A STUDY ON EFFECT OF PARENTERAL TRANEXAMICACID IN REDUCING BLOOD LOSS DURING INTRAOPERATIVE AND POSTOPERATIVE PERIOD IN CAESAREAN SECTION

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CHENNAI, TAMILNAD

BONAFIDE CERTIFICATE

This is to certify that the dissertation entitled "**A STUDY ON EFFECT OF PARENTERAL TRANEXAMICACID IN REDUCING BLOOD LOSS DURING INTRAOPERATIVE AND POSTOPERATIVE PERIOD IN CAESAREAN SECTION"** is a bonafide record work done by **Dr. NANCY F** under my direct supervision and guidance, submitted to the Tamil Nadu Dr. M.G.R. Medical University in partial fulfillment of University regulation for M.S Branch II – Obstetrics & Gynaecology.

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DECLARATION

I **Dr. NANCY F** solemnly declare that the dissertation titled "**A STUDY ON EFFECT OF PARENTERAL TRANEXAMICACID IN REDUCING BLOOD LOSS DURING INTRAOPERATIVE AND POSTOPERATIVE PERIOD IN CAESAREAN SECTION"** has been prepared by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree, diploma to any other University board either in India or abroad.

This is submitted to The Tamilnadu Dr. M. G. R. Medical University, Chennai in partial fulfillment of the rules and regulation for the award of M.S degree Branch – II (Obstetrics & Gynecology) to be held in May 2022.

Place : Madurai **Dr. NANCY F**

Date :

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CONTENTS

INTRODUCTION

Caesarean section is the commonest operative procedure done in the world.

Incidence of caesarean section is increasing throughout the world because of social factors like advanced maternal age, improved surgical techniques and increasing litigation problems.

Although caesarean section delivery is much safer today due to improved techniques but still it is a major cause of intraoperative and post operative complications with higher morbidity and mortality than with vaginal delivery.

Although caesarean delivery is more traumatic than an easy vaginal delivery but an elective caesarean section is preferred over a difficult vaginal delivery to reduce maternal and neonatal morbidity and mortality.

Obstetric blood loss is one of the feared complications of child birth. Blood loss during caesarean section is twice than that of vaginal delivery. During placental delivery the fibrinolytic system gets activated which can last for upto 6-10 hours causing post partum bleeding. Fibrinolytic activity in the endometrium of patients with dysfunctional uterine bleeding will also be high. So, antifibrinolytics will be effective is reducing blood loss during caesarean section and in DUB related menorrhagia.

As postpartum menorrhage contributes to 25% of global maternal death it has to be prevented and treated.

Cesarean section (CS) rates have increased to as high as 25 to 30 % in many areas of the world. Delivery by CS can cause more complications than normal vaginal delivery and one of the most common complications is primary or secondary postpartum hemorrhage (20%). It leads to increased maternal mortality and morbidity. In order to reduce maternal mortality and morbidity caused by bleeding, it is important to reduce the amount of bleeding during and after lower segment cesarean section (LSCS).

Blood loss frequently leads to transfusion of allogeneic blood products, which expose patients to the risk of transfusion-related adverse effects such as febrile non-hemolytic transfusion reactions, transfusion errors and blood-borne infections . Concerns about blood safety, continual blood shortages and rising costs of blood bank operations have generated interest in the reduction of transfusion requirements during and after surgery. A popular approach is to minimize peri-operative bleeding through the prophylactic use of the antifibrinolytic agents aprotinin, tranexamic acid (TXA), and epsilon aminocaproic acid (EACA).

Tranexamic acid is a synthetic derivative of the amino acid lysine that exerts its antifibrinolytic effect through the reversible blockade of the lysine

binding sites on plasminogen molecules.[3,4] Intravenous administration of tranexamic acid has been routinely used for many years to reduce haemorrhage during and after surgical procedures like coronary artery bypass, scoliosis surgery, oral surgery, orthotopic liver transplantation, total hip or knee arthroplasty, and urinary tract surgery. Tranexamic acid has been shown to be very useful in reducing blood loss and incidence of blood transfusion in these surgeries.

Tranexamic acid potentates the blood clotting system and is used to treat and prevent bleeding. The mechanism of action of tranexamic acid is related to its antifibrinolytic effect, which makes this drug potentially very effective in the third stage of labour. During placental delivery, rapid degradation of fibrinogen and fibrin occurs, as well as an increase in the activation of plasminogen activators and fibrin degradation products due to activation of the fibrinolytic system. This activation can last up to six to 10 hours postpartum, which may cause more haemorrhage. The antifibrinolytic effect of tranexamic acid in the third stage of labour could make it a safe and effective alternative or adjunct to other regimens currently used in the third stage of labour for prevention of PPH. Tranexamic acid could reduce blood loss associated with complications such as placenta praevia and lower genital tract trauma, as well as bleeding from the upper segment placental site. Use of tranexamic acid could potentially have prevented some PPH cases

if it was given to women with the risk factors for PPH, as reported in the Cochrane review on treatment of PPH. Therefore, it may be particularly useful in preventing cases of PPH due to factors other than uterine atony, where uterotonics will not be effective.

Tranexamic acid is an effective agent for the reduction of blood loss, which has been widely used in various areas of medicine. It is an inhibitor of fibrinolysis that blocks the lysme-hinding site of plasminogen to fibrin. It has been used to decrease blood loss for many years in cases of haemorrhage, and is reported to reduce intraoperative and postoperative blood loss.

The present study observes the blood loss reduced by Tranexamic acid an antifibrinolytic agent during and after caesarean section.

AIM & OBJECTIVE OF THE STUDY

- To evaluate the effect of injection tranexamic acid in reducing blood loss during and after cesarean section .

- Our objective is to determine the reduction in amount of blood loss after administration of tranexamic acid during and after cesarean section.

REVIEW OF LITERATURE

Definition of Caesarean Section :

Caesarean section is defined as the surgical procedure by which baby is delivered after 28 completed weeks of gestation from an intact uterus through abdominal and uterine incision.

Incidence :

Caesarean section is the commonest operative procedure done in the world. Its incidence has been quadrupled between 1965-1988 because of various factors. Current rate of caesarean section in most of the countries is between 25-40%. But WHO says that there may be no health benefits from caesarean section rates exceeding 15%.

A mandatory second opinion was associated with a small but significant reduction in caesarean rate without an adverse effect on maternal or perinatal morbidity. (Althabe et al 2004).

Maternal morbidity dramatically increases with caesarean section when compared with vaginal delivery. (Burrows et al 2004) and the cost of caesarean section two fold increases than that of vaginal delivery. (Henderson et al 2001). So risks and benefits need to be weighed.

Blood loss during Caesarean Section :

Normal blood loss during vaginal delivery may be up to 500 ml. But a lower value of 300ml should be considered for Asian countries as they may be unable to cope up with a large amount of blood loss due to their small build and lower antenatal Hb. (Ratnam and Rauf et al 1989)

Blood loss during caesarean section is twice than that of vaginal delivery, that is up to 1000 ml (Driffe 1997).

Post partum haemorrhage is defined as,

1. Blood loss of morethan 500 ml following vaginal delivery, more than 1000 ml following caesarean delivery and more than 1500 ml after caesarean hysterectomy.
2. Any post partum bloodloss which needs blood transfusion or causes fall in haematocrit by 10% (ACOG-definition).
3. Any postpartum bloodloss causing haemodynamic instability or if untreated leads to haemodynamic instability.

Incidence of PPH :

2 to 11% when bloodloss is estimated visually (Brant et al 1967) 20% when blood loss is estimated by quantitative methods (Newton et al 1961)

Blood loss estimated by visual observation method will always be less than that of actual blood loss (Pritchard 1962).

Types of PPH :

- Primary PPH → PPH occurring within 24 hours after the delivery of the baby
- Secondary PPH → PPH occurring 24 hours after the delivery of the baby to 6 weeks postpartum.

Factors causing increased blood loss during Caesarean Section :

Four basic causes are 4TS.

1. Tone loss,
2. Trauma
3. Tissue retention,
4. Thrombotic defect.

Of these thrombotic defect is the dangerous and tone loss is the commonest one.

1. Atonicity / Hypotonicity - 80%

Predisposing factors are

1. Multiparity
2. Anaemia / malnutrition
3. Overdistended uterus – twins, big baby, polyhydramnios

4. Halogenated anaesthetic agents

5. Prolonged labour followed by caesarean section

6. Induced labour

7. Fibroids complicating pregnancy

8. Inadverent use of oxytocics in labour

9. Chorioamnionitis

10. Previous H/o PPH

11. Prolonged surgery

12. MgSO4 usage in labour

13. Nifedipine usuage

14. Placenta praevia

15. Abruptio placenta – couvelaire uterus

16. Exteriorished uterine closure

17. Uterine anomalies

2. Trauma – 20 %

Trauma often involves uterine vessels when the incision extends laterally. Traumatic factors causing increased blood loss are

1. Pfannensteil incision
2. Classical caesarean section
3. Blunt uterine incision
4. Obstructed labour with deeply engaged head
5. Big baby
6. Transverse lie
7. Emergency caesarean section
8. Poor obstetrician's experience

3. Tissue retention – 10%

Placenta accreta, increta and percreta, missed colyledons and succenturiate placental lobe.

4. Thrombotic defect - 5%

- Inherent bleeding tendencies like VWD, ITP
- Acquired coagulation disturbances like HELLP, abruptio placenta, IUD retained for long time, septicemia–causing DIC.

Blood Loss Assessment :

In order to reduce the morbidity and mortality of caesarean section bloodloss it has to be measured accurately. It can be measured by the following methods.

Clinical Methods	Quantitative methods
1. By subjective characters	1. Gravimetric method
2. Visual estimation	2. Colorimetric method
	3. Electrolyte conductivity method
	4. Blood loss by suction
	5. Blood volume measurements
	6. Radioactivity method

I - Estimation by Subjective characters :

1. Shock Index : (SI)

SI = Heart rate / systolic BP.

Normal value is 0.5 – 0.7. With significant haemorrhage it increases to 0.9 to 1.1.

2. Rule of 30 has been proposed for the general acute management of PPH. In the patient's

Systolic BP falls by 30 mmHg

Heart rate raises by 30 bpm

Respiratory rate rises to > 30 / min

Hb or HCt drops by 30%

Urine output is < 30 ml / hr

then the patient is most likely to have lost atleast 30% of blood volume and is in moderate shock.

3. Benedetti's Clinical Blood loss Assessments :

Class I (mild shock) - 15% blood loss

- Mild tachycardia
- Normal BP
- Postural hypotension and weakness
- Looking pale

Class II (Moderate shock) - 15 to 25% blood loss

- Tachycardia
- Fall in BP
- Thirst sensation
- Oliguria

Class II - 30 – 35% blood loss

- Poor renal and cerebral perfusion resulting in oliguria, confusion and restlessness.

Class IV (severe shock) > 40% blood loss

- Air hunger (Increased RR)
- Anaemia
- ECG abnormalities
- Needs immediate resuscitation

II – Visual Estimation :

Advantages :

- Inexpensive
- Rapid
- Continuous method

Disadvantages :

- Inaccuracy, blood loss assessment by visual estimation is always less than the actual blood loss (Pritchard et al 1962).
- Intraobserver variation is high.

III – Gravimetric Method :

- Patient weighing method
- Swab weighing method

By measuring the weight of the patient or swabs prior to and after surgery.

1. Patient weighing method → allowance must be made for drain, dressings, infusion and tissue removal and insensible water loss.

2. Swab weighing method

- 1 gm weight gain = 1ml blood loss (Bonica and Lyter et al 1951, Harding 1984)
- Swabs must be weighed as soon as possible so that loss by evaporation can be minimized.
- This is the only practically possible and feasible method used in our study.

IV – Colorimetric Method (Roe et al 1962, Thornton et al 1963), Rustad et al 1963)

The washing of the blood contaminated swabs is carried out in a known volume of tap water to which has been added sufficient amount of ammonium hydroxide to give a one in 1000 dilution as a defoaming agent. Blood collected in the suction container has to be added to the water and the concentration of the resultant solution has to be determined.

$$\text{Blood loss in ml} = \frac{\text{Hb\%of the washing fluid x volume of the washing fluid}}{\text{Hb\%of the patient's blood x dilution factor patient's Hb}}$$

V – Blood loss by Suction :

Blood in the suction container can be measured. Inaccuracy in this method can be reduced by,

a) Having measuring cylinder in the suction line

b) Adding defoaming agent to the container.

VI - Electrocyte Conductivity Method :

(Leveen and Rubricius et al 1958)

Using automated bloodloss meter based on electrolyte conductivity.

VII – Radioactivity Method : (Murray and Dott's et al 1960)

Intravenous injection of small but known amount of radioisotope should be followed by measuring the radioactivity of blood on swabs collected during operation.

VIII – Blood volume measurements :

a) Dye method – using evans blue dye which must neither be catabolised not rapidly lost from the circulation.

b) Radioisotopes like I_{131} labelled albumin or Cr_{51} labelled RBCS can be used preoperatively and measuring the post operative radioactivity by Geiger – Muller count. (Mollison and Veall et al 1955).

Among the above mentioned methods swab weighing method and bloodloss from suction container are practically possible and feasible methods that were used in our study.

Reducing the Caesarean section Blood loss :

This can be done by the following measures

1. Preoperative measures
2. Intraoperative measures
3. Post operative measures

Preoperative measures :

1. Improving pre pregnant Hb% and correcting antenatal anaemia
2. Antenatal Hb% and blood grouping and typing.
3. 2 IV line / blood reservation for high risk cases.
4. Avoid excess and prolonged anaesthesia.
5. Correction of coagulation abnormality before surgery in cases of abruption placenta, and IUP retained for long time.
6. Using antifibrinolytics prophylactically before surgery.

Intra operative measures :

1. Joelcohen incision – straight transverse incision made 3 cm above the pubic symphysis in which rectus sheath is stretched with fingers without cutting with scissors.
2. Lower segment caesarean section (avoiding classical caesarean section)
3. Sharp method of expansion of uterine incision.
4. Following active management of third stage of labour in caesarean section (approved by FIGO in 2003 and recommended by WHO in 2006)

- Early administration of oxytocics immediately after the delivery of the baby (oxytocin 10 units is the drug of choice if available - added to the IV drip)
- Controlled cord traction after placental separation
- Uterine massage
- Interior uterine closure for high risk cases
- Avoiding undue prolongation of surgery
- Asking the assistant to push the deeply engaged head from below upwards.

- Making J shaped or inverted T shaped incision in obstructed labour
- Using Patwarthans or modified Patwarthans method in cases of obstructed labour to deliver the baby
- Placental bed drainage
- Eventhough AMTSL may decreases the incidence of PPH effectively it may be associated with increased nausea and vomiting. (Prendiville et al 2003).
- Drainage of blood from the placental site would reduce its bulkiness and allowing the uterus to contract and retract thereby aids its delivery. (Roger et al 1993)
- Timing of cord clamping is also an important factor which decides placental separation. (Mc Donald 2003).

MISGAV LADACH TECHNIQUE: (Hospital in Jerusalem)

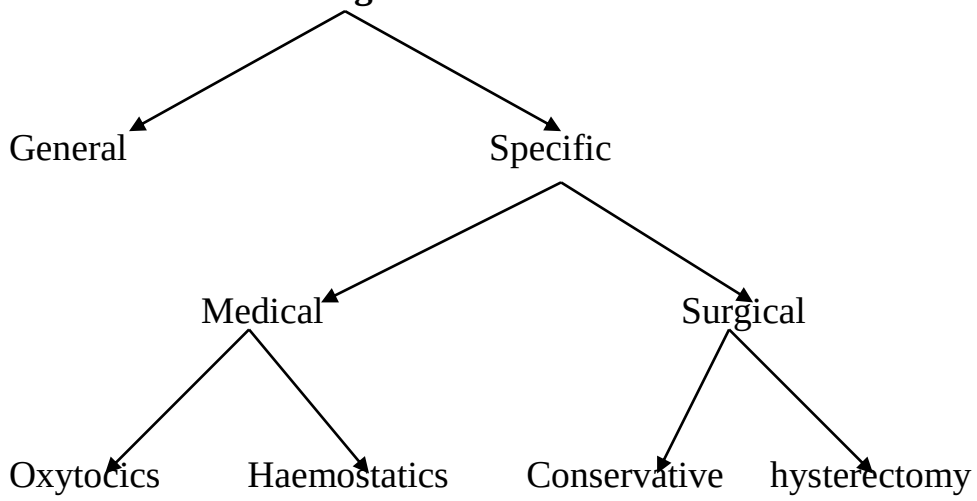
This technique is advised in modern obstetrics to reduce post operative morbidity and has the following components.

1. Joel cohen abdominal wall incision
2. Exteriorised uterine closure
3. Single layer uterine closure
4. No need for peritoneal closure
5. Rectus muscle should not be approximated.

Post operative measures:

1. Proper post operative monitoring of high risk cases
2. Continuing oxytocics in the immediate post-partum period for high risk cases.

Treatment of PPH during Caesarean Section



A systematic and stepwise management of PPH can be achieved with the use of the mnemonic “HAEMOSTASIS”

HAEMO - General Medical Management

H - Ask for help

A - Assess the vital parameters

E - Establish etiology – 4 TS

Ecbolics (oxytocics)

Ensure availability of blood

M - Massage the uterus

O - Oxytocin and prostaglandins

STASIS - Specific surgical Management

S - Shift to operation theatre, Bimanual compression and antistock garments if transfer is required

T - Rule out tissue and trauma and proceed with tamponade test (in vaginal delivery)

A - Apply compression sutures

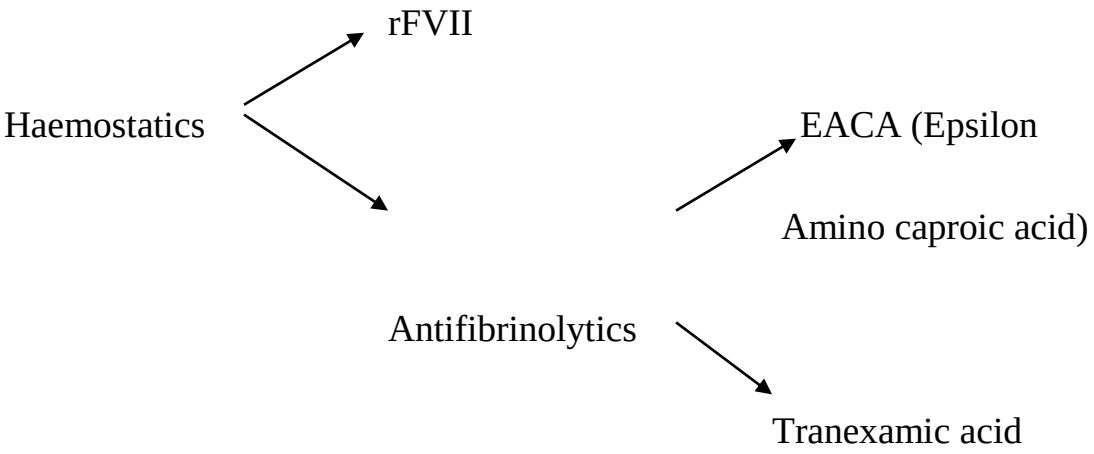
S - Stepwise devascularisation

I - Interventional radiology (uterine artery embolisation)

S - Subtotal (total abdominal hysterectomy)

Oxytocics :

1. Oxytocin – 10 units IM/IV infusion should be given immediately after baby delivery. Maximum dose is upto 100 units in 24 hours.
2. Methyl ergometrine : 0.2 mg IV /IM can be repeated every 15 minutes to a maximum of 5 doses. Contraindicated in heart disease and hypertensives.
3. 15 methyl PGF2 alpha - 250 ug IM / intramyometrial can be repeated every 15 minutes to a maximum of 8 doses. Contraindicated in bronchial asthma patients.
4. Misoprostol (PGE1) – 600 – 1000ug intrarectal, vaginal, intracervical. Main side effect is shivering and hyperpyrexia.
5. Syntometrine - 5 units oxytocin with 0.5 mg ergometrine maleate – given IM.



rFVII (Recombinant Factor VII)

- Produced by recombinant technology by transfecting the liver gene into baby hamster kidney cell line.
- Useful in coagulopathic bleeding
- Advantage - No viral contamination
- Disadvantage – cost

Anti Fibrinocytics : As the fibrinolytics system gets activated after placental delivery and also in menorrhagia antifibrinolytics are useful in treating PPH and DUB.

Delayed severe and prolonged haemorrhage from the placental site several hours post delivery may respond to antifibrinolytic therapy if all other measures fail. (Bonnar et al 1981)

Tranexamic acid can be successfully used to treat women with history of recurrent abruption to get successful neonatal outcome. (Astedt – Nilsson et al 1978).

Tranexamic acid can be used safely and effectively to reduce bleeding resulting from caesarean section. (Tatsumoto K et al 2004).

Tranexamic acid significantly reduces the amount of blood loss during and after caesarean section without any side effects or complications like thrombosis (Gobel Mayer et al 2007).

Prophylactic use of tranexamic acid antenatally in women with bleeding disorders was not associated with any thrombogenic sideeffects. (Lindoff C et al 1993)

Antifibrinolytic tranexamic acid when used preoperatively reduces perioperative allogenic blood transfusion (Cochirane data base 2001).

Antifibrinolytic tranexemic acid when used preoperatively reduces perioperative blood loss in spine surgery. (Laporte S et al 2006.)

Antifibrinolytic tranexemic acid reduces fibrinolytic bleeding in DUB –(Duckitt et al 2005.)

Tranexemic acid decreases the heavy bleeding in DUB patients. (Mc culy et al 2007.)

Tranexemic acid reduces heavy bleeding in DUB patients with menorrhagia. (Cochrane data base 2003.)

Tranexemic acid effectively reduces the blood loss after caesarean section. (Sekhabat et al).

Tranexamic acid effectively reduces the blood loss and blood replacement in total knee replacement surgery. (Department of orthopaedic surgery, Sriraj Hospital, Mahidol University, Bangkoh 10700.)

Tranexamic acid and aprotinin reduce post operative bleeding and transfusions during primary coronary revascularization. (Robert S. Brown et al).

RW Reid, AA Zimmerman et.al (1997) conducted a prospective, randomized, double-blind study design, to study the efficacy of tranexamic acid versus placebo in decreasing blood loss in pediatric patients undergoing repeat cardiac surgery. They found that children who were treated with tranexamic acid had 24% less total blood loss (26 +/- 7 vs 34 +/- 17 ml/kg) compared with children who received placebo (univariate analysis $P = 0.03$ and multivariate analysis $P < 0.01$). Additionally, the total transfusion requirements, total donor unit exposure, and financial cost of blood components were less in the tranexamic acid group.

C J Dunn, K L Goa reviewed use of tranexamic acid & its indications. They concluded that Tranexamic acid is useful in a wide range of haemorrhagic conditions. The drug reduces postoperative blood losses and transfusion requirements in a number of types of surgery, with potential cost and tolerability advantages over aprotinin, and appears to reduce rates of mortality and urgent surgery in patients with upper gastrointestinal haemorrhage. Tranexamic acid reduces menstrual blood loss and is a possible alternative to surgery in menorrhagia, and has been used successfully to control bleeding in pregnancy.

Rajesparan K, Biant LC et.al (2009) studied the effect of an intravenous bolus of tranexamic acid on blood loss in total hip replacement. They concluded that tranexamic acid reduced the early post-operative blood loss and total blood loss ($p = 0.03$ and $p = 0.008$, respectively) but not the intraoperative blood loss. The tranexamic acid group required fewer transfusions ($p = 0.03$) and had no increased incidence of deep-vein thrombosis. The reduction in earlypost-operative blood loss was more marked in women ($p = 0.05$), in whom this effect was dose-related ($r = -0.793$).

Orpen NM, Little C et.al (2006) studied effect of tranexamic acid on total knee arthroplasty by conducting a prospective, randomised, double blind, controlled trial. They concluded that one injection of 15 mg/kg of tranexamic given at the time of cementing the prosthesis in total knee arthroplasty, before deflation of the tourniquet, significantly decreases the amount of blood loss in the early post-operative period. The treatment was not associated with an increase in thromboembolic complications.

PHARMACOLOGY OF TRANEXAMIC ACID

Tranexamic acid is a synthetic derivative of aminoacid lysine. It is an antifibrinolytic haemostatic agent which controls all types of bleeding mainly coagulopathic bleeding.

Chemical Structure:

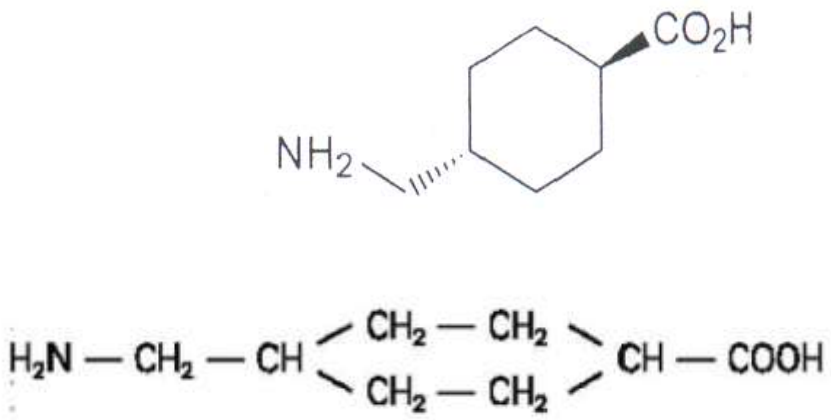
It is a Trans – 4 – amino methyl cyclohexane carboxylic acid (AMCA).

$C_8 H_{15} NO_2$

Molecular Weight – 157.2

It is a white crystalline powder. Aqueous solution for injection has a pH of 6.5 – 8.

Structural Formula:



Chemical structure of tranexamic a c i d

Tranexamic acid is a white crystalline powder. Inert ingredients in thetablets are microcrystalline cellulose, talc, magnesium stearate, silicone dioxide& povidone. The aqueous solution for injection has a pH of 6.5 to 8.0.

POSTPARTUM HEMORRHAGE

In spite of marked improvements in management, postpartum haemorrhage remains a significant contributor to maternal morbidity both in developing countries and in hospitals equipped with all modern medicine has to offer.

Prevention, early recognition and prompt appropriate intervention are keys to minimizing its impact.

Postpartum hemorrhage is the third major cause of maternal mortality next to pregnancy induced hypertension (preeclampsia) and infection.

Primary postpartum hemorrhage is the loss of blood in excess during the first 24 hours after birth of the infant. When it occurs between 24 hours after delivery and within puerperium it is designated as secondary postpartum haemorrhage.

Pritchard has shown that mean blood loss with vaginal and caesarean section is 500m1 and 1000 ml respectively. Any greater loss is

termed as postpartum hemorrhage. Another proposed definition for PPH is a 10% change in haematocrit. Coombs has suggested a clinical definition of "need for blood transfusion".

This definition is complicated by large variations in practice patterns and attitudes towards transfusion by both patients and physicians.

The diagnosis of PPH therefore remains a clinical assessment that includes any amount of blood loss that threatens the women's haemodynamic stability. Any amount of bleeding from or into the genital tract following birth of the baby up to the end of the puerperium which adversely affects the general condition of the patient as evidenced by rise in pulse rate and falling blood pressure is called postpartum hemorrhage.

However, the degree of haemodynamic compromise or shock parallels the amount of blood lost. Some women experience mild symptoms and maintain their blood pressure at a blood loss of 500 to 1000 ml (10 to 15 percent of circulating volume), losses of 2000 to 3000 ml (35 to 45 percent of circulating volume) will cause marked hypotension, with cardiovascular collapse, air hunger, anuria and severe shock.

Clinical findings in PPH

Findings	Degree of Shock			
	Compensati	**Mild**	**Moderate**	**Severe**
Blood loss	500 - l000ml 10 - 15%	1000 - l500 ml 15-25%	l500 – 2000ml 25-35%	2000- 3000 ml 35-45%
Blood Pressure Change	None	Slight fall (80 – 100 mmHg)	Marked fall (70 – 80 mm Hg)	Profound fall (50-70
Symptoms and signs	Palpitations Dizziness Tachycardia	Weakness Sweating Tachycardia	Restlessness Pallor Oliguria	Collapse Air hunger Anuria

Incidence:

The incidence of Postpartum haemorrhage varies from 2 - 11%**.** Postpartum hemorrhage complicates approximately 4% of deliveries in most large obstetric services. While haemorrhage was the cause of maternal death in 19.8% cases, postpartum haemorrhage and retained placenta were responsible in 13.7% and 3% cases respectively of all complications noticed during labour. The incidence is 0.5% amongst

hospital deliveries and Postpartum haemorrhage causes 10 - 16% maternal deaths in I n d i a .

Postpartum haemorrhage complicates approximately 3.9% of cesarean deliveries and is responsible for most of the use of blood and blood products in obstetric units. Postpartum bleeding has serious consequences and the proportions range from less than 10 percent to nearly 60 percent of maternal death in various countries.

Epidemiology

The etiologies of primary PPH are most easily understood as abnormalities of one or more of four basic processes.

↓ Tone

↓ Tissue

↓ Trauma

↓ Thrombin

Risk factors in PPH

	Etiology process	**Clinical risk factors**
Abnormalities of uterine contraction (tone)	- Over distended uterus	- Polyhydromnios - Multiple gestation - Macrosomia
	- Uterine muscle exhaustion	- Rapid Labour - Prolonged labour - High parity
	- Intra amniotic infection	- Fever - Prolonged ROM
	- Functional / anatomic distortion of the uterus	- Fibroid uterus - Placenta previa - Uterine abnormalities
Retained products of conception (tissue)	- Retained products - Abnormal placenta - Retained cotyledon or succinturiate lobe	- Incomplete placenta at delivery - Previous uterine surgery - High parity - Abnormal placenta on US
	- Retained blood clots	- Atonic uterus
Genital tract trauma (trauma)	- Lacerations of the cervix, vagina or perinium	- Precipitous delivery - Operative delivery
	- Extensions, lacerations at caesarean section	- Malposition - Deep engagement
	- Uterine rupture	- Previous uterine surgery
	- Uterine inversion	- High parity - Fundal Placenta
Abnormalities of coagulation (thrombin)	- Pre – existing states - Hemophilia A - Von willebrand's disease	- H/O hereditary coagulation - H/O of liver diasese
	- Acquired in pregnancy - ITP - Thrombocytopenia with pre – eclampsia - DIC - Pre – eclampsia - Dead fetus in utero - Severe infection - Abruption - Amniotic fluid embolus	- Bruising - Elevated BP - Fetal demise - Fever, WBC - Antepartum hemorrhage - Sudden collapse
	- Therapeutic anti - coagulation	- H/O blood clot

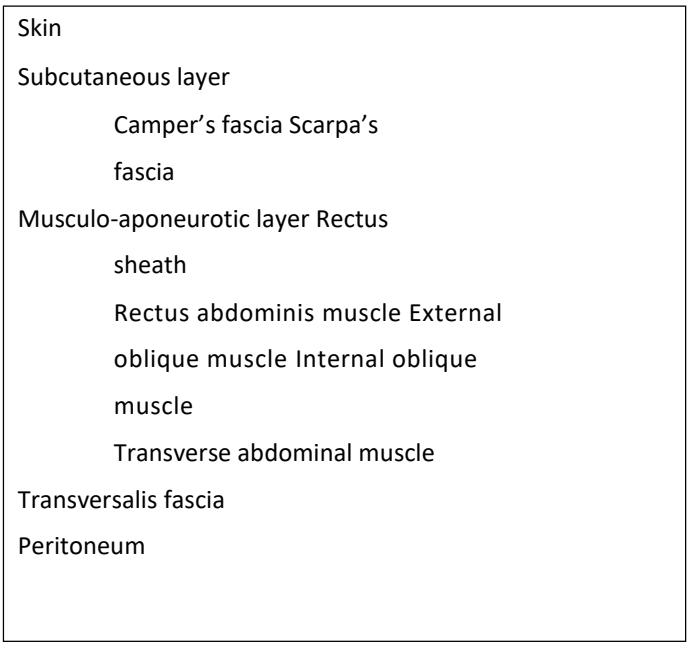
Bleeding will occur, if for some time the uterus is not able to contract well enough to arrest the bleeding at the placental site. Retained products of conception or blood clots, or genital tract trauma may cause large blood losses postpartum, especially if not promptly identified.

CESAREAN SECTION

Cesarean delivery is one of the most commonly performed operations today. As medical science and especially obstetrics has evolved over the recent years, there has been a parallel and steady increase in the rate of cesarean births. From times when childbirth was an event not necessitating medical attention to the present times when concerns are voiced about high cesarean delivery rates, obstetrics has for sure, traveled a long way.

SURGICAL ANATOMY FOR CESAREAN DELIVERY : THE ABDOMINAL WALL :

Cesarean delivery is defined as the birth of the fetus through an incision in the abdominal wall and uterine wall. Knowledge of the layered structure of the abdominal wall permits the surgeon to enter the abdominal cavity during cesarean delivery with maximum efficiency and safety. The summary of the abdominal wall layers is provided in following box.



As the incision for the caesarean section is made, the above layers are incised.

Skin :

Blood supply:

The skin near the midline is supplied by the branches of the superior epigastric artery (branch of the internal thoracic artery), the inferior epigastric artery (branch of the external iliac artery) and the superficial epigastric artery, which is a branch of the femoral artery. The superficial arteries accompany the cutaneous nerves. Those that accompany the lateral cutaneous nerves are branches of the posterior intercostal arteries, while those that travel with the anterior cutaneous nerves are derived from the superior and inferior epigastric vessels. The superficial inferior epigastric vessels run a diagonal course in the subcutaneous tissue from the femoral

vessels toward the umbilicus, beginning as a single artery which branches extensively as it nears the umbilicus. The skin of the flanks is supplied by branches from the intercostals, lumbar and deep circumflex iliac arteries.

The venous blood is collected by a network of veins that radiate from the umbilicus The network above the umbilicus drains via the lateral

thoracic vein & the axillary vein into the superior vena cava and below the umbilicus via the superficial epigastric & great saphenous veins into the femoral vein, and finally into the inferior vena cava. A few small veins, the paraumbilical veins, connect the network through the umbilicus and along the ligamentum teres to the portal vein.

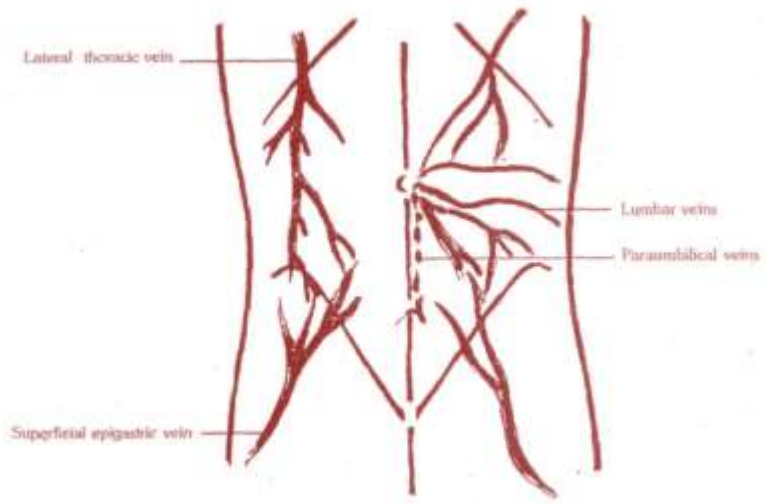


Fig. 2 : Innervation and blood supply of anterior abdominal wall

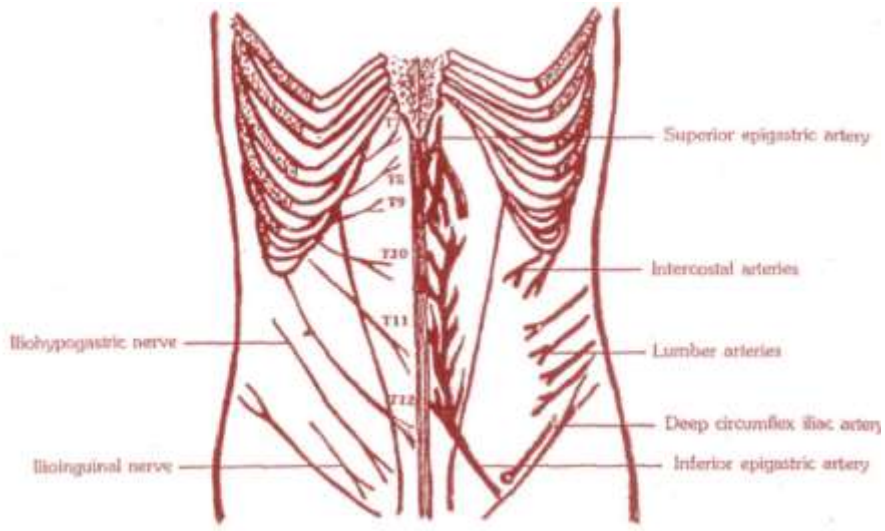


Fig. 3 : Venous drainage of anterior abdominal wall.

Blood supply of the abdominal wall :

The main arterial supply of the abdominal wall consists of the superior epigastric, musculophrenic, deep circumflex iliac and Inferior epigastric vessels.

The medial part of the abdominal wall receives blood from the epigastric arteries, while the musculophrenic and deep circumflex iliac arteries supply the lateral wall. The lateral wall is also supplied by the lower intercostal and lumbar arteries (T8 toT12 and LI). This freely anastomosing vascular system provides one continuous arterial and venous channel on both sides of the anterior abdominal wall, extending from the subclavian vessels cephalad to the external iliac vessels caudal. The linea alba is relatively bloodless. The limited vascular supply in this area of fascial

fusion can impair wound healing when lower midline incisions are used. Thus, a secure closure is mandatory in such incisions.

The Superior epigastric artery, one of the terminal branches of the internal thoracic artery, enters the upper part of the rectus sheath. The artery descends behind the rectus muscle, supplying the upper central part of the anterior abdominal wall and anastomoses with the inferior epigastric artery.

The inferior epigastric artery is a branch of the external iliac artery just above the inguinal ligament. It runs upward and medially along the medial side of the deep inguinal ring. It pierces the fascia transversalis to enter the rectus sheath anterior to the arcuate line. It ascends behind the rectus muscle, supplying the lower central part of the anterior abdominal wall and anastomoses with the superior epigastric artery.

The deep circumflex iliac artery is a branch of the external iliac artery just above the inguinal ligament. It runs upward and laterally towards the antero-superior iliac spine and then continues along the iliac crest. It supplies the lower lateral part of the abdominal wall. The lower two posterior intercostal arteries, branches of the descending thoracic aorta and 4 lumbar arteries, branches of the abdominal aorta, pass forward between the muscle layers and supply the lateral part of the abdominal wall.

The epigastric vessels are subject to injury, particularly when a muscle splitting incision is used. Also, the deep circumflex or musculophrenic vessels can be injured when an extraperitoneal approach is chosen:

The venous blood from the skin is connected in to a network of veins that radiate from the umbilicus. The network drains above into the axillary vein via the lateral thoracic vein and below into the femoral vein via the superficial epigastric & great saphenous veins. A few small veins, the paraumbilical veins, connect the network through the umbilicus and along the ligamentum teres to the portal vein. They form a clinically important porto-systemic venous anastomosis.

The superior epigastric, inferior epigastric, and deep circumflex iliac veins follow the arteries of the same name and drain into the internal thoracic and external iliac veins. The posterior intercostal veins drains into the azygous veins and the lumbar veins drain into the inferior vena cava.

Blood supply of the uterus:

The uterine artery is the predominant vessel supplying the uterus. There are two uterine arteries, one arising on either side as a branch of the anterior division of the internal iliac artery. It runs medially towards the

cervix, crosses the ureter above the lateral vaginal fornix and 2 cm lateral to cervix, ascends upwards along the lateral uterine wall between the two leaves of the broad ligament and then underneath the fallopian tube anastomoses with the ovarian artery. The uterine vessels anastomose with each other extensively. Each uterine artery gives rise to anterior and posterior arcuate branches along the length of the uterus. These pass transversely into the uterine myometrium giving off radial branches before anastomosing with their counterpart. The radial branches, before reaching the endometrium, supply a basal branch to the basal zone of decidua and enter into the decidua as the tortuous spiral arteries.

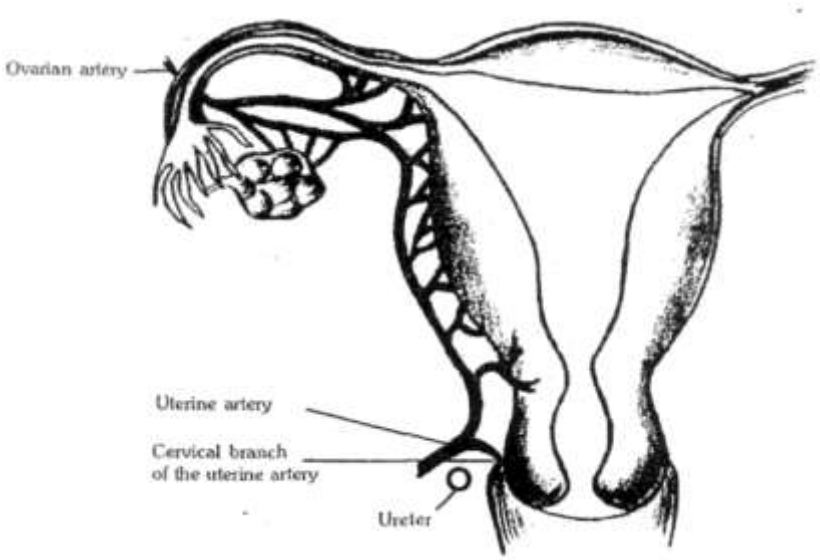
There is marked spiraling of the uterine arteries that reaches its maximum at 20 weeks. Later, they become straight and engorged, with the blood flow increasing from 50 ml / min to 450 - 650 ml / min.

The uterine veins, which too become engorge during pregnancy, run along with the arteries and drain in to the internal iliac veins.

The ovarian artery arises from the abdominal aorta just below the renal artery. It descends along the retroperitoneal space along the posterior abdominal wall, crossing the ureter near its origin from the renal pelvis, and enters the suspensory ligament of the ovary. It courses underneath the fallopian tube before anastomosing with the uterine artery.

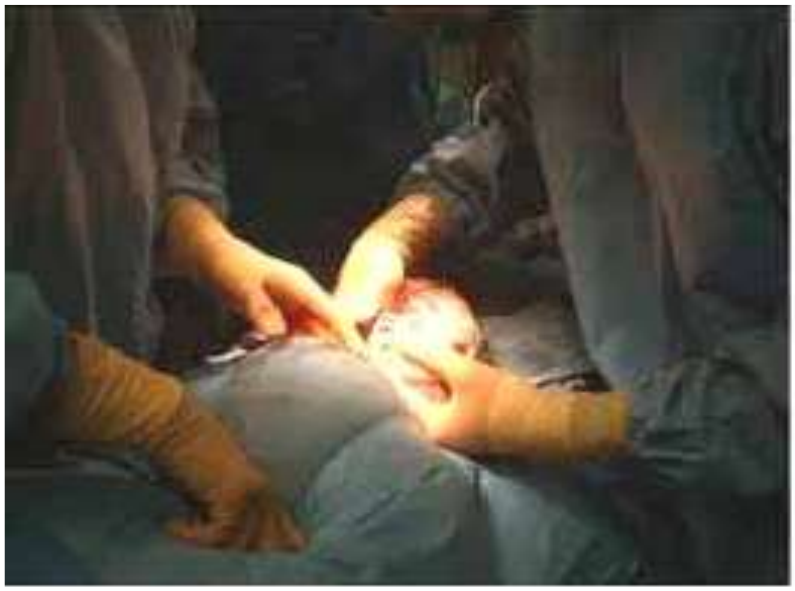
The ovarian vein, arising from the pampiniform plexus at the ovarian hilum courses along with the ovarian arteries and drains into the inferior vena cava on the right side and in to the left renal vein on the left side.

The blood supply of the uterus and its adnexa

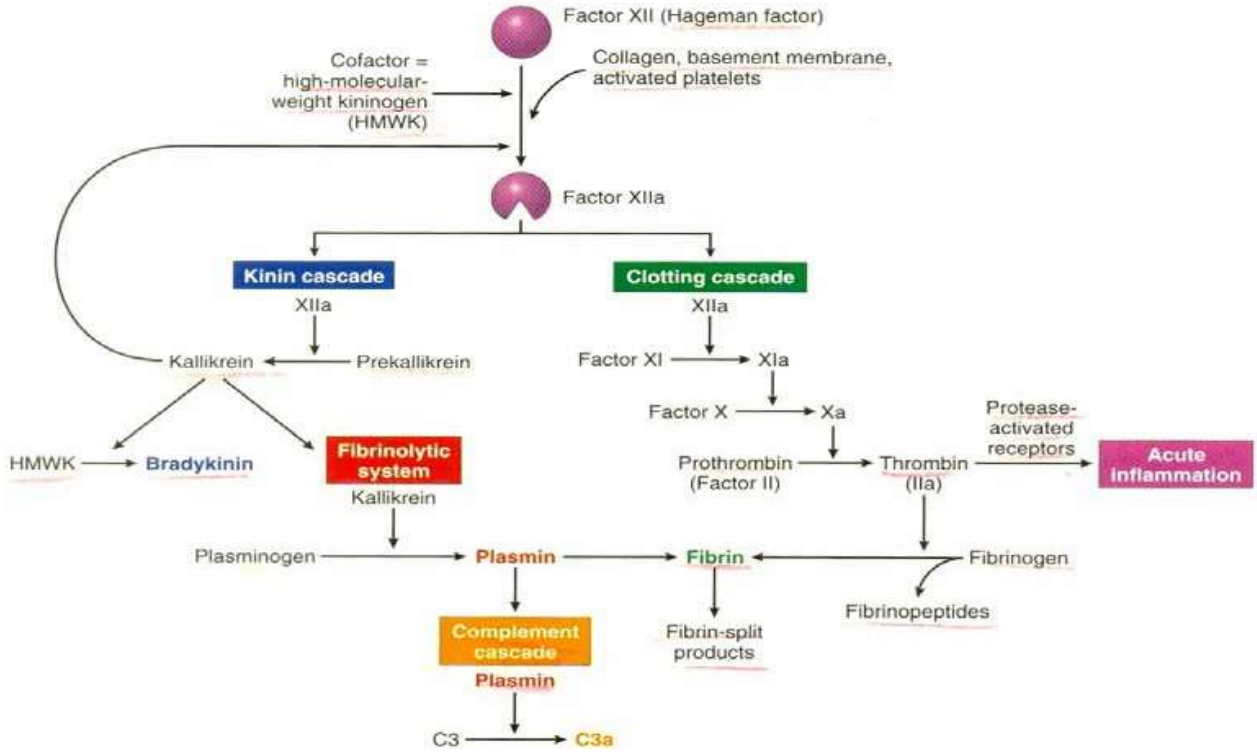


The blood loss during caesarean section could be because of inferior epigastric artery, injury or extension of the uterine artery. It could also be because of upper uterine segment incision or manual removal of placenta etc. The use of tranexemic acid decreases the blood loss by 30%. Tranexemic acid acts by inhibiting the plasminogen activator and there by the inhibiting the fibrin degradation.


Cesarean Section Delivery



Fibrinolytic system



INJ.TRANEXAMIC ACID

MATERIALS AND METHODS

The subjects of this prospective analytical study were 140 pregnant women who were admitted in the labour ward, Government Rajaji Hospital, Madurai in the time period 6 months.

In all patients detailed history – medical history, obstetric history were taken. Vital parameters checked and basic investigations done. Weight of the patient checked. Detailed general examination and obstetric examination done. Gestational age confirmed by USG.

70 patients were placed in group A ie. Study (Transxemic acid) and 70 patients were placed in group B ie, Controls, (Placebo)

All patients were counselled and informed consent obtained.

GROUP A RECEIVING :

1. Inj.Tranexamic acid 1g diluted with 100ml NS given over 15 minutes, given 15 minutes before making skin incision.
2. inj.Oxytocin 10 units IM and IV infusion immediately after the delivery of the baby.

GROUP B RECEIVING :

1. Placebo injection of normal saline 100ml over 15 minutes,15 minutes before skin incision

2. inj.Oxytocin 10 units IM and IV infusion immediately after the delivery of the baby.

Inclusion criteria:

- Full term antenatal mother posted for LSCS with risk for PPH
- Multiparity women
- Anaemia complicating pregnancy
- Multiple pregnancy
- Myoma complicating pregnancy
- Polyhydromnios
- Placenta previa
- GHTN, HELLP
- Macrosomia
- Previous H/O PPH

Exclusion criteria:

- Allergic to tranexamic acid
- Heart disease complicating pregnancy
- Any liver, Renal disease
- Anticoagulant therapy
- Known thromboembolic events
- Pt with defective colour vision

METHODS OF STUDY:

- A prospective study on effect of injection tranexamic acid in reducing blood loss during and after caesarean section was carried out in the department of obstetrics and gynaecology in Government Rajaji Hospital, Madurai.
- A total of 140 pregnant women who are planned for caesarean section have been studied prospectively. In all patients detailed history must be taken.Vital parameters to be checked and basic investigations done. Weight of the patient checked. Detailed general examination and obstetric examination done. Gestational age confirmed by USG. They were divided into 2 groups, 70 patients in group A and 70 patients in group B. All patients were counselled and informed consent obtained.

Statistical Analysis :

After collecting all the data, the data were tabulated in a master chart and analysed. Data analysis was done with the help of computer using Epidemiological information package (2008).

Using this software frequencies, percentage, mean, Standard Deviation, chi square and ‘p’ values were calculated. Kruskul Wallis chi square test was used to test the significance of difference between quantitive variables and ‘t’ test for qualitative variables. A ‘p’ value less than 0.05 is taken to denote significant relationship.

RESULTS

TABLE 1 – AGE DISTRIBUTION

	STUDY (TRANEXAMIC ACID)	CONTROL (PLACEBO)	
Age (Years)	**GROUP A**	**GROUP B**	**Total**
≤25	53	50	103
26-30	13	17	30
31-35	3	2	5
>35	1	1	2
Total	70	70	140
Mean	24.014	23.629	
SD	3.709	3.244	
p value	0.514 Not significant		

The Mean age of the cases in both the group doesn't differ significantly Mean age of the patients 24.01 in study group and mean age of the patients 23.63 in control group

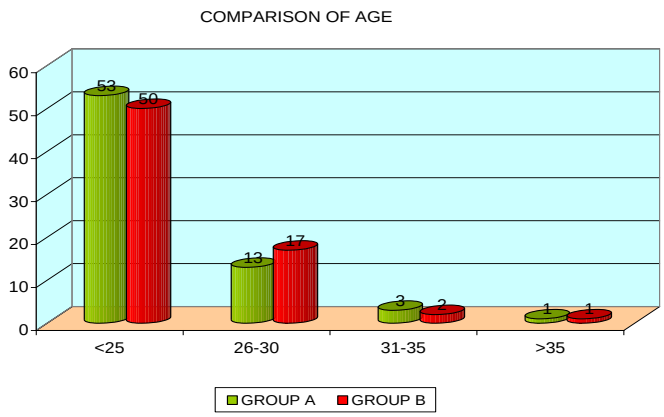


Table 2 COMPARISON OF PARITY

Parity	GROUP A	GROUP B
Primi	20	15
Multi	50	55
Total	70	70
p value	0.435 Not significant	

Parity does not differ in both groups significantly. 28.5% of the patients in study and 20% of the patients in cases were Primi gravida.

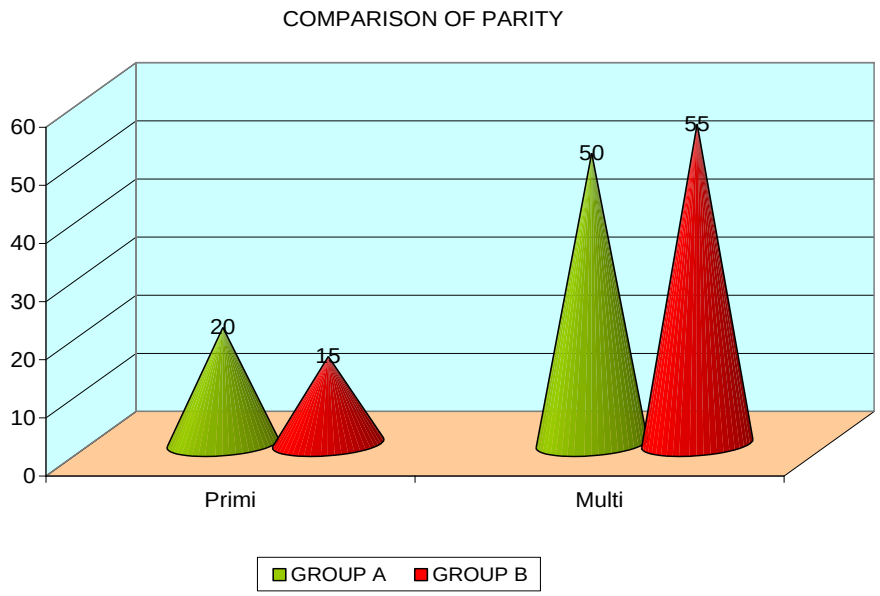


Table – 3

INDICATIONS FOR CAESAREAN

Indication of LSCS	**GROUP A**	**GROUP B**
Primi with breech	3	4
Previous LSCS	32	42
Oblique lie	1	2
Cephalo pelvic disproportion	9	5
Fetal distress	9	4
Previous LSCS/NSP	6	8
Prev LSCS/GDM/Polyhydromnios	6	2
Placenta previa	2	2
Failed induction	2	1
Total	70	70
p value	0.482 Not significant	

There was no statistical significance in indication of LSCS between the two groups. Indications of LSCS can have an amount of intraoperative blood loss. The fact that these were matched adequately in the study group removes the effect of these confounding variables.

INDICATION FOR LSCS

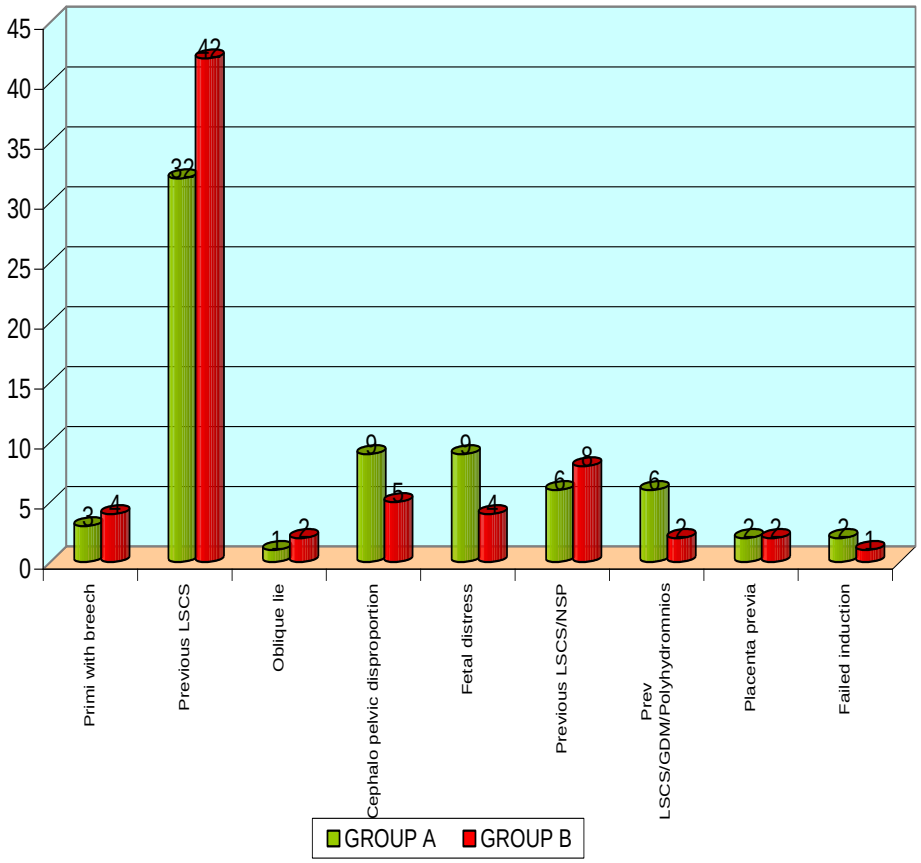


TABLE – 4

BLOOD LOSS - PLACENTAL DELIVERY TO END OF CS

	GROUP A		**GROUP B**			
Blood Loss (ml)	Mean	SD	Mean	SD	Difference	P* Value, sig
Placental delivery to end of CS	**311.571**	**64.508**	**396.857**	**95.562**	**85.286**	**<0.001**

There is highly significant reduction in Mean blood loss in group A when compared with group B from placental delivery to end of CS ie 311.57ml in group A and 396.86 ml in group B.(pvalue is <0.001)

TABLE – 5

BLOOD LOSS - END OF CS TO 2 HOURS POST PARTUM

	GROUP A		**GROUP B**			
Blood Loss (ml)	Mean	SD	Mean	SD	Difference	P* Value, sig
End of CS to 2 hrs post partum	**45.571**	**7.544**	**79.429**	**19.026**	**33.858**	**<0.001**

There is highly significant difference between Mean blood loss in group A and group B from end of CS to two hrs post partum ie 45.57ml in group A and 79.43 ml in group B.

Table - 6

COMPARISON OF TOTAL BLOOD LOSS

	GROUP A		GROUP B			
Blood Loss (ml)	Mean	SD	Mean	SD	Difference	P* Value, sig
Total	357.143	66.357	476.286	106.515	**119.143**	**<0.001**

There is highly significant reduction of Mean of Total blood loss in group A and group B, ie 357.14ml in group A and 476.28 ml in group B.

P value is < 0.001

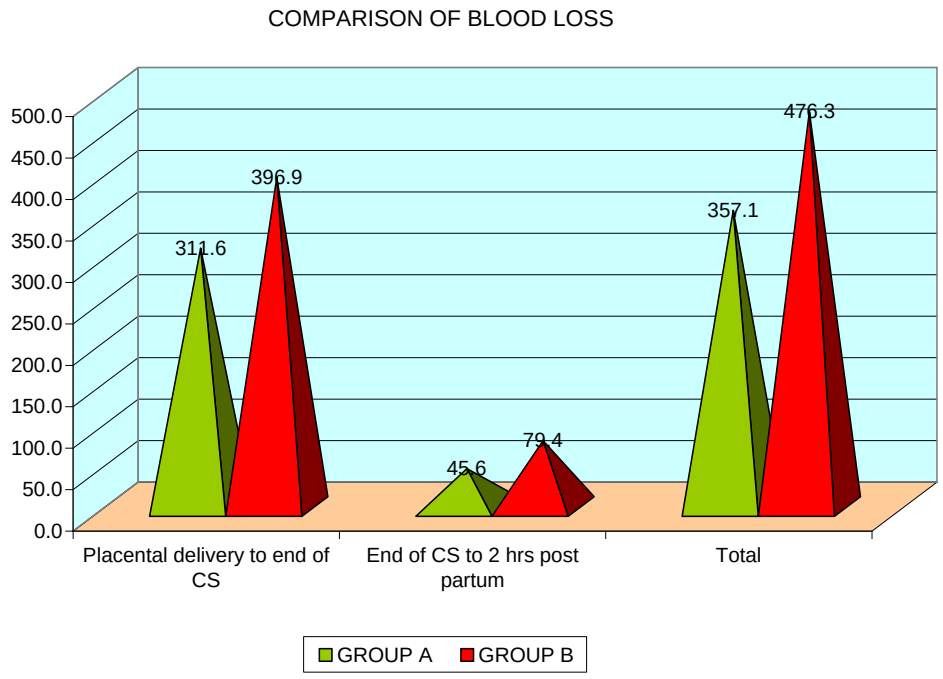


TABLE – 7

COMPARISON OF HB%

	GROUP A		GROUP B			
Hb%	**Mean**	**SD**	**Mean**	**SD**	**Mean Difference**	**p value**
Before Delivery	10.696	0.786	11.057	0.874	**0.361**	0.011 Sig
After Delivery	9.633	0.796	9.046	1.854	**-0.587**	0.016 Sig
Difference	1.063	0.339	2.011	1.586	**0.948**	<0.001 HS

There is significant fall in Hb% in group A and group B due to more blood loss after delivery.

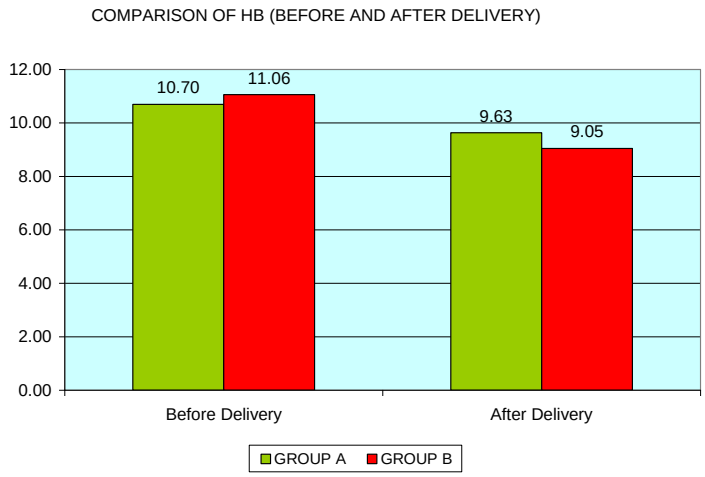


TABLE – 8

COMPARISON OF VITAL SIGNS

	GROUP A		GROUP B			
Vital signs	**Mean**	**SD**	**Mean**	**SD**	**Mean Diff**	**P value**
Heart rate (bpm)	82.114	3.454	82.286	4.047	**0.172**	0.788
Respiratory rate (breath/min)	17.186	1.054	17.2	1.111	**0.014**	0.938
Systolic BP (mmHg) Before	119.171	9.409	119.886	9.059	**0.715**	0.648
After	122.6	9.97	122.971	10.105	**0.371**	0.827
Diastolic BP (mmHg) Before	78.114	5.372	78.543	4.992	**0.429**	0.626
After	82.586	5.923	81.629	6.084	**-0.957**	0.347

No Significant difference between Group A and B by vitals such as Heart rate, RR, Systolic and diastolic BP.

COMPARISON OF VITALS

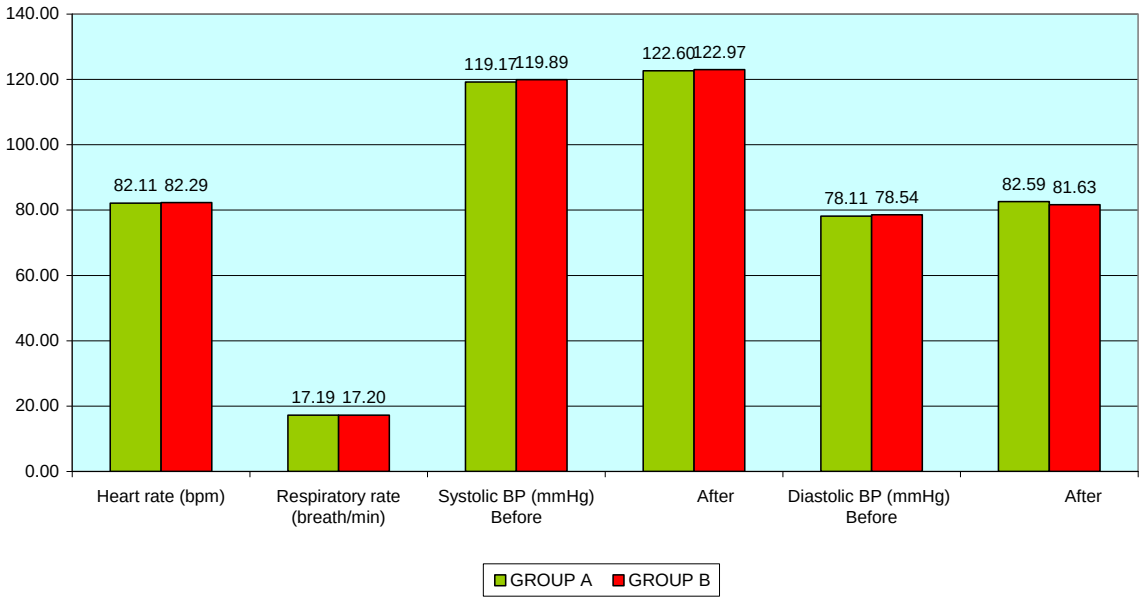


Table – 7

APGAR SCORE COMPARISON

Apgar score	GROUP A	GROUP B	Mean	P value
1 min	8.88 ± 1.19	8.64 ± 1.34	0.95	0.345 NS
5 min	9.4 ± 0.639	9.22 ± 0.79	1.25	0.213 NS

No significant difference between Apgar score in one minute and 5 minutes .

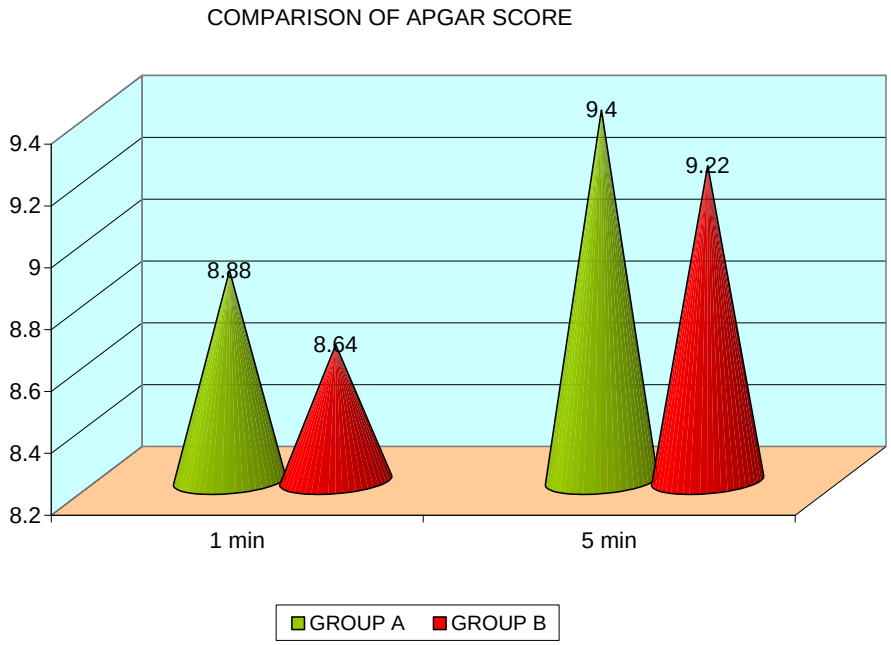


Table – 8

SIDE EFFECTS

Side effects	**GROUP A**	**GROUP B**
Nausea	10	8
Vomiting	7	6
Diarrhoea	0	0
Signs of thrombosis	**0**	**0**
Total	17	14
p value	0.826 Not sig	

No significant side effects between Group A and B p value is 0.826 Not significant.

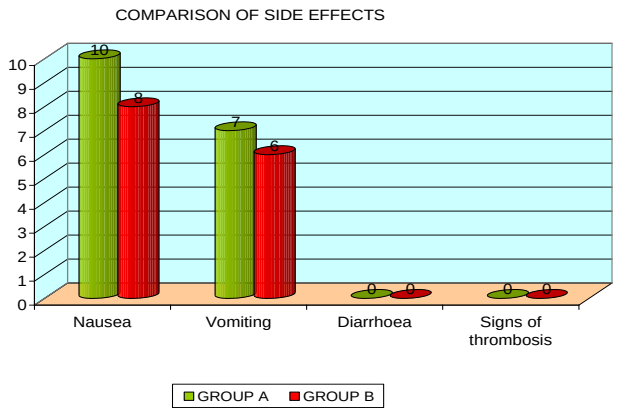


Table – 9

USE OF ADDITIONAL OXYTOCIN

Use of Additional oxytocin	**GROUP A**	**GROUP B**
Yes	1	5
No	69	65
Total	70	70
p value	0.211 Not sig	

Additional oxytocin needed for 5 cases in group B and only one case needed in group A, but no statistical difference between two groups.

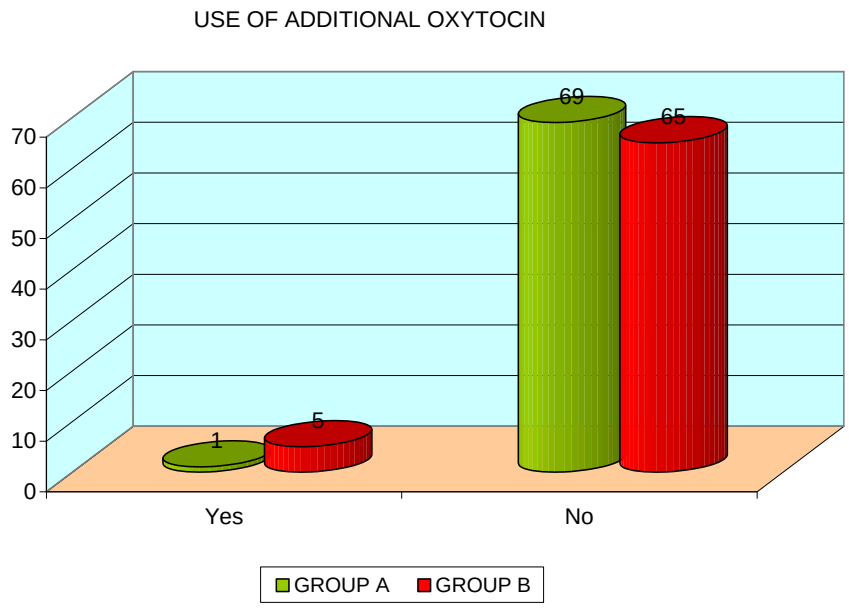
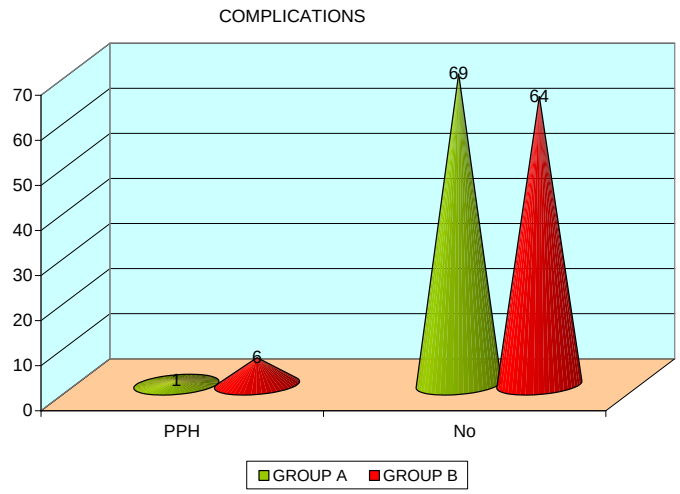


Table – 10

COMPARISON OF COMPLICATIONS

Complications	**GROUP A**	**GROUP B**
PPH	1	6
No	69	64
Total	70	70
p value	0.121 Not sig	

Comparatively patients goes for PPH is high, 6 cases in group B and only one case in Group A. But no statistical difference p value is not significant.(p=0.121)



DISCUSSION

As obstetric blood loss contributes to one fourth of global maternal death its incidence has to be reduced. As the fibrinolytic system gets activated after placental delivery antifibrinolytic agents can be used to reduce obstetric blood loss.

Tranexamic acid exerts its antifibrinolytic effect by blocking the lysine binding locus of the plasminogen & plasmin molecules, thereby preventing the binding of plasminogen & plasmin to the fibrin substrate. Tranexamic acid also inhibits conversion of plasminogen to plasmin by plasminogen activators. It has been used in the treatment of bleeding for many years.

During placental delivery, fibrinogen & fibrin are rapidly degraded, whereas plasminogen activators & fibrin degradation products (FDP) increase due to activation of fibrinolytic system. This activation can last up to 6-10 hrs postpartum, causing more bleeding. It was because of this activation of fibrinolytic system that we decided to use tranexamic acid in this trial. As prevention is always better than cure regarding PPH- an antifibrinolytic agent tranexamic acid was used prophylactically in our study to observe its efficacy in reducing blood loss during and after caesarean section.

1. Maternal age : In our study, the age group of patients included varied from 18 to 35 years. Maximum percentage of patients belong to the age group of 20-24 years. No significant difference between the mean age of both groups.(p value 0.514)

2. Parity : In our study, 75% of group A and group B were Primi. 25% of group A and group B were Primi. In a similar study conducted by International Medical Communication Department, Daiichi Pharmaceutical Co. Ltd, Tokyo, Japan. 69% of study group and 31% of control group were Multi and primi.

3. Blood loss : In our study, there was a statistically significant reduction of blood loss in both periods, that is from placental delivery to end of surgery and also from the end of surgery to two hours post partum. Mean blood loss from PD to EOS in group A was 311.8 ml and in group B was 396.2 ml. Mean blood loss from the end of surgery to 2 hour post partum was 45.5 ml in group A and 79.8 ml in group B. Mean total blood loss was 476.3 ml in group A and 357.2 ml in group B. In contrast in a study conducted by Shanghai International Peace Maternity and Child health hospital, Shanghai, China also blood loss was reduced in both periods. But the blood loss reduction from PD-EOS was not statistically significant and from EOS to 2 hours post partum and the total blood loss reduction were with statistical significance.

Our study showed that tranexamic acid significantly reduces bleeding from time of placental delivery to 2 hrs postpartum in LSCS. Results show that study group patients had mean blood loss of 357.14ml ± 66.3 as standard deviation, while control group patients had mean blood loss of 476.70ml ± 106.5 as standard deviation. Thus, there is reduction in blood loss by about 30% & was found to be statistically highly significant (p value= 0.001).

There was reduction in blood loss in both the parameters, i.e. from time of placental delivery to completion of skin closure & from completion of skin closure to 2 hrs postpartum. Tranexamic acid also reduced the incidence of postpartum hemmorhage (patients with blood loss ≥ 500 ml) in the study group as compared to control group. In my study 1 cases seen in study group and 5 cases in control group which is P-0.085 which insignificant. But other studies have shown significant decrease in PPH in patients who received tranexamic acid.Similar study carried out by Ming-ying Gai, Lian-fang Wu & coworkers (28) in China showed that tranexamic acid significantly reduces bleeding from the time of placental delivery to 2 hrs postpartum. The study group showed total blood loss reduction by 30% as compared to control group. Tranexamic acid also reduced the incidence of postpartum hemmorhage by 6% in the study group (22

cases Vs 35 cases in the study & controlled group respectively) (P value was 0.029). These results correlated well with our study.

Zheng SR, Yang HX, et al[81] showed similar results. Tranexamic acid significantly reduced postpartum blood loss after vaginal delivery. The occurrence of postpartum hemmorhage was 6.4% in study group as compared to 25.3% in control group, which was statistically significant. There were no significant adverse effects. Therefore, tranexamic acid is efficient & safe in reducing postpartum hemmorhage.

Bresnoc K, et al[82] evaluated tranexamic acid in postpartum hemmorhage & showed that tranexamic acid significantly decreased the amount of blood loss & the incidence of postpartum hemmorhage in subjects with vaginal delivery to the tune of about 20% as compared to control group. The results were found similar to that in our study.

Gohel M, et al[84] evaluated tranexamic acid in caesarean section. They showed that showed that tranexamic acid reduces significant blood loss from the end of LSCS to 2 hours postpartum, 75.71 ml in the study group verses ml in the control group (P = .001). It also significantly reduces the quantity of blood loss from placental delivery

to 2 hour postpartum, 372.71 ml in the study group versus 469.70 ml in the control group (P = 0.003) . These results were comparable to our study.

Leila Sekhavat; Afsar Tabatabaii et.al[87] conducted a prospective randomised study on 90 primiparas divided into two groups who underwent CS. Their results showed that tranexamic acid significantly reduced the blood loss from the end of CS to 2 h postpartum; 28.02 ± 5.53 mL in the tranexamic group versus 37.12 ± 8.97 mL in the control group (p = 0.000). These results were comparable to our study.

The incidence of thrombosis during pregnancy & puerperium is 5-6 times higher than that in the general population. When the anti fibrinolytic drug tranexamic acid is administered, the increased risk of thrombosis should be considered, especially in the LSCS postpartum population. In our study, not a single patient developed signs of thrombosis.

In our study, there was no statistical difference in Apgar score at 1 & 5 minutes of the baby in both the groups. Therefore, tranexamic acid had no effect on the Apgar score of the baby. Similar results were found in study done by Ming-ying Gai, Lian-fang Wu[28] & coworkers in China & Zheng SR, Yang HX et al[81].

All data demonstrated that tranexamic acid can be used safely without increasing the occurrence of thrombosis, but still need more cases to be observed for the occurrence of thrombosis.

4. Haemoglobin change : In our study statistically significant fall in Hb% occurred after surgery in the group B than with group A. mean fall of Hb% in group A was 1.06 and in group B was 2.01. In contrast in a similar study conducted by Beijing Obst and Gyn hospital, Beijing, China there was also post operative fall in Hb% in both groups.

5. Vital parameters : In our study, mean decrease in PR was 0.2 in group A and 0.5 in group B post operatively. Mean fall in SBP was 0.3 in group A and 0.5 in group B. There was no significant fall in SBP and in PR without any significant change in RR post operatively. In this study conducted by International Medical Communication department, Daiichi Pharmaceutical Co. Ltd, Tokyo, Japan also there was no statistical significant change in vital parameters.

6. Maternal complication other than blood loss.

In our study, 7 patients in group A and 6 patients in group B had vomiting in the immediate post operative period which may be related to the drug. But this increased incidence of vomiting in group B was not statistically significant.

10 patient in group A and 8 patients in group B had nausea on None of the patients in both groups had thromboembolic complications postoperatively.

7. Neonatal Outcome :

In our study, neonatal outcome were comparable in both groups. One baby in group A needed NICU admission for HIE stage I and the indication for LSCS was unengaged head with foetal distress discharged on 5th POD. and 1 babies in group B needed NICU admission for HIE Stage I and for transient tachypnoea of the newborn the indications for LSCS being unengaged head with foetal distress in one and previous LSCS with PROM in another. They got discharged on 5th and 6th POD. The inference was that tranexamic acid use was not associated with any impact on neonatal outcome in our study. In a similar study conducted by Department of Obs & Gyn King's College hospital, London, there was no significant difference in the neonatal outcome between study and control group.

SUMMARY

- This study was conducted in the Department of Obstetric and Gynaecology, Government Rajaji Hospital, Madurai to clinically observe the blood loss reduced by tranexamic acid during and after caesarean section.
- 140 patients were selected for the study, 70 as Control group and 70 as Study group .
- 74% of the cases belong to the age group 20 – 24 years.
- No significant difference between age and parity between two groups.
- There was no statistically significant difference in the antenatal care in between the two groups.
- Tranexamic acid significantly ($p<0.001$) reduced the bloodloss from placental delivery to 2 hour post partum.
- There was statistically not significant fall in blood pressure and rise in PR without any significant change in RR in the control group compare to study group.
- Hb level was significantly reduced in study group compare to control group postoperatively.
- Incidence of nausea and vomiting was not significant between study group and control group. but None of the patients in both group had thromboembolic complications postoperatively.

- Neonatal outcome was similar in both groups.
- The possible confounding factors like age, height, weight & gravidity were comparable in both the groups.
- Distribution with respect to indication of LSCS like fetal distress, cephalopelvic disproportion, abnormal presentation, previous LSCS & arrest of descent was comparable in both the groups.
- Study group showed marked decrease in the amount of blood loss from time of placental delivery to 2 hours postpartum as compared to the control group
- Study group showed significant decrease in blood loss from time of delivery to completion of skin closure as compared to control group.
- Study group showed marked decrease in blood loss as compared to controls from time of completion of skin closure to 2 hr postpartum.
- There is significant difference in the postoperative Hb, the mean difference being 0.0.5 gm%.
- There was no significant difference in the vital signs of the subjects of the two groups at the time of placental delivery, 1 & 2 hours after the surgery.

- The incidence of adverse effect like nausea, vomiting & diarrhea is is similar in both groups. In addition, incidence of thrombosis is nothing in both study and control group.

CONCLUSION

Tranexamic acid injection, an antifibrinolytic agent when given prophylactically 15 minutes before skin incision by intravenous route appears to reduce the blood loss during and after caesarean section effectively without significant complications.

1) Tranexamic acid significantly reduced the amount of blood loss during & after the lower segment cesarean section.
2) Its use was not associated with any adverse drug reaction like diarrhea or thrombosis. Fetal outcome as evaluated by apgar score was not adversely affected by use of tranexamic acid but significant increase in nausea and vomiting.
3) Tranexamic acid can be used safely in subjects with lower cesarean section.

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PROFORMA

Patient particulars

S.No :

Name :

Age :

Ip No :

Unit :

Education :

Address :

Socioeconomic status :

D.O.Admission :

D.O.Discharge :

D.O.Delivery :

Mode of delivery :

Past history :

Family history :

Examinations :

General examination :

Icterus :

Pedal edema :

pallor :

Physical examination :

height :

weight :

BMI :

Vitals :

BP :

PR :

SP02 :

Systemic examination :

CVS :

RS :

Per abdomen examination :

Per vaginal examination :

Diagnosis :

Investigations :

Hb :

Platelet count :

Hematocrit :

RBS :

Urea :

Creatinine :

Serum electrolytes :

Serum uric acid :

Serum LDH :

Total bilirubin :

direct Bili :

indirect bili :

SGOT :

SGPT :

Urine routine :

Albumin :

Sugar :

Deposits :

Coagulation profile :

ABBREVIATIONS

PR	PULSE RATE
SBP	SYSTOLIC BLOOD PRESSURE
DBP	DIASTOLIC BLOOD PRESSURE
RR	RESPIRATORY RATE
PD	PLACENTAL DELIVERY
EOS	END OF SURGERY
PP	POST PARTUM
HB	HAEMOGLOBIN
POD	POST OPERATIVE DAY
NICU	NEONATAL INTENSIVE CARE UNIT
BPP	BIOPHYSICAL PROFILE
FTP	FAILURE TO PROGRESS
FD	FETAL DISTRESS
CPD	CEPHALO-PELVIC DISPROPORTION

தலைப்பு:

குழந்தைபேறு அறுவை சிகிச்சைபோதும் சிகிச்சை பிறகும் ஏற்படும் இரத்தை போக்கை குறைக்கும் நோக்கில் நரம்பு வழியாக டீரனாக்சமிக் ஆசிட் செலுத்தி ஆராய்ச்சி மேற்கொள்வதற்கான ஒப்புதல் படிவம்

பெயர்:

வயது:

பாலினம்:

தேதி:

உள் நோயாளியின் எண்:

ஆராய்ச்சி சேர்க்கை எண்:

எனக்கு நுண்துளை அறுவை சிகிச்சைக்கு பிந்தைய நாட்களில் நுரையீரல் சோதனை மற்றும் உதரவிதான அசைவு மேம்பாட்டிற்கு உதவும் சுவாசதிறன் பயிற்சிகளை அறுவை சிகிச்சைக்கு முன்பும் பின்பும் மருத்துவரின் பரிந்துரைபடி மேற்கோள்ள சம்மதம்.

இந்த ஆராய்ச்சி விவரங்களும் அதன் நோக்கங்களும் எனக்கு முழுமையாக தெளிவாக விளக்கப்பட்டது. எனக்கு விளக்கப்பட்ட விஷயங்களை நான்புரிந்து கொண்டு எனது சம்மதத்தை தெரிவிக்கிறேன்.

இந்த ஆராய்ச்சியில் பிறரின்நிர்பந்தம் இன்றி எனது சொந்த விருப்பத்தில் தான் பங்கேற்கிறேன். மற்றும் நான் இந்த ஆராய்ச்சியின் விபரங்கள் கொண்ட தகவல்தாளை பெற்றுக்கொண்டேன். நான் என்னுடைய சுயநினைவுடன் மற்றும் முழுசுதந்திரத்துடன் இந்த மருத்துவ ஆராய்ச்சியில் என்னை சேர்த்துக்கொள்ள சம்மதிக்கிறேன்.

இந்த ஆராய்ச்சியில் பங்கேற்பது என்னுடைய விருப்பத்தின் பேரில் தான் இருக்கிறது. மேலும் எந்நேரமும் இந்த ஆராய்ச்சியில் பின் வாங்கலாம் என்பதை தெரிந்துகொண்டேன்.

இந்த சிறப்பு பரிசோதனை முடிவுகளை ஆராய்ச்சியின் போது அல்லது ஆராய்ச்சியின் முடிவின் போது எனக்கு அறிவிப்பார்கள் என்பதையும் அறிந்துகொண்டேன்.

எனக்குவிளக்கப்பட்டவிஷயங்களைமுழுமையாகபுரிந்துகொண்டுஇந்தஆராய்ச்சியில் பங்கு கொள்ள எனது முழு மனதுடன் ஒப்புக்கொள்கிறேன்.

INSTITUTIONAL ETHICS COMMITTEE
MADURAI MEDICAL COLLEGE & GOVT. RAJAJI HOSPITAL, MADURAI
CDSCO:Reg.No.ECR/1365/Inst/TN/2020 &
DHR Reg.No.EC/NEW/INST/2020/484

Study Title	:	A study on effect of Parenteral Tranexamicacid in reducing blood loss during Intraoperative and Postoperative period in Caesarean section
Principle Investigator	:	Dr.Nancy F
Designation	:	PG in MS., Obstetrics & Gynecology (2019-2022)
Guide	:	Dr.N.K.Mahalakshmi, MD., OG Professor of Obstetrics & Gynecology
Department	:	Department of Obstetrics & Gynecology, Government Rajaji Hospital & Madurai Medical College, Madurai

The request for an approval from the Institutional Ethics Committee (IEC) was considered on the IEC meeting held on **30.06.2021** at GRH Auditorium, Govt. Rajaji Hospital, Madurai at 10.00 A.M

The Members of the committee, the Secretary and the Chairman are pleased to inform you that your proposed project mentioned above is **Approved.**

You should inform the IEC in case of any changes in study procedure, methodology, sample size investigation, Investigator or guide or any other changes.

1. You should not deviate from the area of work for which you had applied for ethical clearance.

2. You should inform the IEC immediately, in case of any adverse events or serious adverse reactions. If encountered during from study.

3. You should abide to the rules and regulations of the institution(s)

4. You should complete the work within the specific period and if any extension is required, you should apply for the permission again for extension period.

5. You should submit the summary of the work to the ethical committee on completion of the study.

MEMBER SECRETARY,
IEC, Madurai Medical College,
Madurai

Dr.K.RAADHIKA, M.D(Pharm)
Associate Professor
Member Secretary
IEC - Madurai Medical College
Madurai.

- 5 JUL 2021

CHAIRMAN,
IEC, Madurai Medical College,
Madurai

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						Blood loss (ml)			HB% (gm/dl)			Before Delivery	After Delivery	Before Delivery	After Delivery					
Sl No	Name	IP No	Age	Parity	Indications for caesarean	Placental delivery to end of CS	End of CS to 2 hrs postpartum	Total	Before Delivery	24Hrs After delivery	Fall in Hb% (gm/dl)	SBP (mm of Hg)	SBP (mm of Hg)	DBP (mm of Hg)	DBP (mm of Hg)	Heart rate	Respiratory rate	Use of additional Oxytocics	Complications	Side Effect
1	Meghala	18171	23	G2A1	Failed induction	310	50	340	10.4	9.6	0.8	120	120	80	80	80	16	-	-	-
2	Navanya	27679	26	G2P1L1	Prev.LSCS	340	40	380	11	10	1	130	140	76	86	82	18	-	-	-
3	Muthulakshmi	26244	29	G3P2L2	FD	330	40	390	10	8.8	1.2	120	120	84	86	80	16	-	-	Vomiting
4	Jenifer	24916	25	G2P1L1	Prev.LSCS	320	80	400	12.6	11.4	1.2	130	140	90	96	82	17	-	-	-
5	Kousalya	26410	35	G2P1L1	Prev.LSCS	300	60	360	11	10	1	120	120	80	80	80	19	-	-	Nausea
6	Vanitha	20471	27	G2P1L1	Prev.LSCS	300	50	350	12.6	11.8	0.8	130	136	80	82	84	18	-	-	-
7	Gopika	15975	26	G2P1L1	Prev.LSCS	320	40	360	10	8.8	1.2	120	120	80	80	80	16	-	-	-
8	Muthu	23217	24	G2P1L1	Breech	340	40	380	11	9.6	1.4	124	130	80	84	86	18	-	-	Vomiting
9	Sangeetha	16111	25	G2P1L1	Prev.LSCS	300	40	340	10.6	9.8	0.8	110	110	80	80	82	17	-	-	-
10	Keerthana	19514	22	Primi	FD	280	40	320	10.6	9.8	0.8	110	120	70	82	78	16	-	-	Nausea
11	Shanthi	22448	24	G2P1L1	Prev.LSCS	300	40	340	9.8	8.6	1.2	100	100	70	80	80	16	-	-	-
12	Subbulakshmi	24871	20	Primi	Failed induction	340	40	380	10.2	9	1.2	130	130	70	70	84	18	-	-	-
13	Pandimeena	21427	34	G3P1L1A1	T -4 PP	340	40	380	10.6	9.4	1.2	116	124	84	86	88	18	-	-	-
14	Mutheeshwari	21700	20	Primi	Oblique lie	300	40	340	9.8	9	0.8	120	130	80	82	80	17	-	-	-
15	Esther	27259	22	G2P1L1	Transverse lie	300	40	340	10	9	1	120	124	76	80	80	16	-	-	-
16	Kaaliyammal	20442	26	G3P1L1A1	Prev.LSCS	320	40	360	11	10.2	0.8	110	110	70	70	82	18	-	-	-
17	Eswari	25880	25	G2P1L1	Prev.LSCS	280	40	320	10.3	9.4	0.9	120	120	84	86	80	16	-	-	-
18	Krishnaveni	22982	30	G3P2L2	Prev 2 LSCS	300	50	350	11	10	1	100	110	70	85	82	17	-	-	-
19	Jeyalakshmi	24011	34	G4P1L1A2	Prev.LSCS	280	50	330	10.8	9.8	1	110	120	84	96	80	19	-	-	Nausea
20	Saraswathy	27351	27	G2P1L1	Prev.LSCS	280	50	330	10	9	1	120	120	80	80	84	18	-	-	-
21	Priya	27538	27	G2P1L1	Prev.LSCS	250	50	300	9.8	9	0.8	130	136	76	90	80	16	-	-	-
22	Alagammal	21154	28	G2P1L1	T-4 PP	300	50	350	10	8.8	1.2	120	120	84	86	86	18	-	-	Vomiting
23	Anushya	16980	26	G2P1L1	Prev.LSCS	300	40	340	9.6	8.8	0.8	114	120	70	76	82	17	-	-	-
24	Vimala Devi	16100	25	G2P1L1	Severe oligo	250	40	290	10.4	9.8	0.6	120	120	76	76	78	16	-	-	-

25	Pandiyammal	24664	29	G2P1L1	Doppler changes	300	40	340	11	10.2	0.8	120	130	70	80	80	16	-	-	-
26	Thulasi Devi	25418	23	G3P2L2	Prev.LSCS	280	40	320	10.6	10	0.6	100	110	70	76	84	18	-	-	-
27	Veeru Chinnammal	19953	25	G2P1L1	Prev.LSCS	300	40	340	11	10.2	0.8	130	140	80	88	88	18	-	-	-
28	Aarthi	21486	22	G2P1L1	Prev.LSCS	280	50	330	12	11	1	120	114	76	76	80	17	-	-	-
29	Bhavani	21284	19	Primi	FD	320	40	360	9.8	8.8	1	130	136	90	96	78	16	-	-	Nausea
30	Ranjitha	24079	25	G2P1L1	Prev.LSCS	300	40	340	10.4	9.6	0.8	120	120	80	80	80	16	-	-	-
31	Arivuselvi	22387	21	G2A1	FD	320	40	360	11.4	9.8	1.6	130	130	80	80	84	18	-	-	-
32	Arunjunai	24886	20	Primi	Failed induction	300	40	340	11	10	1	120	120	80	80	88	18	-	-	Nausea
33	Bharathi	18323	19	Primi	Breech	300	40	340	9.6	8.8	0.8	124	126	80	84	80	17	-	-	-
34	Kayalvizhi	27099	23	G2P1L1	Prev.LSCS	800	60	860	12	9.2	2.8	110	110	80	80	100	20	+	PPH	-
35	Vijayalakshmi	22090	20	Primi	FD	320	50	370	10.6	10	0.6	110	114	70	82	80	16	-	-	-
36	Lakshmipriya	26202	19	Primi	Failed induction	300	40	340	11.4	10.6	0.8	100	116	70	80	82	18	-	-	Vomiting
37	Neelambari	17297	20	G2A1	FD	250	50	300	9.8	9	0.8	130	136	70	86	80	16	-	-	-
38	Sundari	16986	21	PRIMI	CPD	300	40	340	10	9	1	116	120	84	88	82	17	-	-	-
39	Nagapriya	22246	20	G3A2	CPD	280	50	330	11.6	11	0.6	130	130	84	84	80	19	-	-	-
40	Vinitha	15990	22	G2P1L1	Prev.LSCS	300	50	350	12.4	11.2	1.2	124	120	80	80	84	18	-	-	-
41	Anitha	16305	36	G3P2L2	Prev.LSCS	340	40	380	11	9.6	1.4	100	110	70	76	80	16	-	-	Vomiting
42	Kavitha	25873	22	G3P2L2	Prev 1 LSCS	350	50	400	10	8.8	1.2	130	136	70	80	86	18	-	-	-
43	Chitra	20553	34	Primi	Long POI	280	40	320	12	11.2	0.8	110	116	76	86	82	17	-	-	-
44	Shanthi Rani	25076	26	G2P1L1	Prev.LSCS	300	50	350	11.6	10.8	0.8	120	120	80	80	78	16	-	-	Nausea
45	Thangamani	26113	20	Primi	Failed induction	280	40	320	9.6	8.8	0.8	120	116	84	80	80	16	-	-	-
46	Shantha Devi	19277	24	G3P2L2	Prev.LSCS	300	50	350	10	9	1	130	130	86	88	84	18	-	-	-
47	Nandhini	15109	22	G2P1L1	Prev.LSCS	250	60	310	11	9.8	1.2	120	120	84	90	88	18	-	-	-
48	Raji	27282	26	G4P3L2	Prev 2 LSCS	340	40	380	10.4	9.2	1.2	116	120	80	90	80	17	-	-	-
49	Muthu Meena	23044	30	G3P2L2	Prev.LSCS	300	40	340	10	9	1	100	110	70	86	80	16	-	-	Nausea
50	Mounam	27832	20	Primi	FD	320	50	370	10.6	9.4	1.2	120	110	84	76	82	18	-	-	-
51	Geetha	16620	24	G2P1L1	Pre baby	300	50	350	11.2	10	1.2	114	120	70	76	80	16	-	-	-
52	Laila	16538	21	Primi	Breech	360	40	400	11.4	10.1	1.3	100	100	70	70	82	17	-	-	-

53	Vinotha	25080	24	G3P2L2	FD	380	50	430	10.4	8.8	1.6	124	120	80	80	80	19	-	-	-
54	Haripriya	15064	25	G3P1L1A1	FD	320	40	360	10	9	1	130	140	80	90	84	18	-	-	Vomiting
55	Lavanya	27090	23	G2P1L1	Prev lscs	280	50	330	11	10.2	0.8	120	114	76	76	80	16	-	-	-
56	Agalya	18440	28	G3P2L2	oblique lie	300	40	340	11.4	10.6	0.8	120	130	80	86	86	18	-	-	-
57	Mallika	22340	21	Primi	Failed induction	320	50	370	11	9.8	1.2	130	130	80	80	82	17	-	-	-
58	Kanimozhi	16400	33	G4P3L3	Prev 1 LSCS	300	40	340	10	8.8	1.2	124	130	80	96	78	16	-	-	-
59	Meenu Kutty	20937	23	G2P1L1	Prev.LSCS	260	50	310	11	10.2	0.8	110	110	76	80	80	16	-	-	Nausea
60	Ganeshwari	26466	22	G2P1L1	Prev.LSCS	300	50	350	11.2	10	1.2	110	110	80	80	84	18	-	-	-
61	Maariyammal	17238	21	G2A1	CPD	320	40	360	11	10	1	120	132	80	90	88	18	-	-	-
62	Kundhavai	22149	24	G2P1L1	Prev.LSCS	320	60	380	12.4	10.8	1.6	130	140	80	94	80	17	-	-	-
63	Aavudaiyammal	20099	22	Primi	FD	300	40	340	11.6	10.4	1.2	120	130	84	90	80	16	-	-	Nausea
64	Sivagami	15776	24	G2P1L1	Prev.LSCS	340	60	400	10.2	8.8	1.4	110	110	80	80	82	18	-	-	-
65	Seeniyammal	17495	28	G3P2L2	Prev 1 LSCS	280	50	330	9.8	8.4	1.4	130	130	80	80	80	16	-	-	-
66	Ponnuthai	21031	23	G2P1L1	Prev.LSCS	300	40	340	9.4	8.8	0.6	136	138	80	82	82	17	-	-	-
67	Anbumani	23976	24	G2P1L1	Prev.LSCS	320	40	360	10.4	9.2	1.2	130	132	80	84	80	19	-	-	Vomiting
68	Mullaikodi	19705	30	G4P3L3	Prev.LSCS	300	40	340	9.8	8	1.8	120	120	80	80	84	18	-	-	-
69	Yazhini	16888	24	G2P1L1	Prev.LSCS	320	50	370	10.2	9	1.2	130	130	80	80	80	16	-	-	Nausea
70	Pavalam	27864	24	G3P1L1A1	Prev.LSCS	300	50	350	11.4	10	1.4	110	116	70	76	86	18	-	-	-

						Blood loss (ml)			HB% (gm/dl)			Before Delivery	After Delivery	Before Delivery	After Delivery					
Sl No	Name	IP No	Age	Parity	Indications for caesarean	Placental delivery to end of CS	End of CS to 2 hrs postpartum	Total	Before Delivery	24Hrs After delivery	Fall in Hb% (gm/dl)	SBP (mm of Hg)	SBP (mm of Hg)	DBP (mm of Hg)	DBP (mm of Hg)	Heart rate	Respiratory rate	Use of additional Oxytocics	Complications	Side Effect
1	Amudha	18504	26	G2P1L1	Prev.LSCS	380	80	460	10.6	9	9.2	120	120	80	80	80	16	-	-	
2	Roshini	21628	26	G3P1L1A1	Prev.LSCS	350	60	410	11	10	1	114	116	80	86	82	18	-	-	
3	Kaaliyammal	18019	24	G2P1L1	Prev.LSCS	400	60	460	11.8	10	1.8	120	126	80	86	80	16	-	-	
4	Vadivu	26355	20	Primi	Breech	350	80	430	12	9.8	2.2	100	110	70	76	82	17	-	-	Vomiting
5	Revathy	16220	20	G3A2	FD	380	60	440	10.6	8.8	1.8	110	110	80	80	80	19	-	-	-
6	Nandhini	16432	36	G2P1L1	Prev.LSCS	360	60	420	12	10.2	1.8	120	130	80	86	84	18	-	-	Nausea
7	Arasi	19314	25	G2P1L1	Prev.LSCS	380	80	460	9.8	7.8	2	130	136	84	90	80	16	-	-	-
8	Jothiyammal	15923	27	G3P1L1A1	Prev.LSCS	340	80	420	12	11	1	120	120	80	80	86	18	-	-	-
9	Rani	24901	20	Primi	FD	340	90	430	10.8	9.4	1.4	114	120	70	76	82	17	-	-	-
10	Thangammal	25766	26	G2P1L1	Oblique lie	380	80	460	11	9.4	1.6	120	124	76	80	78	16	-	-	-
11	Gandhimathi	18089	25	G2P1L1	Prev.LSCS	400	80	480	9.8	8.4	1.4	130	136	86	98	80	16	-	-	-
12	Sangavi	26514	28	G3P1L1A1	Prev.LSCS	380	80	460	10	7.8	2.2	110	110	80	80	84	18	-	-	-
13	Tamilarasi	21068	26	G2P1L1	Prev.LSCS	360	80	440	11	8.8	2.2	120	120	84	86	88	18	-	-	-
14	Isai Vani	22379	20	Primi	CPD	800	90	890	10.8	8.4	2.4	110	120	84	90	80	17	+	PPH	-
15	Kalaivani	17921	26	G3P2L2	Prev.LSCS	360	90	450	12	10.6	1.4	120	114	80	76	100	20	-	-	Nausea
16	Gomathi	21327	26	G2P1L1	Prev.LSCS	400	80	480	11.6	10	1.6	110	110	70	70	80	16	-	-	-
17	Pechiammal	22221	24	G2P1L1	Prev.LSCS	400	70	470	10	8.4	1.6	120	120	80	80	82	18	-	-	-
18	Rekha	25423	26	G2P1L1	Oblique lie	360	80	440	9.8	8	1.8	114	124	70	76	80	16	-	-	Vomiting
19	Radha	15263	25	G3P2L2	Pev 2 lscs	380	80	460	11.8	10	1.8	134	136	80	86	82	17	-	-	-
20	Siva Ranjani	16103	21	G2P1L1	Prev.LSCS	350	90	440	12.4	10.2	2.2	130	140	84	88	80	19	-	-	-
21	Muthu Nageshwari	24835	22	G2P1L1	T-3 PP	380	60	440	10.2	8.4	1.8	130	130	80	80	84	18	-	-	-
22	Sri Nandhini	25807	22	G2P1L1	Prev.LSCS	320	80	400	11.4	10	1.4	130	140	86	94	80	16	-	-	-
23	Kumudha	19164	28	G3P1L1A1	Prev.LSCS	400	80	480	11	9.2	1.8	120	124	80	82	82	17	-	-	-
24	Thanmathi	15706	28	G3P2L2	Prev 2 LSCS	700	120	820	13.4	11.1	2.3	120	130	76	84	78	16	+	PPH	-
25	Mayilu	23716	24	G2P1L1	Prev.LSCS	400	80	480	11	9.2	1.8	130	126	80	80	80	16	-	-	Nausea
26	Vaasavi	23159	27	G3P1L0	Prev.LSCS	300	60	360	10	9	1	110	110	80	82	84	18	-	-	-

27	Vimala	17433	26	G2P1L1	Prev.LSCS	380	80	460	10.6	9.8	0.8	120	126	80	80	88	18	-	-	-
28	Selvi	18217	26	G2P1L1	Beech	600	200	800	12.2	10	2.2	110	110	80	80	80	17	+	PPH	Nausea
29	Vaidhegi	26509	27	G3P2L1	Prev LSCS	400	80	480	11.8	10.4	1.4	130	136	84	90	78	16	-	-	-
30	Azhagumani	26155	24	G2P1L1	Prev.LSCS	380	70	450	10.8	9.2	1.6	130	130	76	76	80	16	-	-	-
31	Veera Jothi	16573	25	G2P1L1	Severe oligo	400	80	480	10	8.2	1.8	116	120	84	88	84	18	-	-	-
32	Alagupandi	19486	21	Primi	Breech	380	80	460	10.6	1.4	9.2	120	120	80	80	88	18	-	-	Vomiting
33	Kavitha	15652	22	G2P1L1	Prev.LSCS	350	60	410	11	10	1	110	110	76	76	80	17	-	-	-
34	Kavitha	24698	20	Primi	Doppler changes	400	60	460	11.8	10	1.8	124	130	70	80	100	20	-	-	-
35	Mariyammal	17385	22	G2P1L1	Severe oligo	350	80	430	12	9.8	2.2	110	116	84	90	80	16	-	-	-
36	Kalaiyarasi	24960	27	G3A2	FD	380	60	440	10.6	8.8	1.8	120	126	76	80	82	18	-	-	-
37	Suhana	17148	22	G2P1L1	Prev.LSCS	360	60	420	12	10.2	1.8	120	120	80	80	80	16	-	-	Vomiting
38	Sankareswari	17004	20	G2A1	FD	380	80	460	9.8	7.8	2	124	124	86	82	82	17	-	-	-
39	Vanishree	19002	22	G2P1L1	Severe oligo	340	80	420	12	11	1	114	120	80	86	80	19	-	-	-
40	Kowsalya	26794	21	Primi	Breech	340	90	430	10.8	9.4	1.4	130	140	80	96	84	18	-	-	Nausea
41	Suriya	17583	28	G3P2L2	Prev.LSCS	380	80	460	11	9.4	1.6	130	130	80	80	80	16	-	-	-
42	Lakshmi	17325	21	G2A1	T -4 PP	400	80	480	9.8	8.4	1.4	110	120	80	86	86	18	-	-	-
43	Premalatha	15336	22	G2P1L1	Prev.LSCS	380	80	460	10	7.8	2.2	124	132	88	80	82	17	-	-	-
44	Sukumari	15031	21	G2P1L1	Breech	360	80	440	11	8.8	2.2	120	120	80	80	78	16	-	-	-
45	Shiyamala	27298	22	G2P1L1	Oblique lie	800	90	890	10.8	8.4	2.4	130	140	70	76	80	16	+	PPH	Nausea
46	Anitha	20991	28	G4P1L1A2	Prev.LSCS	360	90	450	12	10.6	1.4	110	110	80	80	84	18	-	-	-
47	Vairajothi	26227	19	Primi	Failed induction	400	80	480	11.6	10	1.6	120	120	80	80	88	18	-	-	-
48	Mahaakshmi	21555	28	G2P1L1	FD	400	70	470	10	8.4	1.6	124	130	80	84	80	17	-	-	-
49	Lakshmi	27785	21	Primi	CPD	360	80	440	9.8	8	1.8	120	124	76	82	80	16	-	-	-
50	Muthulatchumi	27703	23	G2P1L1	Prev.LSCS	380	80	460	11.8	10	1.8	100	106	70	76	82	18	-	-	Vomiting
51	Krishnaveni	19232	22	G2P1L1	Prev.LSCS	350	90	440	12.4	10.2	2.2	110	110	70	70	80	16	-	-	-
52	Priya	16526	23	G3P1L0	Prev.LSCS	320	80	400	11.4	10	1.4	134	140	80	90	80	19	-	-	-
53	Sivapriya	15619	24	G3P2L2	Prev 2LSCS	380	90	470	10.8	9	1.8	120	126	76	86	84	18	-	-	-
54	Dhivyabharathi	19289	23	G2P1L1	Prev.LSCS	400	80	480	11	9.2	1.8	136	140	82	86	80	16	-	-	-
55	Sivaranjani	20304	23	G2P1L1	Prev.LSCS	700	120	820	13.4	11.1	2.3	120	130	70	76	86	18	+	PPH	Nausea
56	Dheepa	20793	22	G2P1L1	Transverse	400	80	480	11	9.2	1.8	110	110	70	70	82	17	-	-	-

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57	Nagammal	22481	25	G3P1L1A1	Prev.LSCS	300	60	360	10	9	1	110	110	80	80	78	16	-	-	-
58	Nazeema	15074	23	G2P1L1	Prev.LSCS	380	80	460	10.6	9.8	0.8	134	130	84	88	80	16	-	-	-
59	Ramalakshmi	15957	24	G2P1L1	Breech	380	90	470	10.8	9	1.8	120	126	76	86	84	18	-	-	Nausea
60	Kruthika	18440	24	G2P1L1	Prev.LSCS	400	80	530	11.8	10.4	1.4	130	130	84	86	88	18	-	PPH	-
61	Pandeeswari	25801	25	G3P1L1A1	Prev.LSCS	380	70	450	10.8	9.2	1.6	130	130	80	80	80	17	-	-	-
62	Facymary	20162	23	G2P1L1	Prev.LSCS	400	80	480	10	8.2	1.8	110	110	80	80	80	16	-	-	-
63	Kirubha	23191	31	G3P2L2	Prev.LSCS	380	80	460	10.6	1.4	9.2	134	140	82	82	82	18	-	-	Vomiting
64	Indhu	17596	21	G2P1L1	FD	350	60	410	11	10	1	100	100	70	70	80	16	-	-	
65	Manisha	18109	22	G2P1L1	Prev.LSCS	400	60	460	11.8	10	1.8	130	130	80	80	82	17	-	-	
66	Chinnammal	20040	22	G2P1L1	Prev.LSCS	350	80	430	12	9.8	2.2	110	110	70	70	80	19	-	-	
67	Karthika	25912	21	Primi	CPD	380	60	440	10.6	8.8	1.8	120	114	70	70	84	18	-	-	
68	Manimeghalai	20618	19	Primi	FD	360	60	420	12	10.2	1.8	118	120	80	80	80	16	-	-	
69	Veerai	18061	32	G3P2L2	Prev 2 lscs	380	80	460	9.8	7.8	2	110	110	70	76	86	18	-	-	
70	Nagajothi	21607	23	G2P1L1	Prev.LSCS	380	80	410	10.6	9.8	0.8	134	130	84	88	80	16	-	-	