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INDUCTION OF LABOUR: INDICATIONS AND OUTCOME

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ABSTRACT:
Introduction: 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**.**
Setting: Department of Obstetrics and Gynaecology, PRM Medical College, Baripada, India from january 2019 to december 2019.
Aim: To study the profile of induced labour in a rural medical college, Outcome of such induction in nullipara & multipara, Intrapartum, Postpartum maternal and neonatal morbidity and mortality of patients who underwent induction of labour.
Observation & Conclusion: 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. No uterine rupture was encountered in the study. . 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.

Key words: induction of labour, oxytocin, PGE2 gel

INTRODUCTION:

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 fetusis 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. 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. 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.

INDUCTION OF LABOUR is
1. Absolute if risk of continuing pregnancy is life threatening
2. Relative if not life threatening but need intervention

Medical Indications for the Induction of Labor are 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.[1,2,3]

Contraindications to the induction of labor: are 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 are 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 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.[4]

	Score			
	0	1	2	3
Position	Posterior	Middle	Anterior	--
Consistency	Firm	Medium	Soft	--
Effacement	0-30%	40-50%	60-70%	80%+
Dilation	Closed	1-2cm	3-4cm	5+cm
Station	-3	-2	-1/0	+1/+2

Additional factors: +1 point for each previous vaginal birth, -1 point for first time birth givers

Add the score for each factor.

Scores lower than 5 suggest labour will not begin without induction.
Scores 9 and higher indicate labour will likely begin spontaneously.
Scores 3 and lower may indicate that an induction would not be successful

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.

Burnett's Modification of the Bishop Score.[5]

Score	Cervical Dilation	Cervical Effacement	Station of Baby	Cervical Position	Cervical Consistency
0	closed	0-30%	-3	posterior	firm
1	1-2cm	40-50%	-2	mid-line	moderately firm
2	3-4cm	60-70%	-1,0	anterior	soft (ripe)
3	5+ cm	80+%	+1, +2		

Add 1 point to overall score for pre-eclampsia and for each prior vaginal delivery.

Subtract 1 point off overall score do postdate pregnancy, no prior births, premature or prolonged rupture of membranes (water breaking).

A score of 5 or less is said to be "unfavorable." Unfavorable scoring shows mother is a candidate for cervical ripening prior to induction. A score of 6 or higher would indicate that the cervix is ripe and induction would have a higher probability of being successful. A score of 9 or higher indicates a very high probability of induction being successful.

OXYTOCIN

Oxytocin is a polypeptide hormone secreted from the posterior pituitary gland which acts as a potent uterotonic agent.Protocols using intravenous infusions of oxytocin that are used these days are largely based on the work of Turnbull and Anderson (1968). 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 al1970). These are usually set at a starting rate around 1–4 mU/min and increase variably (Lamont et al1991) arithmetically (Kurup et al1991) or logarithmically (Toaff et al1978) 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.[6-10]

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.

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.

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 repeateddaily over three days .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.

AIM OF THE STUDY

1. To study the profile of induced labour in a rural medical college.
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

It was a prospective observational study from january 2019 to december 2019 conducted at department of Obstetrics & Gynaecology, PRM Medical College, Baripada, India after approval of institutional ethical committee.

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.

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

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 as Birth weight ,APGAR ,Resuscitation ,NICU admission , Fever ,Hyperbilirubinemia were done

OBSERVATIONS:

Table 1: Distribution of age & Parity:

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

Table 2: 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

Table 3 : INDICATION OF LABOUR

Indication	Nullipara	Percentage	Multipara	Multipara percentage
Postdatism	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 Diabetes	1	0.16	3	1.09
Rh neg Preg	11	1.79	2	0.72
Severe preeclampsia	5	0.81	1	0.36
Abnormal CTG	5	0.65	4	1.45
Iminent 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.

Table 4: Methods 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

Table 5: Normal Deliveries

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.

Table 6: Caesarean Section Indications

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

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.

Table 7: Complecations:

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.

DISCUSSION & CONCLUSION:

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.

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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