A CLINICAL STUDY OF COMPARISON OF MATERNAL AND FETAL OUTCOME BETWEEN PRIMIGRAVIDA AND MULTIGRAVIDA WOMEN WITH PLACENTA PREVIA ADMITTED AT A TERTIARY CARE CENTRE IN VELLORE, TAMILNADU – A PROSPECTIVE COHORT STUDY

Dissertation Submitted to

THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY

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M.S. BRANCH (II) – OBSTETRICS AND GYNAECOLOGY

REGISTRATION NUMBER : 221916956

GOVERNMENT VELLORE MEDICAL COLLEGE

THE TAMIL NADU DR.M.G.R.MEDICAL UNIVERSITY

TAMILNADU, INDIA

May 2022

CERTIFICATE

This is to certify that, the dissertation **entitled "A CLINICAL STUDY OF COMPARISON OF MATERNAL AND FETAL OUTCOME BETWEEN PRIMIGRAVIDA AND MULTIGRAVIDA WOMEN WITH PLACENTA PREVIA ADMITTED AT A TERTIARY CARE CENTRE IN VELLORE, TAMILNADU – A PROSPECTIVE COHORT STUDY** is a bonafide work done by DR.K.G.UTHRA during her **M.S. (Obstetrics and Gynaecology)** course **2019-2022,** is submitted in partial fulfilment of the requirement for the M.S.(BRANCH-II) – OBSTETRICS AND GYNAECOLOGY of The Tamilnadu Dr. MGR Medical University, May 2022 Examination.

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Reg.No. ECR/1215/Inst/TN/2019

Title of the Study	COMPARISON OF MATERNAL AND FETAL OUTCOME BETWEEN PRIMIGRAVIDA AND MULTIGRAVIDA WOMEN WITH PLACENTA PREVIA ADMITTED AT TERTIARY CARE CENTRE IN VELLORE, TAMIL NADU - A PROSPECTIVE COHORT STUDY AT GOVERNMENT VELLORE MEDICAL COLLEGE AND HOSPITAL, VELLORE..
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The request for an approval from the Institutional Ethical and Scientific Committee (IEC) was considered on the IEC meeting held on 14.07.2021 at the Conference Hall, Govt. Vellore Medical College, Vellore-11.

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DECLARATION

I, certainly declare that this dissertation titled **COMPARISON OF MATERNAL AND FETAL OUTCOME BETWEEN PRIMIGRAVIDA AND MULTIGRAVIDA WOMEN WITH PLACENTA PREVIA ADMITTED AT A TERTIARY CARE CENTRE IN VELLORE, TAMILNADU – A PROSPECTIVE COHORT STUDY** represents a genuine work of me. The contributions of any supervisors to the research are consistent with normal supervisory practice are acknowledged.

I also affirm that this bonafide work or part of this work was not submitted by me or any others for any award, degree or diploma to any other university board, either in India or abroad. This is submitted to The Tamil Nadu Dr. M.G.R Medical University, Chennai in partial fulfilment of the rules and regulations for the award of Master of Surgery Degree Branch-II (Obstetrics And Gynaecology).

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CONTENTS

LIST OF ABBREVATIONS

APH	Antepartum hemorrhage
PPH	Postpartum hemorrhage
MMR	Maternal mortality rate
PMR	Perinatal mortality rate
PC	Packed cell
FFP	Fresh frozen plasma
CRYO	Cryoprecipitate
LSCS	Lower segment caesarean segment
LN	Labour natural
TVS	Trans vaginal ultrasonogram
TAS	Trans abdominal ultrasound

INTRODUCTION

The incidence of placenta previa was reported to be 0.5–1.0% from total number of pregnancies (4). This condition often requires intensive monitoring during hospitalization. Placenta previa has been associated with adverse maternal outcomes as well as neonatal outcomes. Studies have reported 5% of obstetric hysterectomies were due to placenta previa. Indication for emergency peripartum hysterectomy in recent years changed from uterine atony to abnormal placentation has now become a more common indication of pregnant women with previous caesarean scar(3). Placenta previa remains a risk factor for various maternal complications. There were higher incidence of postpartum haemorrhage (PPH) and blood transfusion in women with placenta previa compared to general population. Women with placenta previa were more likely to deliver babies before 37 weeks with Apgar score of less than 7. Studies showed that there were higher admission to neonatal intensive care unit, stillbirth and death. The exact pathophysiology of placenta previa is unknown; however it has been postulated that uterine scarring may be responsible for this abnormal implantation. Adverse maternal ages, higher parity, caesarean delivery, previous curettage, history of placenta previa, and abnormal uterus have been associated with increased risk of placenta previa.

AIM OF STUDY

The primary objective of the study is to compare the maternal and fetal outcome between primigravida and multigravida women with placenta previa admitted in Government Vellore Medical College, Tamil Nadu

Maternal outcome: Normal vaginal delivery, LSCS, PPH, heart failure and cardiogenic shock, thromboembolic manifestations, cerebro-vascular accidents, arrhythmia, acute coronary syndromes, aortic complications.

Fetal outcome: Live births, IUGR / Low birth weight, still birth, spontaneous abortion, therapeutic abortion, congenital anomalies, fetal bleeding.

REVIEW OF LITERATURE

Harvey (1971) studied 89 patients retrospectively diagnosed placenta previa plotted against fetal weight and graph using 1 to 2 standard deviation from normal. There was no evidence of fetal growth retardation in women diagnosed with placenta previa.

McShane PM, Heyl PS and Epstein MF (1985) reviewed 147 cases with partial or complete placenta previa from 1975-1982 and concluded that history of prior caesarean section associated with significant rise in maternal morbidity,(like massive hemorrhage ,placenta accreta and hysterectomy). With tocolytic usage, 2/3rd of patients delivered before 36 weeks and perinatal mortality was 81/1000.

TaylorYM(1995) studied 810 women of Asian origin living in Washington versus 2917 white women randomly as control and concluded that women of Asian origin had 86% increased chance for placenta previa than control (Catanzarite et al., 1996). Suggested that the leading indication for cesarean hysterectomy is placenta accreta. (Miller et al., 1997) incidence of Placenta previa occurs 5 of 1,000 deliveries and has a mortality rate of 0.03% (Ananth etal., 2003) the incidence of placenta accreta is almost 10%.

Ananth CV(1997) bleeding in pregnancy is increased with parity, smoking ,history of PIH and sex of the off-spring in 123941 singleton women (1980-1993). Placenta previa increased with maternal age by 9 times when age was >40 years and there was no relation of sex of the offspring with incidence of placenta previa.

Placenta previa appears as protective factor against PIH due to increase in premature deliveries, hence less chance for PIH at term.

Reddi Rani P. and Latha (1999) from JIPMER, Pondicherry.100 patients of placenta previa in 4 year were reviewed. Previous caesarean section/ abortion was associated in 20% of cases (multiparous in the age group of 20-29 years), while 48% of the patients had major degree of placenta previa and 33% had preterm deliveries and caesarean section rate was 64%. Perinatal mortality was 240/1000. However there was no maternal death. Author concludes that placenta previa account for approximately 0.5% of all deliveries but still remains a major cause of perinatal morbidity and mortality. Improvement in ultrasound, blood transfusion facilities, early detection of placenta previa and conservative management will help to decrease the perinatal mortality.

Buttler (2001) studied that in placenta previa the association between maternal serum alpha fetoprotein and adverse outcome, evaluated 107 pregnancies with placenta previa and found that 14/107 cases (13%) (95% CI: 7%,21%) had MSAFP at least twice the multiple of median, found that increased incidence in hospitalization for APH at gestational age <30 weeks (50%versus 15%), Delivery at gestational age <30 weeks (29% versus 5%) and preterm delivery at <34 weeks (14% versus 1%) when compared with control of women who had MSAFP <2 MOM.

Gillian (2002) studied in placenta previa association between previous LSCS and placenta previa and demonstrated that the effect of parity and previous LSCS had higher chance of placenta previa in primi versus previous LSCS.

A.S.Faiz (2003) prevalence rate of placenta previa was 4.0 per 1000 births, with the rate being higher among cohort studies (4.6 per 1000 births), USA-based studies (4.5 per 1000 births), hospital-based studies (4.4 per 1000 births) than among case-control studies (3.5 per 1000births), foreign-based studies (3.7 per 1000 births) and population-based studies (3.7 per 1000 births) respectively. Advancing maternal age, multiparity, previous Cesarean delivery and abortion, smoking and cocaine use during pregnancy, and male fetuses are increased risk for placenta previa.

Sharma A (2004) studied tocolysis and role of ritodrine in symptomatic placenta previa.60 women of placenta previa with gestational age between 28 to 34 weeks were studied, 30 women were given ritodrine and 30 women were treated symptomatically. They observed that in the study group, pregnancies were prolonged when compared to the control group ($p<0.05$). the drug had no adverse effect on mother and fetus.

Jackson RA(2004)-aim of study was to analyze whether pregnancies following IVF had higher risk of perinatal mortality, preterm delivery and increased chances of placenta previa. Gestational age (OR1.6;95%,CI1.3,2). Placenta previa were also significantly more prevalent in IVF group. Hence, IVF patients are required to be treated as high risk patients and need utmost detailed care and management.

Oyelue (2006) conducted a study on women with placenta previa and observed that when placenta is at a distance of >2cm from cervical os, women had more chances of having a safe vaginal delivery. They also concluded that regional anesthetic for LSCS is safe and rate of placenta accreta increased due to increase in rate of primary LSCS.

Ananth (2006) concluded with increase in age and parity (3+) the decrease in spacing between pregnancies also taken as a confounding factor for placenta previa.

Allen VM (2006) searched article in Cochrane Library and Medline from 1990 to 2005 related to ICSI, IVF, GIFT, ZIFT was excluded. Observed that the perinatal mortality was significantly higher in the study group, than in spontaneous conception. In the study group, perinatal mortality in assisted conception, twin pregnancies appear to be lowest than in spontaneously conceived twin pregnancies. Due to the above mentioned factors closed surveillance is mandatory.

Gobman (2007) analyzed the pregnancy outcome in women with placenta previa in relation to the number of previous sections in 19 academic centers over 4 years , concluded that women with increasing number of previous sections associated with increased maternal morbidity but not with perinatal morbidity.

In Egypt, El Sherbiny, (2008) reported that the risk of placenta accreta is about 15% after one cesarean section and 60% after previous four cesarean section.

Shonali Mayekar (2008) concluded that factors associated with development of placenta previa were advanced maternal age, number of previous cesarean sections, number of previous abortions and multiparity ; incidence of placenta previa was 1.8%, complications seen most commonly in the neonatal outcome was prematurity at birth (42.85%) > RDS (28.5%) >

aspiration(14.2%). 48% of the babies required resuscitation, out of which 24% required NICU admission , neonatal mortality in this study 280/1000 live births.

Vergani et al.,(2009)concluded that >2/3rd of women with a distance of > 10 mm from the placental edge to cervical os have vaginal delivery without an risk of hemorrhage.

Milosevic et al., (2009) concluded that >2/3rd of women exact etiology of placenta previa is unknown. The condition may be multifactorial i.e multiparity, multiple gestations, advanced maternal age, previous cesarean delivery, previous abortion, smoking.

The risk of neonatal mortality is higher for placenta previa babies compared with pregnancies without placenta previa (RCOG - 2011)

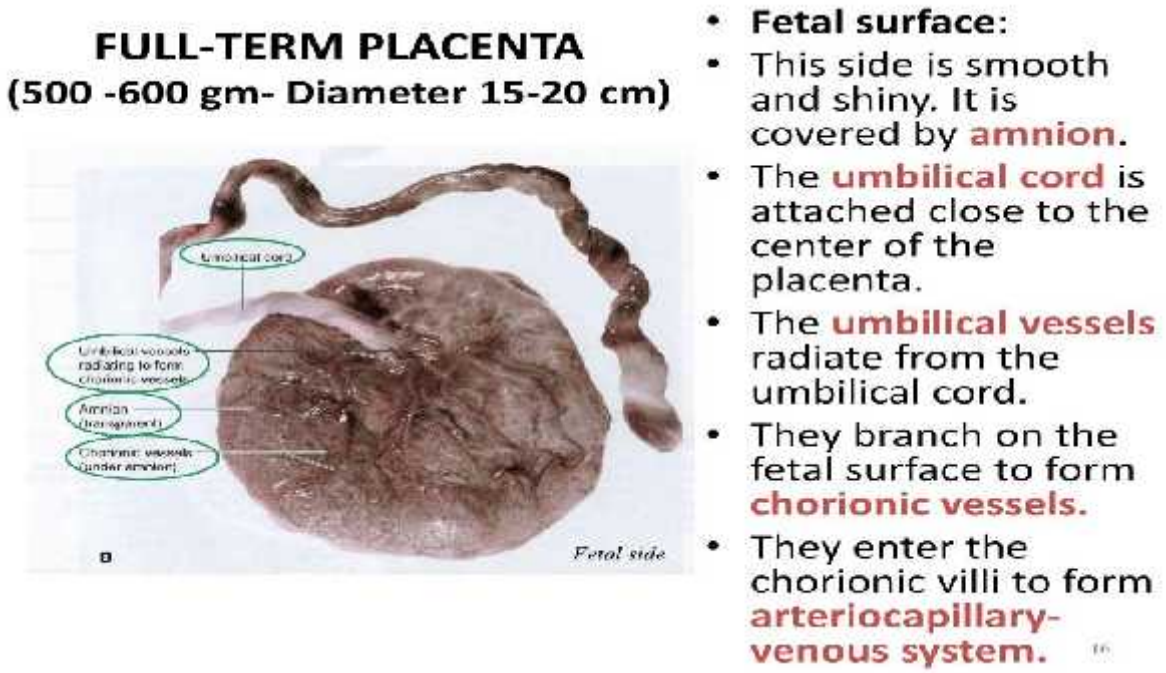
Gorodeski IG evaluated association between maternal and fetal-neonatal outcome in women with placenta previa and the site of Placenta Previa i.e. lowlying, marginal, partial or total. The following 3 were associated with Placenta Previa localization . Advanced maternal age was associated with major types of Placenta Previa, neonatal mortality in cases of vaginal delivery were associated with minor types of Placenta Previa.

Richard E. Besinger, use of tocolysis in symptomatic placenta previa associated with clinically significant delay of preterm delivery. Significant improvement in clinical parameters such as interval from admission to delivery was observed in the tocolysis group. There was no observed statistical difference between the two treatment groups with regard to incidence of recurrent bleeding, interval from admission to first recurrent bleeding , and need for transfusion.

PLACENTA :

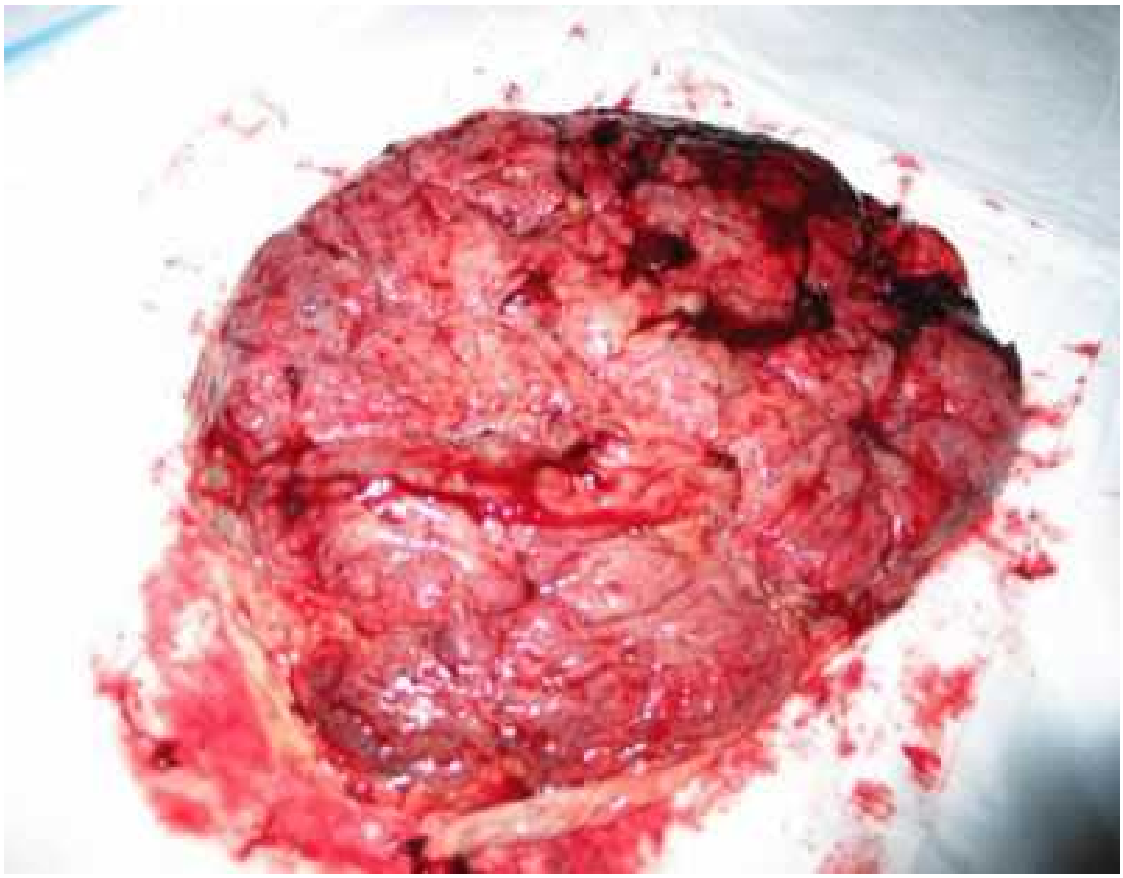
The placenta establishes connection between the mother and fetus through the umbilical cord. At term, Hemochorial, Hemo (blood) chorial (direct contact of the chorion with the maternal blood and decidua).

Shape -spongy, circular disc, **Diameter** - 15–20 cm , **Thickness -** 3 cm at its center. It thins off toward the edge. **Weight**- 500 gm, (weight of placenta :baby weight at term 1:6) **Two surfaces**, fetal and maternal, and a peripheral margin.



Fetal surface: (chorionic plate)	**Maternal surface:(basal plate)**
- smooth and glistening amnion with the umbilical cord attached at or near its center. - Branches of the umbilical vessels are visible beneath the amnion . -The amnion can be peeled off from the underlying chorion except at the insertion of the cord. -At term, 4/5th of the placenta is of fetal origin.	- Rough and spongy -Maternal blood gives it a dull red color. -15–20 convex polygonal areas -- lobes or cotyledons which are limited by fissures. -Each fissure is occupied by the decidual septum which is derived from the basal plate. -Numerous small grayish spots are visible. These are due to deposition of calcium in the degenerated areas and are of no clinical significance. -At term,1/5th of the placenta is of maternal origin

MATERNAL SIDE OF PLACENTA:



Margin: limited by the fused basal and chorionic plates and is continuous with the chorion laeve and amnion. Essentially, the chorion and the placenta are one structure but the placenta is a specialized part of the chorion.

DEVELOPMENT

The placenta is developed from two componenets. Fetal component develops from the chorion frondosum and the maternal component from decidua basalis.

On day 11 of interstitial implantation, all sides from the blastocyst is surrounded by lacunar spaces around cords of syncytial cells called trabeculae.

On day 13 trabeculae develops the stem villi connects the chorionic plate with the basal plate.

From stem villi-- Primary, secondary and tertiary villi developed.

On day 21 Arterio-capillary-venous system of each villus is completed. This ultimately makes connection with the intra embryonic vascular system through the body stalk

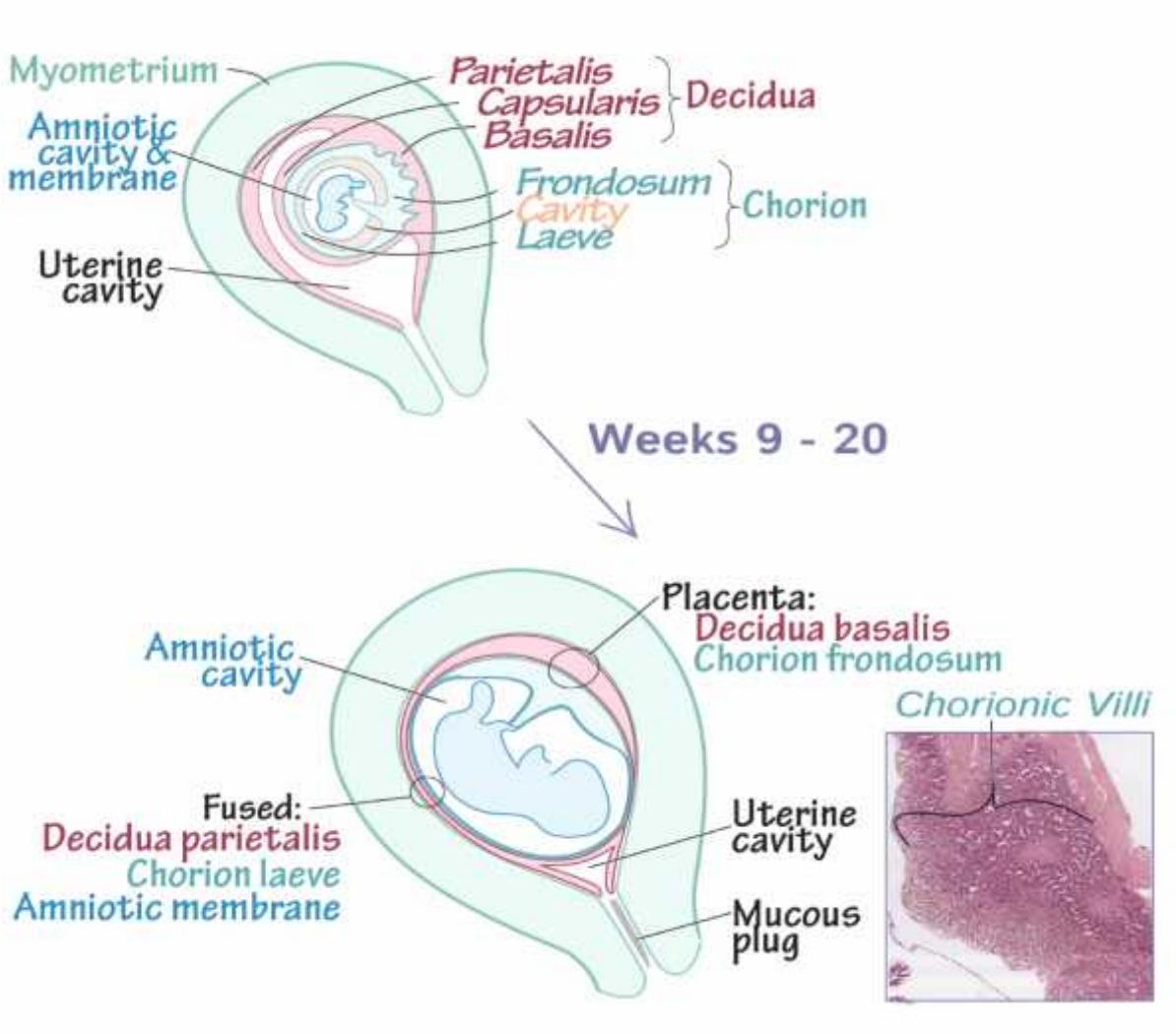
At 3^{rd}-4^{th} week, lacunar spaces form a syncytium filled with maternal blood. This space becomes the future intervillous space.

At 6^{th} week, decidua capsularis becomes thinner and both the villi and the lacunar spaces in decidua capsularis get obliterated, converting the chorion into chorion laeve.

Chorion frondosum and the decidua basalis form the discrete placenta. It begins at 6th week and is completed by 12th week

Until the end of the 16th week, the placenta grows both in thickness and circumference due to growth of the chorionic villi subsequently, there is little increase in thickness but it increases circumferentially till term. (28)

DEVELOPMENT OF PLACENTA:

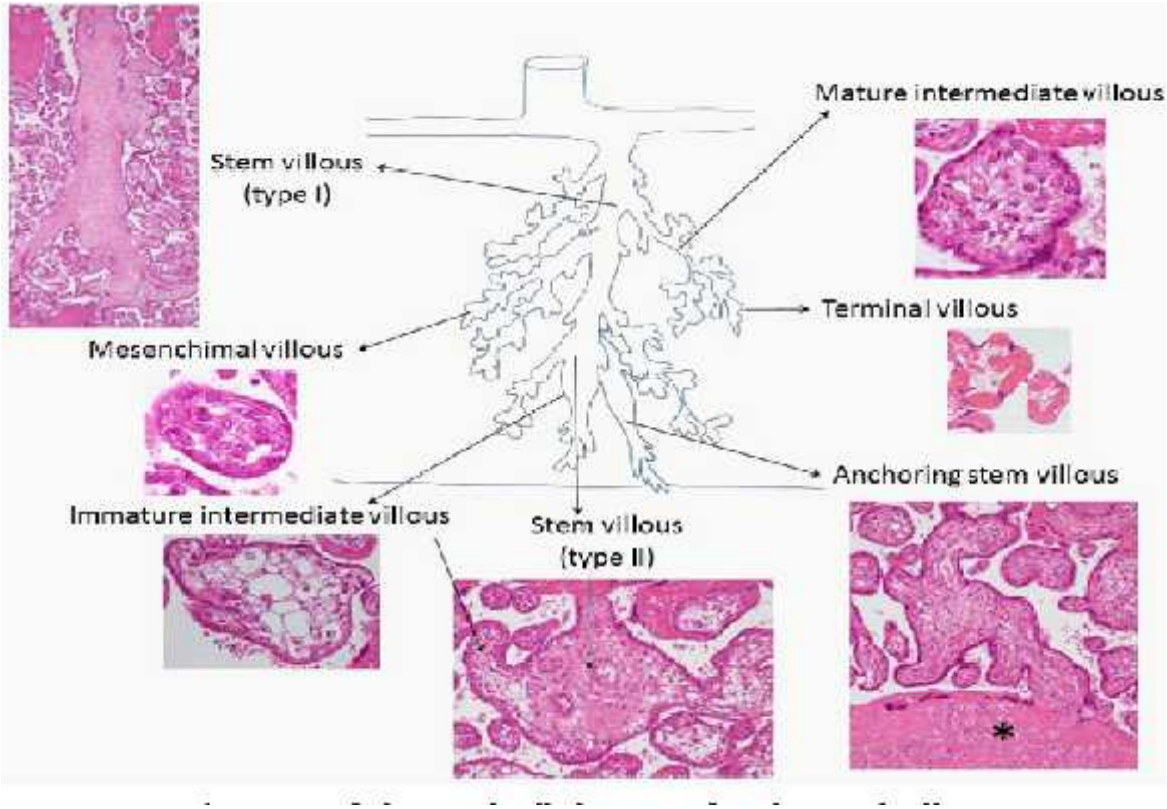


Attachment - usually attached to the upper part of the body of the uterus encroaching to the fundus adjacent to the anterior or posterior wall with equal frequency.

The attachment is effective due to anchoring villi connecting the chorionic plate with the basal plate and also by the fused decidua capsularis and vera with the chorion laeve at the margin.

Separation: Placenta separates after the birth of the baby and the line of separation is through the decidua spongiosum.

HISTOLOGICAL REPRESENTATION OF PLACENTA :



STRUCTURES

Two plates : 1) **chorionic plate** lies internally. It is lined by the amniotic membrane. The umbilical cord is attached to this plate. 2)**basal plate** lies to the maternal aspect

Between the two plates lies the intervillous space containing the stem villi with their branches, the space being filled with maternal blood.

CHORIONIC PLATE:	**BASAL PLATE:**
From within outward, 1.primitive mesenchymal tissue containing branches of umbilical vessels, 2.layer of cytotrophoblast 3. syncytiotrophoblast. The stem villi arise from the plate. It forms the inner boundary of the chorio decidual space.	From outside inwards, (1) Part of the compact and spongy layer of the decidua basalis (2) Nitabuch's layer of fibrinoid degeneration of the outer syncytiotrophoblast (3) Cytotrophoblastic shell; (4) Syncytiotrophoblast Maternal blood flows into the intervillous space by the spiral branches of the uterine vessels.

INTERVILLOUS SPACE: Bounded by inner side - chorionic plate and outer side by the basal plate, lined internally on all sides by the syncytiotrophoblast and is filled with slow flowing maternal blood. (28)

STEM VILLI:

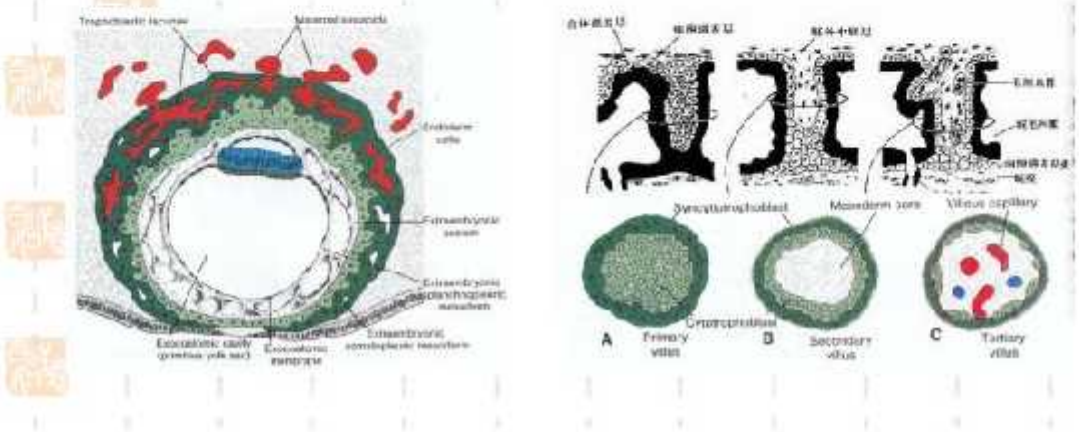
Arise from the chorionic plate and extends to the basal plate.About 60 stem villi persist in human placenta. For exchange total villi surface varies approximately 10-14m2. Fetal capillary system villi is 50km long(some of the villi anchoring the placenta to the decidua, majority are free within IVS – Nutritive villi) . Blood vessels – not anastomosis with neighbour one. It forms

Primary villi Forms functional unit of placenta-fetal cotyledon / placentome contain 15-29 major stem villi	Secondary villi	Tertiary villi Forms functional subunit – lobule

Development of villi

Week 2 to week 3

- Primary villi: cytotrophoblast+syncytiotrophoblast
- Secondary villi: extraembryonic mesoderm enter the primary villi
- Tertiary villi: extraembryonic mesoderm =>CT+BV



From outside inward:

(1) Outer syncytiotrophoblast (thin at places where fetal capillaries present, Thicker at where extensive endoplasmic reticulum present)

(2) Cytotrophoblast (basement membranes becomes thicker, Stroma contains dilated vessls with Hofbauer cells)(hofbauer cells -phagocytic cells, express class-II MHC)

(3) Basement membrane

(4) Central stroma containing fetal capillaries, primitive mesenchymal cells, connective tissue and a few phagocytic (Hofbauer) cells.

ETIOLOGY :

The etiology of placenta previa is unknown however damage to endometrial and myometrium or any process that interferes with placental migration increase the risk of placenta previa.(23,27)

Primary Isthmal implantation of Robert barnes in 1853 describes Placenta previa result from implantation of zygote low in the cavity of the uterus, the actual implantation site being in the isthmus or in the immediate neighbourhood of the isthmus

Secondary isthmal implantation of Newman & Luh 1934 described– placenta in its development comes to extend into the isthmus.

Dropping down theory: The fertilized ovum drops down and is implanted in the lower segment. Poor decidual reaction in the upper segment may be the cause. Failure of the zona pellucida to disappear in time. This explains the formation of central placenta previa.

Persistence of Chorionic activity: Persistence of Chorionic activity in the decidua capsularis and its subsequent development into capsular placenta which comes in contact with decidua Vera of the lower segment can explain the formation of lesser degrees of Placenta

Defective decidua: Defective decidua results in spreading of chorionic villi over wide area on uterine surface to get nourishment. During this process not only Placenta become membranous but encroaches on to the lower segment. Such a placenta previa may invade underlying decidua or myometrium to cause placenta accreta ,increta, percreta.

Large placental surface : Large placental surface in multiple pregnancies and Rh iso-immunization could predispose to lower implantation . A delayed implantation of fertilized ovum could be another cause.

Normal physiology

The blastocyst usually implants into upper anterior portion of uterus with a rich vascular supply. After the implantation, the chorionic villi grow into deciduas. At first these chorionic villi surround the blastocyst soon after the portion of chorionic villi in contact with decidua basalis proliferates into placenta and remaining atrophies.The chorionic villi are 2 types one opens into intervillous space and other in the anchoring villi to stabilize the embryo and placenta and is normally confined to endometrium. Functional villi have two invasions. Primary invasion into endometrium. Secondary invasion into 1/3 of myometrium .The nitabuchs membrane limits the invasion of anchoring villi. (28)

PATHOPHYSIOLOGY:

It is probable that as a result of some local aberration in uterine blood supply the distinction between the areas of chorion frondusum and chorionic leave does not occur and the developing ovum comes to derive its nourishment from lower region of uterus than in customary. With placenta previa blastocyst implants itself in the lower segment over or near the internal os. Decidual reaction in lower uterine segment is often inadequate so abortion occurs, also because of local inadequacy of decidua, patchy areas of morbid adhesion may occur. A large percentage about 90% migrates upward. In the presence of more than 2 cm placental cervical overlaps migration is rare. (Oppenheimer & others2001).

There are 2 current theories

1. The growth of lower uterine segment form 0.5cm -5 cm causes movement of placenta away from the internal os
2. Second theory postulates that the chorionic villi have the ability to grow in one areas and to remain dormant in other.

The decidua basalis is less developed in lower segment of uterus. The fibrinoid layer of nitabuch which stops further invasion of chorionic villi may be absent. Therefore placenta tissue may come into direct contact with the myometrium and placenta accreta, Increta and percreta can develop. It was

later proposed that placenta previa could develop after implantation in poorly vascularized upper uterine segment. The placenta thus spread over a larger area in order to function normally, on occasion extending into the lower segment. Due to increase vascularity, lower uterine segment and cervix becomes soft and more friable. Certainly in some cases of placenta previa the placenta is found to be thin and have large surface area. There is often tongue shaped extension from main placental mass. Extensive areas of degeneration with infarction and calcification may be evident, Succinturate lobes are not uncommon. The association with high parity might indicate that a highly fertile patient is more likely to retain, the ovum when its implants low within the uterus.

Abnormalities in placenta formation, cord insertion and vessel distribution more common with placenta previa. All varieties of placental malformation are seen: Ex: Bipartite, Succenturate Membranacea. Fenestrate and Accreta. Equally varied are the insertion of umbilical cord and distribution of the umbilical blood vessels. Eg: Battle dore insertion and velamentous distribution of the vessels.

Placental migration

It was demonstrated rate of placental migration was 0.1mm per week when it covered the os and 4.1mm per week when the placental age was more than 3cm from the os. The clinical implication of this study is that major degree placenta previa is likely to persist as previa at term rather than the one away from os. Placental migration is less likely if placenta is posterior, thick and the lower edge is less than 2cm from the os, or with the history of previous cesarean section.(14)

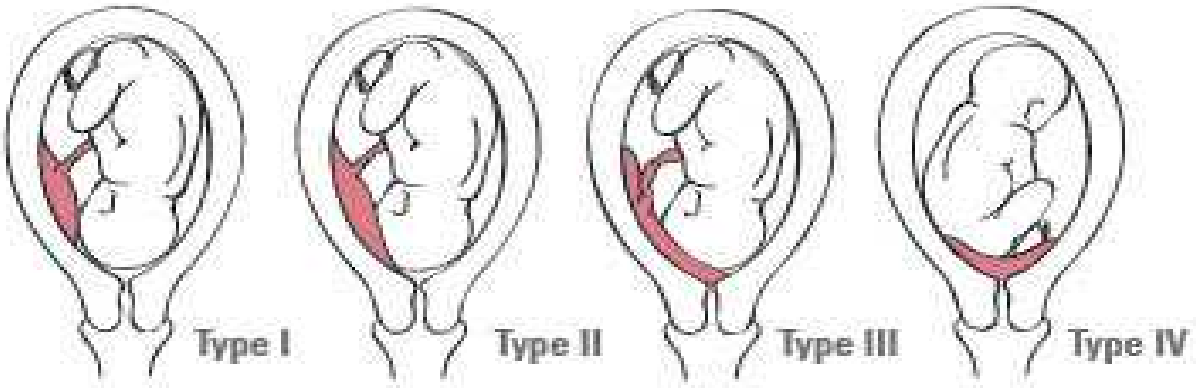
CLASSIFICATION :

GRADE 1(Lateral/Low lying placenta) -Placenta implanted in the lower uterine segment but not reach the internal os

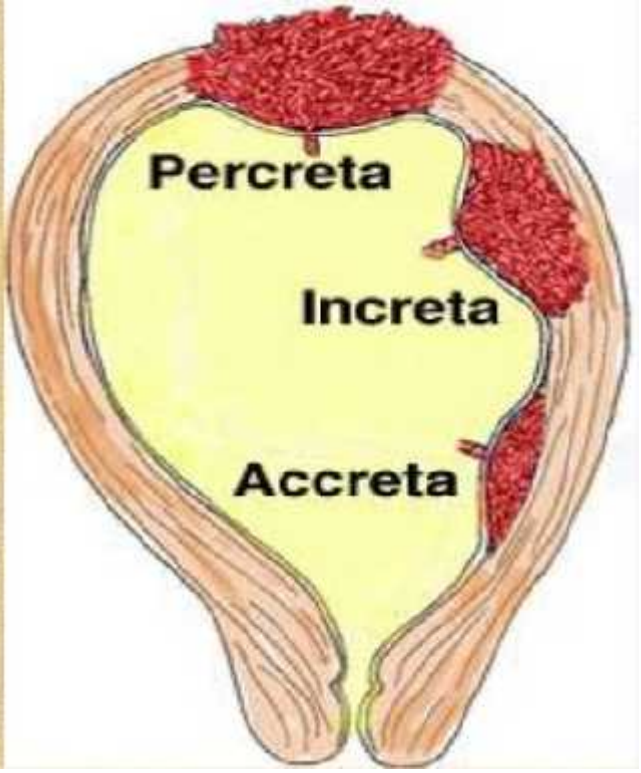
GRADE 2 (Marginal placenta) -edge of the placenta reaches the internal os but not cover it

GRADE3 (Partial placenta previa) -placenta partially covering the internal os

GRADE4(Complete placenta previa) -placenta completely cover the internal os(11)



- 1.Placenta accreta : placenta villi adhere to myometrium without an intervening layer of decidua.
- ✓ A. Placenta increta : villi within the myometrium usually involving previous cesarean section.
- ✓ B.Placenta percreta :villi penetrate through the uterine wall to the serosa



PLACENTA ACCRETA: Placenta attaches deeply into the uterine wall

PLACENTA INCRETA: Placenta attaches into the uterine muscle

PLACENTA PERCRETA: Placenta goes completely through the uterine wall, sometimes invading nearby organs like bladder(5,8)

RISK FACTORS

1. Advanced maternal age

The risk increases with increasing maternal age. Ananth et al. 1996 has shown that women older than 35 years have nearly 4 fold increased risk of developing placenta previa than women in younger age group.1in 100 for women >35years of age, 1 in 1500 women for <19 years, 9 fold more risk for >40years than 20years(2)

As women age collagen progressively replaces normal muscle in the wall of myometrial arteries. These lesions may restrict the luminal expansion of the arteries and consequently restrict the blood flow to placenta. The atrophic changes in older women may also result in defective vascularization of deciduas. Both under perfusion and under vascularization have been postulated in development of placenta previa.

2) Parity : Higher the parity higher the incidence of placenta previa. 1.2 times following one delivery, 1.5 following 2 deliveries, 0.2% in nulliparous ,5% grandmulti (2) 2.2% of incidence in multiparity compared to 0.3% in general population .In nulliparous women lower segment formation occur mostly in weeks leading upto labour. In multiparous women, lower segment formation may occur at part of the labour process. This explains the

difference in incidence of placenta previa between nulliparous and multiparous.

3. Smoking and cocaine abuse Probably due to defective decidualization leads to increased risk of placenta previa. (4)

Williams and colleagues 1991 have shown that 2 fold increase risk carbon monoxide hypoxemia causing compensatory placental hypertrophy and also related defective decidual vascularization.

The women smoking more than 20 cigarettes per day had risk of 2.6 to 4.4 times of placenta previa and in those who stop smoking, perinatal mortality decreased by 33%.Maternal cocaine and opiate consumption increases risk by 2.4 fold

4. Multiple pregnancy/Placental size: The incidence of placenta previa is 40% higher in twins compared with that of singleton. Ananth et al 2003 has shown 40% higher among twins in comparison to singleton pregnancies because the placenta due its bigger size has a greater chance of encroaching to the lower segment. This was confirmed in a study which showed incidence of placenta previa of 0.55% for twin as compared to 0.31% in singleton gestation. (27)

5. Previous placenta previa: Williams reported recurrence in four consecutive pregnancies Gorodeski recorded incidence of 3.2%, 6times more compared to general population. The recurrence risk of placenta previa is increased 8 times (21)

6. Previous cesarean delivery: The risk of placenta previa increases with number of caesarean sections performed on the patients (6,25)

After 1 caesarean risk is 0.65%, After 2 caesarean risk is 1.5%

After 3 caesarean risk is 2.2%, After 4 caesarean risk is 10%

2nd pregnancy within a year after caesarean delivery has 1.7 times higher the incidence Chances of placenta accreta and the need for caesarean hysterectomy are also greater in patients with placenta previa with prior caesarean section than in patients with unscarred uterus. (25%hysterectomy rate in women with repeat caesarean for a previa compared with only 6% undergoing primary caesarean for placenta previa) Previous caesarean section is also risk factor for rupture uterus.

7. Endometrial damage and associated with previous abortions: Damage to the endometrium or myometrium has been shown to be a risk factor for low implantation site. There are significant association between placenta previa and previous dilation and curettage.(1)

Spontaneous abortion or evacuation or retained product of conception has been described. A six fold increase in the risk of placenta previa following medical termination of pregnancy in the first trimester lead to endometrial damage, which is turn lead to endometrial scarring, if significant would predispose to an abnormal site of placental implantation and to increase placental surface area.

8. Preterm delivery: Spontaneous labour before 37 week is more commonly complicated by bleeding from a low lying placenta than labour in a term pregnancy. This may be due to delivery before the lower uterine segment not yet well formed. Hence chances of placental migration is less. Women with placenta previa the uterine contractions that normally occur during gestation cause separation of the placenta from its implantation site in the cervix and lower uterine segment causing bleeding in choriodecidual interface, thrombin release, and activation of the final pathway of parturition(9,10). Another possibility is that the uterine contractions are caused by stress activation of the fetal hypothalamic-pituitary-adrenal axis secondary to fetal growth restriction that is a common finding in women with abnormal placentation.

9. Ethnic origin and socio-economic status: The effect of ethnic origin on the incidence of placenta previa was considered in a study and higher incidence was found in Asian women when compared with white women**.**

10. Uterine Scar and Pathology: Uterine scars from surgical procedures as LSCS, myomectomy, endometritis, submucous fibroids, adenomyosis and uterine adhesions lead to placenta previa due to endometrial damage, endometrial scar, scar formation in lower uterine segment leads to placental migration hindered, defective decidual vascularization, result in inflammatory and atrophic changes (25).

11. Placental pathology : Placental membranacea is an extremely rare cause of placenta previa marginal or velamentous cord insertions, Succenturate lobes, bipartite placenta and fenestrated placenta are all commonly seen in placenta previa.

12. Assisted reproductive technique : Placenta previa is more common after assisted reproductive technique including IVF and ICSI. The prevalence is 6 fold higher in IVF pregnancies, four fold higher in ICSI pregnancies compared with spontaneous conception after adjusting for confounding factors like age, parity, smoking, previous cesarean. The underlying mechanism is not clear. Embryo replacement may induce uterine contraction and lead to implantation in the lower uterine segment and placenta previa.

CLINICALPRESENTATION

1) Vaginal bleeding : The only symptom of placenta previa is vaginal bleeding. The classical features of bleeding is sudden onset, painless, apparently causeless and recurrent.5% cases, occurs for the first time during labor, especially in primigravidae. The bleeding is unrelated to activity and often occurs during sleep and the patient becomes frightened on awakening to find herself in a pool of blood.

Obvious causes for the placental separation such as trauma or hypertension are usually absent. However, preeclampsia may complicate a case of placenta previa.

The first bout of bleeding is usually not alarming but subsequent bouts may be heavier than the previous one due to separation of fresh areas of placenta. In majority of cases, bleeding occurs before 38 weeks Asymptomatic cases may be detected by sonography or at the time of cesarean section.

Cause of bleeding: As the placenta growth in later months and the lower segment progressively dilates, cause sheared off the wall of the lower segment leads to opening up of utero placental vessels and leads to an episode of bleeding.

It is a physiological phenomenon leads to the separation of the placenta and the bleeding is inevitable. Bleeding is aggravated by vaginal examination, coital act, external version or during high rupture of the membranes. (19)

Spontaneous control of bleeding by (1) Thrombosis of the open sinuses.(2) Mechanical pressure by the presenting part.(3) Placental infarction.

2) Malpresentation:

Breech presentation or transverse lies were observed in 30% of cases. Women with placenta previa have a higher risk of fetal malpresentation such as breech or transverse lie than women with normal placental sites.

Malpresentations are found in 30% of cases. It has been suggested that the combination of marginal placenta previa and breech increase the number of Caesarean Section associated with placenta previa. However as mechanism of malpresentation in placenta previa is assumed to be due to the bulk of the placenta in the lower segment preventing engagement of fetal head.

3) Abnormal placentation : Abnormal placentation such as placenta accreta and percreta has an association with placenta previa and in particular with the

combination of previous cesarean section done for placenta previa..The risk of placenta accreta with each repeat Cesarean Section such that 40% of women with 2 or 3 previous Cesarean Section and 69% of women with 4 or more previous Cesarean Section had placenta accreta**. (23)**

4) Small for gestational age (SGA) There is conflicting evidence regarding the association between placenta previa and birth weight of less than 10^{th} percentile for gestation, rates as high as16% have been noted. The cause being decrease placental perfusion due to a suboptimal placental site however then data has not been substantiated by others. (26)

The effect of early and prolonged bleeding from a low lying placenta or fetal growth as compared to uncomplicated previa is not reported but these women seem to be at risk of SGA as well as early delivery

On Examination: General condition and anemia are proportionate to the visible blood loss.

Abdominal examination: The size of the uterus is proportionate to the period of gestation.

1) The uterus feels relaxed without any localized area of tenderness.
2) Persistence of malpresentation like breech or transverse or unstable lie is more frequent. There is also increased frequency of twin pregnancy.

3) The head is floating in contrast to the period of gestation. Persistent displacement of the fetal head is very suggestive. The head cannot be pushed down into the pelvis.

4) Fetal heart sound is usually present, unless there is major separation of the placenta with the patient in exsanguinated condition.

Slowing of the fetal heart rate on pressing the head down into the pelvis which soon recovers promptly as the pressure is released is suggestive of the presence of low lying placenta especially of posterior type (Stallworthy's sign).

Vulval inspection : Only inspection is to be done whether the bleeding is still occurring or ceased, color of the blood and the amount of blood loss to be assessed from the blood-stained clothing.

Vaginal examination should only be done prior to termination of pregnancy in the operation theatre under anesthesia, keeping everything ready for cesarean section

1 of every 16 examinations produce a major hemorrhage and 1 of every 25 examinations results in hypovolemic shock. The accuracy of digital pelvic examination in diagnosing placenta previa is only 65%

DIAGNOSIS : Painless and recurrent vaginal bleeding in the second half of pregnancy should be taken as placenta previa unless proved otherwise. Ultrasonography is the initial procedure either to confirm or to rule out the diagnosis. **Localization of Placenta (Placentography)** by Gotterfeld in 1966

I. Sonography :

Transabdominal ultrasound (TAS)

Transvaginal ultrasound (TVS)

Transperineal ultrasound

Color Doppler flow study

3D Power Doppler study

II. Magnetic resonance imaging

For better diagnosis of placenta previa and placenta accreta

III. By internal examination (double set up examination)

Direct visualization during cesarean section Examination of the placenta following vaginal delivery

Transabdominal sonography:

Diagnostic accuracy of TAS -75%,

False positive rate -23%. False positive result may be due to full bladder or myometrial contractions.

Over distended bladder : there is approximation of anterior and posterior uterine wall leads to false positivity.

Local myometrial contraction: it may simulate a placenta or displace the placental edge low down. If doubts about bladder or myometrial contractions, bladder should be partially emptied or USG repeated after 30min. if myometrial thickness is >2cm suggest uterine contraction or fibroid.

Poor imaging due to maternal obesity and posteriorly situated placenta. The reasons for poor imaging in a posteriorly situated placenta are

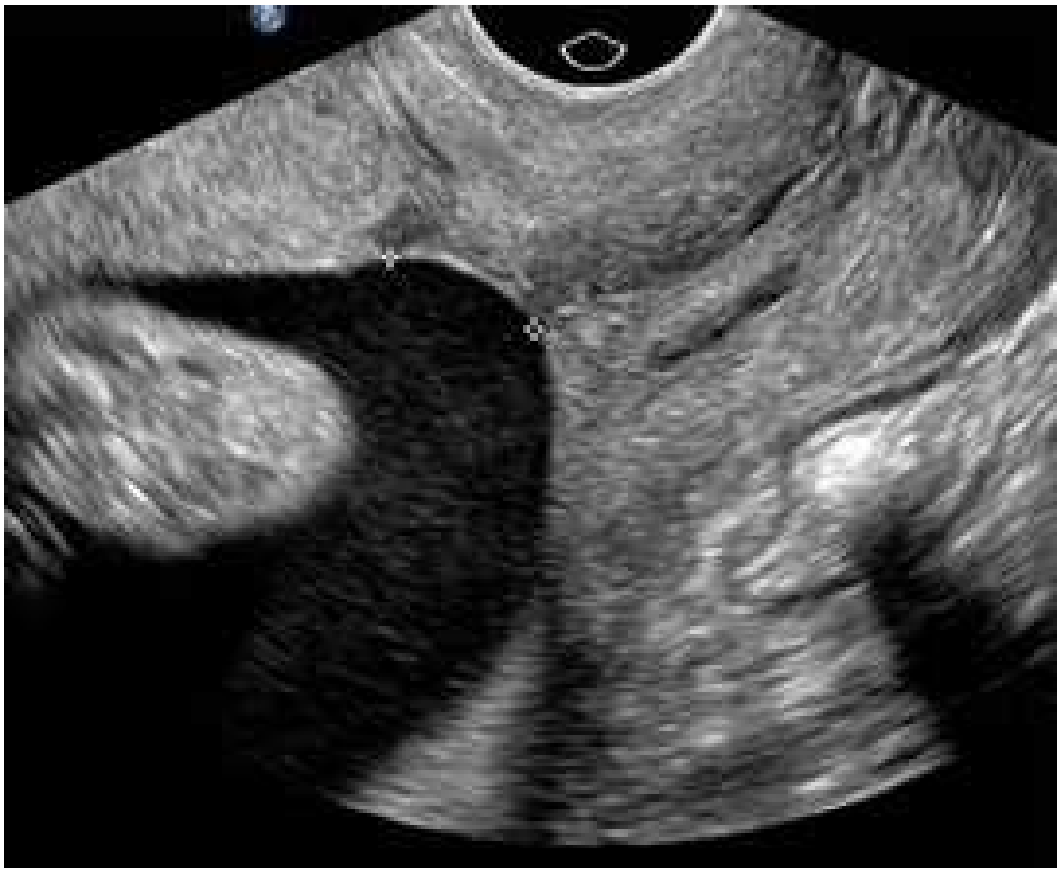
(a) Acoustic shadow from the fetal presenting part may obscure the placental view,

(b) There is no anatomical landmark posteriorly (anteriorly uterovesical angle) below which placenta is defined as previa

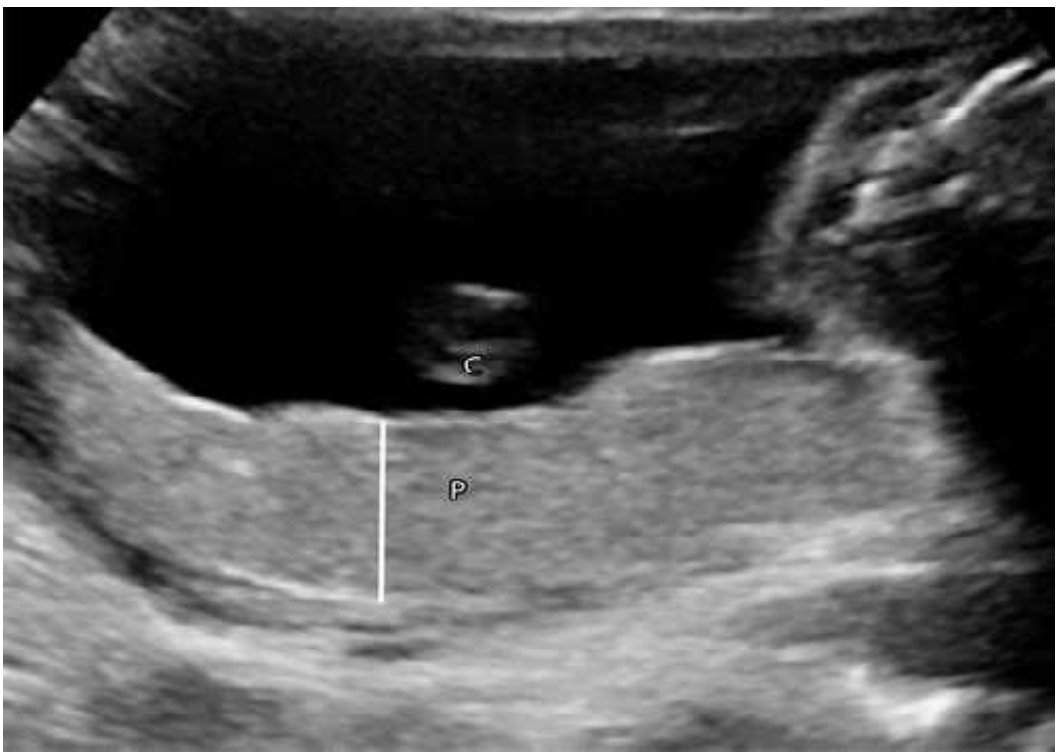
(c) Patient obesity often causes the placenta to be out of focus

It is important to note negative findings on USG do not exclude placental abruption, it can diagnose abruption only in 15-25%cases

TYPE 2 A PLACENTA PREVIA



TYPE 2 B PLACENTA PREVIA



Trans vaginal sonography:

Transducer is inserted within the vagina without touching the cervix. The probe is very close to the target area and higher frequencies could be used to get a superior resolution. It is safe, obviates the discomfort of full bladder and is more accurate (virtually 100%) than TAS.

Advantages :

- It does not need a full bladder to diagnose
- Diagnostic accuracy is better in posterior placenta previa
- Less soft tissue interposition and thereby accuracy is more
- There is less acoustic attenuation

Positive predictive value -93.3%

Sensitivity -87.5%

Specificity -98%

False positive -1%

False negative -2%

USG criteria for diagnosis of placenta accreta as follows:

- Loss of retroplacental sonolucent zone,
- Irregular retro placental sonolucent zone,
- Thinning or disruption of hyperechoic serosa bladder interface,
- Presence of focal exophytic masses invading urinary bladder
- Abnormal placental lacunae.

Transperineal sonography : This is well accepted by patients. Internal os is visualized in 97–100% of cases. positive predictive value 90% and negative predictive value 100%

Colour doppler : TVS and doppler imaging improve the diagnostic accuracy in prediction of placenta previa, presence of lacunae gives moth eaten appearance on 2D imaging colour doppler shows.

- Diffuse vascular lakes with turbulent flow in the hypoechoic areas near the cervix is consistent with the diagnosis of placenta previa.
- Diffuse or focal lacunar flow
- Vascular lakes with turbulent flow (peak systolic velocity over 15cm/s) Hypervascularity at the uterine serosa – bladder junction is diagnostic**.**
- Markdely dilated vessels over peripheral subplacental zon**e**
- USG with color doppler has a sensitivity and specificity of 97%for diagnosis

Three dimensional power doppler: Numerous coherent vessels involving the whole uterine serosa bladder junction (basal view)-in placenta accreta Hypervascularity in lateral view

Magnetic resonance imaging: Role of MRI is inconclusive but it is better detecting the depth of involvement, lateral extension, especially in posterior

placenta or in ultrasound suggestive of parametrial involvement It is a noninvasive method without any risk of ionizing radiation. Dark intraplacental bands are seen on T2 weighted images, heterogenous signal intensity within placenta. MRI is better than ultrasonography to diagnose posterior placenta previa and placenta previa accreta. Limitations of MRI are more time consuming, lack of portability and the cost.

Advantages of Ultrasonography and MRI

(1) Need of vaginal examination with the risk of hemorrhage is avoided.

(2) The need of prolonged and unnecessary hospital stay in patients with clinical diagnosis of APH can be reduced. (29)

(3) Diagnosis of placenta previa can be made even before the bleeding starts.

(4) Diagnosis of morbid adherent placenta (Especially in a woman with placenta previa and prior (caesarean delivery) can be made.

(5) Plan of delivery can be organized accordingly.

CLINICAL EXAMINATION

Double set-up examination (vaginal examination) : To assess the relationship of the lower edge placenta with the cervical os. It is less frequently done these days.

Indications are:

(i) Inconclusive USG report

(ii) USG revealed type I placenta or

(iii) USG facilities not available.

Contraindications

1) Profuse bleeding immediate caesarean section

2) Clear cut sonographic evidence of major placenta previa

3) Fetal distress

4) Malpresentation, malposition

Procedure

- It is done only when the delivery is to be under taken
- A second obstetrician is scrubbed and ready for performing caesarean if required, along with a nurse, anesthetist and pediatrician kept ready.
- Cross matched blood should be available
- Put the patient in lithotomy position and cleaned (only vulva area cleaned not vagina), drapped and should be bladder emptied

- Per speculum examination is done for any local cause of bleeding to identify
- 2 fingers introduced carefully into vagina and directed towards fornices. Each fornix is palpated to feel the presence of placenta between presenting part and vaginal fornix. There is feeling of bogginess, if placenta is present.
- If the fornices are empty then the index finger is gently introduced in the os and the surrounding is felt for the placental edge
- If no placental edge is felt within 3cm from os, or if it is felt only anteriorly but does not reach the os and no bleeding is provoked the membranes should be ruptured in preparation of vaginal delivery
- An organized blood clot can at times be mistaken for the placenta, but the former is friable unlike the placenta which is firm and non friable
- If there is bright red vaginal bleeding during procedure, it should be abandoned and caesarean performed immediately

Differential Diagnosis :

Placenta previa is at times confused with other causes of bleeding occurring in later months of pregnancy.(16)

1) The most common one is premature separation of normally situated placenta (abruptio placentae).

2) Local cervical lesions (polyps, carcinoma) can be differentiated by a speculum examination.

3) In circumvallate placenta, the bleeding is slight and the diagnosis is only made after examining the placenta following deliver

DIFFERENCE BETWEEN PLACENTA PREVIA AND ABRUPTION :

(4,6,15)

	PLACENTA PREVIA	**ABRUPTIO PLACENTA**
NATURE OF BLEEDING	Painless, causeless, recurrent Always revealed	Painful Revealed, concealed, mixed
CHARACTER OF BLOOD	Bright red	Dark red
GENERAL CONDITION	Proportionate to visible blood loss	Out of proportionate to visible blood loss
FEATURES OF PREECLAMPSIA	Not relavent	Associated with 1/3rd cases
HEIGHT OF THE UTERUS	Proportionate to GA	May be disproportional (in concealed type)
FEEL OF THE UTERUS	Soft,relaxed	Tense, tender, rigid
FHS	PRESENT	USUALLY ABSENT IN CONCEALED TYPE
PLACENTA	In lower segment	In upper segment

COMPLICATIONS OF PLACENTA PREVIA

Maternal and fetal complications

MATERNAL: (3)	FETAL COMPLICATIONS IN PLACENTA PREVIA(10)
During pregnancy: **1)** Hypovolemic shock due to hemorrhage(antepartum, intrapartum, postpartum) postpartum hemorrhage due to inadequate occlusion of sinuses in the lower segment following delivery) The first bout of hemorrhage is severe but torrential hemorrhage can be easily be provoked by internal examination. Co-existent placental abruption is about 10%. 2) Anesthetic and surgical risks during emergency caesarean section 3) Puerperal sepsis due to ascending infection 4)DIC may occur with massive hemorrhage 5)Malpresentation: There is increased incidence of breech presentation and transverse lie. 6)Premature labor either spontaneous or induced is common. Death due to massive hemorrhage during the antepartum, intrapartum or	(1) Low birth weight (LBW) are quite common (15%). (2) Labor in a woman with placenta previa complicated with prolapse of umbilical cord and footling. Asphyxia is common due to (a) Early separation of placenta (b) Compression of the placenta (c) Compression of the cord. (3) Intrauterine death is more related to severe degree of separation of placenta, with maternal hypovolemia and shock. (4) Birth injuries are more common due to increased operative interference. (5) Congenital malformation is three times more common in placenta previa. (6)Maternal and fetal morbidity and mortality from placenta previa are significantly high.

postpartum period. 7) Placenta accreta leding to increased maternal mortality and morbidity because of increased chances of post caesarean hysterectomy and intraoperative bleeding **During labor** 1) Early rupture of the membranes 2) Cord prolapse due to abnormal attachment of the cord 3) Slow dilatation of the cervix due to the attachment of placenta on the lower segment. 4) Intrapartum hemorrhage due to further separation of placenta with dilatation of the cervix. Postpartum hemorrhage is due to: Imperfect retraction of the lower uterine segment upon which the placenta is implanted Large surface area of placenta with atonic uterus due to preexisting anemia. 15% of morbidly adherent placenta (placenta accreta, increta, percreta) on the lower segment . Placenta previa accreta is a serious complication that may cause maternal	

death. Often the placenta previa and accreta is managed by hysterectomy Retained placenta and increased incidence of manual removal of placenta cause postpartum shock. retained placenta is due to : (1) Increased surface area (2) Morbid adhesion. The risk of placenta previa being accreta in a woman with previous one cesarean section is 10–20% and it rises to about 50% with two or more prior cesarean section. **Puerperium**: (1) Sepsis due to: (i) increased operative interference (ii) placental site near to the vagina (iii) anemia and devitalized state of the patient. (2) Subinvolution (3) Embolism.	

MANAGEMENT: can be expectant or active depends upon the severity of blood loss, condition of mother and fetus, gestational age ,onset of labour.

AIM OF MANAGEMENT:

- Allow them to progress as close to term as possible and terminate them by caesarean section
- Only in case of minor degree of placenta previa (type I and II)vaginal delivery can be allowed if no obstetrical complication

If the gestational age 32weeks, bleeding has stopped since admission, advisable to continue expectant management to allow fetal lung maturity, and termination should be around 36-37 weeks after antenatal steroid cover

OUT PATIENT MANAGEMENT : 50% reduction in hospitalisation and maternal cost. No difference in maternal or fetal morbidity

Criteria for out patient management :

1) Inpatient management is done for 72hrs and only when there is no bleeding women may be decide for outpatient management
2) Fetus should be in good condition at the time of discharge with normal sonography
3) Stable serial hematocrit >35%
4) Good support from the family and women be attended 24hrs a day
5) Transport facility should be available at any time
6) Complete bed rest and pelvic rest
7) Weekly follow up

EXPECTANT MANAGEMENT (Macafee and Johnson)

The main objective is to reduce perinatal mortality and morbidity due to prematurity. Only hemodynamically stable patients remote from term should be managed conservatively(18).

Expectant management should be abandonded when

1) Pregnancy reaches 36-37 weeks

2) Severe hemorrhage at any time endangered the life of mother

3) Fetus is dead or malformed

4) At the onset of labour or rupture of membranes

5) Frank accidental hemorrhage is suspected

- Protocol: admit the patient in laour room ,give sedation,nil oral
- Start iv line, blood for grouping and cross matching and end the investigations
- Vitals monitoring every 15min till there is an active bleeding and then half an hourly
- Input/output chart hourly, abdominal grith chart to rule out abruption
- Assess the blood loss and transfuse if bleeding is moderate/severe
- Maintain HB-10g% or hematocrit 30% for fetal oxygenation
- Monitor fetal heart rate
- Steroids given for lung maturity(Inj.betamethasone 12mg in once daily for 2days/inj.dexamethasone 6mg q12h 2days)

- Selected cases, tocolytics given for prolong gestation, once bleeding stopped
- Nifedipine 10-20mg orally is drug of choice and continue till patient delivers
- Terbutaline and ritodrine should be avoided it causes maternal tachycardia masking the tachycardia due to blood loss
- RH women require kleihauer test every time there is fresh bleeding and appropriate Anti D prophylaxsis
- Once the bleeding has stopped , patient can be shifted toward after 24hrs
- Complete bed rest, continue iron supplements, stool softener
- Intercourse ,vaginal douching, suppositories are contraindicated
- Elective cervical cerclage is one intervention to delay delivery in case of placenta previa

INDICATION OF TERMINATION OF PLACENTA PREVIA:

- Maternal hemodynamic detoriation
- Persistance or recurrence of bleeding
- Gestational age >37 weeks
- Fetal non reassuring status
- Onset of labour pain

ACTIVE MANAGEMENT :

The decision to terminate the pregnancy immediately after resuscitating the mother and stabilize her condition (22,24)

Coagulation profile should be corrected before any operative intervention

Mode of delivery : Termination of pregnancy is done by caesarean section in case of major degree of placenta previa minor degree of placenta previa, ARM followed by oxytocin, helps in effectively controlling hemorrhage from placental separation.

Caesarean section should be performed:

1) The operation should be performed by a senior obstetrician with the help of an experienced senior anesthetist.
2) Choice of anesthesia is to be made by the anesthetist. spinal anesthesia can be given in hemodynamically stable women. General anaesthesia may be preferred in presence of bleeding.
3) If the patient is in hypovolemic state and the bleeding continues, the operation has to be performed immediately along with restorative measures.
4) Blood and blood products should be made available.
5) Counselling and consent for possible other interventions (hysterectomy) should be taken.
(6) Multidisciplinary involvement should be made (urologist, transfusion specialist).
(7) Availability of a bed in a critical care unit to be ensured.
(8) Interventional radiology service is of help, especially in a case with placenta previa and accreta

Type of incision : lower segment or classical Ideally, surgeon should make the incision away from the placenta when placenta previa accreta is diagnosed or suspected (RCOG).

1. **Lower segment cesarean section :**

Advantages: (1) Conversant technique. (2) The bleeding sinuses at placental site can be better dealt with under direct vision and as such the decision to preserve or to remove the uterus can easily be made. (3) Placenta accreta, if accidentally met, can also be tackled effectively.

Disadvantages: (1). Engorged vessels on the anterior lower segment (anterior placenta previa) bleed profusely when they are cut. (2). In anteriorly situated placenta, the placenta has to be cut or separated to deliver the baby. This causes massive hemorrhage. (3). Risks of fetal exsanguination with such delivery is a real threat to the baby. (4). Risks of cesarean hysterectomy is high (5). Delivery is to be expedited to avoid fetal exsanguination. (6).Umbilical cord should be clamped immediately to prevent neonatal hypovolemia and anemia. (7). The edges of uterine cut margins become so vascular and friable, that the tissues may cut through during suturing.

LOWER SEGMENT APPROACH FOR PLACENTA PREVIA ACCRETA

Women with anterior placenta previa, implanted at the site of prior hysterotomy or caesarean incision, there is an increased risk of placenta accreta. The risk increases with the number of prior caesarean delivery. It increases from 1% with no prior scar to 3% with prior caesarean scar . This may need hysterectomy. Incision is made away from the placenta. Incising the placenta for delivery causes more hemorrhage and may end in hysterectomy.

Delivering the baby without placental separation may allow conservative management of placenta, if there is no bleeding. In a case with morbid adherent placenta without bleeding, placenta may be left in situ. The uterus is then closed when preservation of the uterus is desired. Any attempt of placental separation in a case with morbid adherent placenta (placenta accreta) should be avoided as it excites massive hemorrhage and risks hysterectomy.

In presence of bleeding, hysterectomy could be done after closing the uterus without any attempt to separate the placenta. This reduces blood loss. B-Lynch suture, isthmic cervical apposition suture, uterine and internal iliac arteries ligation or intervention radiology and uterine artery embolization

have been done to control hemorrhage and to preserve the uterus. Multidisciplinary team approach (urologists, transfusion specialists) should be made.

CONTROL OF BLEEDING FROM LOWER UTERINE SEGMENT BY:

1st securing the angles of uterine incision with green armtyage clamps, the entire lower segment is tightly packed with mops and timed pressure is applied for 4 minutes and the pack is removed, most of the bleeding from the placental bed is stopped by this method if there is any bleeding figure of 8 bites with chromic sutures

- Cho's sutures (1991) placement of square interrupted chromic suture around lower uterine segment above and below the transverse incision to control hemorrhage.
- Subendometrial injection of dilute vasopressin (1-2 ml of vasopressin 5 units in 20ml saline)
- Balloon device is inserted into uterus and pressure is applied. uterus closed and the balloon tamponade removed after 24hrs.
- Druzin technique: lower segment is packed with mop and a part is left to protrude through cervix and removed after 12hrs
- Unilateral/bilateral uterine artery ligation or bilateral internal iliac artery ligation done

- When conservative approachs failed, total hysterectomy performed
- Hysterectomy indicated in accreta, percreta, increta depending on the depth of invasion
- Arterial embolization: if antenatal USG suggest morbid adherent placenta, discuss uterine artery embolization of uterine/internal iliac arteries with interventional radiologist preoperatively. The catheter are placed before starting the caesarean and soon after the baby is delivered, arteries are embolized.

2. **Classical caesarean section:**

Advantages:

(1) The operation can be done more quickly.

(2) Baby is delivered without disturbing the placenta.

(3) There is no risk of fetal exsanguination.

(4) Placenta may be left insitu (in case of placenta accreta) if no bleeding

(5) Uterus may be preserved.

(6) Reduction of morbidity in terms of hemorrhage, blood transfusion, ICU admission and urological injury.

Disadvantages: (1) The lower segment over which the placenta is implanted cannot be visualized and as such, it is difficult to control bleeding when it is present.

ASSESS THE SEVERITY OF BLEEDING :

I. Blood loss< 750ml (only 15% of intravascular volume) no change in vitals.

II. Blood loss between 750-1500ml these patients have baseline tachycardia (change of 10-20beats/min) Fall in bp (drop by 10mm or or in diastolic) urine output is between 20-30ml/hr

III & IV. Blood loss between >1500ml (40%blood volume depleted) patient is in shock with decreased or unrecordable bp, oliguria/anuria, confused/lethargic. (30)

ASSESSMENT OF SEVERITY OF BLEEDING

PARAMETERS	STABLE CIRCULATION	COMPENSATED SHOCK	HYPOTENSIVE SHOCK
Capillary refill time	<2sec	>2sec	Very prolong, mottled skin
Extremities	Warm and pink	Cold periphery	Cold,clammy extremities
Peripheral pulse volume	Good	Weak ,thready	Feeble or absent
Heart rate	Normal	Tachycardia	Severe tachycardia with bradycardia in late shock
Blood pressure	Normal	Increased DBP	Narrow pulse pressure
Respiratory rate	Normal	tachypnea	Hyperpnea

	I	II	III	IV
Bloodloss (ml)	<750 <15%	750-1500 15-30%	1500-2000 30-40%	>2000 >40%
Pulse rate (bpm)	<100	100-120	120-140	>140
Blood Pressure	Normal	Decreased	Decreased	Decreased
RR (Per min)	14-20	20-30	30-40	>40
Urine output (ml/hr)	>30	20-30	5-15	Negligible
CNS Symptoms	Normal	Anxious	Confused	Lethargic

In present study, the results are discussed under following headings:

1) Age of the study participants
2) Parity of the study participants
3) Previous pregnancy status/Risk factors
4) Gestational age in weeks
5) Bleeding episodes of study subjects
6) Fetal Presentation of study subjects
7) Types of placenta previa
8) Type of deliveries
9) Types of hemorrhages
10) Types of transfusion
11) Duration of surgery
12) Intraoperative complications
13) Postoperative complications
14) Pattern of blood components transfused
15) Neonatal outcome
16) Correlation between type of placenta previa and intraoperative complications

Total number of birth during study period	15721
Total number of placenta previa case	101
Incidence of placenta previa	6.6%
Perinatal mortality rate	4.3%
NICU babies	42
Neonatal death	0
Still birth	3
Maternal death due to placenta previa	2

1. AGE AND DISTRIBUTION OF AGE IN THE STUDY PARTICIPANTS:

Mean age of study Participant - 25.7 years

Maximum Age - 30 years

Minimum Age - 21 years

Mean + or – 2 S.D = 25.7 $\pm$ 4.6 years

TABLE -1

AGE	NUMBER OF CASES	PERCENTAGE
<19 YRS	10	9.9%
20-29 YRS	68	67.32%
30-35YRS	15	14.85%
>40YRS	8	7.9%
TOTAL	101	100%

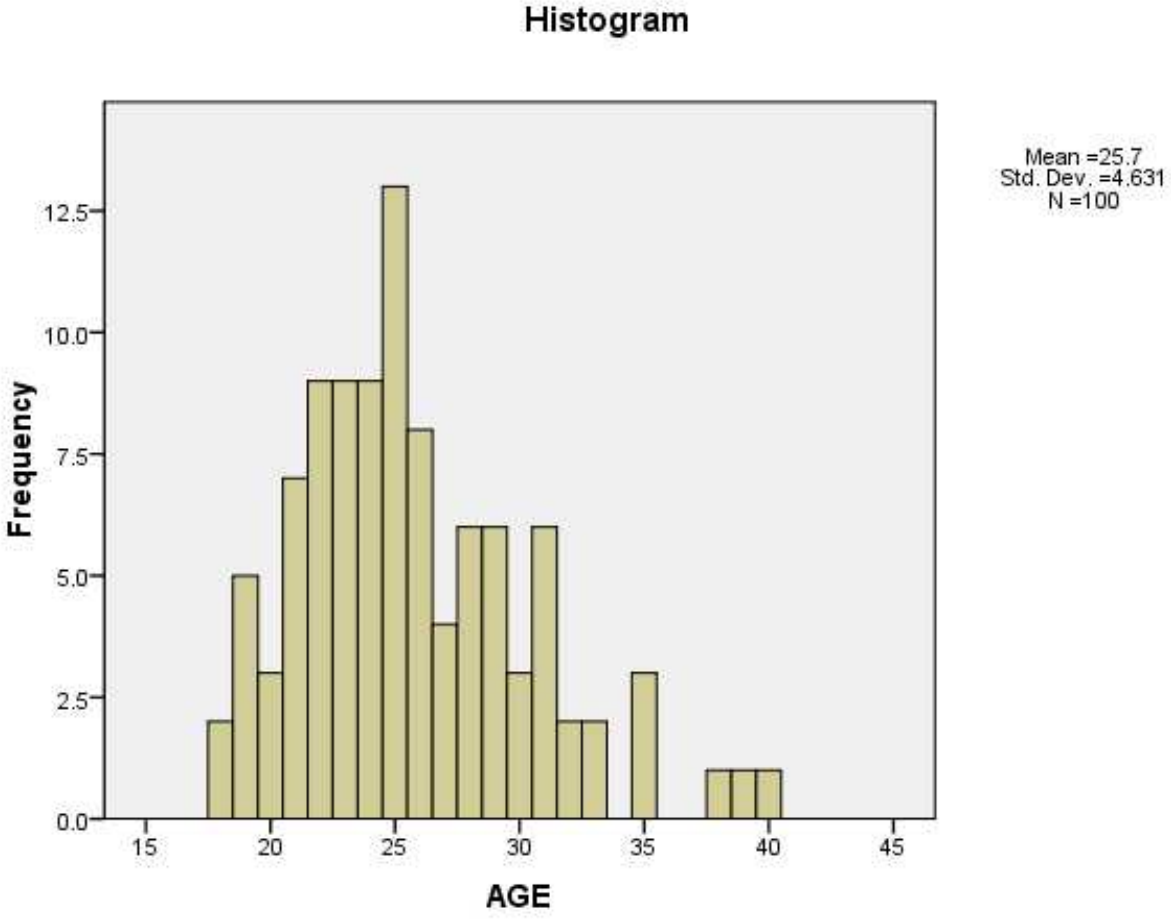
In the present study, the incidence of placenta previa was highest among the following age groups

20-29yrs i.e.67.32% followed by

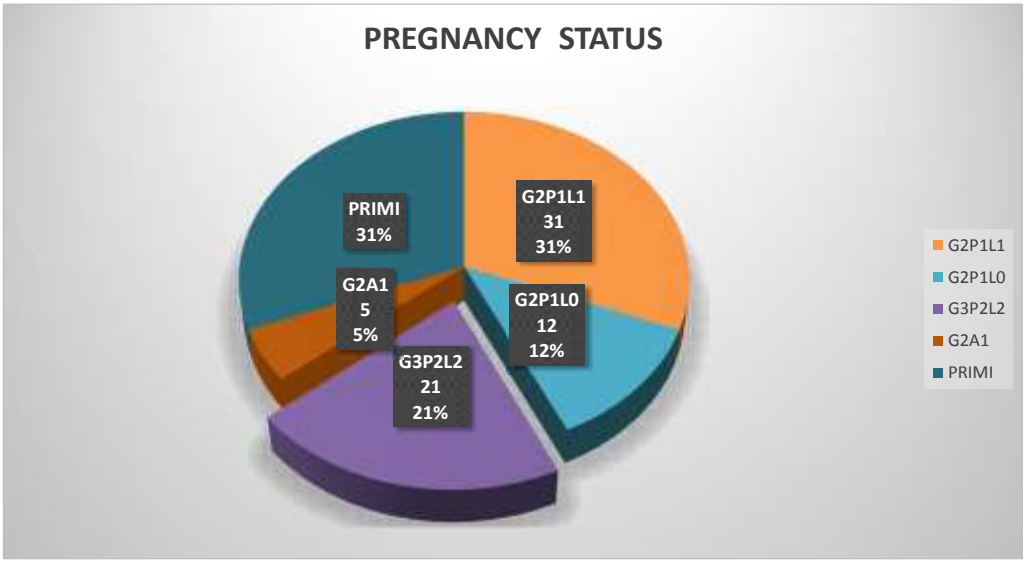
30-35yrs i.e.14.85%,

>35yrs i.e.7.9%,

<19yrs i.e.9.9%


Histogram
Mean =25.7
Std. Dev. =4.631
N =100
Frequency
12.5
10.0
7.5
5.0
2.5
0.0
15
20
25
30
35
40
45
AGE

2. PARITY STATUS OF STUDY PARTICIPANTS :



In our present study ,the incidence of placenta previa was equal in both Primigravidae and multigravidae (G2P1L1)

TABLE -2

	Frequency	Percent	Valid Percent	Cumulative Percent
PRIMI	31	31.0	31.0	31.0
G2P1L1	31	31.0	31.0	62.0
G2P1L0	12	12.0	12.0	74.0
G3P2L2	21	21.0	21.0	95.0
G2A1	5	5.0	5.0	100.0

3) PREVIOUS PREGNANCY/ RISK FACTORS OF STUDY PARTICIPANTS:

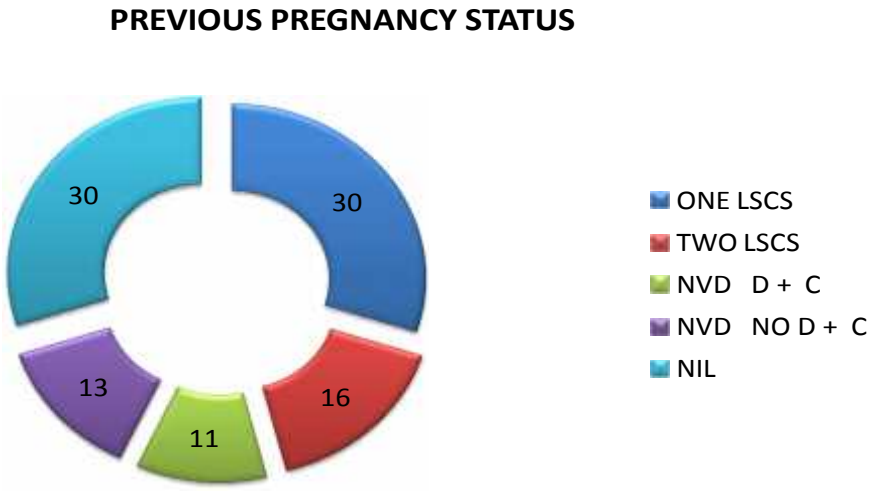


TABLE -3

	Frequency	Percent	Valid Percent	Cumulative Percent
ONE LSCS	30	30.0	30.0	30.0
TWO LSCS	16	16.0	16.0	46.0
NVD D + C	11	11.0	11.0	57.0
NVD WITHOUT D + C	13	13.0	13.0	70.0
NIL	30	30.0	30.0	100.0

RISK FACTORS :

TABLE -4

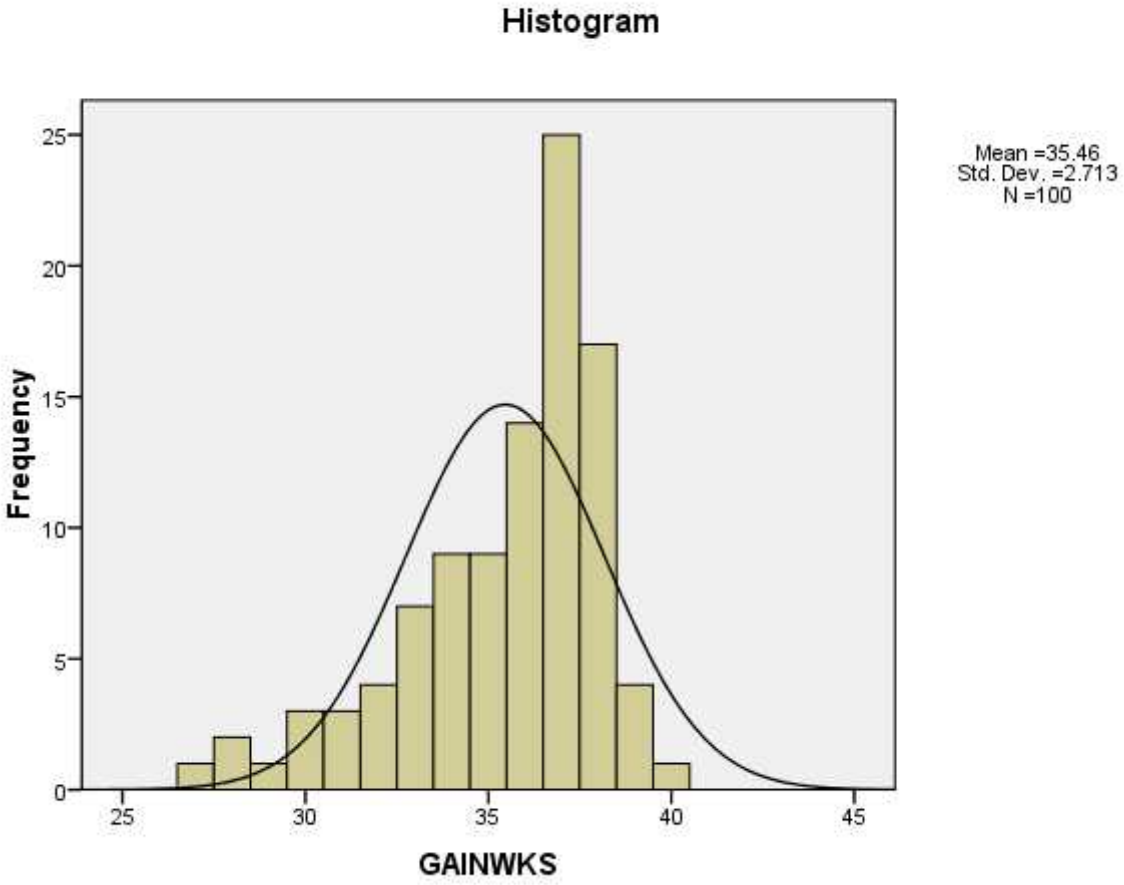
RISK FACTORS	NUMBER OF CASES	PERCENTAGE
CAESAREAN SECTION	46	45.5%
ABORTION	11	10.8%
TWIN GESTATION	0	0
RH ISOIMMUNIZATION	1	0.99%
NONE	43	42.8%
	101 CASES	**100%**

In our study most common risk factors are caesarean section 45.5%(1 LSCS-30%, 2LSCS-16%) followed by 42.8% of cases had no risk factors,10.8% cases had previous history of abortions,1 case were RH iso immunization

4) GESTATIONAL AGE IN WEEKS:

Mean + or – 2 (S.D) = 35.5 ± 2.8 years

The mean gestational age =35.5+/-2.8 yrs



6. BLEEDING EPISODES OF STUDY SUBJECTS :

BLEEDING EPISODES IN BAR CHART

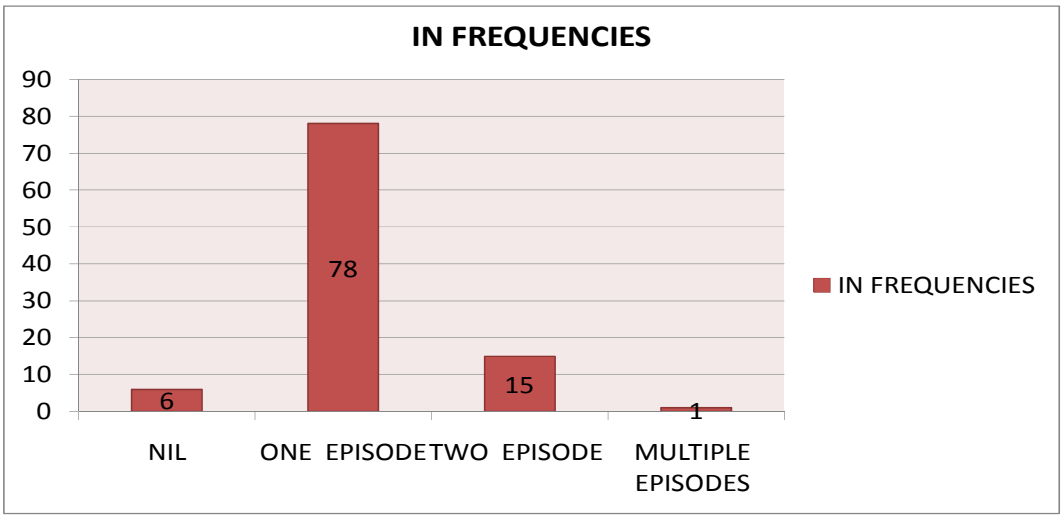


TABLE -5

	Frequency	Percent	Valid Percent	Cumulative Percent
NIL	6	6.0	6.0	6.0
ONE EPISODE	78	78.0	78.0	84.0
TWO EPISODE	15	15.0	15.0	99.0
MORE THAN 2 EPISODES	1	1.0	1.0	100.0

In our study, 1 bleeding episode cases-78% followed by 15% of cases has 2 episodes of bleeding

7. FETAL PRESENTATION PATTERN IN THE STUDY SUBJECTS :

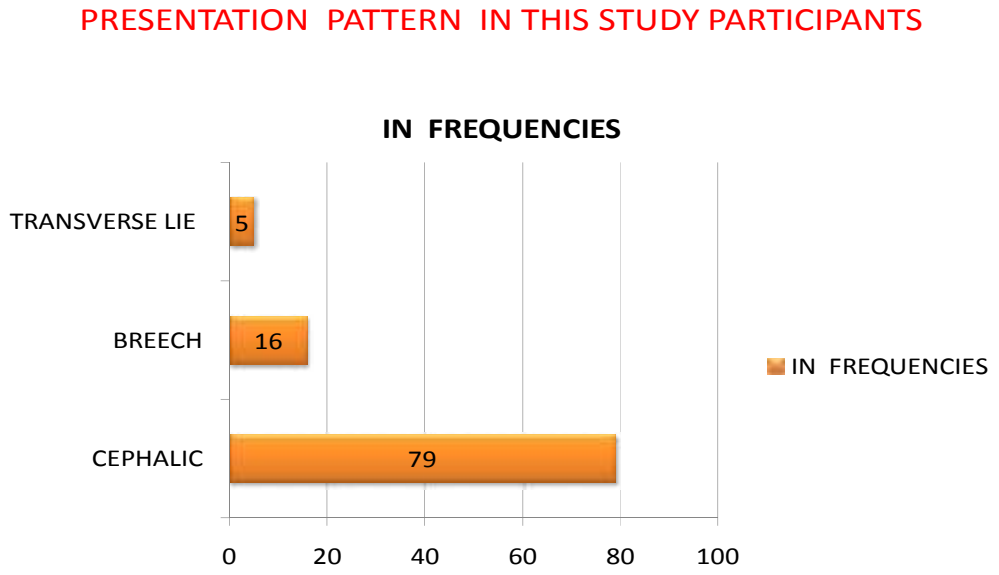


TABLE -6

	Frequency	Percent	Valid Percent	Cumulative Percent
CEPHALIC	79	79.0	79.0	79.0
BREECH	16	16.0	16.0	95.0
TRANSVERSE LIE	5	5.0	5.0	100.0

79% of cases in our study participants had cephalic presentation followed by breech 16% followed by transverse lie 5%

8. TYPE OF PLACENTA PREVIA IN THE STUDY SUBJECTS :

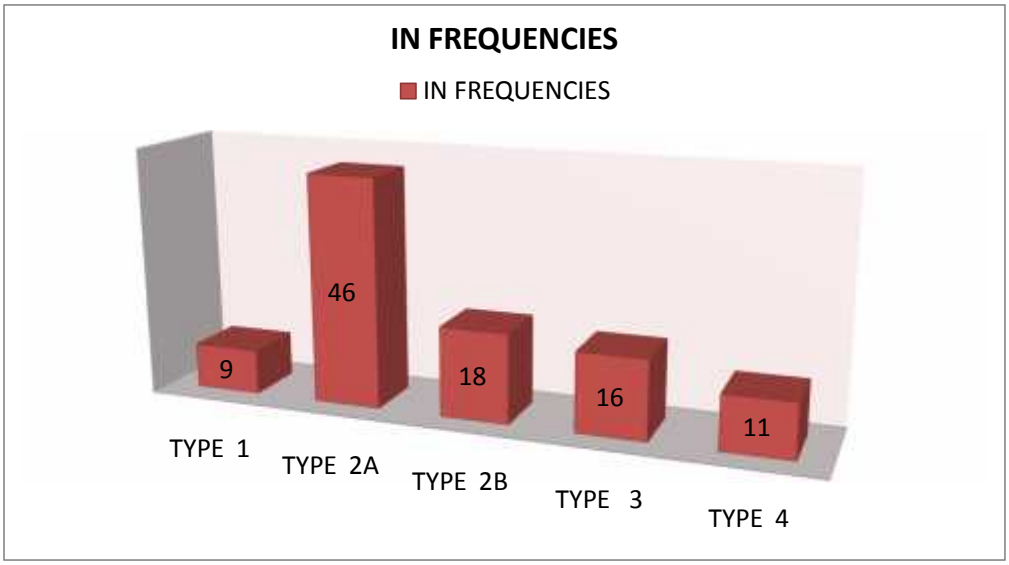


TABLE -7

	Frequency	Percent	Valid Percent	Cumulative Percent
TYPE 1	9	9.0	9.0	9.0
TYPE 2A	46	46.0	46.0	55.0
TYPE 2B	18	18.0	18.0	73.0
TYPE 3	16	16.0	16.0	89.0
TYPE 4	11	11.0	11.0	100.0

Type 2A Placenta previa had 46%, Type 2B placenta previa had 18%,Type 3 Placenta previa 16%,Type 4-11% Lowest incidence Type 1 placenta previa 9%

9. TYPE OF DELIVERIES :

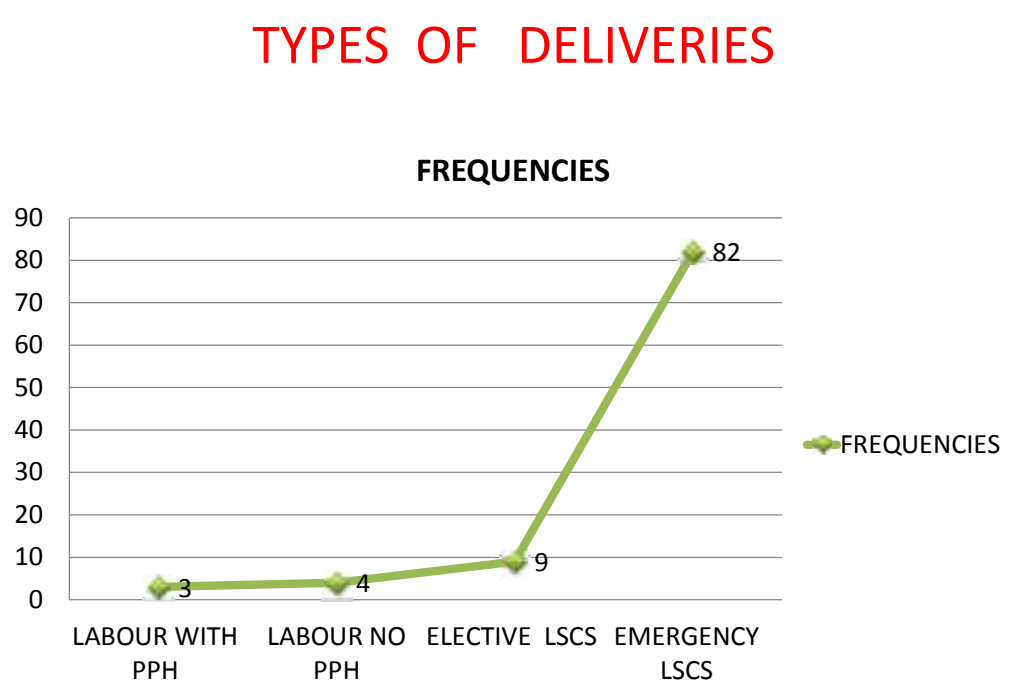


TABLE -8

	Frequency	Percent	Valid Percent	Cumulative Percent
LN WITH PPH	3	3.0	3.0	3.0
LN WITHOUT PPH	4	4.0	4.0	7.0
ELECTIVE LSCS	9	9.0	9.0	16.0
EMERGENCY LSCS	82	82.0	82.0	98.0

There has been profound increase in emergency caesarean section rate with improvement in maternal and neonatal outcome

Total number of cases delivered labour natural with low lying placenta -7 cases
Augmented with oxytocin – 4 cases -3.96%
Spontaneous progression – 3 cases-2.96%
TERM CASES-5
PRETERM CASES-2 delivered vaginally

82% of cases underwent emergency LSCS, 50% of cases underwent prophylactic uterine artery ligation, 32% of cases had PPH managed medically and surgically, 9% of cases underwent elective LSCS, for all 9 cases prophylactic uterine artery ligation done, no postpartum hemorrhage

10. Types of Hemorrhages :

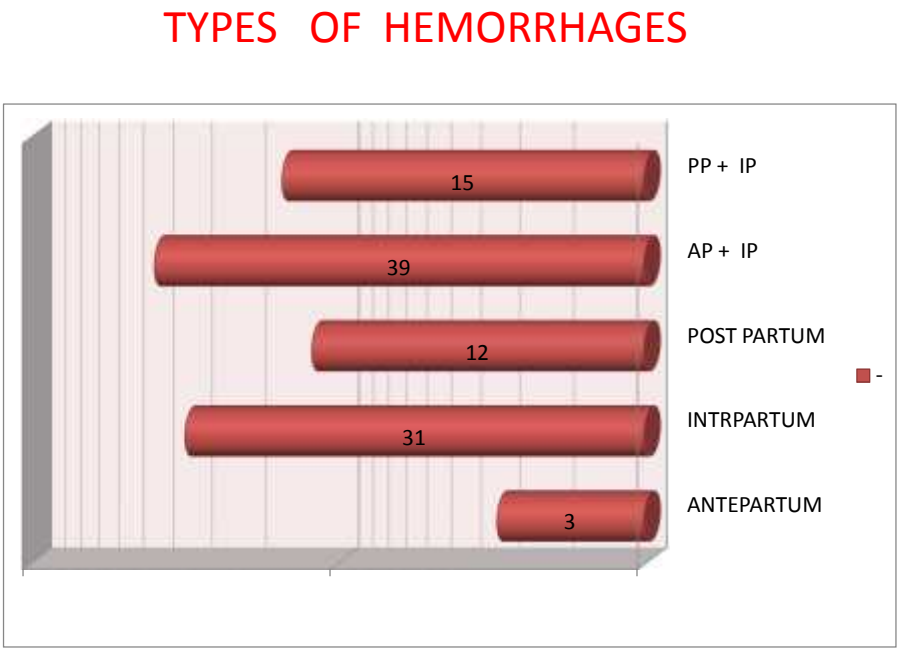


TABLE -9

	Frequency	Percent	Valid Percent	Cumulative Percent
ANTEPARTUM	3	3.0	3.0	3.0
INTRAPARTUM	31	31.0	31.0	34.0
POSTPARTUM	12	12.0	12.0	46.0
AP = IP	39	39.0	39.0	85.0
PP + IP	15	15.0	15.0	100.0

42 cases had hemorrhage in antenatal period in which 3 patients had profuse bleeding during antepartum period followed by 31 cases had intrapartum hemorrhage treated with blood and blood products

11. Types of Transfusion :

TABLE -10

	Frequency	Percent	Valid Percent	Cumulative Percent
ANTEPARTUM	15	15.0	15.0	15.0
INTRAPARTUM	14	14.0	14.0	14.0
POSTPARTUM	22	22.0	22.0	51.0
AP = IP	29	29.0	29.0	80.0
PP + IP	20	20.0	20.0	100.0

Most of the blood transfusion started in antenatal period followed by postpartum period

12. Duration of Surgery :

Mean + or – 2 S.D = 46.7 $\pm$ 16.6 minutes

TABLE -11

INTRA OPERATIVE COMPLICATIONS				
	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
FT	27	27.0	27.0	27.0
UAL	21	21.0	21.0	48.0
B LYNCH	5	5.0	5.0	53.0
SH	3	3.0	3.0	56.0
TH	3	3.0	3.0	59.0
BR	2	2.0	2.0	61.0
FT + UAL	34	34.0	34.0	95.0
UAL + B LYCH	5	5.0	5.0	100.0
Total	**100**	**100.0**	**100.0**	

34% cases had foley tamponade with B/L uterine artery ligation, 27% had foley tamponade

INTERVENTIONS TAKEN FOR INTRA OPERATIVE

COMPLICATIONS - BAR DIAG :

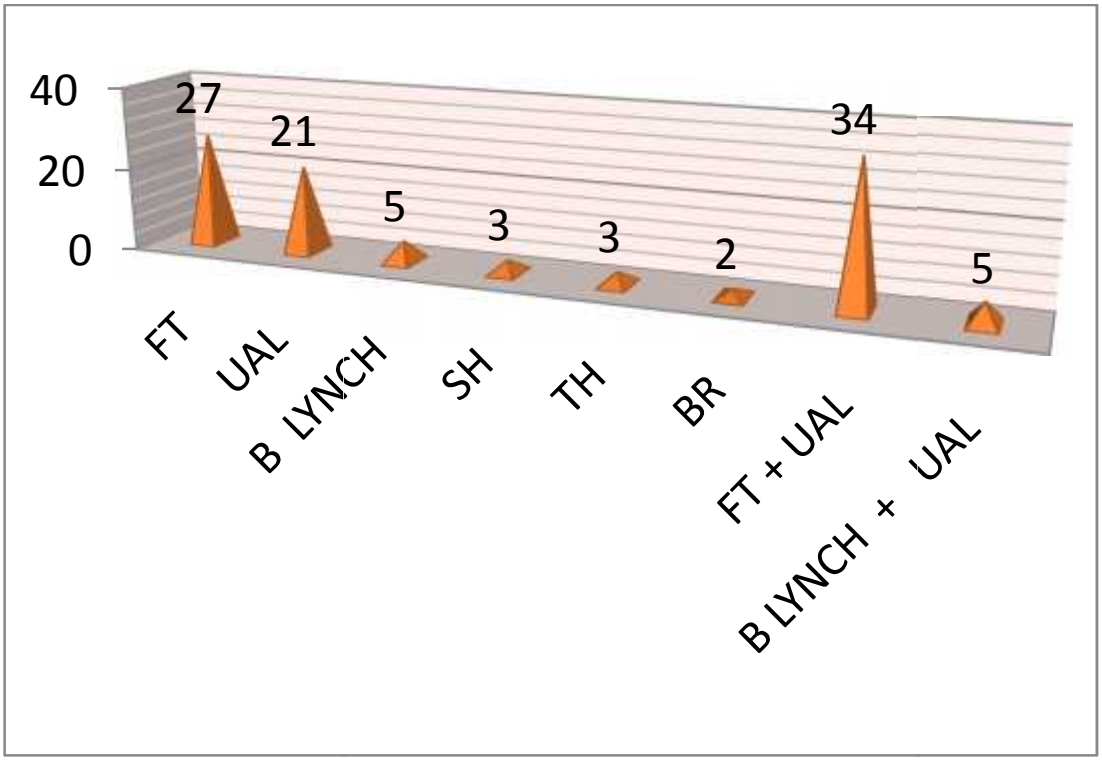


TABLE -12

A. TYPE OF PLACENTA PREVIA - TYPE 1

	Frequency	Percent	Valid Percent	Cumulative Percent
FT	8	88.9	88.9	88.9
UAL	1	11.1	11.1	100.0
Total	**9**	**100.0**	**100.0**	

In Type 1 placenta previa -9 cases (underwent 2 emergency LSCS and 7 labour natural) 88.9% of cases had foley tamponade,15% had foley tamponade with uterine artery ligation

TABLE -13

TYPE OF PLACENTA PREVIA - TYPE 2

	Frequency	Percent	Valid Percent	Cumulative Percent
FT	12	26.1	26.1	26.1
UAL	11	23.9	23.9	50.0
B LYNCH	5	10.9	10.9	60.9
SH	1	2.2	2.2	63.0
FT + UAL	15	32.6	32.6	95.7
UAL + B LYCH	2	4.3	4.3	100.0
Total	**46**	**100.0**	**100.0**	

In Type 2A placenta previa - 46 cases (6 cases elective LSCS, 40 cases emergency LSCS) 15 cases had foley tamponade with uterine artery ligation, 12% cases had foley tamponade, 1 cases underwent subtotal hysterectomy)

TABLE -14

TYPE OF PLACENTA PREVIA -TYPE 2B

	Frequency	Percent	Valid Percent	Cumulative Percent
FT	3	16.7	16.7	16.7
UAL	4	22.2	22.2	38.9
FT + UAL	9	50.0	50.0	88.9
UAL + B LYCH	2	11.1	11.1	100.0
Total	**18**	**100.0**	**100.0**	

In Type 2B placenta previa -18 cases (2 cases elective lscs, 16 cases emergency lscs) 9 cases had foley tamponade with uterine artery ligation, 4 cases had uterine artery ligation, 2cases had uterine artery ligation with B lynch)

TABLE -15

TYPE OF PLACENTA PREVIA - TYPE 3

	Frequency	Percent	Valid Percent	Cumulative Percent
FT	4	25.0	25.0	25.0
UAL	4	25.0	25.0	50.0
SH	1	6.2	6.2	56.2
BR	1	6.2	6.2	62.5
FT + UAL	5	31.2	31.2	93.8
UAL+B LYCH	1	6.2	6.2	100.0
Total	**16**	**100.0**	**100.0**	

In Type 3 placenta previa -16 cases (1 electivelscs, 15 emergency cases) 5 cases had foley with uterine artery ligation, 1 case subtotal hysterectomy, 1 case bladder repair

TABLE -16

TYPE OF PLACENTA PREVIA - TYPE 4

	Frequency	Percent	Valid Percent	Cumulative Percent
UAL	1	9.1	9.1	9.1
SH	1	9.1	9.1	18.2
TH	3	27.3	27.3	45.5
BR	1	9.1	9.1	54.5
FT + UAL	5	45.5	45.5	100.0
Total	**11**	**100.0**	**100.0**	

In Type 4 placenta Previa, 11 cases (emergency lscs), 5 cases - Foley with uterine artery ligation, 3 cases total hysterectomy, 1 case subtotal hysterectomy1 bladder repair

13. Pattern of Post operative Complications :

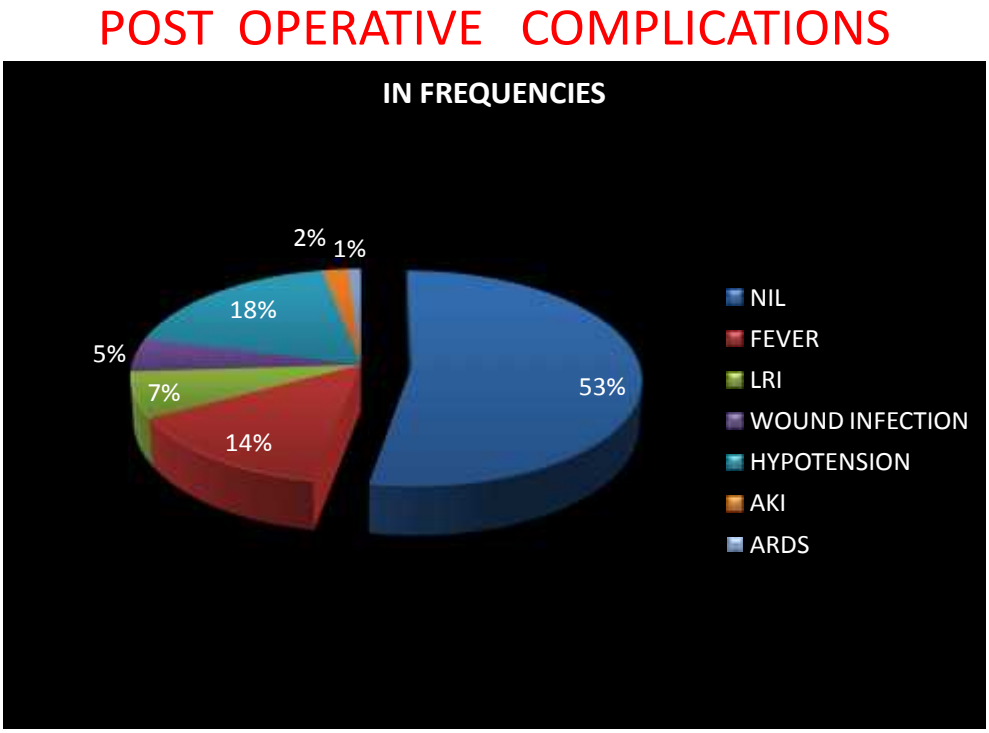


TABLE -17

	Frequency	Percent	Valid Percent	Cumulative Percent
NIL	53	53.0	53.0	53.0
FEVER	14	14.0	14.0	67.0
LRI	7	7.0	7.0	74.0
WOUND INFECTION	5	5.0	5.0	79.0
ARDS	1	1.0	1.0	80.0
HYPOTENSION	18	18.0	18.0	98.0
AKI	2	2.0	2.0	100.0

53% cases were nil postoperative complications, 18 cases were developed hypotension managed with IV fluids, 14 cases were developed fever, LRI treated with antipyretics, antibiotics, 2 cases were AKI managed by fluid restriction and serial renal parametres monitoring

TABLE -18

14. Pattern of Blood components Transfused :

	Frequency	Percent	Valid Percent	Cumulative Percent
PACKED CELL	35	35.0	35.0	35.0
FFP	14	14.0	14.0	49.0
PACKED CELL + FFP	37	37.0	37.0	86.0
PC + FFP + CRYO	14	14.0	14.0	100.0

35% of our patients received only packed cell transfusion, 37% received blood along with FFP transfusion

15. Neonatal Outcomes :

RESUSCITATION	0.9%
NICU ADMISSION	41.5%
NO NICU ADMISSION	53.4%
RECOVERED	87.1%
STILL BIRTH	3

TABLE -19

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
NIL	4	4.0	4.0	4.0
PRE TERM	14	14.0	14.0	18.0
TERM	51	51.0	51.0	69.0
STILL BIRTH	3	3.0	3.0	72.0
RDS	1	1.0	1.0	73.0
PRETERM + LBW	17	17.0	17.0	90.0
PRETERM + LBW + RDS	10	10.0	10.0	100.0

Out of 9 perinatal deaths, Asphyxia and prematurity were major contributions 4.3% and 2.6% respectively followed by RDS1.6%) Neonatal mortality was 8-9% with placenta previa. Perinatal death were higher in gestational age between 30-33 weeks

TABLE -20

16. UNIVARIATE ANALYSIS :

S. No	Study variables	Type of statistical test - applied	(p value)	Significance value Interpretation
1.	Post operative complications Vs Type of delivery	Chi Square Test	.04	Yes
2.	Type of placenta previa Vs Ioc	Chi Square Test	1.07	No
3.	Type of delivery Vs Baby outcome	Chi Square Test	.02	Yes
4.	Transfusion Vs Blood components	Chi Square Test	3.74	No

In univariate analysis, there is an significant p valve between postoperative complication vs type of delivery and type of delivery vs baby outcome.

DISCUSSION

In the present study, the incidence of placenta previa is 6.6%. The incidence was highest in the age group of 20-29 years i.e., 67.3%, followed by women in 30-35 year age group, above 35 year age group and less than 19 year age group, i.e.14.85%, 7.9%,9.9%respectively. The mean maternal age in our study was 25.7+/-4.6 years which is similar to observation made by Singhal et al (2008) as 26.2 years. In the present study, the incidence of placenta previa was equal in primi and multi gravidas 31%. The incidence in Grand multi (>4 viable births) was nil. Recurrence rate following placenta previa is 4-8% but in the present study there was no history of previous placenta previa. Rani. P.R. et al (1999), shows that prior caesarean section is 45.5% and 10.8% had abortion, majority of patient had no risk factors. Totally 45.5% patients were previous LSCS, no patients had previous myomectomies and 11% patients had previous dilatation and curettage. Out of 101cases of placenta previa 7cases had minor degree (Type I, Type IIA) and 94 cases had major degree of placenta previa (Type II B, Type III & Type IV).Among this Type 2a placenta previa is most commonly seen(46%) followed by type 2b(18%),type 3(16%).Mean gestational age in our study 35.5+/-2.8 .79% of cases in our study participants had cephalic presentation followed by breech 16% .In the present study, all patients received blood transfusions (35% received PC alone, 37% received PC +FFP, 14% of patient

received PC+FFP+CRYO) and more blood transfusion required in intrapartum and postpartum period. 53% of patients had nil complications,18%went in for hypotension and / or shock,14%deveoped fever,least complication in our study was AKI and ARDS. Hysterectomy was done in 6 cases. In this study 3case of peripartum hysterectomy was for anterior placenta previa. Indication for emergency peripartum hysterectomy in recent years has changed from uterine atony to abnormal placentation. In the present study, 2 cases, caesarean hysterectomy was done for uterine atony, after all conservative measure to arrest bleeding failed. Histopathology specimen reports for hysterectomy specimens were showing edematous myometrial tissues. For 1 patients hysterectomy was done later for secondary PPH. 2 patients underwent bladder repair. Perinatal morbidity in placenta previa : In the present study, 0.9%, 41.5% of babies required resuscitation and NICU admission,53.4% of babies had no NICU admission,3 babies still born and no neonatal death occur, 9 babies had perinatal death in our study . In the present study perinatal deaths were higher in the gestational age group of 30-33 weeks and the perinatal mortality was 89.1%. The perinatal mortality between 34- 36 weeks group was 0%. This shows that the PNM rates are low for term fetus. The important causes for perinatal mortality are asphyxia, prematurity, congenital malformation and respiratory distress.

SUMMARY & CONCLUSION :

Placenta previa accounts 0.5% of all deliveries still it remains major cause for perinatal morbidity and mortality. It is noted that patient admitted to hospital as emergency admission had maximum chances of maternal morbidity and perinatal mortality. Early detection of placenta previa by USG, conservative management including blood transfusion (mild bleeding cases),early elective termination of pregnancy by assessing fetal lung maturity along with NICU care reduces perinatal mortality .Maternal , perinatal morbidity and mortality is preventable can be achieved by spacing pregnancies, routine USG in pregnancy ,early referral of high risk pregnant cases in tertiary care institute.

In present study,101 placenta previa cases taken and studied type of placenta previa, clinical course, maternal and fetal outcome

1. In the present study, the following age groups had highest and lowest incidence **20-29yrs i.e.67.32%**>30-35yrs i.e.14.85%,>35yrs i.e.7.9%, <19yrs i.e.9.9%

2. Most common risk factors in our study - **caesarean section 45.5%(**1 LSCS-30%, 2LSCS-16%) >42.8% of cases had no risk factors>10.8% cases had previous history of abortions>1 case RH isoimmunization

3. In placenta previa, **primi gravida and multigravida**(G2P1L1 With previous lscs) had same incidence **-31%**

4. **79%** of cases in our study participants had **cephalic** presentation > breech 16% > transverse lie 5%

5. **Type 2A Placenta previa had 46%**>Type2B placenta previa had 18%>Type 3 placenta previa 16%>Type 4 -11% ,lowest incidence Type 1 placenta previa 9%

6. **82%** of cases underwent **emergency LSCS**, 50% of cases underwent prophylactic uterine artery ligation,32% of cases had PPH managed medically and surgically 9% of cases underwent elective LSCS, for all 9 cases prophylactic uterine artery ligation done, no PPH

7. 42 cases had hemorrhage in antenatal period in which 3 patients had profuse bleeding during antepartum period followed by 31 cases had intrapartum hemorrhage treated with blood and blood products

8. Over all most common intra operative procedure done :**34%** cases had **foley tamponade with B/L uterine artery ligation**,27%had foley tamponade

9. In present study, **Type 1 placenta previa -9 cases** (2 cases underwent emergency LSCS and 7 labour natural) 88.9% of cases had foley tamponade,15% had foley tamponade with uterine artery ligation

10. In **Type 2A placenta previa - 46 cases** (6 cases elective LSCS, 40 cases emergency LSCS) 15 cases had foley tamponade with uterine artery ligation ,12% cases had foley tamponade,**1 cases** underwent **subtotal hysterectomy**)

11. In **Type 2B placenta previa -18 cases** (2 cases elective lscs,16 cases emergency lscs) 9 cases had foley tamponade with uterine artery ligation,4 cases had uterine artery ligation, 2 cases had uterine artery ligation with b lynch)

12. In **Type 3 placenta previa-16cases** (1 elective lscs,15 emergency cases) 5 cases had foley with uterine artery ligation,**1 case subtotal hysterectomy**,**1 case bladder repair**

13. **In type 4 placenta previa-11 cases** (emergency lscs) 5 cases -foley with uterine artery ligation, 3 cases total hysterectomy, 1 case subtotal hysterectomy, 1 bladder repair, 2 maternal deaths

14. **53% cases were nil postoperative complications**, 18 cases were developed hypotension managed with IV fluids, 14 cases were developed fever, LRI treated with antipyretics,antibiotics,2 cases were AKI managed by fluid restriction and serial renal parameters monitoring

15. 35% of our patients received only packed cell transfusion,37% received blood along with FFP transfusion

16. Out of 9 perinatal deaths, **Asphyxia and prematurity** were major contributions 4.3% and 2.6% respectively followed by RDS1.6%. Neonatal mortality was 8-9% with placenta previa. Perinatal death were higher in gestational age between 30-33 weeks

REFERENCES

1. Razia Mehboob, Nazir Ahmed. Maternal and fetal outcome in placenta previa. Pakistan J Med. Res. 2003;42.
2. Ananth CV, Wilox AJ, Cavitz DA, Bowes WA Jr, Luther ER. Effect of maternal age and parity on risk of uteroplacental bleeding in pregnancy. Intl J Obstet & Gynecol. 2006;2:511-6.
3. Emily C Olive, Christine L, Roberts Charles S, Algert & Jonatha MM. Placenta previa: Maternal morbidity and place of birth. Aus & NZ J Obstet & Gynecol. 2005;45(6):499-504.
4. Richard LN. Abruptio & placenta previa frequency, perinatal outcome and cigarette smoking. Intl J Obstet & Gynecol. 2005;106:986-991.
5. Oyelue, Yinka, Smiltian J. Placenta previa, placenta accreta, vasa previa. Intl J Obstet Gynecol. 2006;107(9):927-941.
6. Getahun D, Oyelese Y, Salihu HM, Ananth CV. Previous caesarean delivery and risks of placenta previa and placental abruption. Obstet Gynecol 2006;107:771-8.
7. Kainer F, Hasbargen U. Emergencies associated with pregnancy and delivery: peripartum haemorrhage. Dtsch Arztebl Int. 2008;105:629-38. Epub 2008 Sep 12. Comment in: Dtsch Arztebl Int. 2009;106:13.
8. Omstock CH. Antenatal diagnosis of placenta accreta: a review. Ultrasound Obstet Gynecol. 2005;26:89–96.

9. Zlatnik M, Cheng Y, Norton M, Thiet M, Caughey A. Placenta previa and the risk of preterm delivery. J Matern Neonatal Med. 2007;20:719–23.

10. Harper LM, Odibo AO, Macones GA, Crane JP, Cahill AG. Effect of placenta previa on fetal growth. Am J Obstet Gynecol. 2010;203(4):330.e1-5

11. Cunningham FG, Leveno KJ, Bloom SL, Haulh JC, Gilstrap LC, Wenstrom KD, editors. Obstetric haemorrhage. In: Williams Textbook of Obstetrics, 22nd ed. New York: McGraw-Hill, 20 ;809-823.

12. Martin JA, Hamilton BE, Ventura SJ. Births: Final data for 2001. National vital statistics reports. Hyattsville. National Centre for Health Statistics. 2002.

13. Crane JMG, Hof VMC, Dodds L. Neonatal outcomes with placenta previa. Obstet Gynecol. 1999;93:541- 3.

14. Frederiksen MC, Glassenberg R, Stika CS. Placenta previa: a 22-year analysis. Am J Obstet Gynecol. 2009;180:1432.

15. Gesteland K, Oshiro B, Henry E. Rates of placenta previa and placental abruption in women delivered only vaginally or only by cesarean section. J Soc gynecol Investig. 2004;11:208.

16. James DK, Steer PJ, Weiner CP, Gonic B, editors. Bleeding in Late Pregnancy, In: Text book of High Risk Pregnancy Management Options 3rd ed. Saunders, 59. 2010:1259-1266.

17. Salihu HM, Li Q, Rouse DJ. Placenta previa: neonatal deaths after live births in the United States. Am J Obstet Gynecol. 2003;188:1305-8.

18. Cotton D, Read JA, Paul RH, Quilligan EJ. The conservative aggressive management of placenta previa. Am J Obstet Gynecol. 1999;137:687-95. RCOG Guidelines 2018

19. Kaseem GA, Azlahrani AA. Maternal and neonatal outcomes of placenta previa and placenta acreta three years of experience with a two- consultant approach. Int J Womens Health. 2013;5:803-10.

20. Onwere C, Urganci IG, Cromwell DA, Mahmood TA, Templeton A, Jan H, et al. Maternal morbidity associated with placenta previa among women who had elective caesarean section. European J Obst Gyn Repro

21. Rosenberg T, Pariente G, Sergienko R, Wiznitzer A, Sheiner W. Critical analysis of risk factors and outcome in placenta previa. Arch Gynecol Obstet. 2011;284:47-51.

22. Ojha N. Obstetric factors and pregnancy outcome in placenta previa. J Institute Med. 2012;34:38-41.

23. Wu S, Kocherginsky M, Hibbard J. Abnormal placentation: twenty-year analysis. Am J Obstet Gynecol. 2005;192:1458-61.

24. Bhatt AD, Meena A, Desai MR. Maternal and perinatal outcome in cases of placenta previa. Int J Sci Res. 2014;3(1):299-301.

25. Urganchi GI, Cromwell AC, Edozien LC, Smith GCS, Onwere C, Mahmood TA, et al. Risk of placenta previa in second birth after birth cesarean section: a population-based study and meta-analysis. BMC Pregnancy Childbirth. 2011;11:95.

26. Ananth CV, Demissie K, Smulian JC, Vintzileos AM. Relationship among placenta previa, fetal growth restriction and preterm delivery: a population based study. Obstet Gynecol. 2001;98(2):299-306.

27. Faiz AS, Ananth CV. Etiology and risk factors for placenta previa: an overview and meta-analysis of observational studies. J Matern Fetal Neonatal Med. 2003;13(3):175-90.

28. Villarreal, Luis P. (January 2016). "Anatomy of placenta:".

29. Smith, RS; Lauria, MR; Comstock, CH; Treadwell, MC; Kirk, JS; Lee, W; Bottoms, SF (January 1997). "Transvaginal ultrasonography for all placentas that appear to be low-lying or over the internal cervical os". Ultrasound in Obstetrics & Gynecology. 9 : 22–4. doi:10.1046/j.1469-0705.1997.09010022.x. PMID 9060125. S2CID 44809710.

30. "Definition, classification, etiology, and pathophysiology of shock in adults". UpToDate. Retrieved 2019-02-22.

CONSENT FORM

ஒப்புதல் படிவம்

முழுபெயர் :

தந்தை / தாயார்பெயர் :

பிறந்தநாள் / வயது :

I. நான் மேலே குறிப்பிடப்பட்ட ஆராய்ச்சி குறித்த விளக்கம் உள்ளபடியும் படித்துபுரிந்து கொண்டமைக்கான சான்றாக , எனக்கு கொடுக்கப்பட்ட அனுமதிப்படிவத்தில் உரிய விவரங்களை.

II. நான் இந்த ஆராய்ச்சியில் பங்குபெறுவதை தன்னார்வமாகத் தான் எனது , நான் எப்போது வேண்டுமானாலும் , காரணம் ஏதும் தெரிவிக்காமல் இந்த ஆராய்ச்சியிலிருந்து விலக முழுமை எனக்கு அதிகாரம் உள்ளது எனது, அப்படி செய்வதனால் என் சட்ட ரீதியான மற்றும் சமூகரீதி சலுகைகள் பாதிக்கப்படமாட்டது எனது நான் அறிகிறேன்.

III. இந்த ஆராய்ச்சியில் புரிவதற்கு மற்றும் அவர்கள் சார்பாக பணிபுரிபவர்கள் நிறுவனங்கள் , மற்றும் கட்டுப்பாடு குழுவினர் ஆகியோர், இந்த ஆராய்ச்சியில் போது, எனது இதில் சம்பந்தமான வேறு ஆராய்ச்சி செயலுமல்லது , என் சம்பந்தப்பட்ட சமூகரீதி விவரங்களை மேலும் எனது அனுமதி இன்றி காண அனுமதி அளிக்கிறேன். மேலும் நபருக்கு இந்த ஆராய்ச்சியில் பற்றி விளக்கும் போது, இந்த ஆராய்ச்சியில் முடிவுகள் பாதிப்பிக்கும் போது எனது அடையாளம் வெளியிடப்படமாட்டது எனது நான் அறிகிறேன்.

IV. இந்த ஆராய்ச்சியில் மூல அறியப்படும் விஷயங்கள் மற்றும் முடிவுக அறிவியல் சார்ந்த காரணங்களுக்காக வெளியிடப்படுவதை நான் எப்போது தடுக்கமாட்டேன் எனது உரிய அனுமதி அளிக்கிறேன்.

V. நான் இந்த ஆராய்ச்சியில் பங்கு பெற சம்மதம் தெரிவிக்கிறேன்.

1) ஆராய்ச்சியில் பங்கு பெறுபவரின் / சட்டபூர்வ பாதுகாவலரின் கையெழுத்து / ஆள்காட்டி விரல் பதிப்பு.

பெயர் / உறவுமுறை .

2) ஆராய்ச்சியாளர் சாட்சி கையெழுத்து , தேதி.

PROFORMA

Maternal &Foetal Outcome In Placenta Previa

Name:	Hospital:
Age:	I.P.No:
Occupation:	D.O.A:
Address:	D.O.D:
Booked / Referred from:	
Socio Economic Status:	Total Hospital Stay

Presenting Complaints:

Amenorrhea : Months

Bleeding P/V : Yes/ No

No. of Episodes :

Duration :

Pain Abdomen : Yes /No

Foetal movement : Yes /No

Threatened Abortion:

Congenital Anomaly:

Twins :

Obstetric History:

Obstetric score :

Married Life : Year / Consanguineous / Non-consanguineous

Detailed History of Previous Pregnancy:

Abortions :

MTP/ D&C : Yes/No

Blood Transfusion :

Deliveries : Vaginal / Caesarean Section

Menstrual History:

Past History :

Family History :

Personal History :

General Physical Examination:

Level of Consciousness :

Hemodynamic stability : Yes / No

Pallor : Mild / Moderate /Severe:

Pulse : BP :

CVS : RS :

Per Abdominal Examination:

Uterus :

Relaxed or Acting :

Symphsio Fundal Height :

Abdominal Girth in Cms :

Lie

Presentation

FHS

Per-Speculum Examination:

Cervix :

Effacement :

Dilatation :

Status of Membrane :

Presenting Part :

Amount of Bleeding :

Clinical Diagnosis:

Investigations Including CBC :

Date	Gestational Age	Placental Location	Presentation	EFW	Anomalies	Others

Ante partum Management :

Conservative :

Duration :

Mode of delivery

Vaginal/Caesarean Section :

Duration of Labour :

Active Management 3rd Stage : Yes/No

Caesarean : Emergency

Elective :

Indication :

Anaesthesia :

Placental Implantation site : Low Lying

PP – Anterior/Posterior

Intra operative blood loss :

Intra operative complication :

Mode of Baby delivery :

PPH :

Drugs	Dosage	Frequency

Date & Time of Delivery :

3rd stage complication :

Management : Medical

PPH : Atonic

Surgical :

Traumatic Both :

Mixed

Examination of Placenta:

Weight :

Adherent Clots :

Final Diagnosis :

Neonatal Outcome : Live / fresh still Born /Macerated Term /Preterm

Sex :

Weight :

Apgar : At 1 minute : At 5 minute

NICU Admission : Yes/No

Maternal Outcome :

Morbidity :

1. Anaesthesia
2. Major-Hemorrhage
3. Anemia
4. Peri Partum hysterectomy

Minor : Febrile Morbidity

Blood Transfusions	**Date**	**NO**
Whole blood/ Packed RBC		
Component Transfusions		
FF		
Platelet		
Cryoprecipitate		

Maternal Outcome

Risk Factors				
Age				
Parity				
Multiple Pregnancy				
Mal presentation				
Previous MTP				
Previous CD				
No of Previous CD				
Previous History of Placenta Previa				

Foetal Outcome

Preterm			
Term			
LBW			
Fresh still born			
IUGR			
Sepsis			
NICU			

MASTER KEY

Code	Parity	Previous Pregnancy	Bleeding Episodes	Type of Placenta Previa	Hemorrhage & Transfusion	Intra Operative Complications	Post Operative Complications	Blood Components	Baby Out Come
0			No Bleeding				Nil		Nil
1	Primi	1 LSCS	1 - Episode	Type-1	Antepartum (AP)	Foley Tamponade	Fever	PC	Pre Term
2	G_2 P_1 L_1	2 LSCS	2 - Episode	Type-2A	Intrapartum (IP)	Bilateral uterine Artery Ligation	LRI	FFP	Term
3	G_2 P_1 L_0	NVD with PPH	More than 3- Episode	Type-2B	Postpartum (PP)	B Lynch	Wound Infection	Platelet	Still Birth
4	G_3 P_2 L_2	NVD without PPH		Type-3	AP+IP	Sub Total Hysterectomy	ARDS	Cryo	RDS
5	G_2 A_1	Primi -5		Type-4	IP+PP	Total Hysterectomy	Hypotension	PC + FFP	Preterm + LBW
6						Bladder Rent Repair	AKI	PC + FFP + Platelet	Preterm + LBW + RDS
7						TH			
8						Foley Tamponade + Bilateral uterine Artery Ligation			
9						Bilateral uterine Artery Ligation + B Lynch			

MASTER CHART

Sl.No.	Name	Age	Parity	Previouspregnancy	Gainwks	Bleedingepisode	HB	Presentation	Typeofplacentaprevia	Typeofdelivery	Hemorrhage	Transfusion	Dos	Ioc	Postopcomplication	Hospital stay	Bloodcomponents	Babyoutcome
1	Thilagavathy	24	2	4	38	1	13	1	2	4	1	2	45	8	5	5	1	0
2	Athufa parvin	24	1	5	34	2	10.4	1	2	4	1	5	60	8	1	6	5	7
3	Supria	18	1	5	38	0	10.6	1	1	1	2	3	15	1	0	3	1	0
4	Priya	26	3	4	32	1	9.8	1	3	4	4	5	55	9	5	5	5	5
5	Devi	19	1	5	40	0	12	1	1	1	2	3	10	1	0	4	1	0
6	Manjula	27	4	4	30	1	11.4	2	3	4	4	4	40	8	0	5	1	8
7	Sumithra	21	1	5	32	2	10.8	2	2	4	3	4	45	8	3	5	5	8
8	Thilagavathi	24	2	4	38	1	10	1	2	4	2	4	40	3	5	5	5	2
9	Lakshmi	25	2	4	39	2	10.9	1	3	4	4	5	43	8	5	6	5	2
10	Nandini	26	1	5	37	1	11	1	4	4	4	4	55	9	2	5	5	2
11	Priya	21	2	4	38	0	10.7	1	1	1	1	3	15	1	0	2	1	2
12	Rajeshwari	31	2	3	37	1	9.9	1	2	4	5	5	35	8	1	3	5	2

13	Sowmya	24	1	5	36	1	10.3	1	3	4	2	3	40	1	6	8	6	2
14	Leela	25	1	5	37	1	10.2	1	2	4	4	2	60	1	0	5	5	2
15	Oviya	21	2	1	31	1	11	1	2	4	4	3	55	2	5	5	6	7
16	Shreen bhanu	22	1	1	35	1	9.8	1	2	4	4	3	60	3	2	4	5	7
17	Gamdhimathi	40	4	4	36	1	9.7	1	4	4	4	4	30	1	0	4	5	2
18	Vijaya	25	2	1	34	2	10.1	1	3	4	4	5	35	1	0	4	5	7
19	Suriyagandhi	29	4	2	34	1	10.7	1	2	4	4	2	40	8	1	5	6	7
20	Suganya	31	2	1	35	1	11.2	1	4	4	4	3	35	8	1	4	5	7
21	Athulya	22	1	5	29	1	9.3	3	4	4	5	2	40	8	0	3	6	8
22	Rajeshwari	31	3	3	38	1	9.7	1	2	4	4	3	45	3	3	8	5	2
23	Shobana	26	2	1	37	2	10.5	1	2	4	4	4	55	2	3	8	6	2
24	Abinaya	19	1	5	28	1	10.9	2	3	4	4	4	50	8	5	6	5	8
25	Chitra	22	4	2	37	2	10.7	1	3	4	4	4	55	8	0	5	5	2
26	Ramya	28	2	3	28	1	10.2	3	2	4	4	3	55	1	1	5	6	3
27	Poovarasi	23	1	5	37	1	11	1	2	4	4	3	50	8	1	4	5	2
28	Sangeetha	23	1	5	31	1	10.3	2	3	4	3	3	45	8	0	5	1	7
29	Iswariya	23	1	5	37	1	10.5	1	4	4	4	4	50	7	0	5	1	2
30	Mubarak	22	1	5	32	1	9.9	2	4	4	4	4	60	8	1	4	5	7
31	Priyanka	25	2	1	32	2	9.8	1	3	4	3	3	50	1	0	5	1	2

32	Rajeshree	31	3	1	37	1	10.4	1	2	4	2	2	55	3	2	6	5	2
33	Nadhiya	25	1	5	37	1	11.3	1	3	4	4	4	45	8	5	5	5	2
34	Latha	25	4	2	36	2	11	1	2	4	3	3	40	5	1	4	5	2
35	Iswariyashree	27	4	4	34	1	12	1	4	4	4	4	90	1	0	4	5	7
36	Vijayashanthi	29	4	3	33	1	10.8	1	5	4	5	5	120	6	3	16	6	8
37	Kalpana	28	2	1	37	1	11	1	5	4	4	4	50	8	0	4	5	2
38	Sumathy	35	4	1	39	2	11.5	1	2	4	2	2	55	1	0	3	1	2
39	Dhanalakshmi	39	4	2	35	1	11	2	5	4	3	3	90	6	2	14	5	7
40	Sarala	25	4	2	31	1	12.3	3	2	4	4	4	40	9	0	3	2	1
41	Jayalakshmi	35	3	3	33	1	11.4	1	2	4	5	5	45	1	5	5	2	1
42	Vasugi	18	1	5	38	1	10.3	1	1	2	5	5	10	1	0	2	1	3
43	Surya	23	1	5	37	1	10.7	1	5	3	2	2	40	8	0	3	1	2
44	Silambarasi	26	2	1	38	1	11.1	1	2	4	2	5	45	1	1	4	5	2
45	Kirubadevi	29	4	2	37	1	10	2	3	4	4	5	55	9	3	3	2	2
46	Baby	32	4	2	36	1	11.3	1	2	4	2	3	60	8	5	5	2	2
47	Pavithra	29	5	3	37	2	10.9	1	1	3	2	2	35	2	0	3	1	2
48	Rekha	28	1	5	36	1	10.5	1	2	4	5	5	45	1	0	5	1	1
49	Rakshita bee	25	4	2	37	1	11	1	2	3	2	2	55	8	0	3	1	2
50	Sangeetha	26	3	1	39	1	11.3	1	3	3	2	2	30	8	1	3	6	2

51	Kanimozhi	25	3	1	39	2	11.9	2	5	4	4	4	40	8	1	5	5	2
52	Mubeena	27	3	1	37	1	10	1	1	4	4	4	50	1	0	4	2	2
53	Meena	19	1	5	38	1	10.3	1	1	2	2	2	10	1	0	2	1	2
54	Sandhiya	24	1	5	37	1	11.1	1	3	4	3	3	40	2	5	4	1	2
55	Kowsalya	22	5	4	38	1	12	1	4	4	3	3	55	2	5	4	5	2
56	Dhanalakshmi	23	3	4	36	1	11	1	1	2	2	2	15	1	0	3	1	2
57	Naveena	20	2	1	36	1	10.2	1	2	4	4	4	45	8	0	5	1	2
58	Pavithra	22	2	1	35	1	11	1	3	4	4	4	55	8	5	5	5	1
59	Malathi	28	4	2	37	0	10.8	1	2	3	2	2	45	1	0	3	1	2
60	Geetha	38	2	1	38	0	11.4	1	2	3	2	2	35	1	0	3	1	2
61	Revathy	25	2	1	34	2	10.1	2	4	4	4	4	40	8	1	5	1	1
62	Deepika	19	2	1	33	2	11	2	3	4	4	4	45	8	0	3	1	7
63	Tharuma	28	4	2	37	1	10.3	1	2	4	2	2	55	1	0	3	5	2
64	Jansirani	32	1	5	38	1	11.3	1	2	4	3	3	50	1	1	5	5	2
65	Renuga	30	4	2	36	1	10.1	2	2	3	4	4	45	3	0	3	1	2
66	Lavanya	26	4	2	37	1	9.8	2	2	3	4	4	40	8	0	3	1	2
67	Nandhini	24	5	3	36	1	11	1	4	4	2	2	35	1	0	3	2	2
68	Kalaivani	23	5	3	38	0	12	1	1	2	3	3	10	1	0	3	1	2
69	Tamilselvi	22	2	1	33	1	9.9	1	2	4	2	2	50	8	1	4	5	1

70	Ammu	33	2	1	34	1	10.2	1	2	3	2	2	40	9	2	5	5	1
71	Kalpana	31	2	1	38	1	14.8	1	5	4	4	4	120	6	5	9	5	0
72	Jayalakshmi	35	3	1	37	2	11.4	1	2	4	4	4	60	2	0	4	1	7
73	Suganya	29	4	2	33	1	11	2	5	4	4	4	120	7	5	7	6	7
74	Naveena	26	3	4	35	1	8.2	1	4	4	5	5	100	5	6	14	6	1
75	Hajira	19	1	5	36	1	10.7	1	4	4	5	5	40	1	0	4	1	1
76	Jeyapriya	21	2	1	33	2	9.4	1	4	4	5	5	55	8	5	4	6	8
77	Sasirekha	26	1	5	27	3	7.9	3	3	4	4	4	45	2	0	3	1	8
78	Gayathri	22	2	1	35	1	12	2	2	4	2	2	50	2	0	5	2	1
79	Mahalakshmi	25	2	3	36	1	12.1	1	5	4	5	5	55	5	5	9	6	1
80	Nivetha	30	3	4	37	1	12	1	4	4	2	2	60	2	0	5	2	2
81	Rathnapriya	28	2	1	37	1	10	1	2	4	2	2	70	2	0	4	5	2
82	Vidhya	24	2	1	36	1	10.1	1	2	4	2	2	75	1	0	6	2	1
83	Nandhini	21	1	5	35	1	11.3	1	2	4	4	4	70	2	0	4	5	7
84	Jayapriya	29	5	3	34	1	11	1	2	4	4	4	60	8	0	5	5	8
85	Ishwarya	24	1	5	34	1	11.1	2	5	4	5	5	55	8	2	7	2	8
86	Suganya	31	2	1	38	1	13.7	1	5	4	5	5	50	8	5	4	5	2
87	Poovarasi	23	2	1	38	1	10.3	1	2	4	4	4	40	2	0	4	5	2
88	Suryagandhi	27	4	2	37	1	12	1	2	4	2	2	40	2	0	3	2	2

89	Chitra	23	4	2	37	1	9.2	1	2	5	5	5	45	2	2	7	2	2
90	Sweety	21	1	5	36	1	9.9	1	2	4	2	2	55	1	0	3	2	2
91	Gayathri	25	2	2	34	1	8.1	2	4	4	2	2	60	2	0	3	2	7
92	Valliyammal	33	2	1	35	1	10.4	1	4	4	5	5	70	2	5	6	6	7
93	Abinaya	20	1	5	36	1	11.9	1	2	4	2	2	55	2	0	4	1	1
94	Bhuvanshwari	24	1	3	35	1	10	1	3	4	2	2	35	2	0	3	1	1
95	Vijayakumari	25	3	5	30	1	11	1	2	4	2	2	45	8	0	4	1	3
96	Ramani	23	1	5	38	1	11	1	3	4	3	3	50	2	0	4	1	2
97	Shobana	22	2	1	37	1	10	1	2	4	3	3	55	8	0	3	1	2
98	Pavithra	21	1	5	38	1	11.6	1	2	4	3	3	35	2	0	3	1	2
99	Ishwarya	20	1	5	30	1	11	3	2	4	2	2	50	8	0	3	1	8
100	Manjula	30	4	4	33	1	11	1	5	5	5	5	60	2	4	7	6	7
101	Geetha	22	0	1	36	1	11	1	2	4	5	5	60	1	4	7	6	7