ORIGINAL PROF-1081

INDUCTION OF LABOUR;
COMPARISON OF EFFICACY OF DIFFERENT METHODS

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ABSTRACT... maimoonahafeez_pk@yahoo.com. Objectives: For selecting the topic was to compare the efficacy of different methods of induction of labour. Design: Prospective observational study. Setting: Department of Obstetrics and Gynaecology Unit 11, Ghurki Trust Teaching Hospital Lahore. Period: One year, From 1st Jan 2004 to 31st Dec 2004. Subjects and methods. This study included pregnant ladies, irrespective of parity who were selected for induction of labour for different indications, after 28 weeks of gestation. Patients having abnormal presentation such as breech and patients with suspected cephalopelvic disproportion were not included. Induction method was selected according to parity, indication for induction and Bishop scoring. Results. Total no of patients admitted in the said ward during the study period was 3500, 205 were induced with different methods. This gives prevalence of induction of labour in the study group as 5.86%. Age of the patients ranged from 17-45 years/with parity varying from 0-8. Five patients with previous caesarean section were also induced. Conclusion. The most common indication for induction of labour was pregnancy induced hypertension. Success rate of method used depends on Bishop scoring, PGE2 helps in cervical ripening and gives good results in patients with poor Bishop score.

Keywords: Induction, Prostaglandins, Bishop score.

INTRODUCTION

Induction of labour means pregnancy termination any time after 28 weeks of gestation by a method that aims to secure delivery vaginally. It is a planned delivery in which parturition is done as an elective procedure at a predetermined time.

During a normal pregnancy a closed unripe cervix ensures integrity of normal pregnancy till term. At term
a complex process starts, which includes activation of ProstaglandinE2(PGE2). It causes cervix to become soft and compliant. This facilitates cervical dilatation in response to myometrial contractions.

A successful labour is more likely when the cervix is ripe. Different methods have been used for cervical ripening and induction of labour.

Successful induction of labour ending up in smooth delivery reduces the risk of

caesarean section and condition of neonate is also improved.

Since appropriate induction of labour is a central component of good Obstetric practice, there is a necessity for a safe and effective treatment for cervical ripening that would reduce the length of stay in the hospital and, more importantly, the incidence of caesarean section.

Since anquity many methods, at times frankly dangerous, have been used in an attempt to bring on labour. Massage of the breast and uterus are very old method and inefficient methods. The use of tents for cervical dilatation dates back to sixth century and stretching of the cervix digitally has been long employed. In 1838 rubber tubing was pushed into the uterus. Scanzoni used a hot carbolic acid douches in 1856 and Kraus also introduced his boogies. Since 1930 these methods have been fallen into disuse because of their relative inefficacy, their sepsis rate and risk of detaching placenta. Barnes in 1851 used rubber bags filled with water. Denman in 1756 introduced artificial rupture of membranes (fore water) and was known as "English method" of induction of labour. It remains to this day the most efficient and widely used method inspite of sacrifice of an intact amniotic sac. Hind water rupture with Drew Smith catheter was introduced in 1931, fore water preservation reduced amniotic fluid infection and risk of cord prolapse. In comparison with fore water rupture it is less efficient[1].

Ergot preparations have been used as oxytocic for centuries in Europe. In 1935, Prof. A. Stoll isolated Ergotamine from Ergot. In 1938, Prof. A. Stoll and Dr. A. Hofmann were able to partially synthesize Ergotamine. In 1943 they succeeded in preparing Methylergotamine (Methergin). Oxytocin, a posterior pituitary hormone (polypeptide) was discovered by Henry Dale in 1906. In 1950's synthetic oxytocin (syntocinon) was also introduced.

Prostaglandins have been used successfully forcervical ripening and labour induction in clinical environment since the early 1970's[2].

Most of the time induction of labour is indicated when fetus is at risk in utero but sometimes risk to the mother overweight and needs termination of pregnancy to save mother's life. In some instances both the mother and the fetus are at risk so that delivery is planned at an appropriate time.

In prolonged pregnancy perinatal mortality is increased in babies born after 287 days of gestational age3. Intrauterinegrowth retardation, often combined with other pregnancy related complications, constitutes a rather common indication for induction of labour[4]. In a study carried out in JPMC, Karachi, in 3.42% cases, intrauterine growth retardation was the indication of termination of pregnancy[5].

Oligohydramnios has been associated with fetal distress, in part due to cord compression6. Oligohydramnios often accompanies growth retardation. A high perinatal mortality was found in women whose pregnancy was complicated with Oligohydramnios[7]. Timely termination after diagnosis is important. Other indication for termination of pregnancy are intrauterine death, congenital malformation incompatible with life and Rh incompatibility.

Maternal indications include, eclampsia, chronic nephritis, recurrent pyelitis, chronic renal failure, decompensated cardiac and liver disease. Chemotherapy or radiotherapy for malignant disease constitutes a rare indication fortermination of pregnancy. Fetomaternal indications for

termination of pregnancy are, Diabetes Mellitis, premature rupture of membranes, preterm premature rupture of membranes, selected cases of abruptio- placentae. The methods used to induce labour are divided under following headings:

A Pharmacological.
1. Prostaglandins, Dinoprostone., PGF2 alpha, PGE1 (Misoprostol).

2. Oxytocin.
3. RU 486 (Mefipristone).

B Mechanical
1. Extra amniotic intra cervical catheter. It is as effective as is intra cervical PGE2 gel[8].

2. Sweeping of membranes.
3. Laminaria Tents and hygroscopic dilators.

C Surgical.

Low and high amniotomy has a central role in induction and augmentation of labour[2].

There are some advantages and disadvantages of each method used. So care should be taken for selection of a specific method. There are certain prerequisites for induction of labour which are to be met with before induction of labour, and they are as follows,

1. Proper indication for induction of labour.
2. No element of cephalopelvic disproportion and malpresentation
3. Facility for caesarean section in the premises.
4. Good Paediatric care.
5. Counselling of the patient about the need for

induction, risk factors involved and chances of failure.

STUDY METHODOLOGY

This prospective observational study was carried out in Unit-ll of the department of Obstetric Gynaecology, Ghurki Trust Teaching Hospital, Lahore, over a period of one year, from 1st Jan - 31st Dec 2004. This study included pregnant ladies irrespective of parity who were selected for induction of labour for different indications, after 28 weeks of gestation. The patients were admitted through out patient as well as casualty. Patients having abnormal presentation as breech and patients having suspected cephalopelvic disproportion were not included.

Patients were admitted in labour room. In booked cases their antenatal records were scrutinized to find out risk factors. Detailed history taken and examination was done. Baseline investigations were sent. The patients were given kleen enema to empty their bowel.

The induction method was selected according to parity, indication for induction and Bishop score. Prostaglandin pessary was preferred for patients with poor Bishop score; where as oxytocin was chosen in patients with good Bishop score i.e more than [6]. Low amniotomy and sweeping of membranes were selected for multiparous patients with good Bishop score.

INEDUCABILITY RATING(BISHOP SCORE)

Dilation	0	1-2	3-4	5-6
Effacement%	0-40	40-60	60-80	>80
	0	1	2	3
Station	-1	-2	-1	+U2
	0	1	2	3
Consistency	Firm	Medium	Soft	-
	0	1	2	
Position	Posterior	Mid	Anterior	-

	0	1	2	-

Intra cervical Foley catheter for induction was used in selected cases for example non affording patients who could not purchasePGE2 and in patients with intrauterine death or malformed fetus remote from term. Induction with high amniotomy was not done as it is an obsolete method now a days. At times combined methods for induction were preferred to secure vaginal delivery and to make induction certain for example PGE2 along with sweeping of membranes or low amniotomy.

RESULTS

Table-l. Ages of the patients induced.

Ages	No.	% age
17-20	20	9.75
21-25	88	42.92
26-30	64	31.21
31-35	26	12.68
36-40	6	2.93
41-45	1	0.49

The most common age group induced ranged from 21 -30 years.

Total number of patients admitted in Obstetrics ward of the said unit during the study period was 3500.205 were induced with different methods. This gives prevalence of induction of labour in this study group as 5.86%. Age of the patients ranged from 17-45 years, with parity varying from 0-8, Five patients with previous caesarean section were also induced.

The most common indication for induction of labour was pregnancy induced hypertension. In a study carried out in Karachi, hypertensive disorders were the most common indication for induction of labour[5]

Table-ll. Parity of the patients .

Para	No.	% age
0-2	147	71.17
3-5	45	21.19
6-8	13	6.34

The most prevalent group induced was of parity 0-2.

In certain cases there may be more indications for induction of labour. PIH was the commonest cause for induction. Uncontrolled Diabetes or patients with well controlled diabetes may require termination of pregnancy between 38-40 weeks. After 38 weeks there is an increased prevalence of large for dates infants(3 vs

In 24 patients two PGE2 vaginal passeries were used and in two patients three PGE2 vaginal passeries were used. At times combined methods of induction were used to make induction certain. They were used when Bishop score was poor or patient was remote from term. IDI was prolonged in patients who were remote from term. More time was taken for ripening of cervix. At times combined methods of induction were used. Out of 205 patients 33patients had c/s. So out of 172 patients most of the patients delivered within 12 hours. The patients who took more than 24 hours were mostly those who were remote from term. Method of induction did not alter IDI. Out of 12 patients 9 patients were induced with PGE2, in one patient Syntocinon induction was used. In two patients combined methods for induction were used. In one patient 3 PGE2 vaginal passeries and syntocinon was used. In second patient sweeping of membranes

was followed by PGE2 vaginal passery. Patients who underwent c/s for fetal distress and failure of progress were included in successful induction of labour.

Table-Ill. Indications for induction of labour.

Indications	No.	%age
Pregnancy induced hypertension	50	24.39
Post dated	38	18.54
Leaking per vagina	37	18.05
Intra uterine death	12	5.85
Abruptio-placentae	10	4.88
Bad obstetric history	10	4.88
Malformed babies	4	1.95
Diabetes Mellitis	3	1.46
Rh incompatibility	2	0.97
PIH + Post dated	25	12.19
PIH + PROM	10	4.87
PROM + Post dated	2	0.97
IUD + PIH	2	0.97

PIH (Pregnancy induced hypertension.) PROM (Premature rupture of membranes.) IUD (Intauterine death:)

Table-IV. Methods used for induction of labour.

Methods	No.	% age 0-4 5-9	Bishop sore 10-13			Failure
PGE2	141	68.78	125(88%)	16(11.34%)	-	9 (6.4%)
Syntocinon	20	9.75	-	18(90%)	2(20%)	1(5%)
Sweeping of membranes	8	3.9	-	4(50%)	4(50%)	-
PGE2	5	2.44	-	5(100%)	-	-
ARM	5	2.44	-	1(20%)	4(80%)	-
Foley's catheter	3	1.46	1(33%)	2(66%)	-	-
ARM+ Sytocinon	6	2.93	-	6(100%)	-	-
PGE2+Sytocinon	5	2.44	1(20%)	4(80%)	-	1(20%)
Sweeping+PGE2	5	2.44	-	5(100%)	-	
PGE2+Sytocinon +ARM	3	1.46	1(22%)	2(66%)		1(33%)
PGE2+Foley's catheter	2	0.97	1(50%)	1(50%)	-	-
PGE2+PGEa+ synyto +ARM	1	0.48	1(100%)	-	-	-
Synto+Foley's catheter	1	0.48	-	1(100%)	-	-
Total	205		130	65	10	12(5.85%)

PGE2 (Prostaglandin E2.)	ARM (Artificial rupture of membranes.) balloon.) (Extra amniotic)	Synto (Syntocinon.) Foley's catheter (Intra cervical Foley's catheter

Table-V. Effect of OOP IDL

OOP (weeks)	No of pts	No of pts with IDI>24 hrs
28-30	**10(4.87%)**	**7(70%)**
31-33	**30(14.63%)**	**16(53.33%)**
34-36	**60(29.27%)**	**4(6.66%)**
37-41	**105(51.22%)**	**5(5.25%)**

Poorer the Bishop's score longer the IDI. Cervix takes more time for cervical ripening.

DISCUSSION

The study was conducted to evaluate the efficacy of different methods of induction of labour. The most common indication for induction of labour was pregnancy induced hypertension. 24.39% patients were induced for this reason. The results were consistent with study conducted in Karachi, JPMC in1995, in which 27.39% patients were induced5. In some cases there were more than one reasons, as in this study about 15% patients had induction of labour because of PIH along with some other indication.

Table-VI. Bishop score & IDL

Bishop score	No. of Pts	No of pts IDI>24 hrs
0-4	130(63.4%)	78(60%)
5-9	65(31.71%)	6(9.2%)
10-13	10(4.88%)	-

The most prevalent method used for induction of labour was PGE^2 vaginal pessary. Mostly it was used in patients with poor Bishop score. Prostaglandins have been used successfully in clinical environment since 1970's.lt is used for cervical ripening and subsequent induction of labour.

Table-VII. Caesarean section & its indication

Indications	No. of pts	%age
Failure for induction	12	5.85%
Fetal distress	12	5.85%
Failure to progress	9	4.39%
33 patients ended in caesarean section for various reasons.		

Table- VIII. Induction delivery interval (IDI)

IDI(Hrs)	No. of pts	%age
0-12	115	67.09%
13-24	45	26.16%
>24 hrs	12	6.98%

Table-IX. Success rate

Success/failure rate	No. of pts	%age
Successful induction of labour	193	94.15%
Failure of induction	12	5.85%

Prostaglandins are synthesized and released at or very close to their target organs. Circulating Prostaglandins are rapidly inactivated. Systemic administration of these agents require large doses and are likely to provoke troublesome side effects. Consequently in clinical practice , local route of administration within the genital tract have gained wider acceptance. Prostaglandins are said to have a role in initiation and augmentation of labour by acting via Prostaglandin receptors. These receptors belong to plasma membrane G- protein- linked seven trans membrane spanning protein. The prostanoid receptors are classified as TP (thromboxane A2, TXA2), DP (PGD2), IP (PGI 2), FP (PGE2a) and EP (PGE2). In terms of myometrial function, The Prostaglandins most commonly have been considered as uterotonins. PGE2a and TXA2 are vasoconstrictors and cause uterine contraction. PGE2, PGD2& PGI2 cause relaxation of smooth muscles.

There is modification of relative expression of various Prostaglandin's receptors in myometrium during pregnancy at various stages of gestation. It may account in part of varied response of human myomertrial tissues to Prostaglandins. There is another variable that is caused by lack of specificity of prostanoids via different receptors. For example PGE2 causes smooth muscles relaxation at low concentration via adenycylase, cAMP accumulation. At higher concentration PGE2 may act via GXi or GXq to inhibit adenylcyclase or activate phospholipase C, thereby increased myometrial cell Ca++ and uterine contraction. Prostaglandins are available as following preparations:

I. Dinoprostone, available as a Intracervical PGE2 gel =0.5 mg. b Intravaginal PGE2 gel =1or2mg c Vaginal tablet =3 mg d Controlled release intravaginal PGE2 insert =10 mg.

(Cervidil, Forest, USA; Prospess, Ferring, Sweden) Preinduction cervical ripening with slow release PGE2 vaginal pessary resulted in a greater change in Bishop score than with intracervical PGE2. There was a trend towards shorter time to delivery with PGE2[10].

II. Prostaglandin PGE2a, used as extraamniotic and intraamniotic instillation. A prospective randomized trial showed significantly shorter labour and reduced analgesia requirement, decreased surgical delivery and postpartum haemorrhage rate in women treated with PGE2a[11].

III. Misoprostol PGE1, it is a cheap, effective and safe cervical ripening agent in late pregnancy[1213]

IV. Mifepristone, RU486(antiprogesterone) has a promising role in induction at term with unripe cervix i.e Bishop score < 4[14].

Mechanical methods of induction leads to local release of Prostaglandins. Insertion of cervical catheter into the cervical os has been said to be as effective as """" intracervical PGE2 ge[18].

" Similarly sweeping of membranes at 39 weeks of J gestation reduced the need forformal induction of labour. It significantly decreases the number of patients that will reach 41 weeks[15'16]

Likewise carefully selected, amniotomy has a

central place in labour induction and augmentation[2].

Syntocinon is very effective if used in patients with Bishop score >6. Dosage can be minimized by use of a computer- controlled pump[17].

Each method was used individually or in combination after ruling out contraindications to vaginal delivery. The utmost aim was to achieve vaginal delivery to reduce caesarean section rate. If purely single method would have been used irrespective of Bishop score then failure of induction was more likely hence high caesarean section rate, which was unethical. It was a study on human beings so utmost priority was to patient's benefit, operative intervention was done when ever required.

Syntocinon infusion, sweeping and artificial rupture of membranes were used in patients with good Bishop score. Another indication for artificial rupture of membranes was abruptio- placentae. PGE2a and mechanical stimulation with Foley's catheter was done in patients with malformed babies and intra uterine death and are remote from term. In these particular patients uterus is not ready to respond because of less oxytocin receptors so induction delivery interval is usually prolonged.
In this study it was more than 24 hours. Mechanical stimulation was used in three patients, it gave 100 % results. It can be a good alternative to expensive Prostaglandin induction in carefully selected cases. Prostaglandins were effective in patients with unripe cervix. PGE2 vaginal pessary was used in 68.78% patients. Maximum dose used was 9 mg of Dinoprostone. [9] out of 12 patients who had unsuccessful induction were induced with PGE2 vaginal pessary. Maximum failure rate was observed because about 70% induction were done with PGE2 vaginal pessary. Further more it was used in patients with poor Bishop score. Uterine response was unpredictable in these patients especially in primigravida, more so if they are remote from term.

In patients with favourable cervix other methods were used. The success rate was high because of good Bishop score.

Mostly patients delivered in 12 hours of induction of labour i.e in 67% patients induction delivery interval was <12 hours. The same fact was observed in study carried out by Roohi M in PMC Faisalabad18. IDI was more than 24 hours in patients who were remote from term with poor Bishop score.

Morbidity associated with induction was insignificant. No patient had rupture uterus

CONCLUSION

In short with the availability of different methods of induction, with proper selection and monitoring of patients labourcan be induced successfully, especially in patients with poor Bishop score. With the advent of Prostaglandins delivery can be achieved vaginally even in patients with unripe cervix. It reduces the caesarean section rate and duration of hospital stay is also shortened.

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