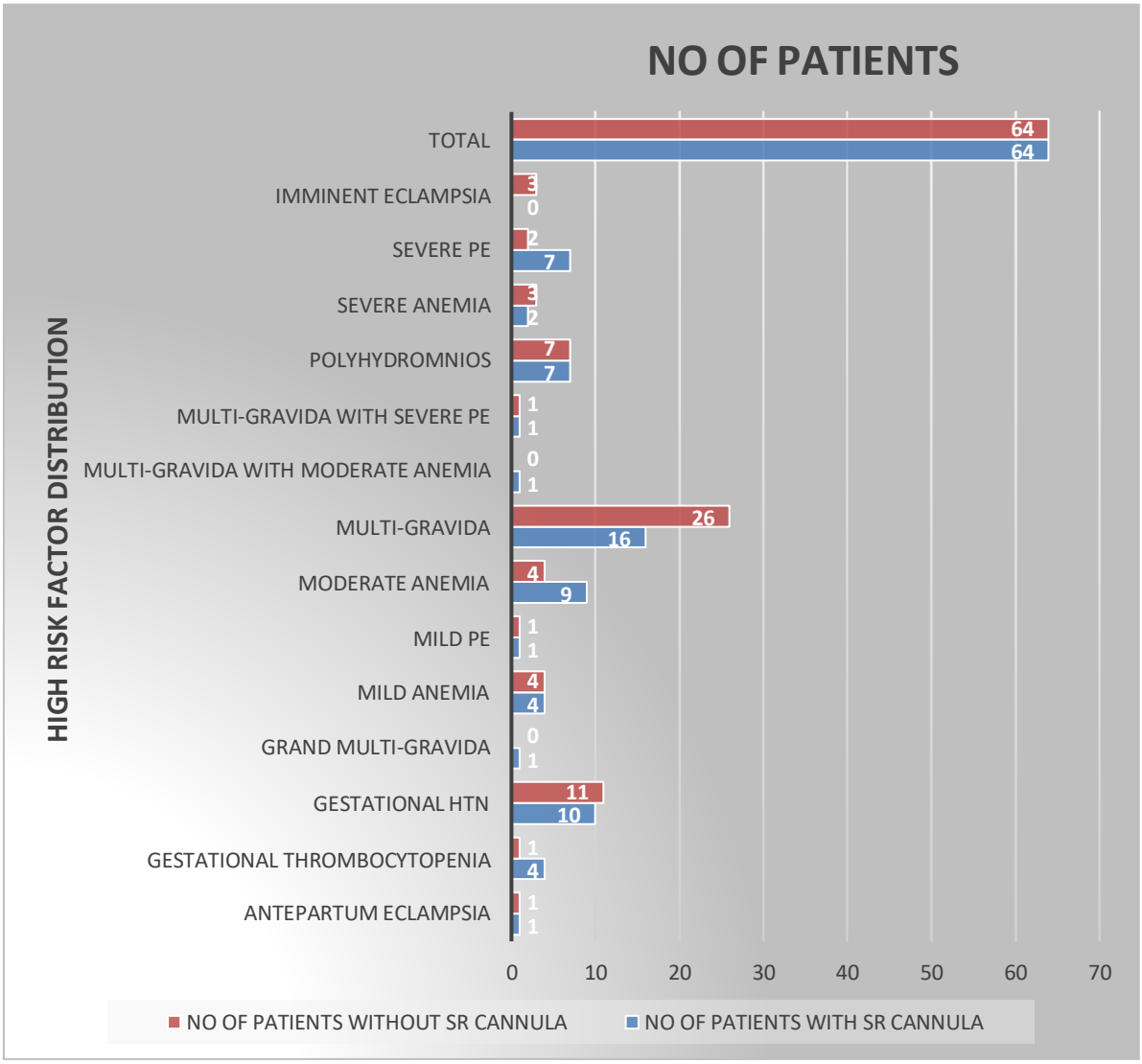

FIGURE 19: Bar chart showing high risk factors

In this study most common associated risk factor was multigravida which was distributed 25%(N-16) cases in group-A and 40.62%(N-26) cases in group-B And next common associated risk factor was gestational hypertension and was distributed 15.62%(N-10) cases in group-A and 17.12%(N-11) cases in group-B, 3rd most common associated risk factor was polyhydromnios and was equally distributed 10.93%(N-7) cases in both the groups and other associated risk factors were distributed as shown in the table No-9.

The associated risk factors which are distributed more in group-A are moderate anemia 14.06%(N-9) cases, severe PE 10.93%(N-7) cases, gestational thrombocytopenia 6.25(N-4) cases and grand multigravida 1.56%(N-1) case, and the factors which are distributed more in group-B are multigravida 40.62%9N-26) cases, gestational HTN 17.12%(N-11) cases, severe anemia 4.68%(N-3) cases and imminent eclampsia 4.68%(N-3) cases. All other associated risk factors distributed equally in both groups.

INDEPENDENT SAMPLES T-TEST

	W	P
AMOUNT OF BLOOD LOSS (ML)	0.000	<.001

Note: For all tests, the alternative hypothesis specifies that group *1* is less than group *2* .

Note*:* **Mann-Whitney U test**.

ASSUMPTION CHECKS

TEST OF NORMALITY (SHAPIRO WILK)

	GROUP	W	P
AMOUNT OF BLOOD LOSS(ML)	A	0.903	<.001
	B	0.832	<.001

NOTE: Significant results suggest a deviation from normality

TEST OF EQUALITY OF VARIANCES (LEVENES)

	F	df	p
AMOUNT OF BLODD LOSS (ML)	0.088	1	0.768

GROUP DESCRIPTIVES

	GROUP	N	MEAN	SD	SE
AMOUNT OF BLOOD LOSS(ML)	A	64	91.5	26.44	3.306
	B	64	270.93	28.93	3.617

Variable	**Group**	**Mean**	**SD**	**Mann-Whitney U Value**	**p-value**
AMOUNT OF BLOOD LOSS (ML)	1	91.5	26.449	0.000	< .001
	2	270.938	28.934		

DISCUSSION

TABLE 10: COMPARISON OF AGE DISTRIBUTION WITH VARIOUS STUDIES

STUDY	AGE DISTRIBUTION
Samartha Ram study (2019)	24.71±4.18 years,
Bela Makhija (2014)	27.0±3.4 years
Samartha Ram & Vasudeva panicker (2014)	25.1±3.1years
Our study	24.36

In the present study the mean age of patient was 24.36 years which was less than the study conducted by **Bela Makhija I e** 27.0±3.4 years, and the study of **Vasudeva Panicker** 25.1±3.1years. the studies which are similar to our study are by **Samartha Ram** which has the most common mean age group is between 21 to 25 years which accounts to 37.8% which are comparable to our study.

TABLE 11: COMPARISON OF ASSOCIATION OF GRAVIDA WITH VARIOUS STUDIES

STUDY	GRAVIDA
Samartha Ram	Primigravida
Vasudeva Panicker	Multigravida
Bela Makhija	Multigravida
Sai Samyukthailla	Multigravida
Our study	Multigravida

Our study showed that majority of the patients were multipara similar to the studies conducted by Vasudeva Panicker, Bela Makhija , Sai Samyukthailla. Multiparous women were treated as a high risk group and were managed accordingly. They were selected in our study for the prophylactic application of SR suction cannula.

In the study conducted by Samartha Ram majority of the patients being primipara with various other associated risk factors.

Table 12: COMPARISION OF GESTATIONAL AGE IN WEEKS

STUDY	GESTATIONAL AGE IN WEEKS
Samartha Ram	39-40
Bela Makhija	38-39
Vasudeva Panicker	39-40
Sai Samyukthailla	39-40
Our study	39-40

In our study majority of patients were multiparas with gestational age of 39 to 40 weeks similar to the study conducted by Dr Samarha Ram, Vasudeva Panicker and Sai Samyukthilla , whereas the study conducted by Bela Makhija included patients with gestation age within 38-39 weeks.

TABLE 13: COMPARISON OF NUMBER OF TIMES NEGATIVE PRESSURE APPLIED

STUDY	NUMBER OF TIMES NEGATIVE PRESSURE APPLIED
Samartharam study	1.3
Bela Makhija	1.5±1.1
Samartharam and Vasudeva Panicker	1.5
Our study	2.8

In our study in majority of the patients mean number of times the negative pressure applied was 2.8 times which was similar to the study conducted by Samartha Ram which is accounting of 70% of the patients included in the study,

In the study conducted by Bela Makhija the number of patients selected were 9 and the mean number of times the negative pressure applied was 1.5 ±1.1 times.

In another study conducted by Samartha Ram and Sai samyukthilla the mean number of times the negative pressure applied was 1.5 times

TABLE 14: COMPARISION OF MEAN AMOUNT OF BLOOD LOSS

Study	**Mean Amount of blood Loss**
Samartha Ram study	187.5
Our Study	91.50

The mean amount of blood loss in our study was 91.50ml And the amount of blood loss in the study conducted by Dr Samartha Ram was 187.5ml

TABLE 15 : COMPARISON OF SUCCESS RATES WITH VARIOUS STUDIES

STUDY	**SUCCESSFUL**	**PERCENTAGE**
Samartharam study	20 out of 20	100%
Bela Makhija	8 out of 9	88%
Our study	64 out of 64	100%

The success rate conducted by Samartharam was 100% and that conducted by Bela Makhija was 88% and in our study it was 100%. which was similar to the study conducted by Dr Samartha Ram.

CONCLUSION

Based on our study we conclude that Postpartum haemorrhage (PPH) is an obstetrical emergency which can happen following any delivery. It is a major cause of maternal morbidity, and one of the top three causes of maternal mortality. Haemorrhage is the leading cause of the admissions to the intensive care unit and the most preventable cause of the maternal mortality. Prophylactic application of SR suction cannula in high risk woman for atonic PPH averts catastrophic bleeding. SR suction cannula should be made part and parcel of normal delivery tray to facilitate quick application. This simple and cost-effective technique takes very little time to organize and can stop bleeding within 2-3 minutes in atonic PPH as shown in this study. But in some cases like complete atonic PPH it is not useful and they need surgical interventions And It gives time to arrange blood and blood products, shifting patients to tertiary care center or operation theatre. This life saving technique is useful in all settings especially in low resource settings. Its utilization in cases of inherited coagulopathies of pregnancy and DIC has to be further explored. The long term effect has to be further explored.

SUMMARY

This study was undertaken to assess the efficacy of prophylactic SR suction retraction cannula a novel, effective, simple and minimally invasive technique for avoiding excess blood loss in High risk women for atonic postpartum hemorrhage.

The procedure reduces blood loss and the need for peripartum hysterectomy and other invasive procedures. A total of 128 patients who were fulfilling the inclusion criteria were considered as subjects and divided into 2 groups group-A application of SR cannula with injection oxytocin 10 units given within one minute after delivery of the baby and in group-B only injection oxytocin 10 units given within 1 minutes after delivery of baby. The observations noted were the average age group of the study included are 24.36 years. Out of 64 patients in group A 40 cases had only 50-100ml of blood loss, 22 cases had 100-150ml of blood loss and 2 cases had 150-200ml of blood loss but in group B all patients had blood loss above 200ml in which 39 cases had 250-300ml of blood loss and 14 had 300-350ml of blood loss.

Time taken to stop bleeding in group A is 2mins for 38 patients, 3mins for 28 cases. where as in group B, time taken to stop bleeding was 2mins in 10 cases 3mins in 28 cases, and 4mins in 25 cases, one case reached up to 5mins. Hence according to the results found in our study explains the effectiveness of the SR cannula in the management of atonic PPH in high risk pregnancy prone for atonic PPH.

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SHRI B.M.PATIL MEDICAL COLLEGE,HOSPITAL AND RESEARCH CENTRE,VIJAYAPURA-586103

PROFORMA

NAME: **IP NO:**

AGE: **OCCUPATION:**

ADDRESS: **CONTACT NO. 1:**

DOA: **CONTACT NO.2:**

DO STUDY:

CASE NO.:

CHIEF COMPLAINTS:

C/O

1.OBSTETRIC HISTORY:

a. Married life-

Consanguineous ( ) Non-Consanguious ( )

b. Obstetric score: G- P- L- A-

c. Gestational age:

2.MENSTRUAL HISTORY:

LMP- According to----weeks ---days scan

EDD- EDD-

POG- POG-

3.PAST HISTORY:

4.FAMILY HISTORY:

5.GENERAL PHYSICAL EXAMINATION

PR:

BP:

6.SYSTEMIC EXAMINATION:

CVS:

RS:

PER ABDOMEN:

PER VAGINA:

7.DIAGNOSIS:

8.STUDY PARAMETERS:

A) COMPLETE BLOOD COUNT BEFORE DELIVERY

Hb- TC- RBCs- Platelets-

B) COMPLETE BLOOD COUNT AFTER 48 HOURS OF DELIVERY

Hb- TC- RBCs- Platelets

C) TIME TAKEN TO STOP BLEEDING .....MINUTES

D) DURATION OF CANNULA APPLIED..... MINUTES

CONSENT

B.L.D.E (DEEMED TO BE UNIVERSITY)

SHRI B. M. PATIL MEDICAL COLLEGE,HOSPITAL AND RESEARCH CENTRE,VIJAYAPURA-586103

INFORMED CONSENT FOR PARTICIPATION IN DISSERTATION/RESEARCH

I, the undersigned,_____, S/O D/O W/O_____, aged ___years, ordinarily resident of_____do hereby state/declare that **Dr. RAGHAVENDRA LOKUR** of Shri. B. M. Patil Medical College Hospital and Research Centre has examined me thoroughly on_____at _____(place) and it has been explained to me in my own language that I am suffering from_____disease (condition) and this disease/condition mimic following diseases. Further Dr.RAGHAVENDRA LOKUR informed me that he/she is conducting a dissertation/research titled **"PROPHYLACTIC SR SUCTION CANNULA APPLICATION FOR HIGH-RISK WOMEN FOR ATONIC PPH- A PROSPECTIVE INTERVENTIONAL STUDY"** under the guidance of DR.SUBHASHCHANDRA R.MUDANUR requesting my participation in the study. According to this, my SR suction cannula application and blood investigations will be taken to assess certain predictors of ATONIC PPH which

I may develop as a complication of my condition. Further Doctor has informed me that my participation in this study help in the evaluation of the results of the study, which is a useful reference to the treatment of other similar cases in the near future.

The Doctor has also informed me that information given by me, observations made/ photographs/ video graphs taken upon me by the investigator will be kept secret and not assessed by the person other than my legal hirer or me except for academic purposes.

The Doctor did inform me that though my participation is purely voluntary, based on the information given by me, I can ask for any clarification during treatment/study related to diagnosis, the procedure of treatment, result of treatment, or prognosis. At the same time, I have been informed that I can withdraw from my participation in this study at any time if I want or the investigator can terminate me from the study at any time the study but not the procedure of treatment and follow-up unless I request to be discharged.

After understanding the nature of dissertation or research, diagnosis made, mode of treatment. I am giving consent for the interventional procedure and investigations and for the further follow-up.

I the undersigned Smt_____ under my full conscious state of mind agree to participate in the said research/dissertation.

Signature of the patient:

Signature of doctor:

Witness: 1.

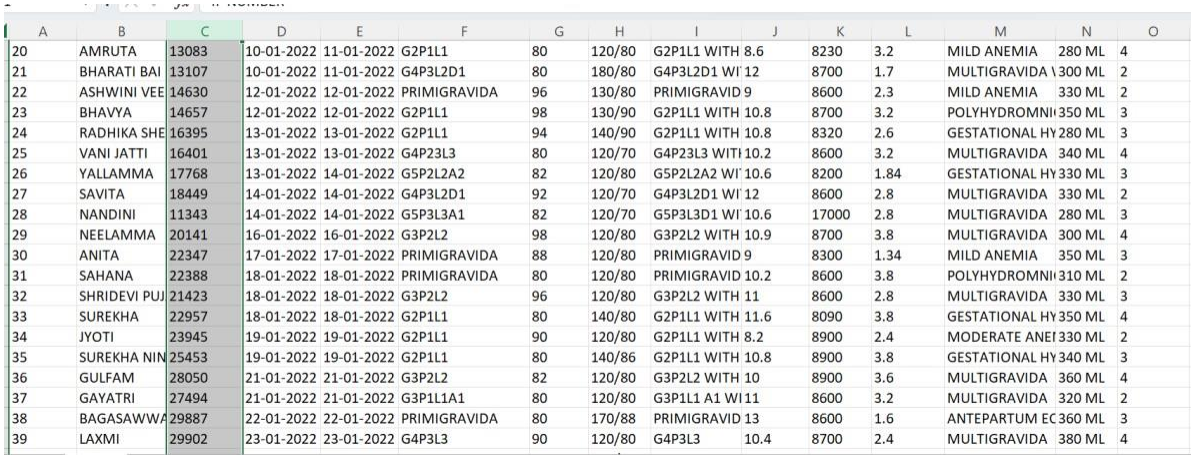
2.

Date:

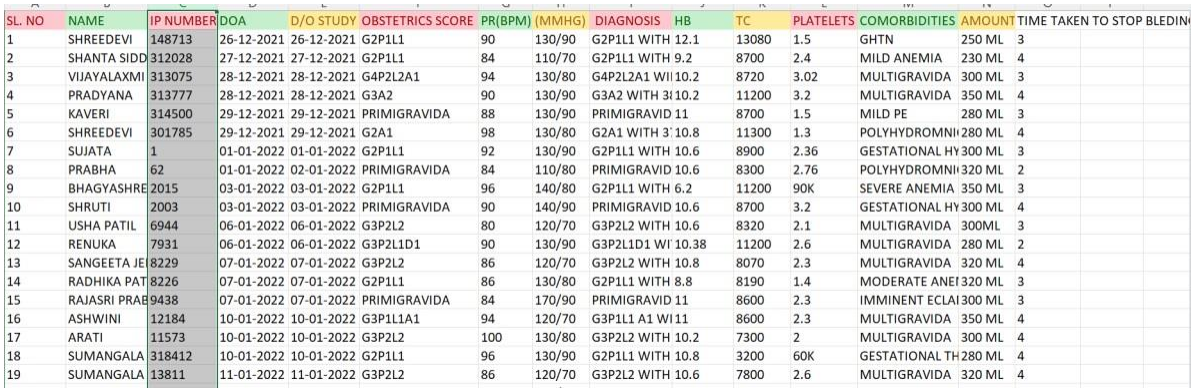
Place:

MASTER CHART

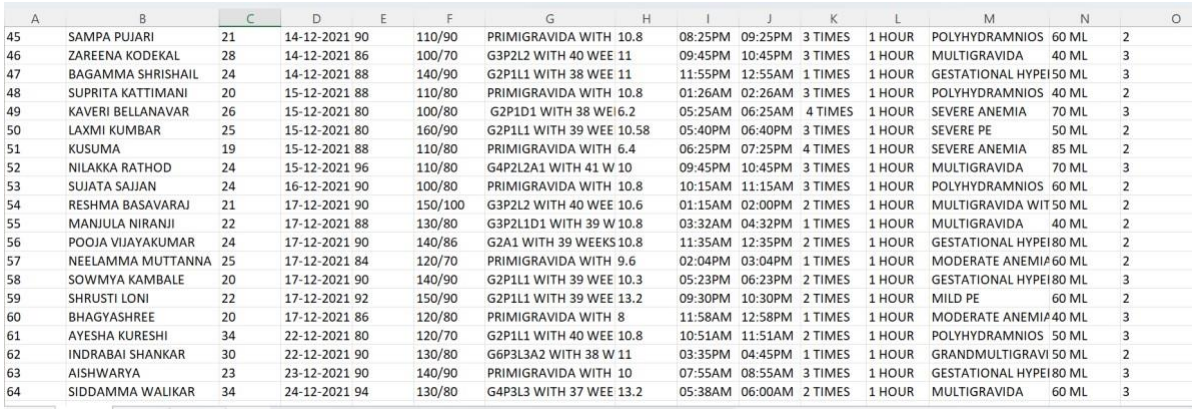
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
40		MAHADEVI M	190891	23-01-2022	23-01-2022	G2P1L1	96	120/80	G2P1L1 WITH	8.2	7800	2.2	MODERATE ANEI	320 ML	3
41		PRIYANKA AN	30571	24-01-2022	24-01-2022	G3P1L1A1	80	120/80	G3P1L1A1 WI	10.8	8800	3.8	MULTIGRAVIDA	320 ML	2
42		TABASUM	31366	24-01-2022	25-01-2022	G3P2L2	80	120/80	G3P2L2 WITH	12.6	8600	3.2	MULTIGRAVIDA	300 ML	4
43		YALLABAI	34181	26-01-2022	26-01-2022	PRIMIGRAVIDA	86	130/90	PRIMIGRAVID	10.8	7300	3.2	GESTATIONAL HY	280 ML	3
44		PRATIKSHA	25545	27-01-2022	27-01-2022	PRIMIGRAVIDA	80	120/80	PRIMIGRAVID	10.8	8600	2.8	POLYHYDROMNI	320 ML	2
45		JAYASHREE	12354	28-01-2022	28-01-2022	G4P2L2A1	96	120/80	G4P2L2A1 WI	10.6	12000	2.1	MULTIGRAVIDA	320 ML	4
46		SAVITA SIDDA	39079	31-01-2022	31-01-2022	PRIMIGRAVIDA	80	140/90	PRIMIGRAVID	12.8	8900	3.2	GESTATIONAL HY	320 ML	3
47		SARU R	40300	31-01-2022	01-02-2022	G3P2L2	86	120/70	G3P2L2 WITH	10.38	8800	3.2	MULTIGRAVIDA	310 ML	4
48		SUJATA SHIVA	41709	02-02-2022	02-02-2022	G2P1L1	78	120/80	G2P1L1 WITH	7.6	8700	1.8	MODERATE ANEI	350 ML	3
49		BIBANBI	43052	03-02-2022	03-02-2022	G2P1L1	76	110/80	G2P1L1 WITH	11	8600	2.6	POLYHYDROMNI	280 ML	4
50		LAXMI SHIVAI	45797	04-02-2022	04-02-2022	G4P2L2A1	96	130/80	G4P2L2A1 WI	11	8600	1.8	MULTIGRAVIDA	350 ML	3
51		POOJA	47216	05-02-2022	05-02-2022	PRIMIGRAVIDA	98	140/90	PRIMIGRAVID	10.8	8600	3.2	GESTATIONAL HY	300 ML	5
52		SUDHARANI	47289	06-02-2022	06-02-2022	G3P1L1A1	96	120/70	G3P1L1A1 WI	10.9	8600	2.8	MULTIGRAVIDA	360 ML	3
53		PALLAVI RAM	47989	07-02-2022	07-02-2022	PRIMIGRAVIDA	100	130/90	PRIMIGRAVID	10.8	8860	3.2	SEVERE PE	340 ML	4
54		HUVAMMA	50818	08-02-2022	09-02-2022	G3P2L2	96	120/80	G3P2L2 WITH	10.8	8600	2.3	MULTIGRAVIDA	360 ML	3
55		AKSHATA	53910	11-02-2022	11-02-2022	G2P1D1	96	120/80	G2P1D1 WITH	6	8600	3.8	SEVERE ANEMIA	380 ML	4
56		YASHODA	55155	11-02-2022	11-02-2022	G3P1L1A1	80	110/80	G3P1L1A1 WI	10.6	8600	1.8	MULTIGRAVIDA	330 ML	3
57		SANGEETA	55264	11-02-2022	11-02-2022	PRIMIGRAVIDA	96	120/80	PRIMIGRAVID	11	8660	1.8	POLYHYDROMNI	280 ML	4
58		RANI BABAGC	56457	12-02-2022	12-02-2022	G2P1L1	100	130/90	G2P1L1 WITH	12.8	18000	1.6	GESTATIONAL HY	330 ML	3
59		GEETA NAND	56505	13-02-2022	13-02-2022	G2P1L1	96	120/80	G2P1L1 WITH	6.2	8600	1.2	SEVERE ANEMIA	380 ML	4



20	AMRUTA	13083	10-01-2022	11-01-2022	G2P1L1	80	120/80	G2P1L1 WITH	8.6	8230	3.2	MILD ANEMIA	280 ML	4
21	BHARATI BAI	13107	10-01-2022	11-01-2022	G4P3L2D1	80	180/80	G4P3L2D1 WI	12	8700	1.7	MULTIGRAVIDA \	300 ML	2
22	ASHWINI VEE	14630	12-01-2022	12-01-2022	PRIMIGRAVIDA	96	130/80	PRIMIGRAVID	9	8600	2.3	MILD ANEMIA	330 ML	2
23	BHAVYA	14657	12-01-2022	12-01-2022	G2P1L1	98	130/90	G2P1L1 WITH	10.8	8700	3.2	POLYHYDROMNI	350 ML	3
24	RADHIKA SHE	16395	13-01-2022	13-01-2022	G2P1L1	94	140/90	G2P1L1 WITH	10.8	8320	2.6	GESTATIONAL HY	280 ML	3
25	VANI JATTI	16401	13-01-2022	13-01-2022	G4P23L3	80	120/70	G4P23L3 WITI	10.2	8600	3.2	MULTIGRAVIDA	340 ML	4
26	YALLAMMA	17768	13-01-2022	14-01-2022	G5P2L2A2	82	120/80	G5P2L2A2 WI	10.6	8200	1.84	GESTATIONAL HY	330 ML	3
27	SAVITA	18449	14-01-2022	14-01-2022	G4P3L2D1	92	120/70	G4P3L2D1 WI	12	8600	2.8	MULTIGRAVIDA	330 ML	2
28	NANDINI	11343	14-01-2022	14-01-2022	G5P3L3A1	82	120/70	G5P3L3D1 WI	10.6	17000	2.8	MULTIGRAVIDA	280 ML	3
29	NEELAMMA	20141	16-01-2022	16-01-2022	G3P2L2	98	120/80	G3P2L2 WITH	10.9	8700	3.8	MULTIGRAVIDA	300 ML	4
30	ANITA	22347	17-01-2022	17-01-2022	PRIMIGRAVIDA	88	120/80	PRIMIGRAVID	9	8300	1.34	MILD ANEMIA	350 ML	3
31	SAHANA	22388	18-01-2022	18-01-2022	PRIMIGRAVIDA	80	120/80	PRIMIGRAVID	10.2	8600	3.8	POLYHYDROMNI	310 ML	2
32	SHRIDEVI PUJ	21423	18-01-2022	18-01-2022	G3P2L2	96	120/80	G3P2L2 WITH	11	8600	2.8	MULTIGRAVIDA	330 ML	3
33	SUREKHA	22957	18-01-2022	18-01-2022	G2P1L1	80	140/80	G2P1L1 WITH	11.6	8090	3.8	GESTATIONAL HY	350 ML	4
34	JYOTI	23945	19-01-2022	19-01-2022	G2P1L1	90	120/80	G2P1L1 WITH	8.2	8900	2.4	MODERATE ANEI	330 ML	2
35	SUREKHA NIN	25453	19-01-2022	19-01-2022	G2P1L1	80	140/86	G2P1L1 WITH	10.8	8900	3.8	GESTATIONAL HY	340 ML	3
36	GULFAM	28050	21-01-2022	21-01-2022	G3P2L2	82	120/80	G3P2L2 WITH	10	8900	3.6	MULTIGRAVIDA	360 ML	4
37	GAYATRI	27494	21-01-2022	21-01-2022	G3P1L1A1	80	120/80	G3P1L1 A1 WI	11	8600	3.2	MULTIGRAVIDA	320 ML	2
38	BAGASAWWA	29887	22-01-2022	22-01-2022	PRIMIGRAVIDA	80	170/88	PRIMIGRAVID	13	8600	1.6	ANTEPARTUM EC	360 ML	3
39	LAXMI	29902	23-01-2022	23-01-2022	G4P3L3	90	120/80	G4P3L3	10.4	8700	2.4	MULTIGRAVIDA	380 ML	4



SL. NO	NAME	IP NUMBER	DOA	D/O STUDY	OBSTETRICS SCORE	PR(BPM)	(MMHG)	DIAGNOSIS	HB	TC	PLATELETS	COMORBIDITIES	AMOUNT	TIME TAKEN TO STOP BLEDIN
1	SHREEDEVI	148713	26-12-2021	26-12-2021	G2P1L1	90	130/90	G2P1L1 WITH	12.1	13080	1.5	GHTN	250 ML	3
2	SHANTA SIDD	312028	27-12-2021	27-12-2021	G2P1L1	84	110/70	G2P1L1 WITH	9.2	8700	2.4	MILD ANEMIA	230 ML	4
3	VIJAYALAXMI	313075	28-12-2021	28-12-2021	G4P2L2A1	94	130/80	G4P2L2A1 WI	10.2	8720	3.02	MULTIGRAVIDA	300 ML	3
4	PRADYANA	313777	28-12-2021	28-12-2021	G3A2	90	130/90	G3A2 WITH 3	10.2	11200	3.2	MULTIGRAVIDA	350 ML	4
5	KAVERI	314500	29-12-2021	29-12-2021	PRIMIGRAVIDA	88	130/90	PRIMIGRAVID	11	8700	1.5	MILD PE	280 ML	3
6	SHREEDEVI	301785	29-12-2021	29-12-2021	G2A1	98	130/80	G2A1 WITH 3	10.8	11300	1.3	POLYHYDROMNI	280 ML	4
7	SUJATA	1	01-01-2022	01-01-2022	G2P1L1	92	130/90	G2P1L1 WITH	10.6	8900	2.36	GESTATIONAL HY	300 ML	3
8	PRABHA	62	01-01-2022	02-01-2022	PRIMIGRAVIDA	84	110/80	PRIMIGRAVID	10.6	8300	2.76	POLYHYDROMNI	320 ML	2
9	BHAGYASHRE	2015	03-01-2022	03-01-2022	G2P1L1	96	140/80	G2P1L1 WITH	6.2	11200	90K	SEVERE ANEMIA	350 ML	3
10	SHRUTI	2003	03-01-2022	03-01-2022	PRIMIGRAVIDA	90	140/90	PRIMIGRAVID	10.6	8700	3.2	GESTATIONAL HY	300 ML	4
11	USHA PATIL	6944	06-01-2022	06-01-2022	G3P2L2	80	120/70	G3P2L2 WITH	10.6	8320	2.1	MULTIGRAVIDA	300ML	3
12	RENUKA	7931	06-01-2022	06-01-2022	G3P2L1D1	90	130/90	G3P2L1D1 WI	10.38	11200	2.6	MULTIGRAVIDA	280 ML	2
13	SANGEETA JE	8229	07-01-2022	07-01-2022	G3P2L2	86	120/70	G3P2L2 WITH	10.8	8070	2.3	MULTIGRAVIDA	320 ML	4
14	RADHIKA PAT	8226	07-01-2022	07-01-2022	G2P1L1	86	130/80	G2P1L1 WITH	8.8	8190	1.4	MODERATE ANEI	320 ML	3
15	RAJASRI PRAE	9438	07-01-2022	07-01-2022	PRIMIGRAVIDA	84	170/90	PRIMIGRAVID	11	8600	2.3	IMMINENT ECLAI	300 ML	3
16	ASHWINI	12184	10-01-2022	10-01-2022	G3P1L1A1	94	120/70	G3P1L1 A1 WI	11	8600	2.3	MULTIGRAVIDA	350 ML	4
17	ARATI	11573	10-01-2022	10-01-2022	G3P2L2	100	130/80	G3P2L2 WITH	10.2	7300	2	MULTIGRAVIDA	300 ML	4
18	SUMANGALA	318412	10-01-2022	10-01-2022	G2P1L1	96	130/90	G2P1L1 WITH	10.8	3200	60K	GESTATIONAL TH	280 ML	4
19	SUMANGALA	13811	11-01-2022	11-01-2022	G3P2L2	86	120/70	G3P2L2 WITH	10.6	7800	2.6	MULTIGRAVIDA	320 ML	4



45	SAMPA PUJARI	21	14-12-2021	90	110/90	PRIMIGRAVIDA WITH	10.8	08:25PM	09:25PM	3 TIMES	1 HOUR	POLYHYDRAMNIOS	60 ML	2
46	ZAREENA KODEKAL	28	14-12-2021	86	100/70	G3P2L2 WITH 40 WEE	11	09:45PM	10:45PM	3 TIMES	1 HOUR	MULTIGRAVIDA	40 ML	3
47	BAGAMMA SHRISHAIL	24	14-12-2021	88	140/90	G2P1L1 WITH 38 WEE	11	11:55PM	12:55AM	1 TIMES	1 HOUR	GESTATIONAL HYPEI	50 ML	3
48	SUPRITA KATTIMANI	20	15-12-2021	88	110/80	PRIMIGRAVIDA WITH	10.8	01:26AM	02:26AM	3 TIMES	1 HOUR	POLYHYDRAMNIOS	40 ML	2
49	KAVERI BELLANAVAR	26	15-12-2021	80	100/80	G2P1D1 WITH 38 WE	6.2	05:25AM	06:25AM	4 TIMES	1 HOUR	SEVERE ANEMIA	70 ML	3
50	LAXMI KUMBAR	25	15-12-2021	80	160/90	G2P1L1 WITH 39 WEE	10.58	05:40PM	06:40PM	3 TIMES	1 HOUR	SEVERE PE	50 ML	2
51	KUSUMA	19	15-12-2021	88	110/80	PRIMIGRAVIDA WITH	6.4	06:25PM	07:25PM	4 TIMES	1 HOUR	SEVERE ANEMIA	85 ML	2
52	NILAKKA RATHOD	24	15-12-2021	96	110/80	G4P2L2A1 WITH 41 W	10	09:45PM	10:45PM	3 TIMES	1 HOUR	MULTIGRAVIDA	70 ML	3
53	SUJATA SAJJAN	24	16-12-2021	90	100/80	PRIMIGRAVIDA WITH	10.8	10:15AM	11:15AM	3 TIMES	1 HOUR	POLYHYDRAMNIOS	60 ML	2
54	RESHMA BASAVARAJ	21	17-12-2021	90	150/100	G3P2L2 WITH 40 WEE	10.6	01:15AM	02:00PM	2 TIMES	1 HOUR	MULTIGRAVIDA WIT	50 ML	2
55	MANJULA NIRANJI	22	17-12-2021	88	130/80	G3P2L1D1 WITH 39 W	10.8	03:32AM	04:32PM	1 TIMES	1 HOUR	MULTIGRAVIDA	40 ML	2
56	POOJA VIJAYAKUMAR	24	17-12-2021	90	140/86	G2A1 WITH 39 WEEKS	10.8	11:35AM	12:35PM	2 TIMES	1 HOUR	GESTATIONAL HYPEI	80 ML	2
57	NEELAMMA MUTTANNA	25	17-12-2021	84	120/70	PRIMIGRAVIDA WITH	9.6	02:04PM	03:04PM	1 TIMES	1 HOUR	MODERATE ANEMIA	60 ML	2
58	SOWMYA KAMBALE	20	17-12-2021	90	140/90	G2P1L1 WITH 39 WEE	10.3	05:23PM	06:23PM	2 TIMES	1 HOUR	GESTATIONAL HYPEI	80 ML	3
59	SHRUSTI LONI	22	17-12-2021	92	150/90	G2P1L1 WITH 39 WEE	13.2	09:30PM	10:30PM	2 TIMES	1 HOUR	MILD PE	60 ML	2
60	BHAGYASHREE	20	17-12-2021	86	120/80	PRIMIGRAVIDA WITH	8	11:58AM	12:58PM	1 TIMES	1 HOUR	MODERATE ANEMIA	40 ML	3
61	AYESHA KURESHI	34	22-12-2021	80	120/70	G2P1L1 WITH 40 WEE	10.8	10:51AM	11:51AM	2 TIMES	1 HOUR	POLYHYDRAMNIOS	50 ML	3
62	INDRABAI SHANKAR	30	22-12-2021	90	130/80	G6P3L3A2 WITH 38 W	11	03:35PM	04:45PM	1 TIMES	1 HOUR	GRANDMULTIGRAVI	50 ML	2
63	AISHWARYA	23	23-12-2021	90	140/90	PRIMIGRAVIDA WITH	10	07:55AM	08:55AM	3 TIMES	1 HOUR	GESTATIONAL HYPEI	80 ML	3
64	SIDDAMMA WALIKAR	34	24-12-2021	94	130/80	G4P3L3 WITH 37 WEE	13.2	05:38AM	06:00AM	2 TIMES	1 HOUR	MULTIGRAVIDA	60 ML	3

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
40	ROOPA IBRAHIMPURA	25	16-08-2021	88	120/70	G3P2L1D1 WITH 40 W	12.8	06:15PM	07:45PM	4 TIMES	1 HOUR	MULTIGRAVIDA	50 MLS	2
41	PREETI KAMBLE	22	15-09-2021	86	110/70	G3P1L1A1 WITH 39 W	10.8	06:30AM	07:30AM	3 TIMES	1 HOUR	MULTIGRAVIDA	70 ML	2
42	LAXMI PAWAR	20	15-09-2021	80	130/80	PRIMIGRAVIDA WITH	10.6	01:00PM	02:00PM	3 TIMES	1 HOUR	GESTATIONAL THRO	60 ML	3
43	GOUSIYA DARGA	26	20-09-2021	86	130/80	G2P1L1 WITH 40 WEE	8.2	09:06PM	10:06PM	4 TIMES	1 HOUR	MODERATE ANEMIA	40 ML	2
44	VARSHA GALASANGI	26	08-10-2021	80	110/70	G2P1L1 WITH 36 WEE	10.7	09:30PM	10:30PM	4 TIMES	1 HOUR	GESTATIONAL THRO	40 ML	3
45	SAMPA PUJARI	21	14-12-2021	90	110/90	PRIMIGRAVIDA WITH	10.8	08:25PM	09:25PM	3 TIMES	1 HOUR	POLYHYDRAMNIOS	60 ML	2
46	ZAREENA KODEKAL	28	14-12-2021	86	100/70	G3P2L2 WITH 40 WEE	11	09:45PM	10:45PM	3 TIMES	1 HOUR	MULTIGRAVIDA	40 ML	3
47	BAGAMMA SHRISHAIL	24	14-12-2021	88	140/90	G2P1L1 WITH 38 WEE	11	11:55PM	12:55AM	1 TIMES	1 HOUR	GESTATIONAL HYPEI	50 ML	3
48	SUPRITA KATTIMANI	20	15-12-2021	88	110/80	PRIMIGRAVIDA WITH	10.8	01:26AM	02:26AM	3 TIMES	1 HOUR	POLYHYDRAMNIOS	40 ML	2
49	KAVERI BELLANAVAR	26	15-12-2021	80	100/80	G2P1D1 WITH 38 WE	6.2	05:25AM	06:25AM	4 TIMES	1 HOUR	SEVERE ANEMIA	70 ML	3
50	LAXMI KUMBAR	25	15-12-2021	80	160/90	G2P1L1 WITH 39 WEE	10.58	05:40PM	06:40PM	3 TIMES	1 HOUR	SEVERE PE	50 ML	2
51	KUSUMA	19	15-12-2021	88	110/80	PRIMIGRAVIDA WITH	6.4	06:25PM	07:25PM	4 TIMES	1 HOUR	SEVERE ANEMIA	85 ML	2
52	NILAKKA RATHOD	24	15-12-2021	96	110/80	G4P2L2A1 WITH 41 W	10	09:45PM	10:45PM	3 TIMES	1 HOUR	MULTIGRAVIDA	70 ML	3
53	SUJATA SAJJAN	24	16-12-2021	90	100/80	PRIMIGRAVIDA WITH	10.8	10:15AM	11:15AM	3 TIMES	1 HOUR	POLYHYDRAMNIOS	60 ML	2
54	RESHMA BASAVARAJ	21	17-12-2021	90	150/100	G3P2L2 WITH 40 WEE	10.6	01:15AM	02:00PM	2 TIMES	1 HOUR	MULTIGRAVIDA WIT	50 ML	2
55	MANJULA NIRANJI	22	17-12-2021	88	130/80	G3P2L1D1 WITH 39 W	10.8	03:32AM	04:32PM	1 TIMES	1 HOUR	MULTIGRAVIDA	40 ML	2
56	POOJA VIJAYAKUMAR	24	17-12-2021	90	140/86	G2A1 WITH 39 WEEKS	10.8	11:35AM	12:35PM	2 TIMES	1 HOUR	GESTATIONAL HYPEI	80 ML	2
57	NEELAMMA MUTTANNA	25	17-12-2021	84	120/70	PRIMIGRAVIDA WITH	9.6	02:04PM	03:04PM	1 TIMES	1 HOUR	MODERATE ANEMIA	60 ML	2
58	SOWMYA KAMBALE	20	17-12-2021	90	140/90	G2P1L1 WITH 39 WEE	10.3	05:23PM	06:23PM	2 TIMES	1 HOUR	GESTATIONAL HYPEI	80 ML	3
59	SHRUSTI LONI	22	17-12-2021	92	150/90	G2P1L1 WITH 39 WEE	13.2	09:30PM	10:30PM	2 TIMES	1 HOUR	MILD PE	60 ML	2

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
20	JASMEEN YALAGAR	28	16-08-2021	82	180/86	PRIMIGRAVIDA WITH	12	08:15PM	09:15PM	03 TIMES	1 HOUR	SEVERE PE	70 ML	3
21	PUTALABAI HARANUR	20	19-08-2021	90	130/80	PRIMIGRAVIDA WITH	13.5	11:40AM	12:40PM	04 TIMES	1 HOUR	POLYHYDRAMNIOS	80 ML	2
22	SHRIDEVI BADIGER	28	20-08-2021	88	140/80	G2P1L1 WITH 38 WEE	11.9	06:35AM	07:35AM	04 TIMES	1 HOUR	GHTN	80 ML	3
23	KALPANA DUDDANAGI	24	24-08-2021	82	170/90	G2A1 WITH 41 WEEKS	11.9	12:35PM	01:35PM	04 TIMES	1 HOUR	SEVERE PE	80 ML	2
24	GEETA BAGALI	24	24-08-2021	86	140/90	G2P1L1 WITH 41 WEE	13.3	10:35AM	11:35AM	03 TIMES	1 HOUR	GHTN	80 ML	3
25	SAMEENA SINDAGI	21	25-08-2021	86	140/90	PRIMIGRAVIDA WITH	13.3	08:10PM	09:10PM	04 TIMES	1 HOUR	GHTN	70 ML	2
26	KAVERI SOUDGAR	24	08-07-2021	82	114/70	G2P1L1 WITH 40 WEE	8.5	09:10PM	10:10PM	04 TIMES	2 HOUR	MODERATE ANEMIA	80 ML	3
27	PRAMILA HALAMANI	27	02-07-2021	86	130/80	G2P1L1 WITH 39 WEE	13.7	06:00PM	07:00PM	04 TIMES	1 HOUR	GESTATIONAL THRO	80 ML	3
28	BHAGYASHREE URARANI	24	20-08-2021	90	110/80	G3P2L2 WITH 37 WEE	14.3	08:20PM	09:20PM	04 TIMES	1 HOUR	MULTIGRAVIDA	60 ML	2
29	SUNITA BIRADAR	30	30-09-2021	80	120/80	G3P1L1A1 WITH 39 W	11.5	08:45AM	09:45AM	04 TIMES	1 HOUR	MULTIGRAVIDA	60 ML	2
30	LAVANYA KADAGI	22	02-09-2021	86	120/80	G2P1L1 WITH 39 WEE	9	04:45AM	05:45AM	2 TIMES	1 HOUR	MILD ANEMIA	90 ML	2
31	MUBINA KALASAKOPPA	21	04-09-2021	86	120/70	PRIMIGRAVIDA WITH	8.2	09:30AM	10:30AM	4 TIMES	1 HOUR	MODERATE ANEMIA	60 ML	3
32	NIRMALA HIREMATH	19	05-09-2021	84	120/80	PRIMIGRAVIDA WITH	8.8	10:25AM	11:25AM	3 TIMES	1 HOUR	MODERATE ANEMIA	80 ML	2
33	SANGEETA	25	04-09-2021	88	150/86	G2P1L1 WITH 40 WEE	10.3	12:30AM	01:30AM	4 TIMES	1 HOUR	GESTATIONAL HYPEI	80 ML	2
34	PARVATI DANDARAGI	21	29-08-2021	80	200/100	PRIMIGRAVIDA WITH	11.6	04:00PM	05:00PM	3 TIMES	1 HOUR	SEVERE PE	80 ML	3
35	KIRAN HANDAGI	25	29-08-2021	80	110/70	G3P1L1A1 WITH 38 W	12.3	11:20AM	12:20AM	2 TIMES	1 HOUR	MULTIGRAVIDA	60 ML	2
36	SHRUTI SHIRAGANVI	22	13-09-2021	92	120/80	G2P1L1 WITH 39 WEE	11	10:25AM	11:25AM	2 TIMES	1 HOUR	POLYHYDRAMNIOS	60 ML	3
37	SUSHMITA KUSUNUR	25	08-09-2021	80	110/70	G3P2L2 WITH 38 WEE	11.6	07:45AM	08:45AM	3 TIMES	1 HOUR	MULTIGRAVIDA	220 ML	2
38	RANI MAHESHAWADAGI	22	12-09-2021	80	170/90	PRIMIGRAVIDA WITH	12	11:05PM	10:05AM	2 TIMES	1 HOUR	SEVERE PE	86 ML	3
39	RATNA NADUR	21	08-09-2021	92	130/80	PRIMIGRAVIDA WITH	8.7	01:45AM	02:45AM	3 TIMES	1 HOUR	MODERATE ANEMIA	80 ML	2

SL. NO	NAME	AGE(Years	DO STUDY	PR(BPM)	BP(MMHG)	DIAGNOSIS	HB	TOA	TOR	FOA	DOA	COMORBIDITIES	AMOUNT O	TIME TAKEN
1	PRABHAVATHI PATIL	25	05-04-2021	88	130/90	PRIMIGRAVIDA WITH	11	10:15PM	11:15PM	01 TIME	1 HOUR	GHTN	110 ML	2
2	SHASHIKALA HUGAR	20	03-07-2021	98	100/60	PRIMIGRAVIDA WITH	7.9	04:45PM	05:45PM	03 TIME	1 HOUR	MILD ANEMIA	130 ML	3
3	KAVITA BIRADAR	20	23-07-2021	80	120/80	PRIMIGRAVIDA WITH	12.3	09:00AM	10:00AM	02 TIMES	1 HOUR	POLYHYDRAMNIOS	140 ML	2
4	RAJASHREE S	29	24-07-2021	86	120/70	G3P2L2 WITH 37 WEE	9.7	09:35AM	10:35AM	03 TIMES	1 HOUR	MILD ANEMIA	110 ML	2
5	TASKIN MASALI	25	25-07-2021	80	110/80	G3P1L1A1 WITH 38 W	7.7	02:35PM	03:35PM	02 TIMES	1 HOUR	MODERATE ANEMIA	100 ML	3
6	SUJATA UKKALI	37	28-07-2021	92	136/84	G5P2L2A2 WITH 37 W	10.1	11:30PM	12:30AM	01 TIME	1 HOUR	MULTI GRAVIDA	120 ML	3
7	TARAMATI PRADANI	21	31-07-2021	78	110/70	PRIMIGRAVIDA WITH	8.8	08:45AM	09:45AM	02 TIMES	1 HOUR	MILD ANEMIA	120 ML	2
8	KASHIBAI KATYAL	36	30-07-2021	80	160/90	G2P1L1 WITH 39 WEE	10.9	07:40PM	08:40PM	03 TIMES	1 HOUR	SEVERE PE	120 ML	2
9	NAGAMMA CHAVANBAVI	29	01-08-2021	88	130/74	G4P3L2D1 WITH 40 W	7.3	01:05AM	02:05AM	03 TIMES	1 HOUR	MULTI GRAVIDA WI	130 ML	2
10	VANITA CHAVAN	29	05-08-2021	86	130/80	G4P2L2A1 WITH 40 W	10.9	04:35AM	05:35AM	03 TIMES	I HOUR	MULTI GRAVIDA	110 ML	2
11	RESHMA CHAPUR	25	04-08-2021	80	130/80	G4P3L3 WITH 39 WEE	12.9	10:45AM	11:45AM	03 TIMES	1 HOUR	MULTIGRAVIDA	110 ML	3
12	SHREEDEVI RATHOD	23	06-08-2021	88	120/80	G4P3L1D2 WITH 40 W	11.3	09:35PM	10:35PM	01 TIME	1 HOUR	MULTI GRAVIDA	130 ML	2
13	SOUMYA	22	04-08-2021	86	110/70	G2P1L1 WITH 37 WEE	12.1	08:00AM	09:00AM	03 TIMES	1 HOUR	GESTATIONAL THRO	80 ML	3
14	RENUKA BANDIVADDAR	26	09-08-2021	88	120/90	G3P2L2 WITH 39 WEE	11.8	11:05AM	12:05PM	03 TIMES	1 HOUR	MULTI GRAVIDA	90 ML	2
15	SUVARNA BAGEWADI	20	05-08-2021	62	170/110	PRIMIGRAVIDA WITH	7.9	02:15PM	03:15PM	04 TIMES	1 HOUR	SEVERE PE	100 ML	2
16	SUKANYA BALAGE	19	09-08-2021	88	124/80	G3P2L1D1 WITH 38 W	10.9	10:25PM	11:25PM	02 TIMES	1 HOUR	MULTI GRAVIDA	80 ML	2
17	MANJULA RATHOD	22	09-08-2021	110	150/100	G2A1 WITH 39 WEEKS	11.8	10:45PM	11:45PM	03 TIMES	1 HOUR	ANTE PARTUM ECLA	45 ML	2
18	DANAMMA PUJARI	30	13-08-2021	106	140/90	G2P1L1 WITH 40 WEE	10.9	08:30AM	09:30AM	02 TIMES	1 HOUR	GESTATIONAL HYPEI	100 ML	3
19	RIZWANA HUNATAGI	23	20-08-2021	84	130/90	PRIMIGRAVIDA WITH	7.2	06:20AM	07:20AM	04 TIMES	1 HOUR	MODERATE ANEMIA	70 ML	2

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
45	JAYASHREE	12354	28-01-2022	28-01-2022	G4P2L2A1	96	120/80	G4P2L2A1 WI	10.6	12000	2.1	MULTIGRAVIDA	320 ML	4
46	SAVITA SIDDA	39079	31-01-2022	31-01-2022	PRIMIGRAVIDA	80	140/90	PRIMIGRAVID	12.8	8900	3.2	GESTATIONAL HY	320 ML	3
47	SARU R	40300	31-01-2022	01-02-2022	G3P2L2	86	120/70	G3P2L2 WITH	10.38	8800	3.2	MULTIGRAVIDA	310 ML	4
48	SUJATA SHIVA	41709	02-02-2022	02-02-2022	G2P1L1	78	120/80	G2P1L1 WITH	7.6	8700	1.8	MODERATE ANE	350 ML	3
49	BIBANBI	43052	03-02-2022	03-02-2022	G2P1L1	76	110/80	G2P1L1 WITH	11	8600	2.6	POLYHYDROMNI	280 ML	4
50	LAXMI SHIVAI	45797	04-02-2022	04-02-2022	G4P2L2A1	96	130/80	G4P2L2A1 WI	11	8600	1.8	MULTIGRAVIDA	350 ML	3
51	POOJA	47216	05-02-2022	05-02-2022	PRIMIGRAVIDA	98	140/90	PRIMIGRAVID	10.8	8600	3.2	GESTATIONAL HY	300 ML	5
52	SUDHARANI	47289	06-02-2022	06-02-2022	G3P1L1A1	96	120/70	G3P1L1A1 WI	10.9	8600	2.8	MULTIGRAVIDA	360 ML	3
53	PALLAVI RAM	47989	07-02-2022	07-02-2022	PRIMIGRAVIDA	100	130/90	PRIMIGRAVID	10.8	8860	3.2	SEVERE PE	340 ML	4
54	HUVAMMA	50818	08-02-2022	09-02-2022	G3P2L2	96	120/80	G3P2L2 WITH	10.8	8600	2.3	MULTIGRAVIDA	360 ML	3
55	AKSHATA	53910	11-02-2022	11-02-2022	G2P1D1	96	120/80	G2P1D1 WITH	6	8600	3.8	SEVERE ANEMIA	380 ML	4
56	YASHODA	55155	11-02-2022	11-02-2022	G3P1L1A1	80	110/80	G3P1L1A1 WI	10.6	8600	1.8	MULTIGRAVIDA	330 ML	3
57	SANGEETA	55264	11-02-2022	11-02-2022	PRIMIGRAVIDA	96	120/80	PRIMIGRAVID	11	8660	1.8	POLYHYDROMNI	280 ML	4
58	RANI BABAGO	56457	12-02-2022	12-02-2022	G2P1L1	100	130/90	G2P1L1 WITH	12.8	18000	1.6	GESTATIONAL HY	330 ML	3
59	GEETA NAND	56505	13-02-2022	13-02-2022	G2P1L1	96	120/80	G2P1L1 WITH	6.2	8600	1.2	SEVERE ANEMIA	380 ML	4
60	SONALI KUMA	56516	13-02-2022	13-02-2022	G3P2L2	96	120/80	G3P2L2 WITH	12.6	8600	1.8	MULTIGRAVIDA	330 ML	4
61	PRIYANKA	57177	14-02-2022	14-02-2022	G3P2L2	80	120/70	G3P2L2 WITH	11.8	6800	2.1	MULTIGRAVIDA	280 ML	3
62	PAYAL ANKUS	58498	15-02-2022	15-02-2022	PRIMIGRAVIDA	78	160/90	PRIMIGRAVID	10.6	8600	1.2	IMMINENT ECLAI	380 ML	3
63	KAUSAR	58502	15-02-2022	15-02-2022	PRIMIGRAVIDA	96	160/80	PRIMIGRAVID	13	8600	1.8	SEVERE PE	380 ML	3
64	GANGASHREE	61069	18-02-2022	18-02-2022	PRIMIGRAVIDA	78	170/90	PRIMIGRAVID	10.8	8600	3.6	IMMINENT ECLAI	350 ML	4

IEC CERTIFICATE

B.L.D.E. (DEEMED TO BE UNIVERSITY) IEC/No-09/2021 Date-22/01/2021

(Declared vide notification No. F.9-37/2007-U.3 (A) Dated. 29-2-2008 of the MHRD, Government of India under Section 3 of the UGC Act, 1956)

The Constituent College

SHRI. B. M. PATIL MEDICAL COLLEGE, HOSPITAL AND RESEARCH CENTRE

INSTITUTIONAL ETHICAL CLEARANCE CERTIFICATE

The Institutional ethical committee of this college met on 11-01-2021 at 11-00 am to scrutinize the synopsis of Postgraduate students of this college from Ethical Clearance point of view. After scrutiny the following original/corrected and revised version synopsis of the Thesis has been accorded Ethical Clearance

Title: Prophylactic SR suction cannula application for high-risk women for atonic PPH-An interventional study.

Name of PG student: Dr Raghavendra Lokur
Department of Obst/Gynaec

Name of Guide/Co-investigator: Dr S R Mudanur, Professor & HOD of Obst/Gynaec

DR .S.V.PATIL
CHAIRMAN, IEC

Institutional Ethical Committee
B L D E (Deemed to be University)
Shri B.M. Patil Medical College,
VIJAYAPUR-586103 (Karnataka)

Following documents were placed before Ethical Committee for Scrutinization:

1. Copy of Synopsis / Research project
2. Copy of informed consent form
3. Any other relevant documents.

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PLAGARISM REPORT

20BMOBG012-RAGHAVENDRA-PROPHYLACTIC SR SUCTION CANNULA APPLICATION FOR HIGH-RISK WOMEN FOR ATONIC PPH – AN INTERVENTIONAL STUDY

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