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ROLE OF CERVICAL LENGTH ASSESSMENT BY TRANSVAGINAL SONOGRAPHY IN PREDICTING THE SUCCESS OF LABOUR INDUCTION IN NEAR TERM WOMEN

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Abstract

Background: Progressive cervical effacement, cervix dilatation and decent of the presenting part leading to vaginal delivery by iatrogenic uterine contractions of a healthy baby is known as induction of labour.
Cervical length measurement by transvaginal ultrasonography is more objective way for assessing cervical status In late pregnancy, measurement of length of the cervix could help in predicting the spontaneous onset of labour and could assist clinicians in assessing favourability for the induction of labour.

Aim: This aim to find the significance of length of cervical by transvaginal sonography in predicting the successful induction of labour in near term women.

Objectives:

1. ***To evaluate the cervical length by Transvaginal sonography. 2. To assess the progress of labour in women with different cervical length after induction by misoprostol tablets in relation to cervical length within 24 hours. 3. To assess the overall course of induction in terms of maternal and neonatal outcome.***

Material and methods:
In the study, Near term women undergoing induction of labour, will be subjected to history taking, examination and required investigations. A formula is used to measure the sample size, which has the desired level of accuracy, the desired level of confidence, and the approximate proportion of the attribute in the population. Total study participants will be selected among term pregnant primigravida women admitted for delivery after screening through inclusion and exclusion criteria. Prior to the enrolment, written informed consent will be obtained from eligible participants. Selected cases will be subjected to trans-vaginal sonography for cervical length assessment and routine digital examination and then induction of labour will be done with misoprostol.
Expected Results: Women having smaller cervical length are expected to have more favourable outcome of induction in comparison to women with longer cervix near term.

Keywords: Induction of labour, Cervical length, Transvaginal sonography

INTRODUCTION

Progressive cervical effacement, cervix dilatation and decent of the presenting part leading to vaginal delivery by iatrogenic uterine contractions of a healthy baby is known as induction of labour (1). Vaginal delivery before onset of spontaneous labour by iatrogenic stimulation of uterine contraction is Induction of labour (2).

Induced pregnancies for medical indications before or near term are about 15% (3). Indication for labor induction is when mother or fetus benefits outweigh those of continuing pregnancy, such as restriction of fetal growth, PROM, post-dated pregnancy or medical disorders with pregnancy and fetal death, etc. (3).

As gestational age advances, risks related to pregnancy also increases, at this time induction of labour seems to decrease the risk of caesarean section beyond 41 weeks of gestation and may be even earlier. Perinatal death and stillbirth rates can be reduced to significant level by labour induction after 41 weeks of completed gestation and not waiting for spontaneous labour . Complications related to preterms such as respiratory difficulties, infection, feeding, jaundice, admissions in NICU and perinatal mortality when labour induction is done prior 39 weeks in without any medical indications like intra uterine growth restrictions (IUGR), pre eclampsia ,or hypertension. Better outcomes are observed in women when induction of labour is done beyond 34 weeks and prior 37 weeks in women with hypertensive disorders like pre-eclampsia, eclampsia and pregnancy-induced hypertension, but it will have no eefect on outcome of baby.
The condition of the cervix is the most significant factor in predicting the probability of successful labour induction. In the evaluation of remodelling and ripeness of the cervix before labor induction, multiple methods were tried and newer methods are being pursued. Few research in asymptomatic pregnant women focused on the significance of cervical duration, primarily on the gestational timeframe very close to birth, either before labor induction or in post-date pregnancies (1).

The goal of this study is to observe the length of the cervix in near-term nulliparous women by transvaginal ultrasound examination and to determine if the measurements could be used in the prediction of labor induction.

RATIONALE:

On an average 15% of women require induction of labour before spontaneous onset near term. Presently success of induction is predicted by pre induction NST and Bishop score.

Bishop score has got limitation of subjective error. Transvaginal cervical length measurement could be beneficial in this condition and handy objective component may lead to better predictive value.

For induction of labour, we will use misoprostol as an inducing agent. It is steady, inexpensive at ambient temperature and can be given through several routes, such as orally, vaginally, and sublingually. I would like to do the present study with this context.

AIM:

This aim to find the significance of length of cervical by transvaginal sonography in predicting the successful induction of labour in near term women.

OBJECTIVE:

1. To evaluate the cervical length by Transvaginal sonography.
2. To assess the progress of labour in women with different cervical length after induction by misoprostol tablets in relation to cervical length within 24 hours.
3. To assess the overall course of induction in terms of maternal and neonatal outcome.

Ethical approval : Legal approval of the Institutional Ethics Committee will be obtained (IEC).
Duration of Study: 2 year.
Study design: Prospective observational study

Study Site: Department of Obstetrics and Gynaecology, AVBRH, Datta Meghe Institute of Medical Sciences, Sawangi (Meghe), Wardha.

Study Population – Pregnant women in the Obstetrics & Gynaecology IPD unit, in the AVBRH hospital, Sawangi, Meghe, complying with research requirements for inclusion and exclusion.

Inclusion criteria:

- Signs of labor induction are post-term pregnancy,
- oligohydramnios,
- intrauterine growth restriction (IUGR),
- pre-eclampsia,
- intrauterine fetal death (IUFD),
- elevated vaginal leakage with intact membranes or a medical condition that warrants termination of pregnancy.
- Singleton pregnancy.
- Cephalic presentation.
- Average size baby.
- Pregnant women with Gestational age between 34-42 completed weeks.

- Reassuring NST pattern before induction.
- Women consenting for the study.

Exclusion criteria:

- Onset of labour or true labour pains assessed by cervical changes.
- Any contraindication for induction of labour.
- Previously scarred uterus(uterus surgery).
- Cephalo-pelvic disproportion by clinical pelvimetry
- Amniotic fluid index Less than 5 that is severe oligohydramnios
- Multiple gravid uterus.
- Fetus Grows beyond a specific threshold (weighing above 4kg)
- Placenta previa.
- Any fetal complication detected before induction e.g., fetal distress, bradycardia, congenital malformation etc.
- Women not willing to participate.

Sample size: The sample size was determined using the formula, after assuming a 95 percent confidence interval and a 6 percent error margin.

$n=z21-\alpha/2.P.(1-P)/d2$
in which $z21-\alpha$ is the level of significance at 95 % confidence interval =1.96 P= 10 %=0.1
D= desired error of margin=5%=0.06 Power of the test=80 %
$n = 1.962x0.1x(1-0.1)/0.062$

=96.04

The sample size of 100 will be considered in the study. For expected 4% loss of subjects due to any reasons during study.

METHODOLOGY

In the study, Near term women undergoing induction of labour, will be subjected to history taking, examination and required investigations. A formula is used to measure the sample size, which has the desired level of accuracy, the desired level of confidence, and the approximate proportion of the attribute in the population. Total study participants will be selected among term pregnant primigravida women admitted for delivery after screening through inclusion and exclusion criteria. Prior to the enrolment, written informed consent will be obtained from eligible participants. Selected cases will be subjected to trans-vaginal sonography for cervical length assessment and routine digital examination and then induction of labour will be done with misoprostol.

For all women in the lithotomy role study group, TVS will be performed, the vaginal probe will be implanted under direct visualization, and the urinary bladder will be evacuated. The midline sagittal plane of the cervix wiil was identified by the amniotic fluid, presenting part, and pulled back by the vaginal probe until the lightest touch provided a clear image of the cervical canal with the proximal one-third of the ultrasound image fixing the inner cervical os. To get the best longitudinal axis of the cervix, the probe will be shifted slightly. The CL

calculation will be correct when the following conditions are met. The sagittal plane of the cervix makes it possible to imagine the entire length of the cervical canal. Cursors placed in precise contact with the closing points of the internal and external cervical os in the absence of excess pressure on the ultrasound probe. The TVS probe of 7.5Hrtz with condom over it will be used for transvaginal sonography device to measure the duration from internal os to external os. Any funneling and dilatation is noted. Cervical length will be noted in mm and tabulated at the difference 5mm gradients.
Induction of labor shall be carried out with the aid of a tablet of 25mcg of Misoprostol (Misoprost, Cipla Ltd 289, JBB Marg, Mumbai 400008) which is put into the posterior fornix and then repetition can be done for a maximum of five doses at intervals of 3 hours or until the women enters into the active stage of labor, defined by dilatation of cervix by 3 cm , 70 per cent uterine contraction effacement, or 70 per cent uterine contraction effacement. If the subject does not enter into the active stage even after five doses of misoprostol, the failure to induce misoprostol will be deemed to have failed.
By carefully monitoring the labour phase, the chances of fetal distress and uterine hyperstimulation will be controlled. In this study, the primary outcome will be evaluated by successful induction of labor and vaginal delivery within 24 hours.

The primary outcome variable is the duration and induction of the latent process to the delivery interval.
The secondary variable will be overall maternal and fetal outcome after induction.
With the help of EPI-6 and SPSS version 20 software, statistical analysis and data analysis will be carried out. Fisher's precise and student's t-test will be used to compare the transvaginal sonography and Bishop's score measurements along with the primary and secondary results in the univariate analysis. Utility of cervical ultrasound measurement and the score of Bishop in independently predicting active labor induction (vaginal delivery will be performed by analysis of bivariate logistic regression within 24 hours).

EXPECTED OUTCOME

Women having smaller cervical length are expected to have more favourable outcome of induction in comparison to women with longer cervix near term. Total number of vaginal deliveries and total number of caesarean sections will be calculated from total number of induced patients and their relation with cervical length at term will be assessed. Sensitivity, specificity, positive and negative predictive value and efficacy will be calculated. The maternal and fetal outcome will also be assessed.

DISCUSSION:

Complications linked to childbirth induction include prolonged labor, failure of induction and an increased risk of Cesarean delivery, and the probability of these complications is greatly affected at the beginning of induction by the state of the cervix3-5. Several methods, including the use of prostaglandin analogs and mechanical dilators, have been suggested to minimize the Cesarean delivery rate and other complications associated with labor induction in patients with an unripe cervix.

Because of the controversial assessment of cervical nature by various examiners, there is limited predictive value of the Bishop’s score for the result of labour induction, hence more chances of subjective error. The overall bishop score is assessed by a trained professional of the following five components by manual vaginal examination;

- In centimeters cervical dilatation
- As a percentage cervical effacement
- Consistency of cervix
- Position of cervix
- Station of the fetal head in reference with pelvic bone.

With a score of 5 or less, it is unlikely that labour will begin without induction. It indicates that labour will most likely start spontaneously with a score of 9 or more. For clinical management, ratings between 5 and 9 require additional attention and professional judgment.

According to the Revised Bishop pre-induction cervical scoring system, the length of the cervix was replaced by the length of the cervix in cm, with the following scores: 0 for >3 cm, 1 for >2 cm, 2 for >1 cm, 3 for >0 cm. Cervical length can be faster and more accurate to test and have less inter-examiner variability in contrast to cervical effacement.

50% of cervical length is made up by supravaginal portion of cervix. Cervical length measurement by transvaginal ultrasonography is more objective way for assessing cervical status (5). In late pregnancy, cervical length assessment could assist in predicting the spontaneous initiation of labor and could assist clinicians in determining favorability for labor induction. Maternal oligohydramnios, bladder filling, obesity, attenuated echoes of the fetal head or artificially lengthened cervical measurements induced by bladder compression do not impact transvaginal sonography in comparison to transabdominal sonography, so transvaginal sonography is more widely used (6).

In nulliparous women, longer period of induced labour is seen and this is usually attributed to late acceleration process incidence than in parous women (7). Transvaginal sonography (TVS) assessed pre-induction cervical ripeness is a more feasible alternative to the conventional Bishop ranking, since it is considered to be easy to learn reproducible and no contrast between intra- and interobserver due to image documentation (8) . Few of the related studies of transvaginal sonography were reported(9-12).

Methods used for Induction of labour (13,14,15) are prostaglandin misoprostol, dinoprostone, cervidil, Cytotec; 16,16,- dimethylprostaglandin E2, Prepidil, Carboprost or hemabate, prostin, oxytocin, amniotomy, membrane sweeping or membrane stripping, laminaria, balloon catheter or Foley catheter, hygroscopic dilators, dilapan, saline injection, nipple stimulation, intercourse, acupuncture, herbs,castor oil.

In labour induction (IOL), oral misoprostol is used and is quickly gaining popularity in environments where resources are scarce be as it is inexpensive, stable at room temperatures, and simpler to administer compared to oxytocin and dinoprostone.

Misoprostol, an analogue of prostaglandin E1, which was used originally for the prevention of peptic ulcer disease which result by the use of non-steroidal anti-inflammatory drugs (NSAIDS), is now commonly used as an IOL agent (labour agent induction). Following the accidental discovery of causing uterine contractions in early pregnancy, the use of misoprostol in obstetrics has gained significant popularity. The FDA updated its initial misoprostol labeling in April 2002 and approved its use in pregnancy. Misoprostol has some possible benefits when compared to other prostaglandins. It is stable, inexpensive at ambient temperature and can be given through various routes, such as orally, vaginally, sublingually and buccal.

REFERENCES:

[1] Shreya MS, Savitha C. Significance of transvaginal sonographic assessment of cervical length before induction of labour. International Journal of Reproduction, Contraception, Obstetrics and Gynecology.;7(9):3703.

[2] Mukherji J, Bhadra A, Ghosh SK, Hazra A, Anant M, Bhattacharya SK, et al. Cervical length measurement in nulliparous women at term by ultrasound & its relationship to spontaneous onset of labour. :11.

[3] Kant RH, Bashir A, Gupta S. Study of Transvaginal Sonographic Assessment of Cervix in Predicting the Success of Labour Induction in Nulliparous Women. 2016;18(1):6.

[4] Meijer-Hoogeveen M, Roos C, Arabin B, Stoutenbeek P, Visser GHA. Transvaginal ultrasound measurement of cervical length in the supine and upright positions versus Bishop score in predicting successful induction of labour at term. Ultrasound Obstet Gynecol. 2009 Feb;33(2):213–20.

[5] Sf E-M. Cervical Length Versus Modified Bishop's Score for Prediction of Successful Labour. J Basic Clin Reprod Sci. 2017;6(1):6.

[6] Yang SH, Roh CR, Kim JH. Transvaginal Ultrasonography for Cervical Assessment Before Induction of Labour. J Ultrasound Med. 2004 Mar;23(3):375–82.

[7] Levast F, Legendre G, Hachem HE, Saulnier P, Descamps P, Gillard P, et al. A mathematical model to predict mean time to delivery following cervical ripening with dinoprostone vaginal insert. Sci Rep. 2019 Dec;9(1):9910.

[8] Fuchs F, Bouyer J, Fernandez H, Frydman R, Senat M. OP01.02: Ultrasound cervical length measurement for the prediction of delivery before 32 weeks in emergency cerclage for cervical insufficiency: Oral poster abstracts. Ultrasound Obstet Gynecol. 2009 Sep;34(S1):62–62.

[9] Phatak, S., D. Shrivastav, G. Marfani, S. Daga, K. Madurwar, and S. Samad. "Transvaginal Sonography and Elastography Evaluation of Ectopic Pregnancy." *Journal of Datta Meghe Institute of Medical Sciences University* 14, no. 2 (2019): 86–89. https://doi.org/10.4103/jdmimsu.jdmimsu_13_19.

[10] Wankhade, A., S. Vagha, S. Shukla, A. Bhake, S. Laishram, D. Agrawal, N. Rastogi, and M. Wankhade. "To Correlate Histopathological Changes and Transvaginal Sonography Findings in the Endometrium of Patients with Abnormal Uterine Bleeding." *Journal of Datta Meghe Institute of Medical Sciences University* 14, no. 1 (2019): 11–15. https://doi.org/10.4103/jdmimsu.jdmimsu_70_18.\

[11] Roy, M., U.L. Gajbe, B.R. Singh, and P. Thute. "Morphometric Measurement of Fetal Femur Length for the Prediction of Gestational Age in the Ii Nd and Iii Rd Trimester of Pregnancy by Ultrasonography." *Journal of Datta Meghe Institute of Medical Sciences University* 12, no. 3 (2017): 187–90. https://doi.org/10.4103/jdmimsu.jdmimsu_71_17.

[12] Gadge, A., N. Acharya, S. Shukla, and S. Phatak. "Comparative Study of

Transvaginal Sonography and Hysteroscopy for the Detection of Endometrial Lesions in Women with Abnormal Uterine Bleeding in Perimenopausal Age Group." *Journal of SAFOG* 10, no. 3 (2018): 155–60. https://doi.org/10.5005/jp-journals-10006-1580.

[13] Deshmukh, S., M.L. Jungari, and U. Shrama. "Use of Pg-e 2 Gel for Cervical Ripening in Labour Induction." *International Journal of Current Research and Review* 12, no. 14 Special Issue (2020): 110–13. https://doi.org/10.31782/IJCRR.2020.110113.

[14] Nair, P.P., M.L. Jungari, M.R. Tiwari, and L.K. Butola. "Study of Induction of Labour with Oral Misoprostol and Its Maternal and Perinatal Outcome." *International Journal of Current Research and Review* 12, no. 14 Special Issue (2020): 77–81. https://doi.org/10.31782/IJCRR.2020.7781.

[15] Agrawal, M., N. Acharya, K. Joshi, and D. Shrivastava. "Effectiveness of Isosorbide Mononitrate in Cervical Ripening before Induction of Labor in Full-Term Antenatal Patients." *Journal of SAFOG* 11, no. 2 (2019): 96–99. https://doi.org/10.5005/jp-journals-10006-1668.