

Mechanical Induction of Labour with Oxytocin AugmentationGowri Sree Vukkem¹, Rita Ekka²¹Associate Professor, Department of Obstetrics & Gynaecology, Kamineni Institute of Medical Sciences, Narkatpally, Nalgonda, Telangana, India.²Associate Professor, Kamineni Institute of Medical Sciences, Narkatpally, Nalgonda, Telangana, India.

Received: 25-11-2023 / Revised: 23-12-2023 / Accepted: 18-01-2024

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Conflict of interest: Nil

Abstract:**Background:** One of the most popular obstetric procedures performed in obstetric facilities is labour induction. For over one-fifth of labours, induction is required. There are currently a variety of techniques for inducing labour; the most popular ones are mechanical and pharmacological. The aim of present study is to assess the efficacy of mechanical method of induction of labour with oxytocin augmentation.**Methods:** The present prospective study was conducted at department of obstetrics and gynecology among 100 pregnant women requiring induction of labour during the study period of two years. A thorough medical history was recorded, including the mother's age, parity, and gestational age and other baseline investigations were completed and data was analyzed using SPSS version 25.0.**Results:** The most common indications of labour induction were term gestation (62%), gestational hypertension (20%), GDM (5%). Induction to delivery interval was variable in primigravida (62) and multigravida (38). The mean weight of neonate was 3.026 kgs. APGAR score at 1 mt was 6.48± 0.87 and at 5 mt was 8.87 ± 0.07.**Conclusion:** Mechanical methods work well for inducing labour. If they would be used in combination with other methods would give best results.**Keywords:** Induction, Labour, Mechanical, Outcome, Parity.

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Introduction

One of the most frequent interventions performed during the perinatal period is induction of labour. For the majority of obstetricians, it is currently a daily habit. Currently, it's thought that 20% of all pregnant women have labour induction.[1] The term "labour induction" describes the artificial stimulation of uterine contractions prior to the commencement of natural labour. Basically, induction is advised in a few recognised medical disorders and occasionally in non-medical circumstances.

Preeclampsia, eclampsia, premature rupture of the membranes, prenatal hypertension, gestational diabetes, substantial foetal development retardation, and post-term pregnancy are a few examples of medical problems that require induction of labour.[2] The idea behind inducing labour under these circumstances is that carrying a pregnancy to term poses greater danger than ending it. Living in a remote location far from a hospital for maternity care represents one of the non-medical circumstances that can call for labour induction. On the other hand, a variety of circumstances, including placenta previa, transverse foetal position, active vaginal infection, history of myomectomy, umbilical cord prolapse,

and gestational age less than 39 weeks (or no indication of lung maturity), make induction of labour contraindicated.[3]

Many women undergoing labour induction have unfavourable cervix, which can result in a protracted and challenging induction. As a result, cervical softening techniques, such as mechanical or pharmaceutical ones, are frequently employed. Cervical ripening prior to induction is frequently used to improve the chances of a successful labour induction.[4]

Mechanical methods for labor induction are older than pharmaceutical methods. They have been utilised for many years and are still used, sometimes in conjunction with pharmaceuticals and other times on their own. The fundamental idea behind mechanical induction of labour is to induce uterine contractions by inserting different kinds of tools into the uterine cavity or the extra-amniotic area.[5]

By applying direct pressure to the internal cervical rostral region, mechanical methods aim to increase the ripening and dilation of cervix by stimulating local prostaglandin and oxytocin release. There are two types of balloon catheters that are commonly

used: the commercial double balloon catheter, which squeezes the cervix from both above and below, and the traditional Foley catheter, which is inflated above the cervix with 30 ml of saline poured into the balloon. Similar results can also be achieved by inserting laminaria tents and osmotic dilators into the cervical canal.[6]

One of the most popular and effective drugs for inducing labour is oxytocin. A hormone called oxytocin is naturally produced during pregnancy and is significantly increased during delivery. In order to be ready for labour, the uterus expresses a lot of oxytocin receptors during the end of pregnancy. Oxytocin is naturally released when labour is about to begin in order to promote uterine contractions. Since oxytocin processes were identified several decades ago, the drug has been utilised to induce labour since years. It is useful to use throughout both the pre-induction cervical ripening phase and the induction phase, while it is suggested to be used during the induction phase.[1]

Over the past 2 decades there has been an abrupt increase in labour induction rate, for variety of indications. The present study was conducted to find out the efficacy of mechanical method of induction of labour. Outcome measures were induction to delivery time, mode of delivery and neonatal outcome.

Material and Methods

The present prospective study was conducted at department of obstetrics and gynecology among pregnant women requiring induction of labour during the study period of two years. Ethical permission was taken from institutional ethical committee before the commencement of study. Informed consent was signed by patients after explaining them about the study procedure.

Total 100 pregnant women were selected for the study through consecutive sampling. Patients were selected on the basis of following inclusion and exclusion criteria-

Inclusion Criteria: Women with gestational age \geq 37 wks, singleton pregnancy with cephalic presentation, intact membranes and Bishop score \leq 5 and those who had obstetric indication for induction of labour.

Exclusion Criteria: Women with multiple pregnancy, fetal demise, anomalous baby, fetal

mal-presentation, previous uterine surgery and those who had contraindications for vaginal delivery.

A thorough medical history was recorded, including the mother's age, parity, and gestational age. Every baseline investigation was completed.

Using strict aseptic measures, Foley's catheter No. 18 F was placed inside the cervix (extra amniotic). The catheter's balloon was inflated with 50 ml of normal saline and the catheter was pushed so that the bulb rested on the internal os of the cervix. After twelve hours, the patients were evaluated again, and in those who did not exhibit regular uterine contractions or cervical changes, augmentation with oxytocin 5 units in 500ml of normal saline with titrated doses was started. Patients with cervical dilatation greater than 3 cm, cervical effacement greater than 60%, or active labour were not given oxytocin augmentation. In accordance with labour room protocol, more workers were added for the necessary instances.

It was agreed that females who did not advance would have a caesarean delivery. The criteria for determining failure to advance were either no head descent after one hour of full dilation despite strong uterine contractions, or two hours after the active period (three to four contractions per ten minutes lasting between thirty and forty-five seconds, cervical dilatation $>$ 3 cm, and effacement $>$ 80%). Delivery modality and induction delivery interval were used to measure the outcome.

Statistical Analysis: Data entry and analysis were performed using the software programmes Excel and SPSS (SPSS Inc, Chicago V 25.0). For continuous data in tables, the findings were averaged (mean \pm Std. Deviation) for every parameter.

Results

Maximum numbers of women were in the age group of 21 to 25 years and mean gestational age of 40 ± 6 weeks. Vaginal delivery was done in 65% of patients and C section was done in 35% of patients. The most common indication of labour were term gestation (62%), gestational hypertension (20%), GDM (5%). The less common ones were decreased PFM, pre-eclampsia, RH negative, Oligohydramnios, IUGR, Oligohydramnios with IUGR and chronic hypertension as shown in table 1.

Table 1 Indications for induction of labour

Indications	Percentage
Term gestation	62
Gestational hypertension	20
GDM	5
Decreased PFM	4
Pre-eclampsia	3

RH negative	2
Oligohydramnios	2
IUGR	1
Oligohydramnios with IUGR	1
Chronic hypertension	1
Total	100

Induction to delivery interval was variable in primigravida and multigravida. 62 primigravida delivered within 25hrs. and 37 delivered within 25 hrs. in multigravida and 1 delivered within 35 hrs. of induction as shown in table 2.

Table 2 Induction to delivery interval

Time duration	Primigravida	Multigravida
<6 hrs.	4 (6.45)	0
6 to 10 hrs.	22 (35.4)	14 (36.8)
11 to 15 hrs.	30 (48.3)	10 (26.3)
16 to 20 hrs.	5 (8.06)	8 (21)
21 to 25 hrs.	1 (1.6)	5 (13.1)
26 to 30 hrs.	0	0
31 to 35 hrs.	0	1 (2.6)
Total	62	38

The mean weight of neonate was 3.026 kgs. APGAR score at 1 mt. was 6.48 ± 0.87 and at 5 mt. was 8.87 ± 0.07 as shown in table 3.

Table 3 Neonatal outcome

Neonatal outcome	Mean \pm SD
Birth weight (kg)	3.026 \pm 0.278
APGAR score at 1 mt	6.48 \pm 0.87
APGAR score at 5 mt	8.87 \pm 0.07

Discussion

The process of mechanically inducing labour involves applying pressure locally to the wall of the cervix of the uterus and/or overstretching the lower segment of the uterine wall. As a result, the uterus would be stimulated to secrete prostaglandins. These mechanisms of action are carried by each instrument in a distinct manner.[7] The balloon catheters, for example, primarily affect the cervix. Once the balloon is inflated, it applies direct pressure to the cervical wall, causing prostaglandin secretion and consequent contractions of the uterus.[8] Conversely, hygroscopic dilation agents function via regulated mechanical force. The device extends inside the cervical canal to exert pressure after absorbing the local tissue fluids.[9]

The double-balloon catheter, the laminaria tents, and the Foley catheter are the most often used devices for mechanical induction. After inserting catheter into the intrauterine extra-amniotic space or the cervical canal, balloon is inflated, and the catheter may or may not be subjected to traction.[8] Laminaria tents are hydrophilic structures made of hydrophilic materials or seaweed. Because of their hydrophilic nature, they are put inside the cervical canal and cause the cervical wall to gradually extend. Stimulating the Ferguson reflex is likely another way via which these devices induce uterine contractions.[10]

Artificial rupture of membranes and digital sweeping or stripping of the membranes are two

more, less popular techniques for mechanically inducing labour. The process of digital membrane stripping involves moving the fingers within the cervix to detach the foetal membranes from the cervical wall. This induces the release of prostaglandins, which in turn causes uterine contractions.[11] In order to purposefully tear the foetal membranes, an artificial rupture of membranes procedure, also known as an amniotomy, entails inserting a sterile plastic hook into the cervix and vagina. Labour is facilitated by prostaglandin secretion and uterine contractions that occur when amniotic fluid is discharged into the vagina.[12]

The current study's gestational age of 40 + 6 weeks is similar to that of a study published by RoudsariFV et al.[13] The gestational age of the 108 women in the Foley's catheter group, who were chosen for induction of labour, was 40 ± 0.9 weeks, as per their study. In a study of 140 women chosen for induction of labour, Murmu S et al [14] found that 31.5% of the women in Foley's catheter group had gestational ages of 40 weeks or more.

The most common indication of labour in present study were term gestation (62%), gestational hypertension (20%) and GDM (5%). In a study done by Priyanka et al and Nasreen et al the main cause of labour induction was oligohydramnios. [15,16] A research by Kenneth G et al included 62 cases of vaginal Misoprostol and 65 cases (group A) of Foley's catheter with intracervical gel. In both

the A and B groups, women with post-dated pregnancy and pre-eclampsia was a key indicator for inducing labour.[17]

In the present study Induction to delivery interval was variable in primigravida and multigravida. 62 primigravida delivered within 25hrs. and 37 delivered within 25 hrs in multigravida and 1 delivered within 35 hrs of induction.. Sabiha N et al reported a comparative study of intravaginal Misoprostal in 50 cases (Group 1) versus Foley's catheter 49 cases (Group 2).[4]

APGAR score at the end of 1 minute is less in present study compared to study reported by Fate et al and Nasareen N et al and is comparable to these studies at the end of 5 minutes.[13,16].

Limitation of the Study: One limitation of this research is that cross-sectional studies do not provide enough data to support changes in practice, especially when compared to other study designs.

Conclusion

Mechanical methods work well for inducing labour. Membrane stripping, balloon catheters, hygroscopic dilators, and artificial membrane rupture are methods used in mechanical induction. Although the mechanical induction of labour has been mostly superseded by pharmaceutical treatments, there are no consensus guidelines that advocate for its usage. There are still contradicting studies based on literature. Nonetheless, everyone agrees that using a combination of approaches will produce the best results.

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