# COMPARATIVE STUDY BETWEEN UTERINE EXTERIORIZATION AND IN SITU REPAIR AT CESAREAN SECTION

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# CERTIFICATE

This is to certify that the dissertation entitled "**COMPARATIVE STUDY BETWEEN UTERINE EXTERIORIZATION AND IN SITU REPAIR AT CESAREAN SECTION**" is a bonafide work done by **Dr.S.DEEPAPRIYA** in the Institute of Obstetrics and Gynaecology (Madras Medical College) Egmore, Chennai in partial fulfillment of the university rules and regulations for award of MD degree in Obstetrics and Gynaecology under my guidance and supervision during the academic year 2010-2013.

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## DECLARATION

I solemnly declare that this dissertation entitled **"COMPARATIVE STUDY BETWEEN UTERINE EXTERIORIZATION AND INSITU REPAIR AT CESAREAN SECTION"** was done by me at the Institute of Obstetrics & Gynaecology, Madras Medical College during the year 2011-2012 under the guidance and supervision of, **Prof.Dr.K.RUKMANI MD.,DGO.** This dissertation is submitted to the Tamil Nadu Dr.M.G.R. Medical University towards the partial fulfillment of requirements for the award of M.D. Degree in Obstetrics and Gynaecology (Branch-II).

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# TABLE OF CONTENTS

# INTRODUCTION

Cesarean is one of the oldest and most commonly performed procedures in obstetrics. This procedure has saved the lives of countless mothers and fetuses in helpless situations. On the other hand, its inappropriate use can be a direct and preventable cause of maternal morbidity and mortality.

With immense advances in anaesthesia , improvements in surgical techniques, availability of antibiotics and blood products, the safety of lower uterine segment cesarean, broadening of indications for cesarean, recognition of fetus as a patient, the feasibility of vaginal birth after cesarean and the acceptance of the procedure by women have characterized the evolution of cesarean during the $20^{th}$ and the $21^{st}$ century.

From the early $21^{st}$ century, the choice for women on the mode of delivery has further added to the evolution of increasing cesarean rates. On the other hand it has simultaneously led to decrease in maternal morbidity and mortality due to the anaesthetic and technical improvements. . This has driven many obstetricians to perform more and more cesarean. The increase in cesarean rates has hit both the developed and developing countries.

The rate of cesarean delivery is on the rising trend. According to world health statistics, the rate of cesarean in India between the year 2005 and 2010 is **9%**(8). This is still increasing and it is alarming that the cesarean rate in India is more in the states of Kerala, Andhrapradesh, Goa, and Tamilnadu with Chennai having a cesarean rate of around 40%. The cesarean rate in our Institute- IOG is 40% during 2010-2011.

Since cesarean is the most commonly performed operation in obstetrics, there is always a need to invent and analyse the best and safest technique in terms of maternal morbidity ,cost and also the one which poses little or no complications.

Due to the escalating rise in cesarean there is a secondary rise in repeat cesarean which in turn add on to the maternal morbidity and mortality due to placenta previa, accreta, urinary tract injuries etc..

There are many variations in the surgical procedure of cesarean each one of them aiming at reducing the blood loss, time taken for surgery, febrile morbidity, post operative infectious morbidity, length of hospital stay, and the costs incurred and thus the overall economical burden on health. This study is aimed to compare the two methods of uterine closure (hysterorrhaphy) during cesarean namely the exteriorization and the insitu repair.

## AIM OF THE STUDY

To compare the influence of the two methods of cesarean- exteriorisation and insitu repair of the uterus on cesarean morbidity.

# REVIEW OF LITERATURE

**CESARIAN DELIVERY**: Defined as the birth of the fetus through incision in the abdominal wall (LAPAROTOMY) and the uterine wall (HYSTEROTOMY)(1).

The term 'cesarean section' is a tautology both meaning the same - 'to cut'. Hence cesarean delivery or cesarean operation is a better terminology than cesarean section.

**EXTERIORIZATION:** After the delivery of the fetus and placenta, the uterus is temporarily taken out of the abdominal cavity and placed on the draped mother's anterior abdominal wall for uterine closure and then repositioned again into the abdominal cavity once closure is over.

**INSITU REPAIR**: After delivery of the fetus and placenta the uterus is not taken out. Uterine closure is performed with uterus in its original place in the abdominal cavity.

There are only few randomized controlled studies on the safety of each of the techniques with some suggesting that exteriorisation is associated with less blood loss, less post operative febrile morbidity and

saves time while others found no association of such results between the two.

**ETYMOLOGY:** The three explanations for the origin of the word cesarean

are as follows.

**1. BIRTH OF JULIUS CAESAR**:

Since Julius Caesar was born by cesarean delivery in 100 BC it gave birth to the origin of the term cesarean. This explanation has its own flaw as the first performed operations were done on a dead or dying woman and mother of Julius Caesar- Aurelia lived several years after his birth.

**2." LEX CAESAREA":**

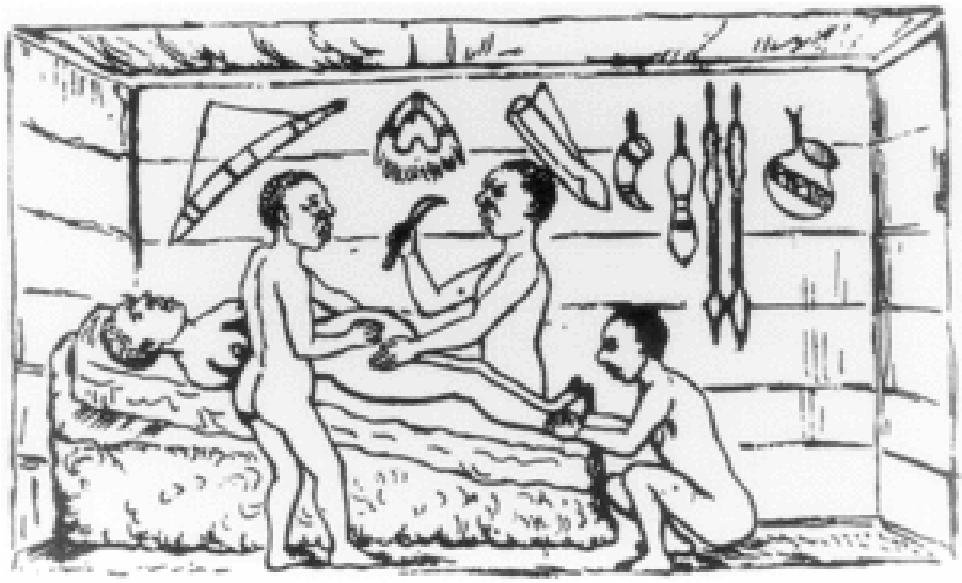
Numa Pompilius, a Roman Emperor in $8^{th}$ century BC created a law called LEX REGIA meaning that operation may be performed on a woman dying in the last few weeks of pregnancy hoping to save the child. This LEX REGIA later became "LEX CAESARIA" (1)

**3.” CAEDERE”:**

The word caesarean was derived from the Latin word “caedere” meaning to cut.

**HISTORY**

In olden days cesarean was performed to deliver the fetus out of a dying or dead woman in the hope of saving the baby and also on the religious grounds that the baby might be separately buried from the dead mother. It was also performed as a last resort of delivery and did not intend to save the life of woman. But things gradually changed after the 19th century where it was done for either maternal or fetal indications.



The first written record of both mother and the infant surviving cesarean is from Switzerland in 1500(3). This was performed by Jacob Nufer on his wife.(2) The woman was unable to deliver the fetus even after many a

days in labour and though helped by thirteen midwives. The desperate husband Jacob Nufer after obtaining permission from the local bodies attempted cesarean. Both the mother and the infant survived. The mother lived and subsequently gave birth to 5 other children. Bindhusara, the second Mauryan Samrat was born by cesarean. His mother consumed poison accidentally when she was about to deliver him. Chanakya , Chandragupta's teacher decided that the baby must survive and he cut open the abdomen of the queen to deliver the baby.Luzhong who was the sixth generation yellow emperor had six sons who were all born by cesarean. Furbaide Ferbend was born by cesarean when his mother was murdered by his evil aunt .Raymond Nonnatus had his surname nonnatus from Latin word meaning 'not born' . He was born by cesarean.Rostam the National Legendary hero of Iran was born by cesarean which is mentioned in the book Shahnameh in 1000AD.All the procedures had a very high mortality rate around 90 to 100 percent(3). The reasons were

1. Cesarean was performed on the exhausted, infected and severely dehydrated women in many hours of prolonged labour as a last resort.
2. The uterus was left unsutured which resulted in life threatening hemorrhage, shock and septicemia

Lebas first advocated uterine suturing in 1769 but then it was not popular atleast for a century.

**PORRO'S OPERATION:**

Understanding the problems of sepsis and hemorrhage, *Eduardo Porro* of Italy performed cesarean followed by subtotal hysterectomy in 1876(11). After hysterectomy, the cervical stump was sutured to the lower end of abdomen wound to control hemorrhage and to clear off the septic drainage. With the introduction of this procedure, the maternal mortality reduced to half of the initial 80 to 90%

**19th Century:**

The next level of development aimed at reducing the risk of sepsis and preservation of uterus. *Ferdinand Ritgen* performed a lateral extraperitoneal cesarean to preserve the uterus in 1821. *Fritz Frank* modified the transperitoneal cesarean by suturing the visceral peritoneum to the margins of abdominal wall incision for the septic drainage.

*Ferdinand Kehrer in 1881* performed a transverse lower segment cesarean(11) and it was him who first emphasized the method of double layer closure of uterine wound. The first layer involving the uterine muscle and the second layer involving the peritoneum.

**FERDINAND KEHRER**

*Max Saenger in 1882* perfomed cesarean with a longitudinal incision on the uterus which was called as the Classical cesarean(11). He meticulously did double layer suturing of the incision with silver wire. Kehrer's transverse lower segment cesarean was forgotten as Saenger's classical cesarean gained popularity.

**MAX SAENGER**

*Murdoch Cameron* of Britain adopted the classical cesarean. In the year 1888, he began doing elective cesarean in rachitic dwarfs with CPD. In the first 2 years after he started the elective classical cesarean , 22 out of 23 women survived cesarean which was a great success.Again a dramatic change occurred in the history of cesarean when *Munro kerr* in 1911 performed the lower segment tranverse cesarean which was originally done by Kehrer in 1881(11). He advocated the advantages of lower segment transverse incision which are as follows.

1. less blood loss
2. better healing since the lower uterine segment is less contractile
3. less incidence of scar rpture in the future pregnancy

**MUNRO KERR**

The concept of asepsis owes its origin to *Ignaz Semmelweis* who proved washing hands before delivery decreased the incidence of puerperal fever. The first modern cesarean was performed by *Ferdinand Adolf Kehrer* in 1881 which was a lower segment transverse cesarean.The first woman to do a cesarean on herself is *Ines Ramirez* on march 5, 2000.

The technique of exteriorization at cesarean was described by ***SANGER*** in 1882(19) and the same was modified by ***LEOPOLD*** in 1884. ***PORTES*** and ***PHANEUF*** advocated it in this century.

## ANATOMY OF THE UTERUS

Uterus is a pear shaped fibromuscular organ of the female reproductive system. It is situated in the pelvis between the bladder anteriorly and rectum posteriorly.

The uterus varies in size and shape through various stages of life mainly influenced by age and parity(6). Before puberty, length of the uterus varies between 2.5 and 3cm. In the adult nulliparous state, uterine length is about 6-8cm and in multipara it is about 9-10cm. Uterus weighs about 50-70g in the non-pregnant state to about 1000g at term pregnancy. Its capacity is about 4ml in non pregnancy to about 4000mlat term gestation.

Uterus is divided into three portions namely the uterine body or the corpus, the isthmus and the cervix . The inside of the uterus is hollow and is called the endometrial cavity.

The isthmus is that portion of the uterus between the anatomical internal os and the histological internal os the former being higher. The portion of the uterus above the isthmus is the corpus and below it is called the cervix.

The uterus is made up of three layers namely

- The inner endometrium
- Middle myometrium
- Outer serosal layer

The mucosal layer is called the endometrium which is composed of the glands, stroma and blood vessels.

**The myometrium:**

It is made up of *3 layers* of non striated muscle fibres.

*1.The outer longitudinal layer* which runs anteroposteriorly over the fundus and is continuos with the fallopian tube and ligaments.

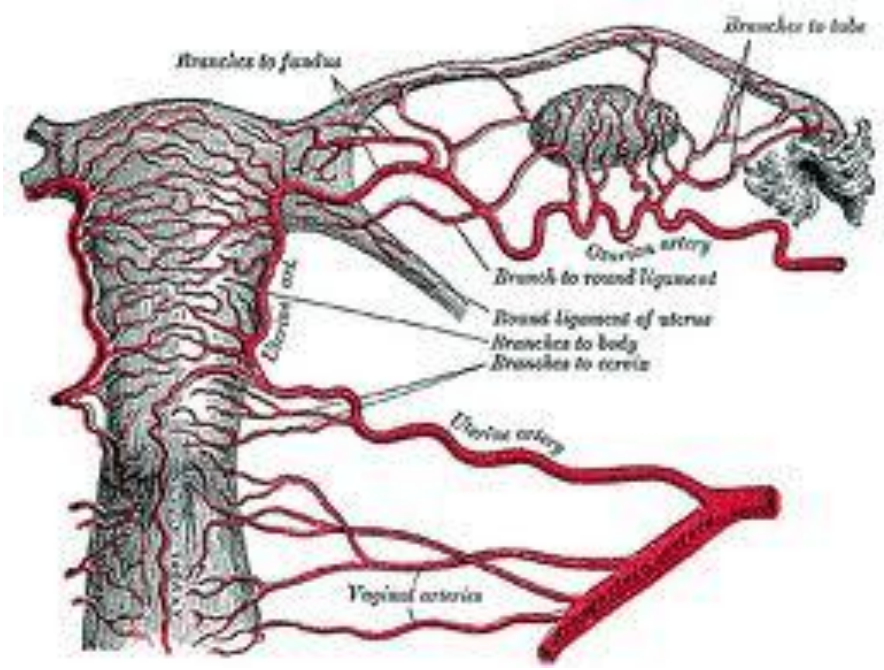
*2.Inner circular muscle layer* which is prominent near the orifices such as the tubal ostia and the internal os.

3.In between these two layers is the *interlacing muscle fibres* in the form of figure of 8 around the blood vessels. This layer is physiologically very important as the contraction of these muscle fibre act as 'living ligatures' and effectively control hemorrhage.The bulk of muscle fibres decrease from above downwards.

**Cervix:** The portion of the uterus below the isthmus which is made up of collage, connective tissue, muscle fibres, blood vessels.

**BLOOD SUPPLY OF THE UTERUS:**

The uterus derives its arterial supply mainly from the uterine and ovarian arteries. Abdominal aorta bifurcates into right and left common iliac vessels at the level of fourth lumbar vertebra. Each common iliac vessel divides into internal iliac and external iliac vessels. Each internal iliac artery runs medio inferiorly along the psoas muscle to divide into anterior and posterior divisions.




The uterine artery is a main branch of anterior division of internal iliac artery(6).It runs downward, forward and medially in the base of the broad ligament , crosses the ureter and turns medially to run along the lateral border of the uterus. The crossing of uterine artery over the ureter ("water under the bridge") 2 cm lateral to the cervix is surgically

important as the ureteric injury can occur at the time of uterine artery ligation or hysterectomy.

The uterine artery before turning medially gives off an inferior branch- the cervicovaginal artery which supplies the lower portion of cervix and upper portion of vagina. The main artery (now the marginal artery) runs in the broad ligament along the lateral border of uterus in a tortuous fashion and gives off three terminal branches- the ovarian, tubal, fundal.

The ovarian branch anastomoses with the ovarian artery while the tubal branch runs along the mesosalpinx to supply the fallopian tube.The main uterine artery while running along the lateral border of the uterus, gives off branches to the myometrium called the arcuate arteries. These arcuate arteries enter obliquely and run parallel to the surface of the uterus to meet the arcuate arteries of the opposite side and thus encircle the entire uterus. From the arcuate arteries, radial arteries branch off at right angles which run towards the endometrium and divide into the short basal arteries and long coiled spiral arteries. The basal arteries supply the basal endometrium and the spiral arteries supply the middle and superficial parts of the endometrium.

**VENOUS DRAINAGE:**

Veins from the fundus of uterus, fallopian tube and ovary unite to form the pampiniform plexus of veins. From this plexus two ovarian veins emerge and later fuse to form a single ovarian vein. The left ovarian vein joins the left renal vein and the right ovarian vein drains into the inferior vena cava. The uterine veins accompany the uterine arteries and end in the corresponding internal iliac veins.

**LYMPHATIC DRAINAGE:**

- The lymphatics from the body of the uterus drain into internal iliac and periaortic lymph nodes.
- The lymphatics from the cervix drain into internal iliac group of nodes

**NERVE SUPPLY:**

The nerve supply is principally derived from the sympathetic nervous system and partly from the cerebrospinal and parasympathetic system.The sympathetic system enters the pelvis through the hypogastric plexus just below the sacral promontory. After descending on either side, it also enters the uterovaginal plexus of Frankenhauser which consists of ganglia of various sizes situated on either side on the cervix just above

the posterior fornix and infront of the rectum. Branches from these plexus supply the uterus, bladder and upper part of vagina.

The parasympathetic system consists of the pelvic nerve on either sides which contain fibres from S2, S3, S4 nerves and end in the ganglion of Frankenhauser.

The sympathetic fibres cause muscular contraction and vasoconstriction whereas the parasympathetic system inhibit contraction and causes vasodilatation. Since the Frankenhauser plexus is derived from both sources, it has certain functions of both the components of autonomic nervous system.

The T11 and T12 nerve roots carry sensory fibres from the uterus, transmitting the pain of uterine contractions to the central nervous system.

## INCIDENCE OF CESAREAN DELIVERY

There is a universal upswing in cesarean rate both in the developed and developing countries. Over the past 20 years there is an alarming rise in cesarean rate all around the world including India.

A study from the United Kingdom (Bragg et al 2010) showed that among 620,604 singleton births, 147,726 i.e 23.8% were delivered by cesarean(5). Women were more likely to have a cesarean section if they had had one previously(70.8%) or had a baby with breech presentation(89.8%).

A survey of cesarean rates in Latin America showed that the median rate of cesarean was 33%with the highest rates in private hospitals(51%) (Villar et al).

In the United States, the overall cesarean rate was 32% in 2007(Hamilton et al 2009) (5).

The contributing factors to the rise in cesarean rates are multifactorial.

1. increase in the number of women with a prior cesarean
2. multifetal gestation
3. use of intrapartum electronic fetal monitoring
4. changes in obstetric training
5. medicolegal concerns

6. alterations in the parental and societal expectations of pregnancy outcome
7. woman's autonomy in decision making regarding the mode of delivery
8. breech presentation
9. induction of labour

**THE UNITED STATES :** In 1984, cesarean was the number one hospital procedure in United States accounting for 21% of all deliveries. In 1980s and 1990s the advocacy of VBAC led to a temporary decrease in the incidence of cesarean – around 20.5% in 1996. The concern about the potential complications of VBAC led to its decrease. By 2006 cesarean rate increased to 31.1%, a 50% increase over the previous decade.

**EUROPE AND UNITED KINGDOM:** There is a trend towards increased cesarean rate with wide National variation. In Norway,cesarean rate was 2.5% in 1972, 12.8% in 1987, 13.6% in 1999, and 15% in 2004.

**In ENGLAND**, the cesarean rate was 9%in 1980, 13% in 1992, 21.3% in 2000, and 23% in 2004.

**ITALY** has one of the highest rates of cesarean in the world about 40% in 2005 from 22.5% in 1995.

**AUSTRALIA** also has a continual increase in cesarean rate with 30.8% in 2006

The contrary situation exists in **the SubSaharan Africa** i.e very low cesarean rates generally less than 5% reported for many years. This most likely reflects the inadequate access to medical services in the economically depressed countries. There also exists a high maternal and perinatal mortality rates in the same regions.

**ETHIOPIA-**0.6% in 2000

**ZAMBIA-**2% in 2001

**GHANA-**4.2% in 2003

**KENYA-**4.2% in 2003

There appears a strong association between the cesarean rates and the socio economic wealth of the Nation

## THE INDIAN SCENARIO:

A collaborative study done by the Indian Council of Medical Research in the 1980s showed a cesarean rate of 13.8% in the teaching hospitals of India(ICMR 1990)(5). KAMBO et al 2002 studied the rising rate of cesarean in the teaching hospitals in India and compared the rates between 1993-1994 and 1998-1999. It was 21.8 % in 1993-1994 which rose to 25.4% in 1998-1999. An alarming fact was that 42.4% were performed on primigravidas and 31% were from rural areas. Between 1990and 1992 the repeat section rate was between 30 to 45% in teaching hospitals in Madurai and Chennai, India(Rao et al 1994)

In a study over a 2 year period in an urban area of India , the total cesarean rates even in the public and charitable sectors were 20% and 38% respectively. In the private sector, the rate was astonishing 47%(Sreevidya and Sathyasekaran 2003). A similar study from the affluent part of Chennai showed that almost 1 out of 2 women (45%) had a cesarean(PAI et al 1999).

**TRENDS IN CESAREAN IN INDIA**

| Country and states | NFHS 1 1992-1993 | NFHS 2 1998-1999 | NFHS 3 2005-2006 |
|---|---|---|---|
| **India** | 2.9% | 7.1% | 10.6% |
| **kerala** | 13.2% | 29.8% | 30.1% |
| **Andhra pradesh** | 4.4% | 14.7% | 27.5% |
| **Goa** | 13.7% | 20% | 25.5% |
| **Tamilnadu** | 7.1% | 17.5% | 23% |
| **Bihar** | 1.1% | 3% | 4.1% |
| **Rajasthan** | 0.7% | 3% | 4.2% |

According to the National Family Health Survey 1, 2 and 3 reports, the steadily rising trend in cesarean is so obvious in various states of India.

- The highest rates are seen in affluent state like Kerala with 30.1%, Andhra pradesh with 27.5%, and Goa with 25.5% (14).
- **Tamilnadu ranks 4$^{th}$ with a cesarean rate of 23%.**
- The lowest rates are seen in Bihar and Rajasthan which are economically backward states with poor access to medical services.

**WORLD HEALTH STATISTICS-2012- WHO**

According to **WORLD HEALTH STATISTICS-2012** published by **WORLD HEALTH ORGANISATION,** the rate of cesarean birth is **9%** in the South East Asian Regions between the year **2005-2010(8).**

- **Region of Americas- 35%**
- Western Pacific Region- 24%
- European Region- 22%
- Eastern Mediterranean Region- 16%
- **South East Asian Region- 9%**
- African Region- 4%

The highest cesarean rates are seen in

- **Mauritius- 44%**
- **Iran- 40%**
- **Italy- 38%**
- **Portugal- 36%**

The lowest rates are seen in the economically poor countries .

- Ethiopia- 1%
- Niger- 1%
- Madagascar- 2%

**In INDIA, the cesarean rate between 2005-2010 is 9% (8).**

## TYPES OF CESARIAN :

There are 2 types based on whether the woman is in labour or not.

### 1. ELECTIVE OR PLANNED CESAREAN:

When cesarean is done for a woman who is not in labour for a specific indication it is called elective or planned cesarian. This is done after 39 weeks to avoid respiratory complications of the newborn(4).

## 2. EMERGENCY CESAREAN :

When cesarean is done in a labouring woman it is called emergency cesarian(4).

**INDICATIONS:**

The most common indications are as follows. 85 percent of the indications fall within the following.

1. Dystocia
2. Fetal distress
3. Previous cesarean delivery
4. Breech presentation

**NICE GUIDELINE 2004:** According to this guideline the various indications for cesarean fall into 4 categories(7).

**CATEGORY 1:** Immediate threat to the life of woman or fetus

- Abruptio placenta with abnormal fetal heart rate or uterine irritability
- Cord prolapse
- Scar rupture
- Prolonged bradycardia
- Scalp pH < 7.2

Fetus should be delivered within 30 minutes.

**CATEGORY 2:** Maternal or fetal compromise which is not immediately life threatening.

- Failure to progress with pathological CTG

**CATEGORY 3:** No maternal or fetal compromise but needs early delivery

- Severe preeclampsia
- IUGR with poor fetal function test
- Failed induction of labour

**CATEGORY 4:** Delivery timed to suit woman or staff ( Elective)

- Twin gestation with first twin in non cephalic presentation
- Maternal HIV
- Primary genital herpes
- Grade 3 and grade 4 placenta previa
- Term singleton breech when external cephalic version is contraindicated or failed.
- Previous hysterotomy or classical cesarean

**CONTRAINDICATIONS TO CESARIAN:**

- Trisomy 13
- Trisomy 18
- Anencephaly

**NEED NOT BE OFFERED:**

- Twin gestation with first twin in cephalic presentation.
- Preterm birth
- SGA baby
- Hepatitis B
- Hepatitis C
- Recurrent genital herpes at term with no visible lesions

**TYPES OF SKIN INCISION:** The different types of skin incision in cesarean are as follows.

- Pfannensteil's incision
- Joel Cohen's incision
- Maylard's incision

- Cherney’s incision
- Midline vertical and
- Paramedian incision

**PFANNENSTEIL’S INCISION:** It is a transverse, slightly upward curving incision placed above the pubic symphisis at the upper border of the pubic hair.

**JOEL COHEN INCISION:** It is a straight transverse incision higher than the Pfannensteil incision about 3 cm below the imaginary line joining the anterior superior iliac spines.

**MAYLARD’S INCISION:** It is a subumbilical transverse incision(muscle splitting incision) and is longer than the Pfannensteil incision

**CHERNEY’S INCISION**: It is similar to Maylard’s incision but a muscle cutting incision.

**MIDLINE VERTICAL INCISION:** It is a vertical incision in the midline. This can be used in cases of central placenta previa, placenta accreta anticipating cesarean hysterectomy and internal iliac artery ligation.

**PARAMEDIAN INCISION:** Not preferred nowadays

**TYPES OF UTERINE INCISION:**

**TRANSVERSE INCISION:**

- **KERR'S INCISION:** It is a transverse incision on the lower uterine segment and it is the recommended incision for most cesarean(4).

  **ADVANTAGES:**

  - Less blood loss
  - Less need for bladder dissection
  - Easy re-approximation
  - Lower risk of rupture in subsequent pregnancies(0.2-1.5%)

  **DISADVANTAGES:**

  - Lateral extension may occur causing laceration of the uterine vessels.

- **OTHERS:** J, T, inverted T shaped incisions. These are used when there is difficulty in delivery. All have the risk of uterine rupture in the subsequent pregnancy

**VERTICAL INCISION:**

- **CLASSICAL VERTICAL:** A vertical incision that extends into the upper segment of the uterus/fundus is called the classical incision. This incision is not performed in modern obstetrics.

  **INDICATION:**

  - Quick delivery( tubal ligation should also be carried out)

  **DISADVANTAGE:**

  - High chance for rupture uterus(even spontaneous when patient is not in labour) in the next pregnancy(4-9%)

- **KRONIG'S INCISION: (DE LEE, CORNEL)**

  It is a low vertical incision in the lower uterine segment and as strong as the low transverse incision. There is no increased risk of this incision when compared to a low transverse incision(4).

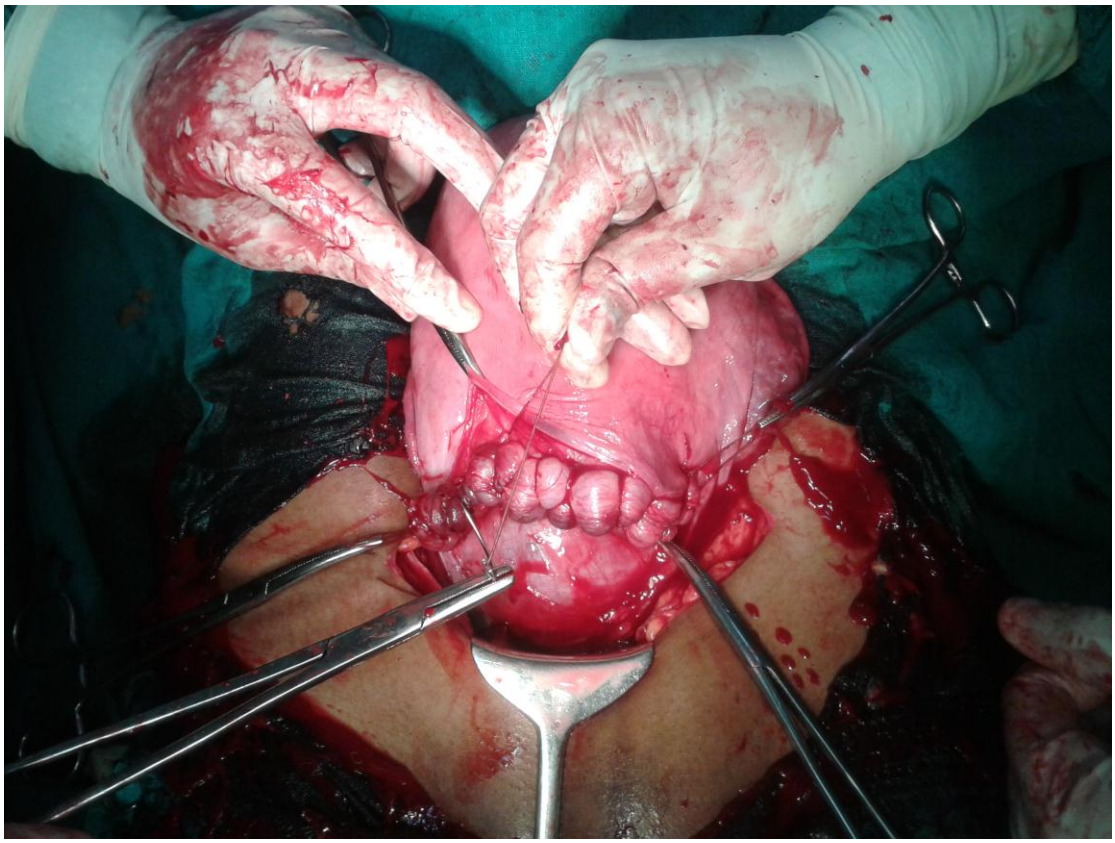
  **DISADVANTAGE:**

  Incision can extend upwards into the fundus or downwards into the bladder, cervix or vagina.

## TYPES OF UTERINE REPAIR:

- **EXTERIORISATION:**

  After the delivery of the fetus and placenta, the uterus is delivered out of the abdominal cavity and placed on the draped anterior abdominal wall for uterine closure. After the closure, uterus is placed back in its original position into the abdominal cavity.



- **INSITU REPAIR(** intraperitoneal , intracavitary, intraabdominal, non- exteriorisation):

  After the delivery of the fetus and placenta, uterus is not taken out of the abdominal cavity. Uterine closure is carried out with uterus in its original place.

**COMPLICATIONS OF CESAREAN:**

Cesarean is one of the major abdominal surgical procedures and is thus subject to the standard complications- anaesthetic, medical, surgical associated with any laparotomy(10)

**INTRAOPERATIVE COMPLICATIONS:** It occurs in 12-15% of the women. The main complications are

- Anaesthesia related
- Hemorrhage
- Uterine or uterocervical lacerations
- urinary tract injuries
- gastrointestinal tract injuries
- difficulty in delivering the fetus
- perinatal asphyxia
- Anaesthesia related: it includes
- Aspiration syndrome

  Hypotension

  High spinal

  Spinal headache

**HEMORRHAGE ( 7-9%):**

Hemorrhage may be related to the operative procedure such as damage to the uterine vessels or incidental like atonic PPH, placenta previa, placenta accreta. Traumatic deliveries or poor delivery technique are associated with increased frequency of operative lacerations. The uterus, vagina and the broad ligament may get lacerated. Lacerations

involving the uterine tissue are usually repaired without difficulty whereas vertical extension into the vagina and lateral extension into the broad ligament are associated with substancial blood loss and their repair may incur ureteric injury.

The incidence of placenta previa and accreta are increasing owing to rise in cesarean rates. These conditions significantly contribute to obstetric hemorrhage specifically when they are associated with previous cesarian deliveries. The effective management of placenta accreta requires Total Abdominal Hysterectomy although others like uterine compression sutures and leaving the placenta in situ have been reported. These procedures involve more blood loss and a number of transfusions of blood and blood products.

**Risk factors predisposing to intraoperative hemorrhage:**

- Atonicity
- Traumatic deliveries
- Placenta previa and accreta
- Abruption placenta
- Extremes of fetal birth weight
- BMI >25
- Classical cesarean

**LACERATIONS:**

5-10% of intraoperative complications occur due to uterine or uterocervical lacerations. It may be due to angle extension involving the uterine arteries , lateral extension into the broad ligament involving the ureter or vertical extension into the cervix and vagina

**Risk factors predisposing to lacerations:**

- Low station of the presenting part
- Cesarean at second stage of labour
- Birth weight >4000g
- Malpresentation
- Internal podalic version
- Increased maternal age
- Category 1 cesarean
- Others:
    - Medical complications of the mother are additional factors that predispose to intraoperative complications especially during emergency cesarean
    - Hypertensive disorders of pregnancy
    - Heart disease complicating pregnancy
    - Gestational diabetes
    - Anemia

- Thyroid disorders
- Bronchial asthma
- Epilepsy
- Autoimmune disorders like SLE, APLA, ITP…
- Obesity
- Urinary tract injuries: Injuries to the urinary bladder occur with variable incidence during the course of cesarean.
- Pfannensteil incision with lower entry into peritoneal cavity may cause inadvertent cystotomy
- Cesarean after a prolonged or obstructed labour where the bladder is drawn cephalad
- Scarring and secondary obliteration of vesicouterine space following previous cesarean
- Low vertical cesarean

**POST OPERATIVE COMPLICATIONS**:

It occurs in about one third of the women undergoing cesarean.

- Endometritis(5%)
- Wound infection(3-27%)
- Urinary tract infections
- Venous thromboembolism

- Pulmonary atelectasis
- Risk factors:

  Preoperative remote infection

  Chorioamnionitis

  Maternal severe systemic disease

  Increased blood loss

  Nulliparity

**REMOTE COMPLICATIONS**: Following are the late complications in subsequent pregnancies.

- Uterine rupture(1in 200 with spontaneous labour)(10)
- Placenta previa(47% increase of background risk)
- Placenta accreta
- Antepartum still birth( risk increases with a previous lscs)
- Women undergoing multiple cesarean (≥3) are at higher risk of

  Excessive blood loss

  Difficult delivery of the fetus

  Dense adhesions

Complications are increased with increasing number of cesarean

- 4% for 2nd
- 8% for 3rd
- 13% for 4th

**A NOTE ON CDMR AND POSTMORTEM CESAREAN:**

**CDMR: Cesarean delivery on maternal request**

CDMR by itself is not an indication for cesarean. The woman should be counselled regarding the pros and cons of both vaginal and cesarean deliveries. The concept of CDMR has given rise to a significant increase in the incidence of cesarean and therefore the repeat cesarean in many developed countries and also the developing nations.

**According to the NIH- National Institute Of Health-2006**

- CDMR should be avoided by those who want several children
- should not be done before 39th week of gestation as it is associated with respiratory complications of the newborn or before verifying the lung maturity of the fetus.
- Nevertheless, CDMR has the benefits for both mother and the baby as it decreases the risk of hemorrhage and birth injuries.

- CDMR is associated with a longer stay in the hospital than vaginal delivery and also increases the chance of placenta previa and placenta accreta in the future pregnancy.

**POSTMORTEM AND PERIMORTEM CESAREAN :**

*'It is indeed, possible to save a child by the cesarean operation, or cutting it out of the womb of its mother just expired; but what man in his senses would put his character upon this footing'-*

EDMUND CHAPMAN

Cesarean is performed on the dying or dead woman in view of saving the baby. There is evidence of neurological injury within 6 minutes of cessation of blood flow to the brain in the mother. Hence the fetus should be ideally delivered within 5 minutes of starting CPR to the mother. Classical cesarean is often done to facilitate urgent delivery.This is beneficial to both the mother and the fetus. Around half the women show improvement in hemodynamic status immediately after the uterus was emptied by cesarean.

## STUDY DETAILS

**STUDY DESIGN:**

Randomised prospective study

**STUDY PERIOD:**

1 YEAR (2011-2012)

**SETTING:**

Institute of Obstetrics and Gynecology,

Egmore, Chennai 600008

**POPULATION:**

200 subjects undergoing primary cesarean for delivery

**INCLUSION CRITERIA:**

1. Primi undergoing LSCS
2. Multigravida undergoing first LSCS

**EXCLUSION CRITERIA:**

1. Placenta previa
2. Abruptio placenta
3. Anemia – Hb <11g/dl
4. Previous cesarean
5. Multiple pregnancy
6. Chorioamnionitis
7. Rupture uterus
8. Obstructed labour
9. Prolonged rupture of membranes

**PRIMARY OUTCOME MEASURES:**

**1. Perioperative Hemoglobin changes:**

- Preoperative Hb
- Postoperative Hb

**2. Intraoperative hemodynamic changes:**

Two readings of pulse rate, mean arterial pressure, spo2 were noted. First reading at the time of skin incision and second one at the time of uterine closure.

**3. No of vomiting episodes**

**4. Time taken for surgery**

**5. Post operative infection**

**6. No of days of hospital stay**

**SECONDARY OUTCOME MEASURES:**

1. Shock
2. Pulmonary embolism
3. Deep vein thrombosis

## METHODOLOGY:

Ethical committee clearance was obtained from Institution's Ethics Committee, Madras Medical College and Research Institute, Chennai-600003. Two hundred subjects undergoing primary cesarean were selected for the study based on the inclusion and exclusion criteria. Each subject was allocated randomly to either group. Procedure was performed by Assistants and trained Residents who were familiar with both the methods. Women were recruited from antenatal wards and labour ward. Informed consent was obtained from all the women.100 women were randomized to exteriorisation group and 100 women to insitu repair.

## PREOPERATIVE PREPARATION:

- Preparation of abdomen and perineum
- IV line secured and blood collected for grouping and cross matching
- Preoperative hemoglobin and time since last solid/ liquid food was noted
- Injection Ampicillin 1g given intravenously after test dose 1 hour before or just before surgery in case of emergency

- Injection Ranitidine 50mg intravenous and injection Perinorm 10mg intramuscular given
- Bladder catheterization done

**SURGICAL TECHNIQUE:**

Under spinal anaesthesia , patient in supine position with 15' tilt towards the leftside, abdomen opened by Pfannensteil incision. Blunt dissection of the layers carried out. Dextrorotation corrected. UV fold of peritoneum identified, cut and separated with fingers. Lower uterine segment identified.Lower segment cesarean section done by transverse incision. Baby delivered. Injection Syntocin 10 units added to the drip by the anaesthetist. Umbilical cord clamped and cut between the clamps. Baby handed over to pediatrician. Spontaneous separation of the placenta awaited. Uterine cavity mopped with a sterile pad. Placenta and membranes delivered in toto ensuring no retained bits. Uterine incision closed in two layers using No 2 and No 1 chromic catgut. Both visceral and parietal peritoneum left unsutured . Rectus sheath closed with No 1-0 prolene. Subcutaneous layer if needed was closed with No 1 chromic catgut. Skin was closed subcuticularly with No 1-0 prolene.

**EXTERIORISATION AND REPAIR:**

After the delivery of the fetus and placenta, Uterus is taken out of the abdominal cavity and placed over the mother's anterior abdominal wall and closure is done. Once closure is over uterus is placed back inside the abdominal cavity.

**INSITU REPAIR:** After the delivery of the fetus and the placenta, uterine incision is closed with uterus is in its original position i.e inside the abdominal cavity

The two groups varied only in the choice of uterine closure whether exteriorisation and repair or insitu repair. The other steps were the same in both the groups.

**INTRAOPERATIVE MONITORING:**

Two readings of pulse rate , mean arterial pressure (calculated from systolic and diastolic blood pressure), oxygen saturation of the tissues ( spo2 using pulse oxymetry) were noted. The first reading was noted at he time of skin incision and second reading at the time of uterine incision closure whichever method is followed. Number of vomiting episodes (1,2,..) and time taken for surgery in minutes (from the time of skin incision to skin closure) were also noted.

**POSTOPERATIVE MONITORING AND CARE:**

Subjects were monitored in the post operative ward. Half hourly pulse chart, fourth hourly temperature chart and any excessive bleeding per vaginum were monitored carefully in the first 24 hours. Intravenous antibiotics ampicillin 1g gentamycin 80 mg and metronidazole 500mg given to all the women until the 2nd post operative day followed by oral antibiotics till day 7. Clear fluids started 6 hours after surgery followed by liquid diet on the 1st post operative day and soft solid diet on the 2nd post operative day. Urinary catheter removed on the 2nd postoperative day. Early ambulation advised.

Post-operative hemoglobin was taken after 48 hours of surgery for diagnosis of anemia and the need for iron supplement or blood transfusion. Women were monitored for postoperative fever, wound infection, endometritis, number of days of hospital stay and life threatening complications like pulmonary embolism and deep vein thrombosis. Wound swab cultures were taken and appropriate antibiotics given in case of wound infection.

The following were noted for postoperative wound infection and endometritis.

1. wound induration / erythema
2. wound discharge
3. wound gaping
4. uterine tenderness
5. foul smelling lochia
6. tenderness on cervical motion
7. wound swab culture
8. endocervical swab culture

## RESULTS AND STATISTICAL ANALYSIS

200 women were included in the study based on the inclusion and exclusion criteria. 100 women were randomized to exteriorisation group and 100 women to insitu repair of uterus.

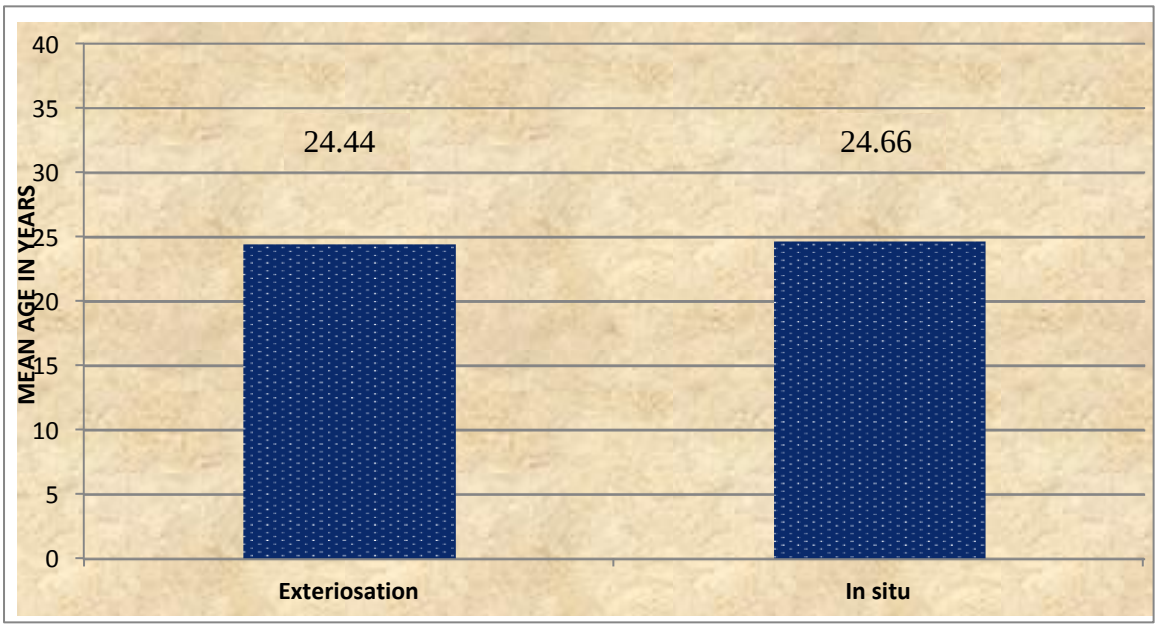
The characteristics of women in both the groups were similar in age and parity. All the women underwent cesarean under spinal anaesthesia with gestational age ranging from 37 to 41 weeks of gestation.

**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| AGE | EXTERIORISATION | 100 | 24.44 | 2.858 | .286 |
| | INTRAPERITONEAL | 100 | 24.66 | 2.793 | .279 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| AGE | Equal variances assumed | .201 | .654 | -.551 | 198 | .583 | -.220 | .400 | -1.008 | .568 |
| | Equal variances not assumed | | | -.551 | 197.896 | .583 | -.220 | .400 | -1.008 | .568 |




The mean age of the women in exteriorisation group was 24.44 and the mean age in the insitu group was 24.66 with no significant difference between the two groups in age.

## OBSTETRIC CODE :

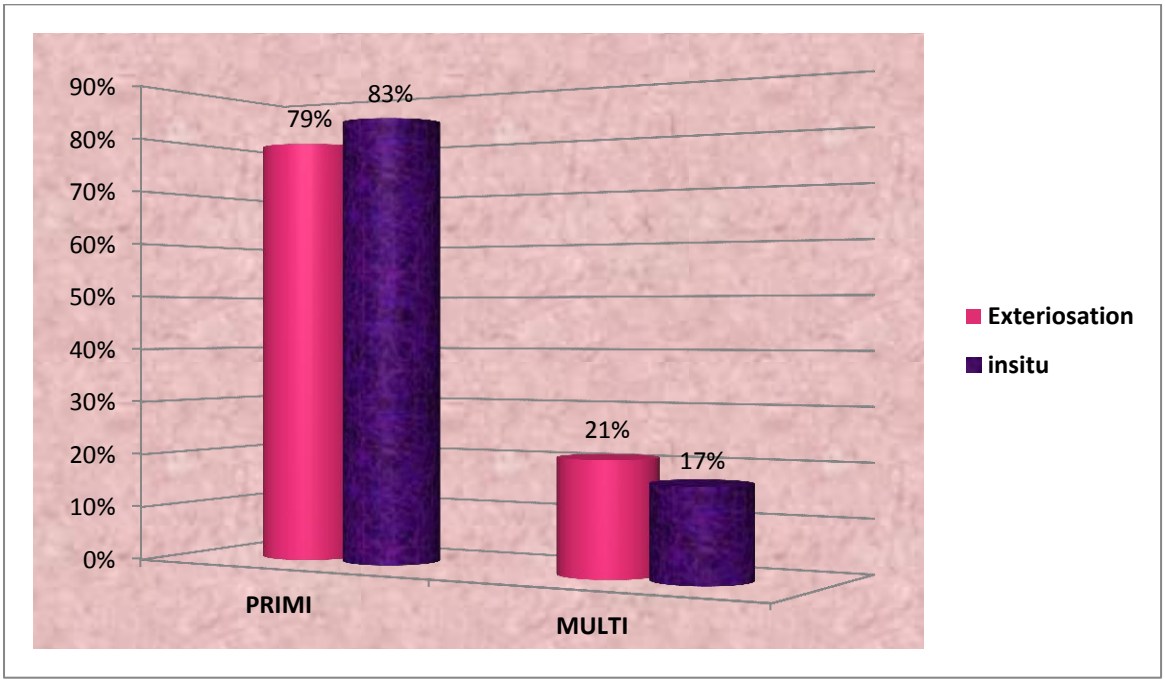
**Crosstab**

| | | | GROUP | | |
|---|---|---|---|---|---|
| | | | EXTERIORISATION | INTRAPERITONEAL | Total |
| OBSTETRIC CODE | PRIMI | Count | 79 | 83 | 162 |
| | | % within GROUP | 79.0% | 83.0% | 81.0% |
| | MULTI | Count | 21 | 17 | 38 |
| | | % within GROUP | 21.0% | 17.0% | 19.0% |
| Total | | Count | 100 | 100 | 200 |
| | | % within GROUP | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | .520[b] | 1 | .471 | | |
| Continuity Correction[a] | .292 | 1 | .589 | | |
| Likelihood Ratio | .521 | 1 | .471 | | |
| Fisher's Exact Test | | | | .589 | .295 |
| Linear-by-Linear Association | .517 | 1 | .472 | | |
| N of Valid Cases | 200 | | | | |

## OBSTETRIC CODE:




79% (79/100) were primi in the exteriorisation group and 83% (83/100) were primi in the insitu group. Multigravida constituted 21% in the exteriorisation group and 17% in insitu group.

# GESTATIONAL AGE:

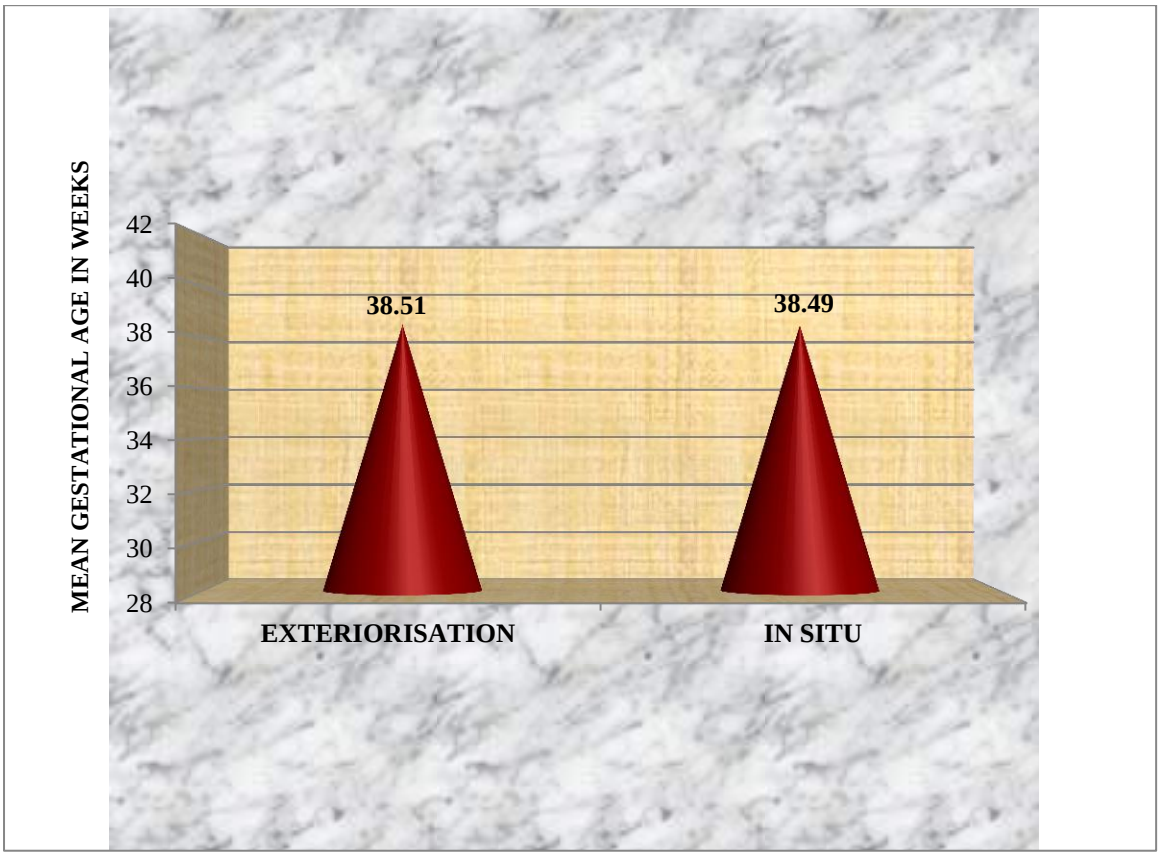
**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| GA | EXTERIORISATION | 100 | 38.51 | .879 | .088 |
| | INTRAPERITONEAL | 100 | 38.49 | .921 | .092 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| GA | Equal variances assumed | .607 | .437 | .181 | 198 | .857 | .023 | .127 | -.228 | .274 |
| | Equal variances not assumed | | | .181 | 197.559 | .857 | .023 | .127 | -.228 | .274 |

## GESTATIONAL AGE:



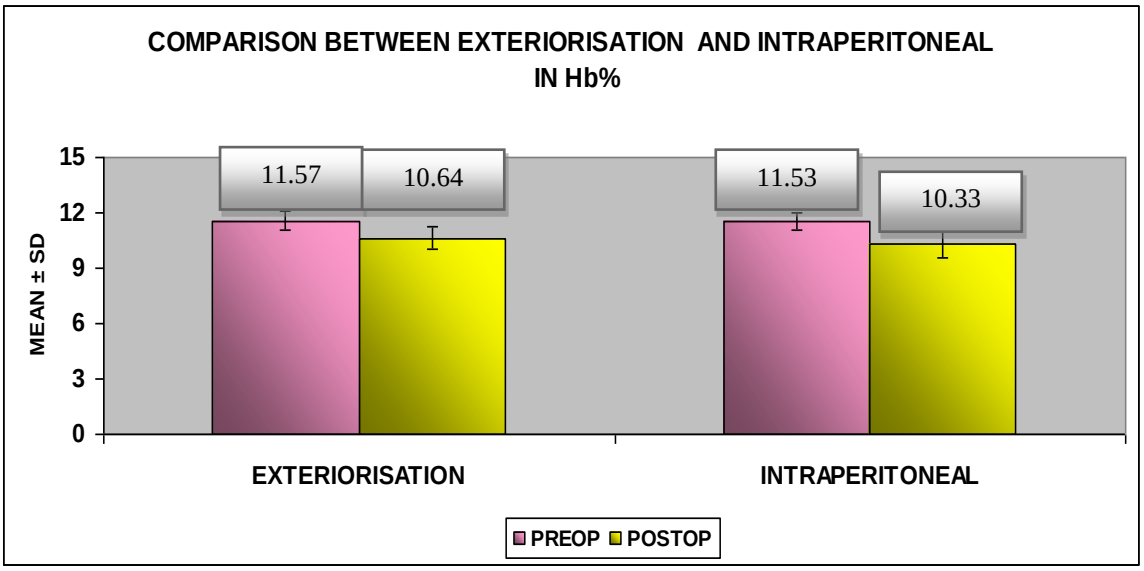

The mean gestational age in exteriorisation group was 38.51 and that in the insitu group was 38.49. Both groups were similar in the gestationl age with insignificant p value of 0.857.

**LSCS:**

In the exteriorisation group, 74% of women had emergercy lscs and 26% had elective lscs. In the insitu group, 87% had emergency lscs and 13% had elective lscs.

**PREOPERATIVE HEMOGLOBIN:**

All the women had Hb values between 11-13g/dl. Those who had Hb less than 11 g were excluded while selecting the women for study

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The mean preoperative hemoglobin level in exteriorisation group was 11.57 g/dl and the mean preoperative hemoglobin level in insitu group was 11.53g/dl. Both the groups were comparable in the preop Hb levels and there was no significant difference between the groups (p = 0.571).

**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| PREOP HB | EXTERIORISATION | 100 | 11.57 | .503 | .050 |
| | INTRAPERITONEAL | 100 | 11.53 | .518 | .052 |
| POST OP HB | EXTERIORISATION | 100 | 10.647 | .5825 | .0582 |
| | INTRAPERITONEAL | 100 | 10.335 | .8191 | .0819 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| PREOP HB | Equal variances assumed | .007 | .935 | .568 | 198 | .571 | .041 | .072 | -.101 | .183 |
| | Equal variances not assumed | | | .568 | 197.816 | .571 | .041 | .072 | -.101 | .183 |
| POST OP HB | Equal variances assumed | 3.385 | .067 | 3.104 | 198 | .002 | .3120 | .1005 | .1138 | .5102 |
| | Equal variances not assumed | | | 3.104 | 178.733 | .002 | .3120 | .1005 | .1137 | .5103 |

But there was a significant drop in the post operative hemoglobin levels in the insitu group compared to the exteriorisation group **(p=0.002)**. This might be taken as an indicator of less intraoperative blood loss. None of our subjects had secondary PPH which may interfere with the post operative Hb levels**. Thus in our study, the exteriorisation group had less post operative Hb drop than the insitu which is a significant factor.**

Also the number of subjects who required blood transfusion were 1% (1/100) in the exteriorisation group with post op Hb of 7.8g% and 2%

(2/100) in the insitu group with post op Hb 7.5g%, 7.2g%. Additional subjects who required anemia correction with Iron sucrose infusion fell in the insitu group (n=3, 3%). Thus exteriorisation is associated with less post operative Hb fall , less anemia and less number of blood transfusion in our study.

## INTRAOPERATIVE HEMODYNAMICS:

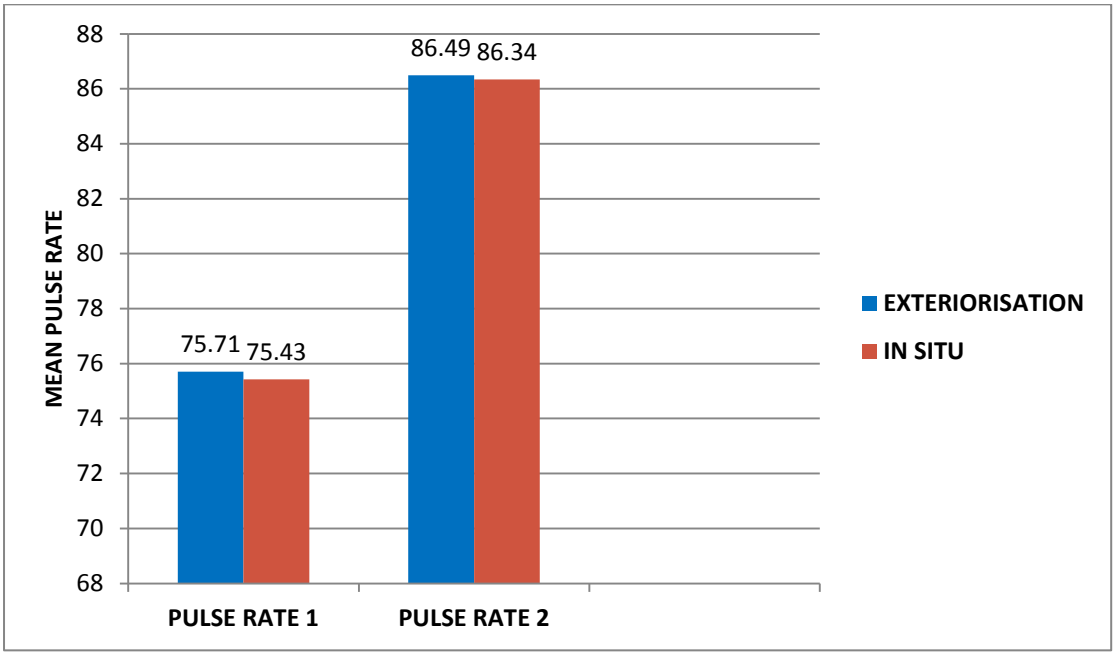
The pulse rate, mean arterial pressure, spo2 at the time of skin incision was denoted as PR1, MAP1, SPO21 in both the groups. The second reading at the time of uterine closure was denoted as PR2, MAP2,SPO22.

**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| PULSERATE 1 | EXTERIORISATION | 100 | 75.71 | 5.781 | .578 |
| | INTRAPERITONEAL | 100 | 75.43 | 5.163 | .516 |
| PULSERATE 2 | EXTERIORISATION | 100 | 86.49 | 6.284 | .628 |
| | INTRAPERITONEAL | 100 | 86.34 | 5.602 | .560 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| PULSERATE 1 | Equal variances assumed | 2.339 | .128 | .361 | 198 | .718 | .280 | .775 | -1.248 | 1.808 |
| | Equal variances not assumed | | | .361 | 195.518 | .718 | .280 | .775 | -1.249 | 1.809 |
| PULSERATE 2 | Equal variances assumed | 2.636 | .106 | .178 | 198 | .859 | .150 | .842 | -1.510 | 1.810 |
| | Equal variances not assumed | | | .178 | 195.442 | .859 | .150 | .842 | -1.510 | 1.810 |




The mean PR1 in the exteriorisation group was 75.71 and the mean PR2 in insitu group was 75.43. There was no wide difference in the preoperative pulse rate between the groups(p=0.718). The mean pulse rate after exteriorisation PR2 was 86.49 and the mean PR2 after insitu repair was 86.34. There occurred no significant difference in the PR2 after either methods of uterine closure.

When analysed within the same group, the maximum difference between the 2 readings of pulse rate was 16bpm in the exteriorisation group and 28bpm in the insitu group. This could be due to the sudden blood loss after the delivery of the fetus and placenta with reflex tachycardia. None of the subjects in either group had bradycardia. Only

one woman in insitu group had mild tachycardia 104bpm which settled in the immediate postoperative period spontaneously and none in the exteriorisation group.

**MEAN ARTERIAL PRESSURE:**

*MAP= diastolic pressure + 1/3 of pulse pressure*

*Where pulse pressure= systolicpressure – diastolic pressure*

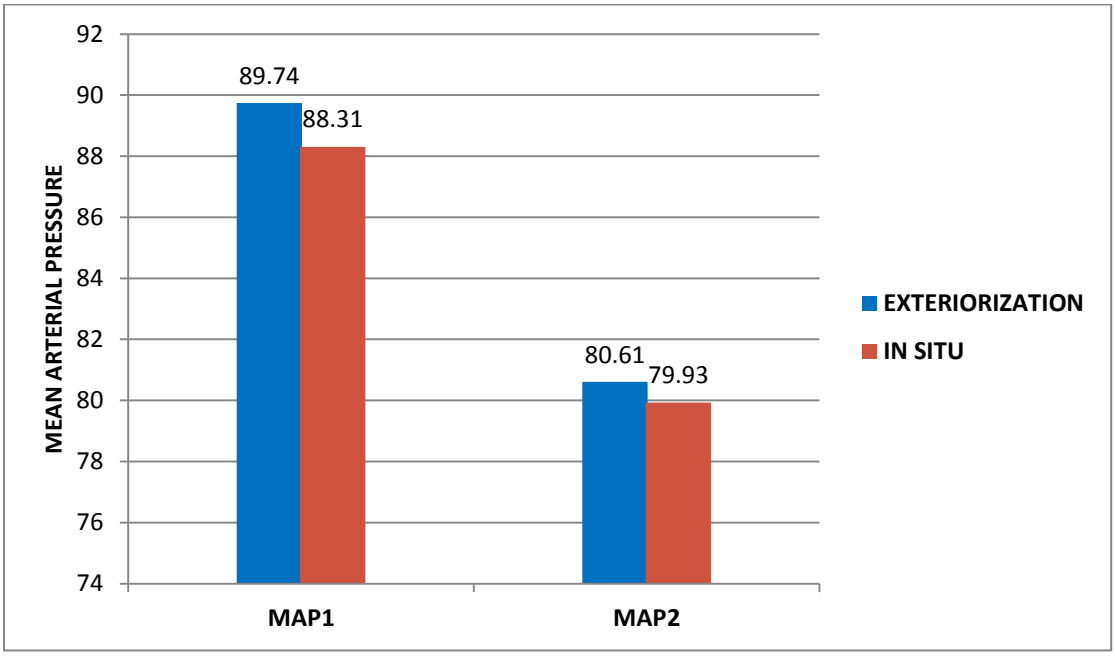
Two readings of systolic and diastolic pressure were noted. One at skin incision and second at uterine closure. Then mean arterial pressure was calculated using the above formula. Normal MAP = 70-110 mmHg. This range of MAP is required to perfuse the vital organs like brain, heart and kidneys. If the blood pressure falls < 90/60, MAP also decreases which leads to underperfusion of the vital organs which when not corrected on time may result in refractory shock.

**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| MAP1 | EXTERIORISATION | 100 | 89.74 | 4.305 | .430 |
| | INTRAPERITONEAL | 100 | 88.31 | 4.543 | .454 |
| MAP2 | EXTERIORISATION | 100 | 80.61 | 4.998 | .500 |
| | INTRAPERITONEAL | 100 | 79.93 | 5.002 | .500 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| MAP1 | Equal variances assumed | .155 | .694 | 2.291 | 198 | .023 | 1.434 | .626 | .200 | 2.668 |
| | Equal variances not assumed | | | 2.291 | 197.428 | .023 | 1.434 | .626 | .200 | 2.668 |
| MAP2 | Equal variances assumed | .154 | .695 | .959 | 198 | .339 | .678 | .707 | -.716 | 2.072 |
| | Equal variances not assumed | | | .959 | 198.000 | .339 | .678 | .707 | -.716 | 2.072 |




The mean MAP1 in exteriorisation group was 89.74 and MAP1 in insitu group was 88.31. The mean MAP2 in exteriorisation group was 80.61 and MAP2 was insitu group is 79.93 which ensured adequate perfusion. Both the groups did not show any significant fall in MAP( P= 0.339).None of the subjects had untoward events like hypotension, shock or ICU care in either groups.

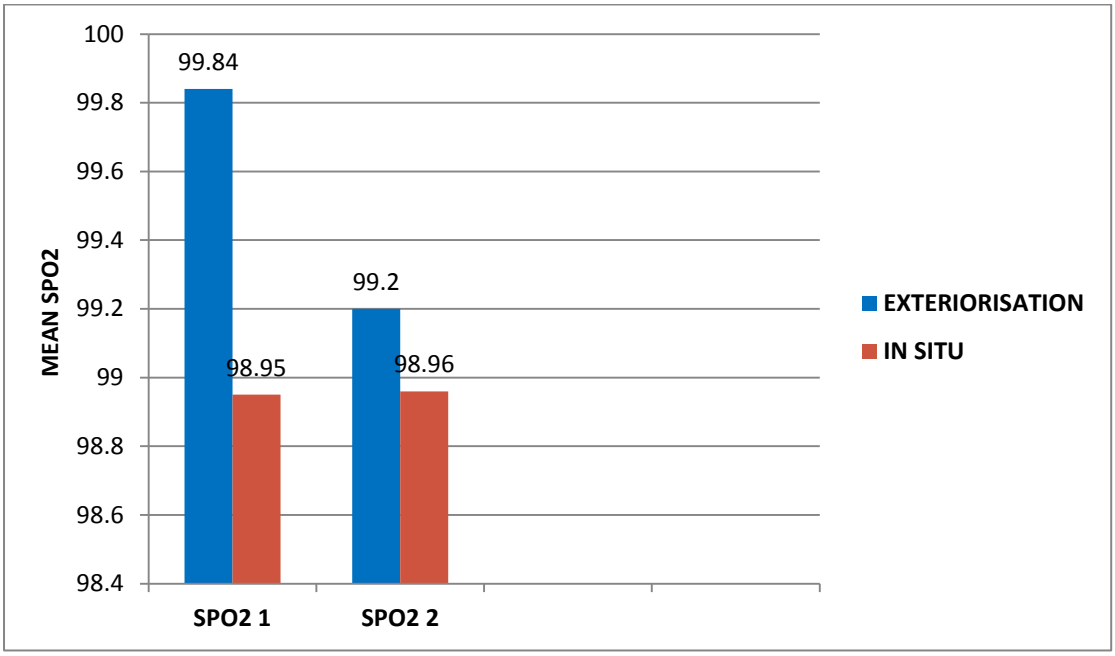
## SPO2:

**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| SPO21 | EXTERIORISATION | 100 | 99.84 | .395 | .039 |
| | INTRAPERITONEAL | 100 | 98.95 | 8.993 | .899 |
| SPO22 | EXTERIORISATION | 100 | 99.20 | .841 | .084 |
| | INTRAPERITONEAL | 100 | 98.96 | .909 | .091 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| SPO21 | Equal variances assumed | 2.997 | .085 | .989 | 198 | .324 | .890 | .900 | -.885 | 2.665 |
| | Equal variances not assumed | | | .989 | 99.382 | .325 | .890 | .900 | -.896 | 2.676 |
| SPO22 | Equal variances assumed | .233 | .630 | 1.938 | 198 | .054 | .240 | .124 | -.004 | .484 |
| | Equal variances not assumed | | | 1.938 | 196.803 | .054 | .240 | .124 | -.004 | .484 |




Likewise the oxygen saturation of the tissues also did not have a significant difference between the 2 groups (p=0.324,0.325,0.54,0.54). The spo22 ranged between 97 to 100 percent in both groups .

## VOMITING EPISODES:

**Crosstab**

| | | | GROUP | | |
|---|---|---|---|---|---|
| | | | EXTERIORISATION | INTRAPERITONEAL | Total |
| VOMITING EPISODES | 1 | Count | 17 | 11 | 28 |
| | | % within GROUP | 63.0% | 64.7% | 63.6% |
| | 2 | Count | 9 | 5 | 14 |
| | | % within GROUP | 33.3% | 29.4% | 31.8% |
| | 3 | Count | 1 | 1 | 2 |
| | | % within GROUP | 3.7% | 5.9% | 4.5% |
| Total | | Count | 27 | 17 | 44 |
| | | % within GROUP | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | .164 [a] | 2 | .921 |
| Likelihood Ratio | .162 | 2 | .922 |
| Linear-by-Linear Association | .001 | 1 | .981 |
| N of Valid Cases | 44 | | |

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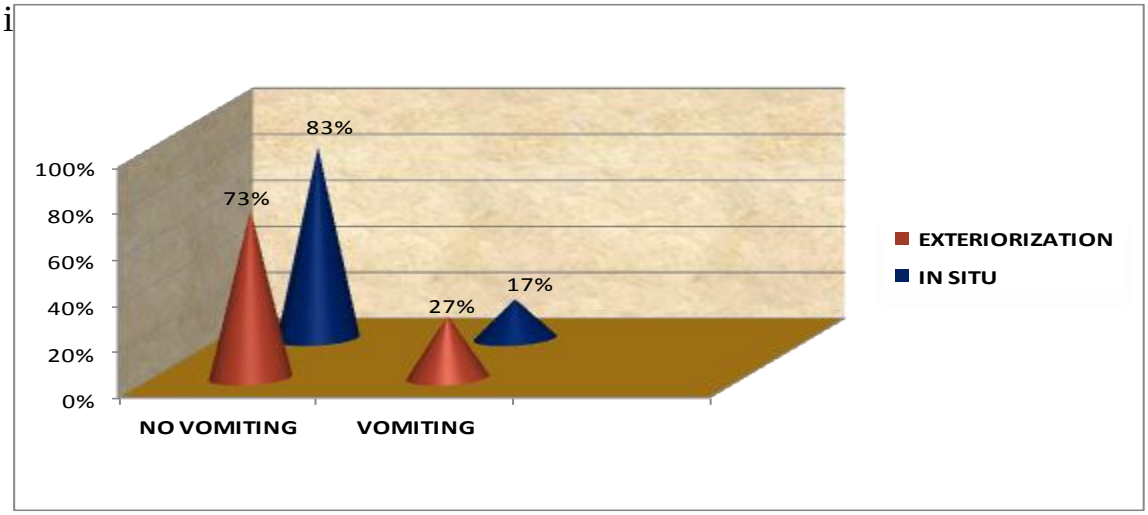
Total number of subjects who had vomiting in the exteriorisation group were 27%(27/100). Out of the total 27 , 17(63%)women had one episode, 9(33.3%) had two episodes, and 1(3.7%) had three episodes of vomiting intraoperatively.

The total number of subjects who had vomiting in the insitu group were 17%(17/100). Out of the 17, 11(64.7%) had one episode, 5(29.4%) had two episodes, and 1(5.9%) had three episodes of vomiting i




Though the vomiting episodes did not reach a statistically significant value, the number of subjects who had vomiting were higher in the exteriorisation(P=0.921) group than the insitu group(27vs17).

This might be attributed to the emergency nature of the cesarean where the time since last intake was <6 hours or stretch of the peritoneum during tubal ligation or the technique of exteriorisation itself.

**Crosstab**

| | | | GROUP | | |
|---|---|---|---|---|---|
| | | | EXTERIORISATION | INTRAPERITONEAL | Total |
| VOMITING EPISODES | PRESENT | Count | 27 | 17 | 44 |
| | | % within GROUP | 27.0% | 17.0% | 22.0% |
| | ABSENT | Count | 73 | 83 | 156 |
| | | % within GROUP | 73.0% | 83.0% | 78.0% |
| Total | | Count | 100 | 100 | 200 |
| | | % within GROUP | 100.0% | 100.0% | 100.0% |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 2.914 | 1 | .088 | | |
| Continuity Correction[a] | 2.360 | 1 | .124 | | |
| Likelihood Ratio | 2.934 | 1 | .087 | | |
| Fisher's Exact Test | | | | .124 | .062 |
| Linear-by-Linear Association | 2.899 | 1 | .089 | | |
| N of Valid Cases | 200 | | | | |

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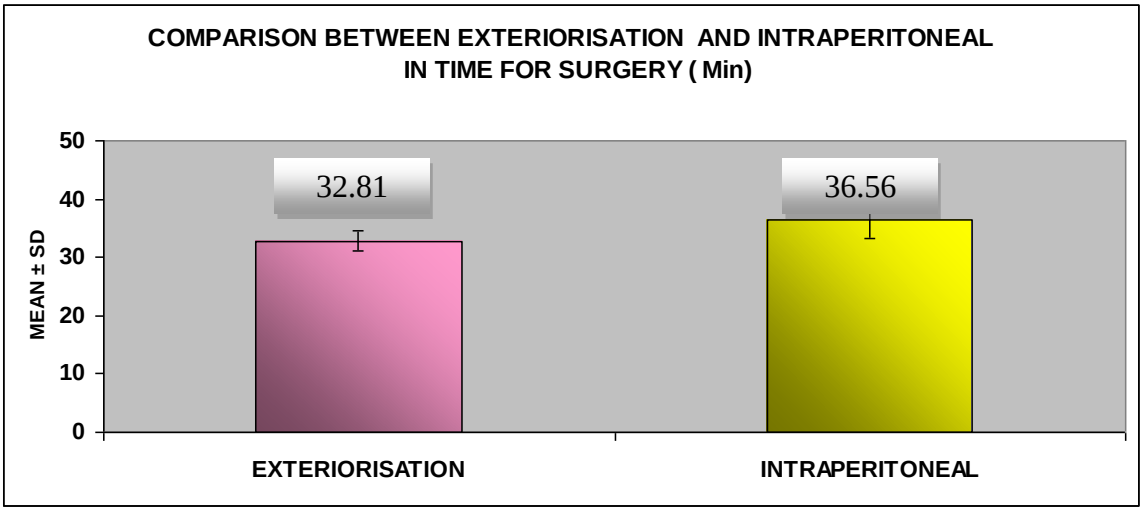
## DURATION OF SURGERY:

The time taken for surgery was noted from the time of skin incision to the time of skin closure in minutes.




**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| TIME FOR SURGERY (min) | EXTERIORISATION | 100 | 32.81 | 1.774 | .177 |
| | INTRAPERITONEAL | 100 | 36.56 | 3.205 | .320 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| TIME FOR SURGERY (min) | Equal variances assumed | 28.032 | .000 | -10.239 | 198 | .000 | -3.750 | .366 | -4.472 | -3.028 |
| | Equal variances not assumed | | | -10.239 | 154.445 | .000 | -3.750 | .366 | -4.474 | -3.026 |

The average time taken for surgery in the exteriorisation group was 32.81minutes and for insitu group it was 36.56 minutes. **The p value was found to be 0.000 which was statistically very significant.**

## POSTOPERATIVE WOUND INFECTION:

Wound infection was noted in 7%(7/100) women in the exteriorisation group and 5% (5/100) in the insitu group and did not have any significant difference.

Wound resuturing was required in 3/5 subjects in insitu group and 1/7 in exteriorisation group. Others were treated with appropriate antibiotics after wound swab culture and sensitivity.

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | .355 | 1 | .552 | | |
| Continuity Correction | .089 | 1 | .766 | | |
| Likelihood Ratio | .356 | 1 | .551 | | |
| Fisher's Exact Test | | | | .767 | .384 |
| Linear-by-Linear Association | .353 | 1 | .553 | | |
| N of Valid Cases | 200 | | | | |

**POST OP WOUND INFECTION * GROUP Crosstabulation**

| | | | GROUP | | |
|---|---|---|---|---|---|
| | | | EXTERIORISATION | INTRAPERITONEAL | Total |
| POST OP WOUND INFECTION | PRESENT | Count | 7 | 5 | 12 |
| | | % within GROUP | 7.0% | 5.0% | 6.0% |
| | ABSENT | Count | 93 | 95 | 188 |
| | | % within GROUP | 93.0% | 95.0% | 94.0% |
| Total | | Count | 100 | 100 | 200 |
| | | % within GROUP | 100.0% | 100.0% | 100.0% |

## POSTOPERATIVE FEBRILE MORBIDITY:

Febrile morbidity was taken as temperature more than 100.4 deg F for more than 24 hours after 24 hours of surgery. 2 subjects in the insitu group had only one episode of fever of 101 deg F

## HOSPITAL STAY:

**Group Statistics**

| | GROUP | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| NO OF DAYS OF HOSPITAL STAY | EXTERIORISATION | 100 | 8.22 | .836 | .084 |
| | INTRAPERITONEAL | 100 | 8.09 | .494 | .049 |

**Independent Samples Test**

| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | 95% Confidence Interval of the Difference | |
| | | F | Sig. | t | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | Lower | Upper |
| NO OF DAYS OF HOSPITAL STAY | Equal variances assumed | 7.203 | .008 | 1.339 | 198 | .182 | .130 | .097 | -.061 | .321 |
| | Equal variances not assumed | | | 1.339 | 160.705 | .183 | .130 | .097 | -.062 | .322 |

The average duration of hospital stay in the exteriorisation group and insitu group were 8.22, 8.09 respectively which did not have significance(p=0.097).

None of the subjects in either of the groups had life threatening complications like hemodynamic shock, shock following exteriorisation, pulmonary embolism, deep vein thrombosis, admission in ICU or any maternal mortality.

**Exteriorisation technique was found to be associated with less postoperative hemoglobin fall which indicate less intraoperative blood loss(p=0.002) and less time for surgery(p=0.000).**

# DISCUSSION

In our current study we found a statistically significant decrease in the blood loss and the time taken for surgery in the exteriorisation group compared with the insitu group There was no statistical significance between the groups in terms of intraoperative hemodynamics, vomiting episodes, postoperative febrile and infectious morbidity, length of hospital stay.

**I. BLOOD LOSS:** Accurate estimation of intraoperative blood loss is very difficult owing to

- Spillage of blood from operation table
- Splashing of blood accidentally
- Mixing of liquor and blood in the suction apparatus
- Polyhydramnios where the estimated blood loss may be more than the actual loss.

Because of these technical difficulties, we resorted to the method of analyzing the perioperative hemoglobin changes. Base line hemoglobin was taken before surgery and the drop in postoperative hemoglobin was taken 48 hours after surgery and compared with the pre op value.

**HERSHEY AND QUILLIGAN** reported no statistical significance between exteriorized and insitu groups in terms of blood loss, duration, puerperal febrile illness and infectious morbidity. But the mean hematocrit drop was higher in the insitu group which did not reach a statistical significance(21)

**WAHAB et al** conducted a randomized controlled study which included 139 women in the exteriorized group and 149 in the non exteriorized group. He concluded that exteriorisation of the uterus, elective cesarean and regional anaesthesia, each associated with a statistically significant reduced blood loss. He found no statistical significance in measures of intraoperative hemodynamics, pain, post operative wound sepsis, fever, length of hospital stay(17).

**O.C.EZECHI et al** also found a statistically significant reduction in blood loss in the exteriorisation group compared to insitu closure(18).

Identical to the study by Wahab et al and O.C.Ezechi at al, we are also able to demonstrate a statistically significant reduced blood loss in the exteriorisation group**(p=0.02)** compared to insitu group. The estimation of blood loss by the peri operative hemoglobin changes is also similar to the study by Wahab et al.

**OTHER STUDIES:** Studies by MAGANN et al(1993), EDI OSAGIE et al, ISABILA CHRISTINA COUTINHO et al found no significant less blood loss in the exteriorisation group compared to insitu group.

**Proposed mechanism of less blood loss:**

- **Elevation of the uterus during exteriorisation causes decreased perfusion and favours venous return- Wahab et al**
- **Traction pressure on the uterus during exteriorisation acts as a tourniquet on the uterine vessels and causes decreased blood loss- O.C.Ezechi et al**

**II. DURATION OF SURGERY:**

In our study, the time taken for surgery attained a statistically significant value(p=0.000) where the mean operating time in the exteriorisation group was 32.81 minutes and in the insitu group, the mean was 36.56 minutes.This is in agreement with the study conducted by **ISABILA CHRISTINA COUTINHO et al** in which the duration of surgery was statistically significant. Mean duration was 50.1+_13.3 in exteriorisation group and 52.5+_13.1 in intracavitary group(23).

In a controlled study which was done in 2007, a statistically significant difference in time was observed between the exteriorisation and insitu group in terms of duration of uterine repair. Though the time

taken for uterine repair was less in the exteriorisation group, the study didnot achieve a significant difference in the total duration of surgery in the exteriorisation group.

**III. INTRAOPERATIVE HEMODYNAMICS:**

Though many of the fears regarding exteriorisation is centered around intra operative hemodynamic events, none of the studies pinpoint a direct link between the technique of exteriorisation with the intra operative hemodynamic instability if any.

In his study, **EDI OSAGIE** observed wide fluctuations in pulse rate in both the groups which followed no clear pattern. This wide fluctuation he accounted for the sudden blood loss that occurs with delivery(19).

Another fear with exteriorisation is the occurrence of bradycardia which may be due to the profound vagal discharge. But this did not occur in our study in any case. We did not get any statistical significance regarding changes in pulse rate.

Also exteriorisation technique is proposed to cause decrease in mean arterial pressure. The exact mechanism though unknown, it is believed that vagal stimulation results in decrease in heart rate and decrease in the peripheral resistance by means of vasodilatation of the

internal vital organs including uterus. If that is said to be true then exteriorisation technique should be associated with more blood loss. There appears no direct link between exteriorisation technique and vagal stimulation. Additionally, regional anaesthesia is believed to compound the effects of bradycardia and decrease in MAP by sympathetic inhibition.

The hemodynamic changes may be attributed to the sudden uterine decompression with subsequent autotransfusion of blood from the uteroplacental bed into the systemic circulation and the sudden blood loss following delivery of fetus and placenta.

Our study found no significant fall in MAP in either groups.There was also no significant difference in spo2- oxygen saturation of tissues between the two techniques. No untoward events of fall in saturation occurred during surgery in either techniques and no case required post operative monitoring in ICU.

**VARTIKAR et al** has demonstrated features of venous air embolism using Doppler changes in about 65% of 78 cesarean. 47% of the subjects showed a decrease in spo2(25). He thus suggested a correlation between decrease in spo2 and venous air embolism. Doppler changes occurred in 47 subjects at the time of uterine closure, during exteriorisation in 16 subjects and at the time of uterine incision in 9

subjects. He found no direct link between exteriorisation technique and air embolism. It can occur at any time during surgery but was more commonly associated with cases of antepartum hemorrhage.

**NELSON et al** analysed 45 deaths during labour and delivery and found that 12 occurred during 1st stage of labour, 12 during 2nd stage , 14 during 3rd stage and 7 during cesarean. The most common factor which existed was the association of placenta previa and air embolism in 24% of the cases studied(26).

Air embolism though rare is a potential life threatening event that causes sudden maternal mortality. It can occur at any stage of labour and delivery and more so with cases of APH(placenta previa, abruption placenta) and may be unrelated to the technique of cesarean.Still if fear exists with exteriorisation we can avoid this technique in cases of APH. Conclusion regarding association of exteriorisation as a direct cause of air embolism yet to be arrived.

**HESHEY AND QUILLIGAN** reported a higher incidene of vomiting in exteriorisation group than the non exteriorized group(21). In our study we found no statistically significant vomiting episodes. Nevertheless, the number of patients who had vomiting in the exteriorisation group(27%) were higher than those in the insitu group(17%). This may be due to the

emergency nature of the surgery irrespective of the time since last food intake or cervical dilatation during labour or the stretch of peritoneum during tubal ligation.

**EDI OSAGIE et al** quotes that pregnancy in itself is predisposed to nausea and vomiting which when accompanied by increased intragastric pressure significantly increases vomiting during cesarean(19). In his study vomiting occurred immediately following regional anaesthesia even before the commencement of the surgery in one third of women who had vomiting. He also observed that hypotension played a role in causing vomiting as it settled when the fall in MAP was corrected to the pre anaesthetic level. Out of 10% of the subjects who had vomiting, 90% fell into the elective procedure(women with empty stomach) undertaken and found to be associated with an inconsistent anti emetic practice in elective cases owing to fasting status. Thus he strongly recommends anti emetic practice even in elective cases, and antacids, adequate oxygen saturation, avoidance of hypotension to avoid vomiting during cesarean.

**IV.POST OPERATIVE WOUND INFECTION AND FEBRILE MORBIDITY:**

In our study there was no significant increase in the incidence of fever and wound infections in exteriorisation group compared to in situ group. The number of patients who required wound resuturing was 3/5 in insitu group whereas it was 1/7 in exteriorisation group.

**MAGANN et al (1995)** reported that exteriorisation and the method of manual removal of placenta are associated with an increased incidence of infectious morbidity and length of hospital stay(24). Others like **Hershey and Quilligan, Wahab et al, and Edi Osagie found no difference.**

**V.OTHERS**

The duration of hospital stay was also not significant between the two groups. The average days of hospital stay was 8.22 in the exteriorisation group and 8.09 in insitu group.

Post operative pain evaluation using visual analogue scale and pain score has been done in certain studies. But we could not evaluate pain due to technical difficulties. The 6 weeks post partum questionnaire return method was also unable to carryout .

The following **valid points** were noted during cesarean by either methods in our study

- Better visualization of the lower uterine segment and uterine wound during closure especially when cesarean was performed in advanced labour where the posterior surface may be confused with the lower edge of the uterine wound
- Collection of blood obscured the suturing field in the insitu group whereas blood relatively drained on to the drape when exteriorisation was followed making the surgeon feel easy
- Any atonicity could be identified early in the exteriorisation technique and hence management commenced early
- Uterine massage could be directly given on the fundus in exteriorisation
- Angle extension and tears could be easily identified and repaired in exteriorisation whereas it was technically difficult in insitu group
- Exteriorisation of uterus facilitates a good visulisation of the adnexa and its pathology and also favours tubal ligation.
- The posterior surface of the uterus could be visualized before closure for any hematoma or tears which might go unnoticed and might end up in relaparotomy

- Exteriorisation facilitated the confirmation of the presence of uterine anomalies which might go unnoticed during insitu repair
- Exteriorisation might favour uterine artery ligation and B Lynch suturing when needed
- During exterorisation the uterine artery gets kinked and thus reduces blood loss during surgery.

## CONCLUSION:

We have found that the technique of uterine exteriorisation during cesarean is associated with less drop in postoperative hemoglobin levels which indicates less blood loss intraoperatively. We have also demonstrated that the time taken for surgery is significantly less in the exteriorized group when compared to in situ group. Other morbidities are similar in both the techniques.

Hence, with good preoperative preparation, effective anaesthesia, surgeon's experience with the technique, the method of uterine exteriorisation is a valuable option. However caution should be excised in cases of antepartum hemorrhage.

# INSITU GROUP

| S.No | NAME | AGE | OBSTETRIC CODE | GA | EMERGENCY/ ELECTIVE LSCS | ANAESTHESIA | PREOP HB | INTRAOPERATIVE | | FINDINGS | | | | VOMITING | TIME | POSTOP HB | POST OP WOUND INFECTION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PULSERATE | | MAP | | SPO2 | | EPISODES | (min) | | |
| 1 | pandiyammal | 22 | G3P1L1 | 38+2 | Emergency Lscs | SA | 11 | 72 | 86 | 92.3 | 85.5 | 100 | 100 | 1 | 35 | 10.5 | + |
| 2 | thangamani | 22 | Primi | 37 | Emergency Lscs | SA | 11.2 | 74 | 90 | 86 | 72.5 | 100 | 99 | | 36 | 10 | |
| 3 | krithika | 24 | Primi | 37+3 | Emergency Lscs | SA | 11.4 | 72 | 85 | 84 | 73.2 | 100 | 98 | | 38 | 10 | |
| 4 | vanaja | 28 | Primi | 38 | Emergency Lscs | SA | 11 | 76 | 104 | 90.2 | 84.3 | 100 | 98 | 2 | 40 | 9 | |
| 5 | kalaivani | 24 | Primi | 38 | Elective Lscs | SA | 12 | 68 | 80 | 93 | 87 | 100 | 100 | | 34 | 11.2 | |
| 6 | visalatchi | 25 | G2A1 | 39 | Emergency Lscs | SA | 13 | 72 | 74 | 94.2 | 86.5 | 100 | 100 | | 34 | 12 | |
| 7 | kanagavalli | 23 | G3A2 | 37+5 | Emergency Lscs | SA | 12 | 74 | 86 | 93.2 | 85.1 | 100 | 99 | | 40 | 11 | |
| 8 | lakshmi | 27 | Primi | 38+3 | Emergency Lscs | SA | 11.5 | 72 | 86 | 96 | 80.8 | 100 | 98 | | 42 | 10.5 | |
| 9 | esther | 30 | Primi | 39 | Emergency Lscs | SA | 11 | 70 | 86 | 94.6 | 83 | 100 | 99 | | 35 | 10 | |
| 10 | anusha | 35 | Primi | 39+1 | Emergency Lscs | SA | 12 | 60 | 76 | 90.4 | 87 | 100 | 98 | 1 | 35 | 10.5 | |
| 11 | malliga | 28 | Primi | 40 | Elective Lscs | SA | 12 | 72 | 86 | 80.6 | 74 | 100 | 99 | | 37 | 10 | |
| 12 | niranjana | 27 | G2P1L1 | 40+2 | Emergency Lscs | SA | 12 | 74 | 82 | 84 | 75 | 100 | 100 | | 38 | 11 | |
| 13 | jaya | 25 | G2PILI | 41 | Emergency Lscs | SA | 11 | 76 | 88 | 80.6 | 74 | 100 | 100 | | 40 | 10 | |
| 14 | nirupa | 26 | Primi | 38 | Emergency Lscs | SA | 11.2 | 78 | 90 | 82.4 | 73 | 100 | 98 | | 42 | 10.2 | |
| 15 | jeyalakshmi | 24 | Primi | 37+6 | Emergency Lscs | SA | 11.6 | 70 | 84 | 85.4 | 72 | 100 | 97 | 3 | 42 | 8 | |
| 16 | krishnaveni | 24 | Primi | 38 | Emergency Lscs | SA | 11 | 72 | 86 | 83.6 | 76 | 100 | 100 | | 40 | 10.5 | |
| 17 | uma | 22 | Primi | 38 | Emergency Lscs | SA | 11.4 | 74 | 84 | 83.6 | 72 | 100 | 100 | | 35 | 10.2 | |
| 18 | saroja | 22 | Primi | 38 | Emergency Lscs | SA | 11 | 72 | 88 | 86.3 | 74 | 100 | 100 | | 35 | 10 | + |
| 19 | chellammal | 26 | G3A2 | 38 | Emergency Lscs | SA | 11.4 | 72 | 90 | 83 | 74 | 100 | 98 | 1 | 34 | 10.2 | |
| 20 | rani | 25 | G2P1L1 | 38 | Emergency Lscs | SA | 12 | 74 | 90 | 87.3 | 76.5 | 100 | 99 | | 41 | 10.5 | |
| 21 | amsaveni | 24 | Primi | 39+2 | Emergency Lscs | SA | 12.5 | 72 | 86 | 92.4 | 84 | 99 | 98 | | 35 | 11 | |
| 22 | yuvarani | 23 | Primi | 38+3 | Emergency Lscs | SA | 12.6 | 82 | 88 | 90.2 | 87 | 98 | 97 | | 32 | 11.4 | |
| 23 | maheshwari | 26 | G2A1 | 38+1 | Elective Lscs | SA | 12 | 84 | 96 | 84.2 | 78 | 100 | 100 | 2 | 32 | 11.2 | |
| 24 | leesa | 25 | G2P1L1 | 38 | Emergency Lscs | SA | 12.6 | 82 | 98 | 80.6 | 74 | 100 | 100 | | 35 | 11.6 | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | sarasu | 25 | G3P1L1A1 | 39 | Emergency Lscs | SA | 11 | 72 | 90 | 86 | 75 | 100 | 98 | | 35 | 7.5 | |
| 26 | durga | 24 | Primi | 39 | Emergency Lscs | SA | 12 | 80 | 92 | 85 | 72 | 100 | 99 | | 32 | 11 | |
| 27 | maha | 26 | Primi | 40 | Emergency Lscs | SA | 11.2 | 84 | 96 | 88.5 | 76 | 100 | 99 | | 32 | 10 | |
| 28 | rosy | 28 | Primi | 40 | Elective Lscs | SA | 12 | 80 | 90 | 83.5 | 76.3 | 100 | 100 | | 34 | 11.6 | |
| 29 | vaidegi | 29 | Primi | 37+6 | Emergency Lscs | SA | 11.4 | 82 | 94 | 92.6 | 79 | 100 | 99 | 1 | 35 | 10.5 | |
| 30 | suryakala | 21 | Primi | 37+5 | Emergency Lscs | SA | 11.2 | 80 | 92 | 95.4 | 75 | 100 | 99 | | 35 | 10.5 | |
| 31 | chandrika | 19 | Primi | 37+2 | Emergency Lscs | SA | 11 | 68 | 76 | 91 | 86 | 10 | 98 | | 40 | 10.2 | |
| 32 | savithri | 20 | Primi | 38 | Emergency Lscs | SA | 12 | 72 | 86 | 90.8 | 86.4 | 100 | 100 | | 38 | 11 | |
| 33 | andal | 22 | Primi | 38 | Emergency Lscs | SA | 11.6 | 70 | 94 | 95.4 | 84 | 100 | 100 | | 37 | 8 | + |
| 34 | roobini | 26 | G2P1L1 | 38+4 | Emergency Lscs | SA | 11.4 | 74 | 90 | 94.3 | 86 | 100 | 99 | 1 | 36 | 10.2 | |
| 35 | iswarya | 20 | G3P2L2 | 39 | Emergency Lscs | SA | 11 | 72 | 86 | 96.3 | 83 | 99 | 99 | | 38 | 10 | |
| 36 | kamaleshwari | 28 | Primi | 39 | Emergency Lscs | SA | 11 | 74 | 88 | 92.5 | 78 | 100 | 98 | | 38 | 10 | |
| 37 | vanitha | 26 | Primi | 39 | Emergency Lscs | SA | 11.2 | 82 | 86 | 90.3 87.6 | 87.6 | 100 | 98 | | 32 | 10.5 | |
| 38 | sandhya | 25 | Primi | 40 | Emergency Lscs | SA | 11.4 | 80 | 76 | 86.4 | 80 | 100 | 100 | 1 | 33 | 10.5 | |
| 39 | arthi | 25 | Primi | 40 | Emergency Lscs | SA | 12 | 82 | 88 | 84.3 | 78 | 100 | 99 | | 40 | 11 | |
| 40 | jessy | 23 | Primi | 37+1 | Emergency Lscs | SA | 11 | 80 | 92 | 85.2 | 76 | 100 | 98 | | 39 | 9 | |
| 41 | swarna | 22 | Primi | 38+2 | Emergency Lscs | SA | 11 | 84 | 90 | 86.3 | 80 | 100 | 100 | | 40 | 10.2 | |
| 42 | manjula | 25 | Primi | 38 | Emergency Lscs | SA | 11.2 | 74 | 86 | 92.5 | 85 | 100 | 98 | 1 | 36 | 10.5 | |
| 43 | poorna | 30 | Primi | 39 | Emergency Lscs | SA | 11.4 | 72 | 84 | 87.3 | 79 | 100 | 98 | | 36 | 10 | |
| 44 | leela | 25 | Primi | 39+3 | Emergency Lscs | SA | 12 | 74 | 86 | 91.4 | 75 | 99 | 98 | | 35 | 11.4 | |
| 45 | gomathy | 23 | Primi | 39+3 | Emergency Lscs | SA | 12.4 | 80 | 94 | 95 | 86 | 99 | 99 | | 35 | 11.2 | |
| 46 | nisha | 24 | Primi | 39+2 | Emergency Lscs | SA | 12 | 80 | 92 | 92.3 | 84 | 99 | 99 | | 34 | 8.8 | |
| 47 | valli | 30 | G3A2 | 41 | Elective Lscs | SA | 12 | 82 | 90 | 90.4 | 86 | 100 | 100 | | 33 | 11 | |
| 48 | vijayashree | 21 | G2A1 | 40 | Emergency Lscs | SA | 12.2 | 78 | 86 | 89 | 80 | 100 | 100 | 2 | 33 | 10.8 | |
| 49 | habibunisha | 24 | Primi | 40+3 | Emergency Lscs | SA | 12.4 | 76 | 82 | 83.5 | 76 | 100 | 98 | | 32 | 11 | |
| 50 | kanaga | 24 | Primi | 38 | Emergency Lscs | SA | 11.4 | 82 | 84 | 79 | 72 | 100 | 99 | | 30 | 10 | |
| 51 | christina | 21 | Primi | 38 | Emergency Lscs | SA | 11 | 80 | 88 | 86.8 | 73 | 100 | 99 | | 37 | 10.2 | |
| 52 | kalliammal | 22 | G4A3 | 39 | Emergency Lscs | SA | 11 | 82 | 90 | 90.3 | 85 | 100 | 99 | | 36 | 10 | |
| 53 | dillirani | 24 | G2P1L1 | 39 | Emergency Lscs | SA | 11 | 84 | 90 | 93.6 | 83 | 100 | 98 | | 35 | 10 | |
| 54 | rasathi | 27 | Primi | 39 | Elective Lscs | SA | 12 | 72 | 84 | 87.1 | 79.5 | 100 | 99 | 1 | 35 | 11.2 | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55 | dharani | 24 | Primi | 38+2 | Emergency Lscs | SA | 11.2 | 74 | 86 | 82.5 | 78.3 | 99 | 99 | | 32 | 7.4 | |
| 56 | kaveri | 23 | Primi | 38 | Emergency Lscs | SA | 11.4 | 80 | 84 | 89.2 | 72.8 | 99 | 99 | | 32 | 10 | |
| 57 | ponnuthai | 23 | Primi | 38 | Emergency Lscs | SA | 12 | 82 | 92 | 93.4 | 74.2 | 100 | 98 | | 34 | 11.2 | |
| 58 | dhanam | 23 | G2P1L1 | 37+5 | Emergency Lscs | SA | 11.2 | 78 | 86 | 86.3 | 79 | 100 | 98 | 2 | 33 | 10.5 | |
| 59 | akila | 24 | G2A1 | 37+6 | Emergency Lscs | SA | 11.4 | 74 | 90 | 85.4 | 76 | 100 | 100 | | 33 | 8.6 | |
| 60 | zarina | 27 | Primi | 38 | Emergency Lscs | SA | 11 | 72 | 86 | 90 | 78.4 | 100 | 100 | | 32 | 10.2 | |
| 61 | gowripriya | 26 | Primi | 37 | Emergency Lscs | SA | 11.4 | 82 | 86 | 93.6 | 86.8 | 100 | 98 | 1 | 40 | 10.5 | |
| 62 | pandiyammal | 24 | G2P1L1 | 39 | Emergency Lscs | SA | 11 | 84 | 90 | 94.2 | 88.5 | 100 | 99 | | 40 | 10 | |
| 63 | anandhayi | 21 | Primi | 40 | Emergency Lscs | SA | 11.2 | 82 | 88 | 87 82.5 | 82.5 | 100 | 100 | | 42 | 10.5 | |
| 64 | kriba | 21 | Primi | 40+3 | Elective Lscs | SA | 13 | 72 | 80 | 86.4 | 80.7 | 100 | 98 | | 42 | 11.5 | |
| 65 | aparna | 24 | G2P1L1 | 37+3 | Emergency Lscs | SA | 11 | 74 | 82 | 84.3 | 80 | 100 | 99 | | 45 | 10 | |
| 66 | shanthi | 26 | Primi | 37+4 | Emergency Lscs | SA | 11 | 73 | 82 | 93.2 | 85 | 100 | 98 | | 45 | 10 | |
| 67 | sudha | 27 | Primi | 38 | Emergency Lscs | SA | 11 | 76 | 84 | 94 | 83.3 | 100 | 99 | | 38 | 10.2 | |
| 68 | malathi | 26 | Primi | 38 | Emergency Lscs | SA | 11 | 72 | 96 | 90 | 84.3 | 100 | 100 | | 38 | 9 | |
| 69 | vadivu | 24 | Primi | 38+5 | Emergency Lscs | SA | 11.2 | 74 | 90 | 90.6 | 85.4 | 100 | 100 | | 37 | 10 | |
| 70 | rupa | 24 | Primi | 39 | Emergency Lscs | SA | 11.4 | 82 | 96 | 80.5 | 76.3 | 100 | 99 | | 45 | 10.5 | |
| 71 | lalitha | 26 | Primi | 40 | Emergency Lscs | SA | 11.6 | 70 | 74 | 85.3 | 78.6 | 100 | 100 | 1 | 32 | 10.2 | |
| 72 | surekha | 35 | Primi | 38 | Emergency Lscs | SA | 12 | 76 | 84 | 88.5 | 80.7 | 100 | 100 | | 34 | 11.2 | |
| 73 | sivagami | 19 | Primi | 38 | Emergency Lscs | SA | 12.4 | 74 | 80 | 92.6 | 80.6 | 99 | 99 | | 34 | 11 | |
| 74 | ruthra | 20 | G3A2 | 39 | Elective Lscs | SA | 12.2 | 72 | 86 | 90.5 | 84.5 | 99 | 98 | | 38 | 11.5 | |
| 75 | ruth | 23 | Primi | 37 | Emergency Lscs | SA | 11 | 68 | 76 | 95.1 | 87.4 | 99 | 98 | | 38 | 10.2 | |
| 76 | elizabeth | 23 | Primi | 37+6 | Emergency Lscs | SA | 11 | 69 | 76 | 90 | 79 | 100 | 100 | | 37 | 10.2 | |
| 77 | arockiamary | 22 | G2A1 | 38+4 | Emergency Lscs | SA | 12 | 70 | 84 | 87.4 | 80.2 | 100 | 100 | | 37 | 11 | |
| 78 | paapu | 25 | G2P1L1 | 38+3 | Emergency Lscs | SA | 12 | 72 | 96 | 85.5 | 78.6 | 100 | 99 | 1 | 38 | 9.6 | |
| 79 | nirosha | 25 | Primi | 38+6 | Emergency Lscs | SA | 11.6 | 74 | 82 | 89.4 | 80 | 100 | 98 | | 39 | 10 | |
| 80 | anjana | 27 | Primi | 39 | Elective Lscs | SA | 11.6 | 82 | 86 | 94.5 | 86 | 100 | 99 | | 40 | 10.5 | |
| 81 | varalakshmi | 24 | Primi | 38 | Emergency Lscs | SA | 11 | 78 | 74 | 90.6 | 84 | 99 | 98 | | 41 | 10.2 | |
| 82 | srimathi | 28 | G2P1L1 | 39 | Emergency Lscs | SA | 11 | 79 | 84 | 93.5 | 85 | 99 | 98 | | 41 | 10 | |
| 83 | deivanayaki | 27 | G2A1 | 38+3 | Elective Lscs | SA | 11.4 | 80 | 84 | 92 | 86 | 100 | 100 | | 38 | 10.2 | + |
| 84 | saroja | 25 | Primi | 37+6 | Emergency Lscs | SA | 11.4 | 84 | 86 | 90 | 84 | 100 | 100 | | 38 | 10.4 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 85 | muthammal | 24 | Primi | 37+3 | Emergency Lscs | SA | 11.2 | 80 | 88 | 80.7 | 76.4 | 100 | 99 | | 37 | 10.5 | |
| 86 | bavitha | 27 | Primi | 38 | Emergency Lscs | SA | 11.2 | 74 | 79 | 83.5 | 72 | 99 | 99 | 2 | 37 | 10.5 | |
| 87 | bakyalakshmi | 27 | G3P1L1A1 | 39 | Emergency Lscs | SA | 12 | 80 | 86 | 83.4 | 74 | 100 | 100 | | 36 | 11.2 | |
| 88 | elakiya | 26 | Primi | 37+3 | Elective Lscs | SA | 12.2 | 80 | 84 | 82.4 | 75 | 100 | 100 | | 36 | 11.4 | |
| 89 | ellammal | 24 | Primi | 37+5 | Emergency Lscs | SA | 12 | 72 | 86 | 90.3 | 86.4 | 100 | 98 | | 35 | 11.2 | |
| 90 | faritha | 25 | Primi | 38 | Emergency Lscs | SA | 12.4 | 74 | 88 | 92.8 | 84.3 | 100 | 100 | | 35 | 11.4 | |
| 91 | geetha | 27 | Primi | 38 | Emergency Lscs | SA | 11 | 72 | 84 | 89.4 | 84.3 | 100 | 98 | | 36 | 10 | |
| 92 | haritha | 26 | Primi | 39 | Emergency Lscs | SA | 11 | 74 | 86 | 86.3 | 78.5 | 100 | 97 | | 36 | 10 | |
| 93 | inbarasi | 26 | Primi | 37+5 | Emergency Lscs | SA | 11 | 72 | 86 | 84.9 | 78.4 | 100 | 98 | | 38 | 10.2 | |
| 94 | jeyalakshmi | 24 | Primi | 38 | Emergency Lscs | SA | 11.4 | 70 | 82 | 79.8 | 72.6 | 100 | 97 | | 38 | 10.5 | |
| 95 | kalyani | 25 | G4A3 | 38 | Elective Lscs | SA | 11.4 | 74 | 86 | 84.8 | 76 | 100 | 98 | | 33 | 10.4 | |
| 96 | kumudha | 25 | Primi | 40 | Emergency Lscs | SA | 11.6 | 72 | 88 | 80.7 | 73.6 | 100 | 99 | | 34 | 10.8 | |
| 97 | lalli | 23 | Primi | 38 | Emergency Lscs | SA | 11.6 | 60 | 74 | 79 | 72 | 100 | 100 | | 35 | 10.6 | |
| 98 | famidha | 23 | Primi | 39 | Emergency Lscs | SA | 11.5 | 78 | 90 | 87.5 | 82 | 100 | 100 | | 35 | 10.2 | + |
| 99 | manimegalai | 21 | Primi | 39 | Elective Lscs | SA | 11 | 64 | 76 | 90.3 | 86 | 100 | 100 | | 38 | 10 | |
| 100 | krishnaveni | 21 | Primi | 39 | Emergency Lscs | SA | 11 | 72 | 90 | 92.7 | 85.3 | 100 | 100 | | 36 | 10 | |

| NO OF DAYS OF HOSPITAL STAY |
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**BIBLIOGRAPHY:**


1. William's Obstetrics 23rd edition page 544
2. Cesarean section a brief history pary 1
3. Young JH. The History of Cesarean section. London: HK Lewis & co 1994
4. The management of labour- Sir Sabaratnam Arulkumaran, Gita Arjun, Leonie k Penna, third edition, 252-256 techniques of cesarean delivery
5. The management of labour- Sir Sabaratnam Arulkumaran, Gita Arjun, Leonie k Penna, third edition 248, 249 rising rates of cesarean sections
6. Mudaliar and Menon's clinical Obstetrics- Tenth edition page 11-13, 90
7. NICE Guideline 2004- cesarean section 1.1.3.1
8. World Health Statistics -2012 - internet source
9. High Risk Pregnancy- Management Options- James, Steer, Weiner, Crowther, Robson. Page 1270
10. OXFORD Handbook of Obstetrics and Gynecology- second edition, page 306, 307
11. Munro Kerr's Operative Obstetrics

12. Kaltz V Balderstan K, De Freest M- perimortem cesarean delivery: were our assumption correct? American Journal of Obstetrics and Gynecology 2005; 192: 1916-1921
13. Stark M, Finkel A; Comparison between the Joel Cohen incision and Pfannensteil incision in cesarean. European Journal of Obstetrics and Gynecology 53: 121-122, 1994
14. Increasing trend in CaesareanSection Delivery in India- Internet source
15. Maternal Health- Sancheeta Ghosh
16. NICE Guideline 2004- cesarean section 1.2
17. Wahab MA, Karantzis P, Eccersley PS, Russell IF, Thompson JW, Lindow SW. A randomised controlled study of uterine exteriorisation and repair at cesarean section. British J of Obstetrics and Gynecology 1999; VOL 106: 913-916
18. Ezechi OC, Kalu BK, Njokamma FO, Nwokoro CA, Okeke GC, Uterine incision closure at cesarean section: a randomized comparative study of intraperitoneal closure and closure after temporary exteriorisation. West African J of Med 2005; 24: 41-43
19. Edi-Osagie EC, Hopkins RE, Ogbo V, Lockhat-Clegg F, Aveko M, Akpala WO, et al Uterine exteriorization at cesarean section: influence on maternal morbidity
20. British J of Obstetrics and Gynecology 1998; 105: 1070-78

21. Hershey DW, Quilligan EJ. Uterine exteriorization at cesarean section Obsfet Gyneco 1978; 52: 189-192
22. Magann EF, Dodson MK, Allbert JR, McCurdy CM, Martin RW, Morrison JC. Blood loss at the time of cesarean section by method of placental removal and exteriorization vs in situ repair of uterine incision. Surg Gynecol Ohatet 1993; 177: 389-392
23. Isabela Cristina Coutinho, Melania Maria Ramos de Amorim, Leila Katz, Alvaro Antonio Bandeira de Ferraz. Uterine exteriorization compared with in situ repair at cesarean delivery- a randomized controlled trial American J of Obstetrics and Gynecology 2008; vol 111: 639-647
24. Magann EF, Washburne JF, Harris RL, Bass JD, Duff WP, Morrison JC, Infectious morbidity, operative blood loss and length of the operative procedure after cesarean delivery by method of placental removal and site of uterine repair. J Am Coll Surg 1995; 181: 517-520
25. Vartikar JV, Jonson MD, Datta S. Precordial Doppler monitoring and pulse oximetry during cesarean delivery: detection of venous embolism. Regional Anesthesia 1989; 14: 145-148
26. Nelson PK pulmonary gas embolism in pregnancy and the peurperium. Obstet Gynecol Surv 1960; 15: 449-481
27. Ian Donald's Practical Obstetric Problems

**KEY TO MASTER CHART :**

G- gravida

P-para

L-live issue

A-abortion

LSCS- lower segment cesarean section

SA-spinal anaesthesia

GA-gestational age

HB-hemoglobin

MAP-mean arterial pressure

SPO2- tissue saturation of oxygen

**PROFORMA**

Name :

Age : D.O.A. :

I.P. No. : D.O.D. :

Unit :

Educational Status :

Husband Name :

Family Size and Income:

Socio economic status:

Address :

Obstetric code:

LMP:

EDD:

Booked / Unbooked

Immunised/ single dose/ unimmunized:

History :

Chief Complaints :

History of Amenorrhoea :

Labour pains :

Leaking PV :

Bleeding PV :

History of Presenting illness :

Menstrual History :

Age of Menarche : LMP :

Previous cycles : EDD :

Regularity :

Married Life :

Consanguinity

Obstetric History :

Obstetric Score :

Gravida : Para : Live : Abortion :

Booked / Unbooked

Immunised/ single dose/ unimmunized:

History of Previous Pregnancies :labour natural/cesarean

Spontaneous/induced delivery

Indication for cesarean

Birth weight of the baby, apgar score

Postoperative period

complications

Past History :

Family history :

Personal History :

GPE :

Pulse : Height :

BP : Weight :

Temperature : BMI :

Thyroid, Breast, Spine :

Pallor, icterus, pedal edema,clubbing, cyanosis, lymphadenopathy :

Systemic Examination :

1. CVS

2. RS

3. CNS

4. Per Abdomen

a. Inspection

b. Palpation

i. Height of Uterus (corresponds to gest. Age or less)

ii. Fetal parts, presentation, position.

iii. Abdominal girth

iv. Symphysiofundal height

v. Estimated fetal weight

I and II pelvic grip

Evidence of oligohydramnios noticed clinically

c. Auscultation FHS Yes / No Regular / Irregular / Absent

d. Perspeculum

e. P/v findings

Investigations :

Hb% :

PCV :

Urine routine :

Blood grouping and Rh typing :

HIV, HBs Ag :

Ultrasound Findings :

1st trimester :

2nd trimester :

3rd trimester :

NST – Reactive / Non-reactive :

Mode of Delivery : Induced / spontaneous / operative interference

Labour details : Spontaneous / Induced

PROM Absent / Present

Duration of labour

Induction of labour Yes / No

Indication for LSCS :

Type of Anaesthesia :

Complications if any :

Primary / Repeat cesarean

Duration of operation :

Type of skin incision :

Type of uterine incision:

Extension of Uterine incision :

Operative findings :

Intraoperative Difficulties :

Uterus : Exteriozed / Insitu repair

Placental delivery

PPH

Intraoperative findings

BP

Pulse Rate

Oxygen saturation

CVS

RS

Nausea / vomiting

Baby apgar score 1st Minute 5th Minute

Tubectomy Done / Not done

Method

Post operative Findings

Operating Time

Need for emergency blood Yes / No

Post operative Hb% (after 48 hours)

Mid stream urine for culture and sensitivity

Endometritis Yes / No

Cytitis Yes / No

Febrile morbidity Yes / No

Suture removal

Period of Hospitalization

# CONSENT FORM

**STUDY TITLE :**

**COMPARATIVE STUDY BETWEEN UTERINE EXTERIORIZATION AND INSITU REPAIR AT CESAREAN SECTION**

**STUDY CENTRE**: Institute Of Obstetrics And Gynaecology, Egmore, Chennai

**PARTICIPANT NAME** : **AGE:** **SEX :** **LD. NO.**

I confirm that I have understood the purpose of the above study. I have the opportunity to ask the question and all my questions and doubts have been answered to my satisfaction.

I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving any reason.

I understand that the investigator, regulatory authorities and the ethics committee will not need my permission to look at my health records both in respect to the current study and any further research that may be conducted in relation to it, even if I withdraw from the study. I understand that my identity will not be revealed in any information released to third parties of published, unless as required under the law. I agree not to restrict the use of any results that arise from the study.

I hereby consent to participate in this study titled **"COMPARATIVE STUDY BETWEEN UTERINE EXTERIORIZATION AND INSITU REPAIR AT CESAREAN SECTION"**

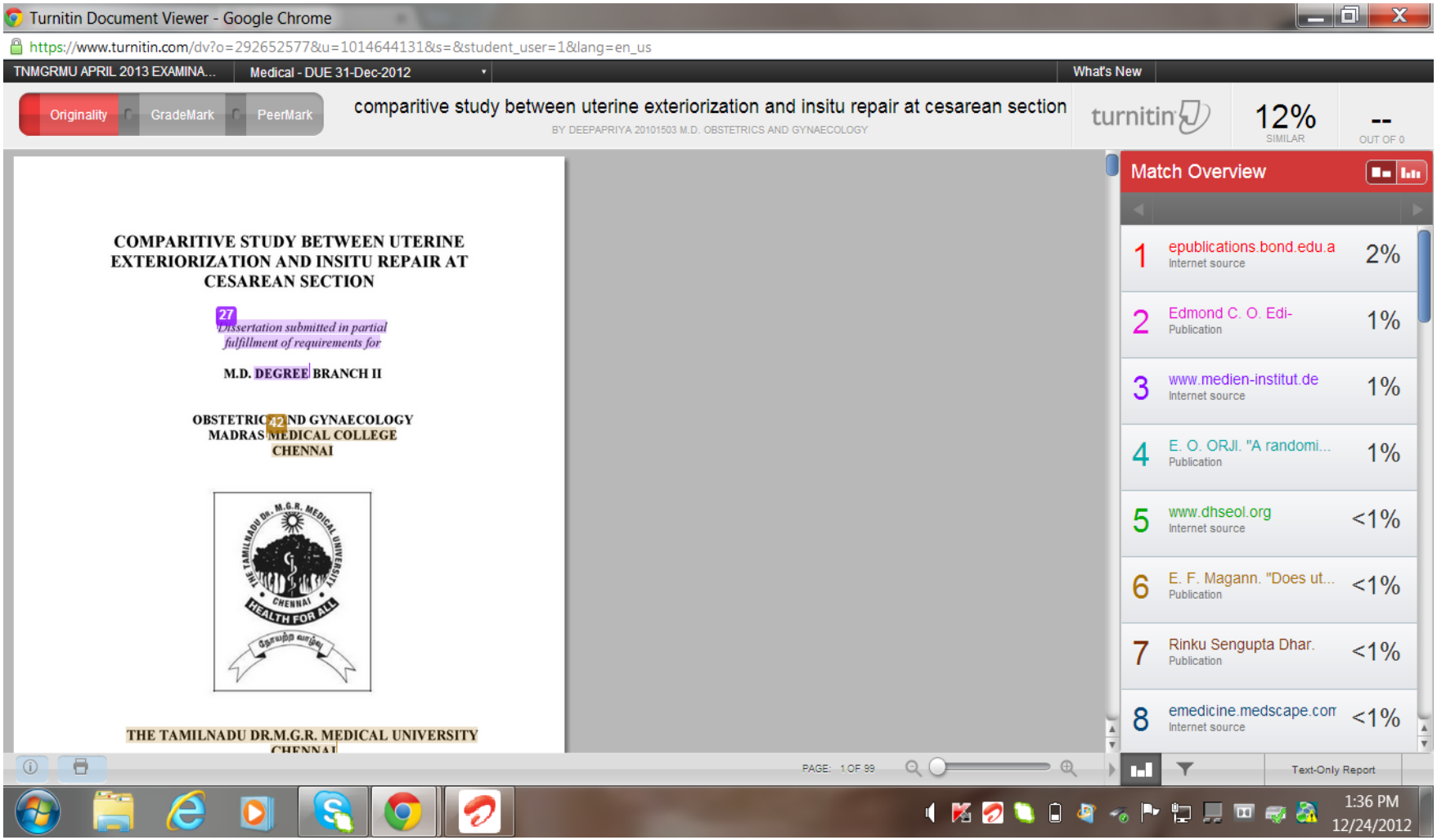
Signature of Investigator Place :

Date :

Study Investigators Name

Institution :

Signature/thumb impression of patient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Dissertation submitted in partial fulfillment of requirements for
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OBSTETRICS AND GYNAECOLOGY
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**KEY TO MASTER CHART :**

G- gravida

P-para

L-live issue

A-abortion

LSCS- lower segment cesarean section

SA-spinal anaesthesia

GA-gestational age

HB-hemoglobin

MAP-mean arterial pressure

SPO2- tissue saturation of oxygen

# EXTERIORIZATION GROUP

| S.No | NAME | AGE | OBSTETRIC CODE | GA | EMERGENCY/ ELECTIVE LSCS | ANAESTHESIA | PREOP HB | INTRAOPERATIVE | | | | | | VOMITING | TIME FOR | POST OP HB | POST OP WOUND INFECTION | NO OF DAYS OF HOSPITAL STAY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | PULSERATE | | MAP | | SPO2 | | EPISODES | SURGERY (min) | | | |
| 1 | Prema | 22 | Primi | 38 | Emergency lscs | SA | 12 | 72 | 80 | 90.2 | 80 | 100 | 100 | 2 | 32 | 11.5 | | 8 |
| 2 | usha | 23 | Primi | 37 | Emergency lscs | SA | 11 | 80 | 86 | 92.2 | 78 | 100 | 100 | | 32 | 10.8 | | 8 |
| 3 | amala | 24 | G2P1L1 | 37 | Emergency lscs | SA | 12 | 82 | 90 | 91.3 | 77.3 | 100 | 100 | | 34 | 11 | | 8 |
| 4 | srividya | 22 | Primi | 39 | Emergency lscs | SA | 12.5 | 76 | 84 | 94 | 73.3 | 100 | 99 | | 34 | 12 | | 9 |
| 5 | suganya | 23 | Primi | 40 | Elective lscs | SA | 12 | 74 | 86 | 84.7 | 76 | 100 | 100 | | 30 | 11 | | 8 |
| 6 | vasanthi | 24 | Primi | 40+2 | Elective lscs | SA | 12 | 80 | 88 | 86 | 72 | 99 | 99 | | 30 | 11 | + | 10 |
| 7 | keerthana | 28 | G3A2 | 40+5 | Emergency lscs | SA | 12.5 | 72 | 80 | 87.3 | 74 | 100 | 98 | | 33 | 11.5 | | 8 |
| 8 | gayathri | 25 | G2P1L1 | 38+2 | Emergency lscs | SA | 11.5 | 78 | 90 | 90 | 80 | 100 | 99 | | 32 | 11 | | 8 |
| 9 | rahmad begum | 27 | G3A2 | 38+4 | Emergency lscs | SA | 11 | 76 | 89 | 83.3 | 76 | 100 | 100 | 2 | 33 | 11 | | 8 |
| 10 | asha | 23 | Primi | 37 | Elective lscs | SA | 12 | 68 | 76 | 86.7 | 74 | 100 | 100 | | 32 | 11.5 | | 8 |
| 11 | surya | 24 | Primi | 39 | Elective lscs | SA | 12 | 82 | 90 | 86 | 80 | 100 | 100 | | 35 | 11 | | 8 |
| 12 | sujatha | 25 | G2A1 | 38 | Emergency lscs | SA | 12 | 84 | 92 | 86.7 | 80 | 100 | 99 | | 35 | 11 | + | 12 |
| 13 | manimegalai | 26 | Primi | 38 | Emergency lscs | SA | 12.5 | 86 | 98 | 92 | 86 | 100 | 97 | 1 | 35 | 12 | | 8 |
| 14 | renuka | 24 | Primi | 38+3 | Emergency lscs | SA | 11.4 | 84 | 92 | 94 | 78 | 100 | 98 | | 32 | 11 | | 8 |
| 15 | rekha | 24 | Primi | 38+5 | Emergency lscs | SA | 11 | 72 | 80 | 93.3 | 76 | 100 | 99 | | 33 | 10.5 | | 8 |
| 16 | gowthami | 23 | G2P1L1 | 38+6 | Emergency lscs | SA | 11 | 74 | 82 | 96 | 83 | 100 | 100 | | 33 | 10.5 | | 8 |
| 17 | shanthi | 25 | G2P1L1 | 37+5 | Emergency lscs | SA | 11.5 | 72 | 86 | 86.7 | 79.3 | 100 | 100 | 1 | 31 | 10.8 | | 8 |
| 18 | punitha | 26 | Primi | 37 | Elective lscs | SA | 11.5 | 80 | 90 | 85 | 83 | 100 | 100 | 1 | 32 | 10.6 | | 8 |
| 19 | vasanthi | 24 | Primi | 38 | Emergency lscs | SA | 11 | 82 | 90 | 80.6 | 74 | 100 | 100 | 2 | 32 | 10.2 | | 8 |
| 20 | gowri | 35 | Primi | 40 | Elective lscs | SA | 12 | 86 | 84 | 84.2 | 72 | 100 | 99 | | 33 | 11.2 | | 8 |
| 21 | anjalai | 23 | Primi | 39 | Emergency lscs | SA | 11.2 | 70 | 78 | 94 | 86.5 | 100 | 100 | 3 | 32 | 10.8 | + | 12 |
| 22 | kumudha | 24 | Primi | 41 | Emergency lscs | SA | 11 | 72 | 80 | 90 | 84 | 100 | 100 | | 34 | 10 | | 8 |
| 23 | jeyamary | 25 | Primi | 38 | Emergency lscs | SA | 11.2 | 82 | 90 | 93 | 80.5 | 100 | 99 | 1 | 34 | 10.4 | | 8 |
| 24 | menaka | 26 | Primi | 39 | Emergency lscs | SA | 11.8 | 74 | 86 | 90.6 | 84 | 100 | | | 32 | 11 | | 8 |
| 25 | vinothini | 25 | Primi | 37 | Emergency lscs | SA | 11.8 | 72 | 86 | 93 | 90 | 100 | 99 | 2 | 30 | 11 | | 8 |
| 26 | shantha | 24 | G2P1L1 | 38+4 | Emergency lscs | SA | 11.8 | 70 | 82 | 92 | 86 | 99 | 99 | | 30 | 10.8 | | 8 |
| 27 | deepa | 26 | G3A2 | 39 | Emergency lscs | SA | 11.6 | 84 | 90 | 84.6 | 78 | 99 | | | 32 | 10.8 | | 8 |
| 28 | chitra | 35 | Primi | 39 | Elective lscs | SA | 12 | 82 | 94 | 93 | 88 | 100 | 99 | | 34 | 11 | | 8 |
| 29 | srirangam | 25 | Primi | 39 | Emergency lscs | SA | 12 | 86 | 98 | 86 | 76.3 | 100 | 99 | 1 | 34 | 11 | | 8 |
| 30 | selvi | 26 | G2P1L1 | 38+3 | Elective lscs | SA | 12 | 84 | 90 | 86.5 | 82 | 100 | 100 | | 35 | 11 | | 8 |
| 31 | sanchitha | 26 | G2A1 | 39+3 | Emergency lscs | SA | 11 | 73 | 82 | 91.3 | 84 | 100 | 100 | | 35 | 10 | | 8 |
| 32 | pavithra | 25 | G2A1 | 39+2 | Emergency lscs | SA | 11 | 74 | 86 | 94.5 | 80 | 100 | 100 | | 35 | 10 | | 8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 33 | usha | 25 | Primi | 38+1 | Emergency lscs | SA | 11 | 68 | 76 | 96.2 | 86 | 100 | 100 | | 33 | 10.2 | | 8 |
| 34 | maheshwari | 26 | Primi | 38 | Emergency lscs | SA | 11.4 | 64 | 72 | 94.2 | 83.8 | 99 | 99 | | 32 | 11 | | 8 |
| 35 | savitha | 23 | Primi | 39 | Emergency lscs | SA | 11.4 | 80 | 76 | 90.5 | 84..4 | 99 | 99 | 2 | 32 | 10.5 | | 8 |
| 36 | mary | 22 | Primi | 39 | Elective lscs | SA | 12 | 72 | 84 | 90.2 | 84 | 100 | 99 | | 30 | 11.2 | | 8 |
| 37 | manju | 25 | G2P1L1 | 40 | Emergency lscs | SA | 11 | 74 | 82 | 95 | 90 | 100 | 100 | | 30 | 10.5 | | 8 |
| 38 | nagarani | 24 | G2A1 | 39 | Emergency lscs | SA | 11.2 | 72 | 84 | 97 | 86 | 100 | 100 | | 30 | 10.5 | | 8 |
| 39 | ammu | 24 | G3A2 | 38 | Elective lscs | SA | 12 | 74 | 88 | 84 | 82 | 99 | 99 | | 32 | 11 | | 8 |
| 40 | meena | 22 | Primi | 38+3 | Emergency lscs | SA | 11.2 | 72 | 84 | 92 | 84.4 | 99 | 98 | 2 | 32 | 10.5 | + | 10 |
| 41 | radha | 20 | Primi | 38+5 | Emergency lscs | SA | 11.2 | 76 | 84 | 95 | 86.2 | 100 | 99 | | 32 | 10.6 | | 8 |
| 42 | bhavani | 25 | Primi | 38+2 | Emergency lscs | SA | 11.4 | 84 | 90 | 94.3 | 84 | 100 | 98 | | 34 | 10.6 | | 8 |
| 43 | karthiga | 26 | Primi | 39 | Emergency lscs | SA | 11.6 | 68 | 76 | 95 | 82 | 99 | 99 | | 35 | 10.6 | | 8 |
| 44 | geetha | 24 | G2A1 | 37 | Emergency lscs | SA | 11.8 | 80 | 92 | 90.4 | 90 | 98 | 98 | 1 | 35 | 11 | | 8 |
| 45 | indhuja | 25 | G2A1 | 38 | Emergency lscs | SA | 12 | 84 | 94 | 92.6 | 88 | 100 | 97 | | 35 | 11.2 | | 8 |
| 46 | prema | 24 | G3A2 | 39+5 | Elective lscs | SA | 12.5 | 82 | 96 | 92 | 86.6 | 100 | 98 | | 36 | 12 | | 8 |
| 47 | sindhya | 22 | G2P1L1 | 39+6 | Emergency lscs | SA | 12.4 | 84 | 98 | 88 | 70 | 100 | 99 | 1 | 34 | 12 | | 8 |
| 48 | devi | 25 | G2P1L1 | 37+5 | Emergency lscs | SA | 12 | 74 | 86 | 86 | 74.8 | 100 | 100 | | 35 | 11 | | 8 |
| 49 | lavanya | 28 | Primi | 37+4 | Elective lscs | SA | 12 | 62 | 78 | 86 | 76 | 100 | 100 | | 36 | 11 | | 8 |
| 50 | ramya | 30 | Primi | 38 | Emergency lscs | SA | 12.4 | 74 | 88 | 90 | 78.4 | 100 | 99 | | 36 | 11.2 | | 8 |
| 51 | soundarya | 21 | Primi | 38 | Emergency lscs | SA | 11 | 64 | 76 | 94.3 | 80.5 | 100 | 100 | 1 | 35 | 10.5 | | 8 |
| 52 | rani | 19 | Primi | 39 | Emergency lscs | SA | 11 | 74 | 86 | 97 | 89.5 | 100 | 98 | | 35 | 10.5 | | 8 |
| 53 | shivani | 20 | Primi | 40 | Emergency lscs | SA | 11.2 | 84 | 98 | 93 | 86.3 | 100 | 99 | 1 | 32 | 10.5 | | 8 |
| 54 | chandrika | 30 | Primi | 38+6 | Elective lscs | SA | 11 | 82 | 94 | 91 | 78 | 100 | 100 | | 32 | 10.2 | | 8 |
| 55 | vani | 22 | G2A1 | 38+5 | Emergency lscs | SA | 11 | 84 | 98 | 93.5 | 86 | 100 | 100 | 1 | 34 | 10.2 | | 8 |
| 56 | josephine | 24 | G2P1L1 | 39 | Emergency lscs | SA | 11 | 72 | 84 | 90 | 86 | 100 | 100 | | 34 | 10.5 | | 8 |
| 57 | vembu | 30 | G2P1L1 | 39 | Emergency lscs | SA | 11.5 | 82 | 96 | 93 | 86 | 100 | 99 | | 30 | 10.6 | | 8 |
| 58 | anitha | 25 | G3A2 | 38 | Emergency lscs | SA | 11.5 | 82 | 96 | 92.8 | 79.6 | 100 | 98 | | 30 | 10.6 | | 8 |
| 59 | radhika | 29 | G2A1 | 38+5 | Emergency lscs | SA | 11.5 | 76 | 88 | 94 | 87 | 99 | 99 | | 30 | 10 | | 8 |
| 60 | padma | 20 | G2A1 | 39 | Elective lscs | SA | 12 | 72 | 84 | 90.8 | 86 | 99 | 98 | 1 | 30 | 11 | | 8 |
| 61 | thara | 25 | Primi | 38 | Elective lscs | SA | 12 | 72 | 84 | 96 | 86.3 | 99 | 98 | | 30 | 10 | | 8 |
| 62 | kala | 28 | Primi | 37 | Emergency lscs | SA | 11 | 70 | 86 | 94 | 84.6 | 100 | 99 | | 30 | 10.5 | | 8 |
| 63 | uma | 25 | Primi | 37+2 | Emergency lscs | SA | 11 | 74 | 80 | 92.8 | 84 | 100 | 100 | | 34 | 10 | | 8 |
| 64 | nirmala | 25 | G2A1 | 38+6 | Emergency lscs | SA | 11.2 | 68 | 76 | 94 | 80 | 100 | 98 | | 35 | 10 | | 8 |
| 65 | maria | 24 | G2A1 | 38 | Emergency lscs | SA | 11.4 | 64 | 78 | 86 | 80 | 100 | 100 | 2 | 35 | 10.6 | | 8 |
| 66 | eswari | 27 | G4A3 | 37+5 | Elective lscs | SA | 12.5 | 72 | 86 | 85.3 | 74.3 | 100 | 100 | | 35 | 11 | + | 10 |
| 67 | kavitha | 20 | G2P1L1 | 38 | Emergency lscs | SA | 12 | 80 | 92 | 82.5 | 76.3 | 100 | 98 | | 32 | 11 | | 8 |
| 68 | bhavani | 22 | G2P1L1 | 38 | Emergency lscs | SA | 11.2 | 76 | 88 | 86.4 | 72.4 | 100 | 100 | | 32 | 10 | | 8 |
| 69 | venda | 24 | Primi | 39+4 | Emergency lscs | SA | 12 | 72 | 86 | 80.4 | 74.3 | 100 | 100 | 1 | 32 | 11 | | 8 |
| 70 | adhilakshmi | 29 | Primi | 38 | Emergency lscs | SA | 11 | 70 | 82 | 84.6 | 76 | 100 | 98 | | 34 | 10.2 | | 8 |
| 71 | roseline | 24 | Primi | 38 | Elective lscs | SA | 11 | 72 | 96 | 86.8 | 74.4 | 100 | 100 | | 30 | 10 | | 8 |
| 72 | subhashini | 23 | Primi | 37+6 | Elective lscs | SA | 11.5 | 74 | 88 | 93.5 | 84.6 | 100 | 100 | | 30 | 10.2 | | 8 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73 | shakila | 24 | G2P1L1 | 38 | Emergency lscs | SA | 11.2 | 68 | 78 | 83.5 | 78.2 | 100 | 98 | 1 | 32 | 10 | | 8 |
| 74 | shakina | 22 | G3P1L1A1 | 38 | Emergency lscs | SA | 11.4 | 82 | 96 | 86 | 80 | 100 | 100 | | 35 | 10 | | 8 |
| 75 | nithya | 20 | Primi | 39 | Emergency lscs | SA | 11.4 | 80 | 92 | 84 | 75.4 | 100 | 98 | | 35 | 10 | | 8 |
| 76 | banu | 24 | G2A1 | 39 | Emergency lscs | SA | 11.2 | 78 | 90 | 82.6 | 74.6 | 100 | 99 | | 32 | 10 | | 8 |
| 77 | daftary | 24 | G2A1 | 38+3 | Elective lscs | SA | 12 | 76 | 84 | 86.2 | 73 | 100 | 98 | | 34 | 11.2 | | 8 |
| 78 | henakowsar | 24 | G3A2 | 38+3 | Emergency lscs | SA | 11 | 74 | 96 | 93 | 83.5 | 100 | 98 | 1 | 32 | 10 | | 8 |
| 79 | sunitha | 26 | Primi | 39 | Elective lscs | SA | 12 | 80 | 76 | 92 | 76 | 100 | 99 | | 34 | 11 | | 8 |
| 80 | rama | 35 | Primi | 39 | Emergency lscs | SA | 11 | 80 | 74 | 95.2 | 82 | 99 | 99 | | 34 | 10 | | 8 |
| 81 | bhavani | 24 | Primi | 39+3 | Emergency lscs | SA | 11 | 72 | 96 | 84.5 | 74 | 99 | 100 | | 32 | 7.8 | + | 13 |
| 82 | latha | 22 | Primi | 40 | Emergency lscs | SA | 11 | 74 | 86 | 85.6 | 80 | 100 | 100 | | 32 | 10.5 | | 8 |
| 83 | subha | 23 | Primi | 40+4 | Emergency lscs | SA | 11.5 | 70 | 84 | 84.3 | 72 | 100 | 98 | | 34 | 10.8 | | 8 |
| 84 | ranjana | 22 | G2A1 | 38 | Emergency lscs | SA | 11 | 68 | 76 | 82 | 70 | 99 | 99 | | 34 | 10 | | 8 |
| 85 | revathy | 23 | G2A1 | 38 | Emergency lscs | SA | 11 | 74 | 88 | 86.4 | 76 | 100 | 100 | 2 | 30 | 10 | | 8 |
| 86 | arifa | 24 | Primi | 37+6 | Emergency lscs | SA | 11.5 | 72 | 86 | 82.6 | 78 | 100 | 100 | | 30 | 10.2 | | 8 |
| 87 | sarala | 25 | Primi | 38 | Elective lscs | SA | 12 | 70 | 84 | 84.8 | 80 | 100 | 100 | | 33 | 11.2 | + | 10 |
| 88 | ambika | 25 | G3A2 | 38 | Elective lscs | SA | 12 | 72 | 86 | 94.3 | 84 | 100 | 100 | | 32 | 11 | | 8 |
| 89 | sathya | 24 | Primi | 39 | Emergency lscs | SA | 12 | 74 | 84 | 92.5 | 80 | 100 | 99 | | 33 | 11.2 | | 8 |
| 90 | amala | 22 | Primi | 37 | Emergency lscs | SA | 11.6 | 70 | 86 | 90.4 | 84.3 | 100 | 100 | | 32 | 10.5 | | 8 |
| 91 | shankari | 24 | G2P1L1 | 38 | Emergency lscs | SA | 11.2 | 72 | 86 | 92.7 | 84 | 100 | 99 | 1 | 35 | 10.2 | | 8 |
| 92 | nagarani | 23 | G3P2L2 | 39 | Elective lscs | SA | 11 | 74 | 86 | 94 | 78 | 100 | 98 | | 35 | 10 | | 8 |
| 93 | meenalochani | 22 | Primi | 39 | Elective lscs | SA | 11.4 | 70 | 84 | 92.6 | 76 | 100 | 100 | | 35 | 11 | | 8 |
| 94 | agnes | 23 | Primi | 40 | Emergency lscs | SA | 12.5 | 72 | 86 | 87.3 | 84 | 100 | 98 | | 32 | 11 | | 8 |
| 95 | ammu | 22 | G2P1L1 | 40 | Emergency lscs | SA | 12.5 | 74 | 82 | 85 | 80 | 100 | 99 | 1 | 33 | 10.2 | | 8 |
| 96 | deivanai | 24 | G3P1L1A1 | 37+6 | Elective lscs | SA | 11.2 | 80 | 90 | 84.3 | 86 | 100 | 98 | | 33 | 10.6 | | 8 |
| 97 | baby | 22 | Primi | 38 | Elective lscs | SA | 11.4 | 80 | 88 | 93 | 84 | 100 | 100 | | 31 | 11 | | 8 |
| 98 | hajira | 23 | Primi | 39 | Emergency lscs | SA | 13 | 82 | 90 | 92.2 | 80 | 100 | 100 | | 32 | 10.5 | | 8 |
| 99 | aruna | 22 | G3P1L1A1 | 38+5 | Emergency lscs | SA | 12 | 84 | 92 | 94.4 | 82 | 100 | 100 | 2 | 32 | 10.2 | | 8 |
| 100 | kala | 23 | Primi | 39 | Emergency lscs | SA | 11.2 | 86 | 98 | 90 | 86 | 100 | 100 | 1 | 33 | 10 | | 8 |

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