PROFILE OF INDUCED LABOUR

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CERTIFICATE

This is to certify that the dissertation entitled, **"PROFILE OF INDUCED LABOUR"** submitted by Dr**. K.TAMILSELVI,** in partial fulfillment for the award of the degree of Doctor of Medicine in Obstetrics and Gynaecology by the TamilNadu Dr. M.G.R. Medical University, Chennai is a bonafide record of the work done by her in the Department of Obstetrics and Gynaecology, Madras Medical College, during the academic year 2007-2009.

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CONTENTS

INTRODUCTION

Around 10 - 50% of all deliveries are preceded by labour induction, a proportion that has not varied dramatically over recent years. Fetal death was the only indication for labour induction centuries ago, while this is now a very rare indication, with prolonged pregnancy and maternal hypertensive disorders being the major indications for the last 50–60 years. Safety, success, and patient satisfaction continue to be the major objectives with economic evaluations now becoming a significant factor in the search for the ideal induction method.

TURNBULL(1970) *said that the spontaneous labour is robust and effective mechanism and should be allowed to operate on own. we should induce labour if we are sure we can do better.*

Induction of labor is defined as the initiation of the process of labour, by artificial methods to anticipate delivery via naturalis after the fetus has attained the viability.

In modern obstetrics, induction of labour is mainly attempted when continuation of pregnancy may harm the mother, fetus or both. Ideally the patient to be induced should be close to term, in good health with adequate pelvis and favourable cervix with preferably a viable fetus. The induction of labour is aimed at vaginal delivery of a healthy infant with risk of minimal morbidity and distress to infant and mother. Induction is termed failed when the uterus fails to contract after attempts at stimulation or the uterus contracts abnormally and the cervix does not dilate or the fetus

is in jeopardy. The stimulation of uterine contractions by means of pharmacological agents administered to the patients by any route with the aim of starting labour constitutes “medical induction of labour”. There is no single satisfactory method that can be used in all patients. Each patient needs to be viewed in the context of her past obstetrical history and complications in the pregnancy before deciding on the mode of termination.

Since no method of induction is free from complications, this study is undertaken with the aim of observing various clinical aspects and outcome of labour after induction by various methods in **IOG, Egmore**.

HISTORICAL REVIEW

Induction of labour has a long and interesting history. In the previous times, it was employed almost exclusively for the particular purpose of ensuring the birth of a small baby in cases of severe pelvic deformity, and thus giving the woman her only chance of producing a live child. It was a method of treatment peculiar to British obstetrics.

MACAULAY performed it for the first time in 1756. He induced premature labour in contracted pelvis. It was performed in Britain as a definite treatment for pelvic malformation. In 1756, Macaulay popularized “low rupture of membranes” for induction of labour, which was referred to as the “English method”. Thomas Denman in 1793 also used the same to induce labour in contracted pelvis.

SCHEEL in 1979 used low amniotomy – It is known as **“SCHEELS METHOD**”. It was first performed in Britain as a definite treatment for pelvic malformation. For many years it was used only in Britain.

In Germany **WENZEL** in 1809, performed it first. But in France, it met with religious and political opposition.

BAUDELOCQUE objected to it very much. In 1802, **HERDER** studied the electrical stimulation of labour on cervical dilation resulting in reduction of the duration of labour. **RADFORD** of Manchester also employed this method. In 1973, T**HEOBALD** also used this method for induction of labour.

HAMILTON in 1980 introduced the stripping of membranes to induce labour.

In 1820, **ULSAMER** and **D'OUTREPONT** tried massaging the uterus for induction. In the same year **BRUNNING HAUSEN** introduced spongy tent into the cervix which caused cervical dilation and thereby inducing labour. It was used for removing the dead fetus.

In 1839**, FRIEDRICH** tried nipple stimulation for induction of labour.

In 1842, **SCHOLLER** as a method to induce labour, used tampons.

In 1844, **COHEN** used extraamniotic injection of fluids for induction of labour, which is called as "COHENS METHOD". In modern obstetrics, prostaglandin solutions and gels are injected extraamniotically to induce labour. In the same year **KIWISCH** used hot vaginal douches.

SCANZONI (1856), used hot carbolic douche. It produced sepsis and placental separation. So it was abandoned.

KRAUS'S method-In 1855, Kraus used bougie to induce labour. But it produced severe degree of infection. So it was later replaced by low rupture of membranes.

BARNES in 1861, introduced rubber bag filled with water for induction. This was used by JAMES 100 years earlier.

In 1865, **WILSON** used laminaria, tent for induction of labour. Laminaria tents have been used for more than 100 years in Germany and Japan.

In 1878 **CROSS** and **PITKIN** used laminaria tent for induction. It helped only in increasing the Bishop's score and had no action on the myometrium. Low amniotomy again became popular in 1930 by **DREW SMITH**.

The oxytocic effect of posterior pituitary extract was first noticed by **DALE**, in 1906, but the credit of introducing the drug into the clinical practice goes to BLAIR BELL (1909) who employed it in the treatment of postpartum hemorrhage and uterine atony.

HOFBAUER (1911) suggested its use in the treatment of uterine inertia and two

years later **WATSON** (1913) advocated its routine use in the induction of labour.

In 1920, B.P.WATSON used quinine for induction of labour. But because of unpredictable results and possible danger to the fetus, this method has been discarded in general.

It was not until 1929 that **KAMM et al** separated and concentrated two active principles in the form of potent solid preparations, “Itocin” and “Pitressin”.

KLEIN (1939) used spartine sulphate of labour. Intrauterine injection of hypertonic glucose was used for induction of labour by ABUREK in 1939, in intrauterine death or malformed fetus. Painless labour has been the cherished desire of every woman and the constant aim of the obstetrician.

THEOBALD (1948) first advocated one unit of oxytocin to 500 ml of Dextran in aqua infused in at a rate of 40 drops per minute, as the extreme range of physiological oxytocin dose.

In 1954, **CUNNIGHAM** in Sydney did daily digital dilation of Cervix, if it admitted two fingers. This helped in sweeping of membranes, prior to low amniotomy.

ULIRICH (1956) reported valethamate bromide as a potent, rapidly acting cholinolytic, spasmolytic, musculotropic agent.

DILLEN et al (1960) – reported the use of buccal pitocin to induce labour. Buccal tablets are used for both induction and augmentation.

NADRARNI and **SHAH** (1964) used unitocin for acceleration of labour.

MITRA et al (1978) found valethamate bromide to be effective in both primi and multi and showed that it shortened the duration of labour remarkably with no untoward effect on both mother and fetus.

The term "Prostaglandin" was introduced by **VANULER** in 1935. in 1971, **KARIM** and SHARMA first reported the results of clinical trail of induction of labour at term with the use of oral PGE_2. They successfully induced labour in 79 of the 80 patients. Since that time, a large number of reports have appeared in the literature, evaluating the efficacy of oral PGE2 for induction of labour with the success rate of more than 85%.

ALDER and **EMBERY** (1975) have used PGE2 extraamniotically. **MELLOWS** et al (1977), **WILSON** (1978) have given PGE2 intravaginally. **EMBREY** et al (1980), **HEFNI** and **LEWIS** (1980), has given PGE2 intracervically.

PEARLE at al (1979), **VERMA** et al (1981) found that PGE2 pessaries were easy to

place in the posterior vaginal fornix and were useful in inducing labour.

LIGGINS and his coworkers in 1968 said that, cortisone secreted by the fetal adrenals is the key factor in the initiation of labour and also for the maturation of fetal lungs.

MATI et al (1973) and **IAN CRAFT** (1976) studied the effects of betamethasone given by different routes, namely intraamniotic, intramuscular and intravenous to induce labour.

PHYSIOLOGICAL BACKGROUND

The cervix is essential in maintaining uterine stability during pregnancy. To achieve this, the maintenance of cervical shape and consistency is imperative since cervical 'ripening' is a physiological process occurring throughout the latter weeks of pregnancy and is completed with the onset of labour. When delivery is necessary and ripening has not had time to occur, or has failed to be initiated, this natural process has to be accelerated.

The cervix possesses a unique construction as described by Danforth (1947) [1] to enable it to perform its various roles. It consists predominantly of a stromatous body of connective tissue that can be subdivided into a superficial loose zone and a deeper dense stromal zone. The main elements of this connective tissue are collagen together with a small amount of elastic tissue and an even smaller component of muscle fibres. The collagen is composed of dense regular fibrils arranged in parallel bundles held together by cross-links, with a few interspersed mast cells and other cellular elements. The ground substance is composed of proteoglycan complexes consisting of glycosaminoglycan side chains (GAGs) on core proteins linked to a hyaluronic acid chain that bind tightly. The dominant GAGs in the cervix are dermatan sulphate and chondroitin sulphate, both of which contain hyaluronic acid conferring additional binding strength and have hydrophilic properties. Fibroblasts with numerous long cytoplasmic processes radiating from one cell body to another, possibly similar to myometrial gap junctions, infiltrate the ground substance (Ulmsten 1986)[2]

With the advance of pregnancy, increased vascularity is seen and the fibroblasts become secretory, white cells and macrophages migrate out of vessel walls into the cervical stroma with an increase in water content. There is a reduction in collagen content and a relative increase in the glucuronic acid-containing GAG heparin sulphate that binds much less strongly (Uldbjerg *et al.* 1983)[4] Ekman *et al.* 1986)[3] . Enzymatic breakdown of collagen fibrils by collagenases/matrix metalloproteinases produced by fibroblasts and polymorphonuclear leukocytes alongside leukocyte elastase, which catabolises elastin, leads to increased cervical compliance. The precise mediation and inter-relationships remain to be elucidated, but the prostaglandins and their synthase inhibitors are closely implicated with the known increase observed as pregnancy advances. Significantly there is reasonably strong evidence that the process of cervical ripening will occur without any detectable uterine contractions being stimulated (Ledger *et al.* 1985, Forman et a*l.* 1992)[4] Platelet activating factor (PAF) (Sugano et al)[5] and monocyte chemotactic protein-1 (MCP-1) (Yamamoto et al. 2000) have been proposed as possible interactants in the remodeling process involved in cervical ripening, as has nitric oxide, synthesized by macrophages, myometrium and the cervix (Chwalisz & Garfield 1998).[6]

INDUCTION OF LABOUR

INDUCTION OF LABOUR is

1. Absolute if risk of continuing pregnancy is life threatening
2. Relative if not life threatening but need intervention
3. Hospital protocol applicable in cases like post dated pregnancy and Rh –ve pregnancies
4. Social induction

Medical Indications for the Induction of Labor [7,8,9]

Postdated pregnancy

Premature rupture of the membranes*

Hypertension or preeclampsia or eclampsia

Chorioamnionitis

Severe intrauterine fetal growth retardation

Significant maternal medical problems, such as diabetes mellitus with pregnancy at term

*No labor within four hours after membranes have ruptured.

Contraindications to the induction of labor:

- Cephalopelvic disproportion because of malpresentation or abnormal pelvic bone structure
- Hypersensitivity to cervical ripening agents
- Major degree of Placenta praevia
- Vasa praevia
- Previous classical uterine incision or incision because of metroplasty or extensive myomectomy when the cavity is opened
- Active genital Herpes infection
- Invasive cervical carcinoma
- Transverse lie

Conditions where Induction of labour is not a true contraindication but where special caution is required

- Multiple pregnancy
- Polyhydramnios
- Severe hypertension.
- Breech presentation
- One or more previous cesarean section
- Abnormal fetal heart rate not requiring emergency cesarean section
- Maternal heart disease.

Risks of Induction of labour

Maternal Risks

- Failure leading to Cesarean section
- Increased risk of operative vaginal delivery
- Increased risk of post partum hemorrhage
- Uterine hyper stimulation
- Rupture uterus
- Intrauterine infection, Chorioamnionitis
- Amniotic Fluid Embolism
- Precipitate labor , Dysfunctional labor
- Abruptio Placenta
- APH from undiagnosed placenta praevia
- Water intoxication

Fetal Risks

- Fetal distress
- Fetal death
- Neonatal sepsis
- Iatrogenic delivery of a preterm infant
- Cord prolapse
- Neonatal jaundice
- Increased risk of birth trauma

PREINDUCTION CERVICAL ASSESSMENT:

It is known that success of labor induction is closely related to ripeness of the cervix. Various scores have been proposed to evaluate the cervical status.

a) **Bishop's Score:** This was proposed by Bishop in 1964 [10] and is the most widely used score. It was originally proposed to determine the suitability of a patient for Induction of labour in patients who were parous, at term, had an uncomplicated pregnancy and the fetus was in cephalic presentation.

Bishop's Score

Factor	**0**	**1**	**2**	**3**
Dilatation (cm)	0	1-2	3-4	5-6
Effacement (%)	0-30	40-50	60-70	80
Station	- 3	- 2	-1 or 0	+1 or +2

Consistency	Firm	Medium	Soft	-
Position	Posterior	Mid	Anterior	-

Cm = Centimeters

* A score of 9 or more ensured a safe and uniformly successful induction

Fields [11] a year earlier to Bishop had in addition to scoring the physical characteristics of the cervix also considered other factors. His proposed score is as follows.

Fields System for Rating Readiness for Induction

	0	1	2
Timing of induction Versus EDC# (wks)	Uncertain or >3 prior	1-3 prior	within 1week
Attitude	Objects|/ fears	Hesitates/accepts	Enthusiastic
Estimated fetal weight (grams)	< 2,500	Uncertain	> 2,500
Uterine tone on palpation	Flaccid	Some tone	Firm
Softness of cervix	Firm	Firm Somewhat soft	Soft
Effacement(%)	< 80	80	> 80
Position of cervix	Posterior	45^0 to vaginal axis	Toward Vulva
Station of presenting part (cm)	-2 or higher	-1 to 0	+ 1 or lower

Dilation (cm)	0-1	2-3	>3
vaginal discharge	No change	Increased	Blood tinged

EDC : Expected date of confinement

* Induction with a score of 16 more is considered favorable

Burnett later on modified the original Bishop's score giving a maximum score of 2 to each of Bishop's five categories, giving a total maximum score of 10. He considered effacement in terms of length and not percentage and considered previous term birth and cephalic presentation to be pre-requisites for induction.

Table 4. Burnett's Modification of the Bishop Score.[12]

Factor	**0**	**1**	**2**
Dilatation (cm)	< 1.5	1.5 – 3	> 3
Station	-2 or higher	- 1	0 or lower
Position	Posterior	Mid	Anterior
Effacement (cm)	1.5 or more	Intermediate	0.5 or less
Consistency	Firm	Intermediate	Soft

Cm = centimeters

* Outcome of patients with a score of less than 6 was unfavorable, with a score of 9- 10

all patients could be delivered within 4 hours and most within 24 hours.

Evaluating the performance of Bishop's score, Lange et al (6) observed that cervical dilatation was twice as important as the other factors and proposed a modification of the original score which predicted successful induction equally well.

Pelvic Score Proposed by Lange et al [13]

Factor	**0**	**1**	**2**	**3**	**Multiply by**
Dilatation (cm)	0	1-2	3-4	>4	X 2
Length (cm)	3	2	1	0	X 1
Station(cm)	-3	- 2	-1 or 0	+1 or +2	X 1

O'Leary and Ferrell [14] in 1987 had proposed a semi- quantitative ultrasound scoring system on Transabdominal Ultrasound evaluating the thickness and contour of the lower uterine segment, length and dilatation of the cervix and the station of the presenting part. Later Transvaginal ultrasound was used by **Boozarjomehri et al**[15] in 1994 who found that cervical length measurement was significantly associated with the duration of the latent phase of labor. Importantly wedging if present was associated with a shorter duration of both the latent phase and the total duration of labour. However, a regression analysis of the ultrasound assessment by other authors has noted that cervical length assessment by ultrasound did not provide significant additional information; only cervical dilatation was predictive of the duration of the latent phase

PHARMACOLOGICAL METHODS

OXYTOCIN

Oxytocin is a polypeptide hormone secreted from the posterior pituitary gland which acts as a potent uterotonic agent. The drug was used intravenously in 1948 by Theobald et al to induce labor. Later in 1958 Du Vigneaud et al synthesized the drug. Since du Vigneaud synthesized Syntocinon from the oxytocin in the 1950s (den Hertog et al. 2001)[16] it has been used by intravenous infusion for the majority of women having their labour induced. Although still used as the primary induction agent occasionally, it is more frequently given to assist the induction process using prostaglandins when the cervix is unfavourable or as an adjunct to low amniotomy in more favourable cases.

Protocols using intravenous infusions of oxytocin that are used these days are largely based on the work of Turnbull and Anderson (1968).[17,18] Although originally given as a constant low dose infusion at less than 10 mU/min, this has been replaced by titrated doses, determined by the intensity and frequency of uterine contractions assessed clinically by staff adjusting the infusion rate using mechanical pumps or electronic drip counters.

Alternatively, automatic infusion pumps governed by intrauterine contraction pressures using solid-state pressure transducers have been used providing an automatic increase or decrease in rate with the theoretical avoidance of over dosage (Francis et al 1970). These are usually set at a starting rate around 1–4 mU/min and increase variably (Lamont et al 1991)[19] arithmetically (Kurup et al

1991)[20] or logarithmically (Toaff et al 1978) [21] at 15–30 min intervals often to a maximum of around 32 mU/min, or until satisfactory labour has been established; occasionally higher rates may be required.

There is evidence that continuous intravenous infusions of oxytocin to induce or augment labour down regulate myometrial oxytocin receptors (Phaneuf *et al* 2000) the clinical consequence of this, however, is uncertain. While a pulsed administration of oxytocin has been tried to reduce the risk of over dosage (Pavlou et al.), this approach has not been widely adopted. Most consider that the rate required to establish labour should be maintained into the second stage, and increased once the third stage of labour is reached, being maintained for approximately an hour following delivery of the placenta and membranes.

Routes of administration

Oxytocin can be administered by any parenteral route, intravenous route being the most widely used. It can be absorbed from the nasal or buccal mucosa, however when given orally it is rapidly inactivated by trypsin.

Pharmacokinetics and mechanism of action

The half life of oxytocin is 3-5 minutes. Once absorbed it is distributed in the extracellular fluid and does not bind to plasma proteins and is excreted by the liver and

kidneys.

The action is mediated by oxytocin receptors (OTR) which are present on the myometrium. Myometrial response to oxytocin begins at 20 weeks, increases through out pregnancy and peaks just before initiation of labour. The response varies according to the status of the cervix, uterine sensitivity, variability in oxytocin clearance rate, duration of pregnancy and the pre-existing myometrial contractions. The OTR concentration is the rate limiting step for oxytocin action. Oxytocin on binding to the OTR increases the intracellular concentration of calcium causing myometrial cell contraction. Uterine contractions are also stimulated by a calcium independent mechanism involving the prostaglandins. PGE and PGF are increased during oxytocin administration. It has been postulated that Prostaglandin release by oxytocin is necessary for fully efficient uterine contractions during labor.

Dosing and Usage Guidelines

10 –20 units are dissolved in 1000 ml of balanced salt solution (Ringer Lactate solution or Normal saline) making it as 10-20 mu/ml and it is preferable to give it through an infusion pump. Further increments are made according to the low dose or high dose protocol given below [22] .

Regimen	Starting dose (mU/ min)	Incremental dose (mU/ min)	Dosage interval (min)

Low Dose	0.5 – 1	1	30-40
	1 –2	2	15
High dose	6	6	15
	6	6, 3*, 1*	20-40

* The incremental increase is reduced to 3 mU/min in presence of hyper stimulation and reduced to 1mU/min with recurrent hyper stimulation.

After intravenous infusion , uterine response occurs within 3-5 minutes and a steady state plasma concentration is reached in about 40 minutes. The end point to be achieved is uterine contractions every 2- 3 minutes lasting for 60-90 seconds and a uterine pressure of 50- 60 mm Hg or 150 Montevideo units.

Risks of Oxytocin

Hyper stimulation, with or without fetal heart rate changes

Failed induction with need for repeat induction or possibly cesarean

Increased risk for uterine rupture in some studies

Hypotension if administered by IV bolus

Hyponatremia if administered with large amounts of sodium poor fluids

Antidiuretic hormone like effect if administered at high doses

Increased risk for neonatal hyperbilirubinemia

***RCOG Guidelines*:** [23]

1) Oxytocin should not be started for 6 hours following administration of

Vaginal prostaglandins

2) In women with intact membranes, if feasible amniotomy should be Performed prior to commencement of oxytocin infusion
3) Minimum possible dose of oxytocin should be used and titrated against uterine contractions. Maximum licensed dose is 20 mU/min and should not exceed 32 mU/min

Randomized controlled trials have shown a wide range of dosages and frequencies to be successful. Dose increment schedules as short as 15 minutes and 30 minutes have been compared, using a starting dose of 2.5 mU/minute with increases of the same amount, showing no significant difference between the two groups[24].Successful low dose protocols have begun with an initial dose as low as 0.5 mU/minute and intervals as long as 60 minutes between dose increases. Both the 20 and 40 minute dosage intervals have been shown to be safe and efficient when using high dose oxytocin defined as a starting dose of 6 mU/minute with increases of 6 mU/minute.[25]

Comparison of low-dose to high-dose regimes of oxytocin in metaanalysis study found that the potential shortening of induction to birth time with the high-dose protocol occurred at the expense of higher rates of excessive uterine activity, fewer spontaneous vaginal deliveries, a trend towards a higher cesarean section rate and an increased potential for maternal morbidity.[26] Hourvitz *et al* (1996) was the only study that focused

on comparing different start infusion rates: high-dose patient started at 2.5 mU/min versus low-dose patients started at 1.25 mU/min.

No statistically significant differences between the two protocols were observed in induction-delivery interval and rates of c-section, abnormal FHR or hyper stimulation. However, because the proportion of patients with hyper stimulation was 10% higher and abnormal FHR was 13% higher in the high-dose group, they recommend the low-dose protocol . **Orhue** [27] included only primigravid patients and observed in the 15-minute protocol that while the induction-delivery interval was significantly shorter, the hyper stimulation rate was more than 5 times greater (3% vs. 16%, p=0.03) and the fetal distress rate (abnormal FHR) was almost 4 times greater (3% vs. 11%, p =0.05).Chua[28] did not find any statistically significant differences in any of these outcomes but nevertheless concluded that a 30-minute interval was safer.

PROSTAGLANDINS

PG E2 gel has been widely used for pre-induction cervical ripening. Local application of PGE2 causes cervical ripening by three mechanisms.

- Alteration of extracellular ground substance of cervix by increasing collagenase, elastase, glycosaminoglycans, dermatan sulfate, and hyaluronic acid levels
- Relaxation of smooth muscle of cervix
- Gap junction formation leading to initiation of uterine contractions

Preparations available, Dosage and Usage Guidelines

Intracervical PGE2 gel (Cervigel, Dinoripe, Prepidil)

- Contains 0.5 mg of PGE2
- The gel is brought to room temperature before use and instilled in the cervical canal below the internal os
- The patient lies supine for 15-30 minutes after the insertion.
- If no response occurs in one application, a repeat insertion may be required after 6 hours
- Maximum of 1.5 mg or three insertions are allowed over a period of 24 hours.
- If required oxytocin is used only after 6- 12 hours of the last insertion.

Intravaginal PGE2 gel

- Vaginal PG E2 gel contains 2.5 mg PGE2

  2 doses 6 hours apart are used.
- Vaginal controlled release insert **(Cervidil)**

  10 mg insert which releases 0.3 mg / hr of the prostaglandin

  No need to prewarm the insert.

  The patient should lie supine for 2 hours following the insertion

  The insert is to be removed after 12 hours or when active labor begins or in case of hyper stimulation.

Contraindications

Established uterine activity, glaucoma, asthma, severe hepatic or renal impairment, known hypersensitivity to prostaglandins, active vaginal bleeding.

ACOG Guidelines: [22]

Bishop's score should be less than four. Drug should be administered near the delivery suite. Patient should lie recumbent for 30 minutes after the instillation. FHR and uterine activity should be monitored for 30 minutes to two hours after the instillation. After this, patient may be transferred elsewhere, if there is no increase in uterine activity and FHR is normal. The controlled release insert should be removed at the onset of labor. Oxytocin should be avoided for initial 6-12 hours

RCOG Guidelines: [23]

Intravaginal PGE2 should be used in preference to intracervical preparations as they are equally effective and administration of intravaginal PGE 2 is less invasive of the vaginal preparations. Tablets should be preferred over the gel as they are cheaper and equally effective.

Intravaginal or intracervical administration of exogenous PGE2 (dinoprostone) is the most widely used pharmacologic method to promote cervical ripening and labour induction [29].Prostaglandins were first used intravenously in the late 1960-s but this route of administration was associated with significant side effects.[30]A meta analysis comparing women who received prostaglandins to placebo or no treatment groups indicated that receiving prostaglandins did more to improve the cervical score and ripen the cervix..[31]Cochrane reviewers studied the use of prostaglandins for cervical ripening

on labour induction and concluded that compared with placebo, use of vaginal prostaglandins increased the likelihood that a vaginal delivery would occur within 24 hours[32] .

The optimum route (endocervical or vaginal), the initial dose of PGE2 and the interval and frequency of dosage increase is a source of great debate. A study by Seeras etal[33] suggests that a 2 mg dose of vaginal PGE2 given on a 12 hourly basis may be as good or better than on a 6 hourly basis. The authors also suggest that there is little or no benefit in using more than three doses. The American College of Obstetricians and Gynecologists recommend that regardless of route of administration, fetal and maternal well-being should be monitored for 30 to 120 minutes following administration of PGE2 [34].

A meta-analysis suggests that when labour must be induced with an unripe cervix, prostaglandins can decrease the likelihood of failed induction, decrease the incidence of prolonged labour and increase the chance of spontaneous vaginal delivery.

Oxytocin is less effective than prostaglandin to help bring on labour but is as effective when used alone in women with ruptured membranes. The review of trials found that using PGE2, inserted either via the vagina or cervix, rather than oxytocin was probably more effective. However, oxytocin alone compared to PGE2 used either way, in women with ruptured membranes, showed that all three methods are probably equally effective.[35]

MECHANICAL MODALITIES

Hygroscopic dilators : These are natural or synthetic rods inserted through the cervical os and left in situ for a particular time wherein because of their osmotic properties they absorb endocervical and local tissue fluids . This swelling causes a controlled dilatation of the cervix along with releasing prostaglandins. Natural dilators are obtained from the seaweed *Laminaria japonicum.*

Balloon devices: Foley's catheter or designer balloon devices when inserted intracervically can facilitate cervical ripening. Once properly placed (beyond the internal os) balloon or the catheter is inflated with 30-50 ml saline. It is recommended to either attach a defined weight to the catheter end (1litre of i.v. fliud) or to use "gentle tugs" –

2 to 4 each hour until the catheter or the balloon passes out [26,27] . Some recommend infusion of extra-amniotic saline at the rate of 1 cc/minute.

NATURAL AND COMPLEMENTARY MEDICINE

METHODS

Homoeopathy has been used in recent years for labour induction but a recent literature review identified only one prospective controlled trial examining the use of the herb 'caulophyllum' in a small group of women and concluded there was insufficient information to draw any conclusion at present (Smith 2001),[36] although there have been concerns expressed about neonatal morbidity resulting from its use (Finkel & Zarlengo 2004)[37].

Breast stimulation has been suggested as an effective inexpensive non-medical means of inducing labour. A Cochrane Database review of six randomized controlled trials involving 719 women reported a significant reduction in the number of women with a favourable cervix not in labour 72 h following the start of nipple stimulation compared with no intervention. There was, however, no reduction in the need for delivery by caesarean section (Kavanagh *et al.* 2001*b*). [38]

Acupuncture, however, although it has been used for the induction of labour and appears safe without any recognized teratogenic effects, there is very limited information upon its clinical effectiveness for this purpose (Smith & Crowther 2001)[39].

Sexual intercourse during the latter weeks of pregnancy has been suggested as a logical strategy to encourage labour since semen is presumed to contain the highest prostaglandin concentration of any body fluid. However, any role that sexual intercourse may have in the initiation of labour is uncertain since it could be due to the physical stimulation of the lower uterine segment, or endogenous release of oxytocin as a result of orgasm or the Ferguson reflex or from the direct action of the prostaglandins in semen. A review of the relevant literature on this subject led the reviewers to conclude that it must be difficult to standardize sexual intercourse as an intervention to allow meaningful comparisons with other methods of induction of labour particularly for randomized studies involving a no-treatment or placebo group; trial violations could be difficult to identify (Kavanagh *et al.* 2001*a*.) [40].

SURGICAL METHODS

Membrane sweeping and amniotomy

Cervical stretching and membrane sweeping performed during a vaginal examination has been shown to result in established labour in 70% of cases if repeated

daily over three days (Swann 1958).[41]Amniotomy,a procedure involving puncturing the membranes and releasing the amniotic fluid contained beneath the presenting fetal part is done when the cervix is favourable. The manipulation of the cervix during the amniotomy provokes a release of oxytocin from the posterior pituitary via the Ferguson reflex and this is followed a few minutes later by a release of prostaglandins into the uterine vein, encouraging uterine contractility (Turnbull & Anderson 1978).

In less favourable cases, the amniotomy is usually followed after an hour or two with the addition of an infusion of Syntocinon, while in the unfavourable case an amniotomy is usually performed after previously administered prostaglandins have provoked cervical ripening .The Cochrane reviewers concluded that stripping when used as an adjunct does seem to be associated with a lower mean dose of oxytocin needed and an increased rate of normal vaginal deliveries.[42]

Only two well-controlled trials studied the use of amniotomy alone, and the evidence did not support its use for induction of labor.[43]

Predicting the success of labour induction

Cervical condition exerts a significant influence upon induced labour outcome and in consequence the decision about how to induce labour must take account of the favourability of the cervix. To assist the obstetrician in deciding which way to induce labour a cervical scoring system is often used. More than 12 different pelvic or cervical scoring schemes have been described during the past 70 years, but the semi-quantitative

clinical scoring system described by Bishop is the one most widely employed (Bishop 1964)[10]. There was no difference in success of induction as measured by induction-to-delivery interval or by rate of vaginal, delivery using higher initial concentrations of oxytocin. Higher pre-induction Bishop scores were associated with shorter labors and more vaginal deliveries [44]

There is no evidence to support cervical ripening independent of labour induction. Therefore, when indicated, cervical ripening should be considered part of the labour induction process[45]. Recent reports have confirmed early studies that emphasized that the state of the cervix was the most important predictor of success, leaving little doubt that ripening of the cervix greatly facilitates labour and increases the likelihood of vaginal delivery.[46-48]

Fetal fibronectin (FFN) concentrations in cervical transudate represent a laboratory approach and have been shown to correlate with induced labour outcome with concentrations greater than 50 µg/ml associated with a favourable cervix and reduced intrapartum morbidity (Ekman *et al.* 1995).[49] A review of eight reports concluded that a positive FFN was associated with significantly shorter delivery intervals than when a negative FFN result is obtained (Kiss *et al.* 2000.)[50]Since this assessment can be performed at the bedside, and there is evidence of circadian changes in uterine activity and responses to prostaglandins (Haluska *et al.* 1987, MacKenzie 1987), an assessment of FFN might assist in determining the most appropriate time during the

working day when to initiate an induction.

Ultrasound assessment of the cervix has been investigated as a way of predicting the likely outcome of induced labour as an alternative to clinical digital examination. Studies have explored possible relationships between cervical length, internal cervical os shape and assessment of the angle between the cervical axis and the wall of the inferior segment of the uterus (Chandra *et al.* 2001, Pandis *et al.* 2001).[51] The results from many published studies, some prospectively stringently controlled and others observational, suggest that, as with clinical observations, there is quite wide variation in the predictive value.

Electrical impedance measurements across the surface of the cervix using a 8 mm tetra polar pencil probe have been used to investigate correlations with clinical examination to assess cervical favourability (O'Connell *et al.* 2003)[52].A statistically significant association was found with the resistivity and the favourability of the cervix.

Serum nitrite/nitrate levels have also been assayed in nullipara undergoing prostaglandin induction of labour and using multiple regression analyses significantly lower levels of each were found in women who delivered within 15 h of labour induction compared with those delivering over a longer period (Facchinetti *et al.* 1998)[53].

In the study that was conducted by Nancy ,in 365 cases (in nullipara and multipara

women),it was found out that Bishop score is a weak clinical indicator in the prediction of successful vaginal delivery induction regardless of number of birth. In the study conducted by Nicolaides[54] in 2001 in 240 cases between 37-42 weeks in which they used Dinoprostone gel and oxytocin for induction, cervix length and Bishop score was compared. Cesarean section was found as 19.2%, while the rate of vaginal delivery within 24 hours was approximately 60%. 74.3% of vaginal deliveries within 24 hours were multipara, and induction-birth interval was significantly found shorter in multipara. Bishop score was found relevant to successful vaginal delivery and induction-birth interval. Cervix parameter was indicated to have a more powerful prediction performance in terms of these parameters**.**

In the successful study conducted by Paterson-Brown [55],in 50 pregnant women, successful vaginal delivery and Bishop score was found clearly in relation, however, its prediction performance was insufficient. Besides, cervical length was shown not to have relation with Bishop score and induction-birth interval .

AIM OF THE STUDY

1. To study the profile of induced labour in a tertiary care institution
2. Outcome of such induction in NULLIPARA & MULTIPARA.
3. Intrapartum, Postpartum maternal and neonatal morbidity and mortality of patients who underwent induction of labour.

MATERIALS AND METHODS

TYPE OF STUDY

Prospective observational study.

PERIOD OF STUDY

JANUARY 2008 TO JUNE 2008

SETTING

This study was conducted at Institute of Obstetrics and Gynaecology, Chennai. Approval of institutional ethical committee had been obtained.

METHODOLOGY

SUBJECT SELECTION CRITERIA

Inclusion Criteria

Singleton live Pregnancies

Cephalic Presentation

Gestational Age >37 Weeks

Bishop Score <4

Reactive CTG

No Spontaneous uterine contraction

Exclusion criteria

Multiple Pregnancies

Mal presentation

Preterm Pregnancies

Non Reactive CTG

Antepartum haemorrhage

Previous uterine scar

Spontaneous Labour

Reason for Induction:

1. Absolute Indication:

   As in severe PET, imminent eclampsia, eclampsia

2. Marginal indication:

   GDM on insulin, PET, Repeated false labour, AFI < 8, BOH,

Hospital protocol as in postdated pregnancy, Rh negative pregnancy and prelabour rupture of membranes.

Patients were counseled regarding the decision taken and their wishes respected. Informed written consent obtained.

Admission procedure

On admission, complaints and detailed obstetric, past and personal history of the patient was obtained. General examination done and pulse rate, blood pressure, temperature noted. Per abdomen examination of the patient with detailed pervaginal examination done and Bishop score calculated. Antenatal risk factors and reason for induction of labour was documented. Modified biophysical scoring including Cardiotocogram and AFI was done. According to ACOG criteria 1999, period of gestation was confirmed.

Procedure

For patients with Bishop score <4 and intact membranes, PGE2 0.5mg was applied intracervically under strict aseptic precautions after excluding the contraindication criterias. Patient reassessed after 6 to 12 hours. If in active labour, active labour management by amniotomy and augmentation with oxytocin done. Labour monitored with partogram. Otherwise, repeat cardiotocogram done. If reactive, second dose of PGE2 applied in patients with intact membranes, otherwise oxytocin was used. In patients presenting with ruptured membranes, only oxytocin was used.

Mode of application of PGE2

Patient was advised to empty the bladder. Fetal heart rate was recorded.Then the patient was put in lithotomy position. Under strict aseptic precautions, a preloaded insert with 0.5mg of PGE2 gel was introduced into the endocervical canal and PGE2 instilled taking care not to rupture the membranes. Fetal heart rate was recorded again. Patient was made to rest in lateral position for 30 minutes. Fetal heart rate and uterine activity monitored for 30 minutes and further for a period of 6 hours.

Mode of oxytocin use

5units of oxytocin is added in 500ml of normal saline and intravenously administered at the rate of 5mu/min. Uterine contractions are monitored and oxytocin

dosage increased at the same increments once in every 30mins.

Side effects

Fever

Vomiting and diarrhea

Meconium staining

Uterine hyper stimulation

Fetal heart rate abnormalities

Hypotension

Water intoxication

Cord prolapse

Abruption

Uterine rupture

Postpartum haemorrhage.

Amniotic fluid embolism

Indications for operative delivery

Failed induction: No improvement in Bishop score with one application of PGE2 with associated antenatal risk factor or cervix remains unfavourable even after 2 doses of PGE2 or after adequate oxytocin stimulation.

Fetal distress: Meconium stained liquor in early labour

Persistent late/variable deceleration on cardiotocogram.

Arrest of cervical dilatation

Arrest of fetal descent.

Indications for instrumental delivery

Prolonged second stage

Early deceleration due to head compression in late second stage

Maternal exhaustion

Indicated forceps as in maternal heart disease.

Neonatal observations

Birth weight

APGAR

Resuscitation

NICU admission

Fever

Hyperbilirubinemia

RESULTS AND ANALYSIS

AGE DISTRIBUTION

Age in years	Nulli	Nulli %	Multi	Multi %
<21 yrs	150	23.7	9	3.9
21-25 yrs	405	61.4	122	53.5
26-30 yrs	96	14.5	85	37.2
31-35 yrs	8	1.2	10	4.3
>35 yrs	0	0	2	0.8

Maximum number of patients are in the age group 21 -25.Only 0.8% of multipara were above the age group of 35 years

GESTATIONAL AGE IN WEEKS

Gestational age	Nullipara	Nullipara%	Multipara	Multipara%
37-40 weeks	314	47.6	96	42.1
41 weeks	237	35.8	94	46.9
42 weeks	110	16	37	10.9

In nullipara, about 47.6% were induced prior to EDD. But in multipara,47% of the patients were induced post EDD.

BMI AND MODE OF DELIVERY

BMI	Nulli	NVD	Nulli NVD %	Multi	NVD	Multi NVD%
<19.8	40	25	62.5	15	13	86.6
19.8-26	397	179	45.1	127	106	83.3
26-29	124	41	33.06	45	37	82.2
>29	98	23	23.5	41	28	68.2

Major group of the patients have BMI of 19.8-26.

As BMI of the patient increases, there is proportionate increase in the operative delivery especially in nulliipara .

ANTENATAL RISK FACTORS

RISK FACTORS	Nulli	Nulli %	Multi	Multi %
Preeclampsia	192	55.97	63	60
Rh-ve pregnancy	48	13.9	13	12.38
IUGR/OLIGO	35	10.2	10	9.52
Long period of infertility	23	6.7	0	0
HEARTDISEASE	9	2.62	3	2.85
OTHERS	36	10.61	16	15.25
TOTAL	343	51.8	105	47.5

More than 50% of the patients had an associated risk factor.

Most common antenatal risk factor found in our group of patients is preeclampsia

INDICATION FOR INDUCTION

Indication	Nullipara	Nulli%	Multipara	Multi %
Postdated	270	40.06	111	48.6
Preeclampsia	170	25.57	48	21.05
PROM	137	20.09	46	20.07
IUGR/OLIGO	41	6.68	6	2.91
Gestational	1	0.16	3	1.09

diabetes				
Rh-ve	11	1.79	2	0.72
Severe preeclampsia	5	0.81	1	0.36
Fetal alarm signal	5	0.65	4	1.45
Imminent eclampsia	3	0.48	3	1.09
HROM	2	0.32	0	0

Postdated pregnancy was the major cause for induction followed by preeclamptic toxemia followed by prelabour rupture of membranes.

MODE OF INDUCTION

Mode	Nulli	Nulli %	Multi	Multi %
PGE2 SINGLE DOSE	382	57.8	152	66.6
PGE2 2 DOSES	106	16.07	13	5.7
OXYTOCIN	171	25.94	58	25.43

In all patients in the PGE2 group, oxytocin used in the augmentation of labour. In patients with prelabour rupture of membranes, only oxytocin drip used .

NORMAL VAGINAL DELIVERY IN VARIOUS MODES OF INDUCTION

Mode of induction	Nulli	NVD	Nulli NVD%	Multi	NVD%	Multi NVD%
PGE2 SINGLE DOSE	382	158	41.3	152	128	84.2
PGE2 2 DOSES	106	34	32	13	6	46.1
OXYTOCIN	171	70	40	58	46	86.6

About 41 .3% of patients induced with PGE2 delivered vaginally. The high LSCS rate is because more than 70% of patients had associated medical disorder ,which had an influence on the decision along with no improvement in mean Bishop score.

INDICATION FOR LSCS

Indication	Nulli	Nulli %	Multi	Multi %
Failed induction	112	19.5	21	9.40
Fetal distress	161	27	30	13.20
Cephalopelvic disproportion	93	14.80	12	5.30
Others	21	3.10	8	3.50

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Most common indication for LSCS is fetal distress in both primipara and multipara. Failed induction accounts for 20% of LSCS in primipara and 10% of multipara.

BIRTH WEIGHT

Birth weight	Nulli	Nulli %	Multi	Multi %
<2.5 kg	65	9.86	24	10.5
2.5-3.5 kg	560	83.7	221	96.92
3.6-4.0 kg	33	4.93	15	6.57
>4.0 kg	0	0	0	0

More than 90% of babies delivered weighed between 2.5- 3.5 kg. About 10% of babies weighed less than 2.5 kg.

RISK FACTORS AND MODE OF DELIVERY

	NVD	NVD %	LSCS	LSCS%
Nulli with risk factor	105	31.16	179	68.9
Nulli with no risk factor	166	51.5	155	48.4
Multi with risk factor	82	76.6	100	23.3
Multi with no risk factor	25	84	19	15.9

As more than half of the patients had an associated medical complication, it accounts for the high caesarean rate among the induced group with associated risk factors.

INTRAPARTUM AND POSTPARTUM COMPLICATIONS

Complication	Nullipara	Nulli %	Multipara	Multi %
Fever	27	4.08	9	3.9
Wound resuturing	12	1.81	1	0.36
Wound infection	13	1.9	0	0
Atonic PPH	5	0.89	3	1.09
Traumatic PPH	1	0.16	0	0
CPT	1	0.16	1	0.36
Rupture uterus	0	0	0	0
Apgar <7	60	9.78	10	3.64
MSL	54	8.8	13	4.7
Anaemia	1	0.16	1	0.36
Neonatal death	10	1.51	2	0.8

The most common complication was the febrile morbidity of the patients. Atonic PPH was seen in about 1% of multipara. Among them one required Internal iliac artery ligation to arrest haemorrhage.About 10% of babies delivered had Apgar <7.

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INCIDENCE OF MSL AND HYPERBILIRUBINEMIA

	MSL	MSL %	HYPERBILIRUBINEMIA	HYPERBILIRUBINEMIA %
PGE2 single dose	48	12.50 %	7	1.80%
PGE2 two doses	14	13.20 %	3	2.80%
oxytocin	12	4.16	3	2.80

In the present study, when two doses of PGE2 was used, there was increased rate of meconium stained liquor and hyperbilirubinemia.

DISCUSSION

RATE OF INDUCTION

Total no of deliveries: 8386

No of term deliveries: 5973

No of induced term pregnancies with Bishop Score<4:887

CHARACTERISTICS OF THE PATIENT

	Low dose oxytocin	High dose oxytocin	present study
AGE	26.1	26	23.3
GA	38.1	38.1	41
NULLIPARA	216(52.4%)	207(51.4%)	659(74.2%)
BS<4	133(40.8%)	145(44.5%)	ALL

Mean Age in the present study is 23.3 years.

More than two thirds of the study group are nullipara with mean BISHOP SCORE <4 as against the study by MERILL et al

INDICATION FOR INDUCTION

	JARVELIN et al	MERRILL et al	PRESENT study

ELECTIVE	51.30%	12%	NIL
PROM	2.30%	25.10%	21.60%
IUGR	5.20%	18%	4.79%
MEDICAL DISORDER	18.20%	13.30%	26.14%
POSTDATED PREGNANCY	12.30%	8%	44.70%

Medical disorders complicating pregnancy forms the major cause for induction of labour and this institution being a tertiary care institution with referral services has large group of high risk patients.

COMPARING EFFICACY OF PGE2 SINGLE DOSE AND PGE2 TWO DOSES

NULLIPARA

	PGE2 single dose	PGE2 2 doses

	MAC KENZIE et al	Present study	MAC KENZIE et al	Present study
No	237	382	262	106
NVD	128(54%)	15(40%)	143(55%)	34(32%)
INSRUMENTAL DELIVERY	74(31%)	13(3.5%)	84(34%)	NIL
FAILED INDUCTION	4(2%)	46(12.4%)	3(1%)	48(46.3%)
FETAL DISTRESS	10(4%)	107(28.1%)	16(6%)	18(16.9%)

MULTIPARA

	PGE2 single dose		PGE2 2 doses	
	MAC KENZIE et al	Present study	MAC KENZIE et al	Present study
No	246	152	210	13
NVD	228(93%)	128(83.8%)	203(97%)	5(46.2%)
INSTRUMENTAL DELIVERY	14(6%)	0	0	0
FAILED INDUCTION	0	7(4.8%)	0	6(42.8%)
FETAL DISTRESS	1(0.4%)	10(6.6%)	1(0.5%)	2(14.2%)

Application of second dose of PGE2 did not improve rate of vaginal delivery.

According to MACKENZIE et al in his RCT comparing 1 dose Vs 2 dose ,the second dose resulted in more prolonged disturbance with little benefit in decreasing the need for oxytocin and labour duration. Little benefit in inducing with two doses as failed induction rate with 2 DOSES of PGE2 is still around 48% and comparable with MACKENZIE et al.

SUCCESSFUL LABOUR OUTCOME WITH PGE2 ALONE

	NIMROD et al	PRESENT study
PGE2	9(60%)	288(32.4%)
Mean BishopScore	2.6	1.6
BS CHANGE<2	2(16%)	39(13.5%)

Rate of failed induction was 16% comparable to our rate of 13.5%.Improvement in Bishop score by 3.86 in patients who delivered by single dose of PGE2. While women induced with two doses of PGE2 the improvement in BS was 1.65 after I gel and 2.1 with second gel.

INDICATION FOR LSCS

INDICATION FOR LSCS	MERILL et al Low dose oxytocin	High dose oxytocin	Present study
FAILED INDUCTION	25(6%)	25(5%)	119(29.3%)
FETAL DISTRESS	20(5%)	17(4%)	167(41.2%)
FAILURE TO PROGRESS	20(5%)	17(4%)	91(22.40%)
OTHERS	3(0.7%)	3(0.7%)	28(6.9%)

The higher rate of Caesarean section is because the 74.8 % of patients included in the present study are nullipara while nullipara accounted for only 52.4% of patients in the study by MERRILL et al. Moreover only 42% of patients had Bishop Score <4 while all patients included in the present study had Bishop Score<4.

INDUCTION – DELIVERY INTERVAL(IDI)

Average IDI In hours	Merrill et al		Present study	
	Low dose oxytocin	High dose oxytocin	nullipara	multipara
	10.5	9.7	12.49	9.46

Parity and initial bishop score influence the outcome of induced labour. The Induction delivery interval is less in multipara compared to primipara**.**

INTRAPARTUM AND POSTPARTUM COMPLICATION

COMPLICATION	low dose oxytocin	high dose oxytocin	Present study
UTERINE RUPTURE	1(0.2%)	1(0.2%)	nil
PPH	19(4.9%)	15(4%)	9(1.1%)
WOUND INFECTION	2(0.5%)	1(0.3%)	19(2.47%)

Nil rupture rate in the study due to exclusion of previous LSCS and non use of epidural analgesia.

NEONATAL COMPLICATIONS

COMPLICATION	MERILL et al		present study
	low dose oxytocin	high dose	
neonatal death	5(1.2)	4(1.1)	12(1.3)
Birth weight	3124	3174	2890
apgar<7	22(5.3)	22(5.8)	70(7.89)

SUMMARY

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Mean age of women 23.3with range between 18 and 37 years.

Mean gestational age is 41 weeks.

Nulliparous women accounted for 74.25%

About 52% of primipara and 47.5% of multi has associated antepartum risk factor.

Medical disorders, mainly PET (23.41%) formed the major antenatal risk factor.

Most common indication for induction is postdatism followed by Preeclampsia.

Rate of vaginal delivery is 51.1% .Among them 65.6% delivered with single dose of PGE2 and augmentation with oxytocin.

8.59% delivered with two doses of PGE2and augmentation with oxytocin.

Rate of caesarean section is 48.3%

Common indication for induction is fetal distress.

Mean birth weight is 2.89 with range between 1.5 and 4.0kg.

No uterine rupture was encountered in the study.

CONCLUSION

The rate of induction of labour has increased nowadays with better methods for induction of labour and better techniques for evaluation of fetal wellbeing available. Clearly the favorability of the cervix has a substantial impact on the potential success of any labour induction. The present study thus shows that application of intracervical PGE2 gel caused favourable changes in the cervix by increasing the Bishop score with minimal side effects. Although labour induction is not without its risks for the mother and particularly for the fetus, intracervical PGE2 gel application followed by oxytocin is found to be safe and acceptable method for induction of labour in patients with unfavourable cervix with minimal maternal morbidity and mortality.

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PROFORMA

UNIT

NAME :

AGE : IPNO

DOA : BOOKED/IMMUNISED

OBSTETRIC CODE :

LMP :

EDD :

CYCLES :

PREVIOUS PREGNANCY OUTCOME :

ASSOCIATED PREGNANCY COMPLICATION:

Maternal:

Fetal:

ON EXAMINATION

Pallor: Height

Febrile Weight

Jaundiced Pulse rate:

Pedal edema Blood pressure:

CVS

RS

Per Abdomen Examination:

Uterus

Acting /Not acting

Engagement

FHR

Liquor

Per Vaginal Examination

Cervix effacement

Position

Dilatation

Membranes

Vertex
Pelvis
Liquor

Bishop Score:

INVESTIGATION:

Haemoglobin:

Urine

Blood Group

Ultrasonogram:

AFI:

Cardiotocogram:

Reason for Induction:

Mode of Induction:

Time of Induction: Time 6hr 12hr 18hr 24hr

Bishop score:

Side Effects:

Maternal: Fetal:

Mode of Delivery:

NVD/Forceps/Ventouse/LSCS Induction – Delivery Interval

Indication :

Time:

Baby sex:

Weight:

Apgar:

Admitted/Not Admitted: Cause:

Complication:

Intrapartum:

Postpartum:

Neonatal:

GLOSSARY

IOL - Induction of Labour

CTG - Cardiotocogram

FHR - Fetal heart rate

PET - Preeclamptic toxemia

AFI - Amniotic fluid index

PPH - Postpartum haemorrhage

APH - Antepartum haemorrhage

CPT - Complete perineal tear

IUGR - Intrauterine growth restriction

MSL - Meconium stained liquor

NVD - Normal vaginal delivery

NICU - Neonatal intensive care unit

BS - Bishop score