

Posterior Cervical Angle and Cervical Length in Predicting the Successful Induction of Labour in Nulliparous Woman

Thesis

*Submitted for Partial Fulfillment of Master Degree
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List of Abbreviations

Abb.	Full term
AUC	Area under the curve
C.S	Cesarean section
CW	Continuous-wave
IOL	Induction of labor
IUPC	Internal uterine pressure catheter
NPV	Negative Predictive value
NVD	Normal vaginal delivery
OA	Occipito anterior
OP	Occipito posterior
OT	Occipito transverse
PCA	Posterior cervical angle
PGs	Prostaglandins
PPV	Positive Predictive value
ROA	Right occiput anterior
ROC	Receiver operating characteristic curve
ROM	Rupture of membranes
US	Ultrasound

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Posterior Cervical Angle and Cervical Length in Predicting the Successful Induction of Labour in Nulliparous Woman

Abstract

Objective: To assess the value of pre-induction sonographic assessment of the posterior cervical angle (PCA) and cervical length in the prediction of successful induction of labor (IOL).

Methods: The present prospective observational study included IOL candidates who had their PCA and cervical length assessed by transvaginal ultrasonography and the Bishop score at the Obstetrics and Gynecology Department, Ain Shams Maternity Hospital, Cairo, Egypt, from 1st November 2018 to 31 May 2019. The accuracy of these tests in predicting successful IOL (defined as vaginal delivery) was compared.

Results: The analysis included 41 women with successful IOL and 29 women with unsuccessful IOL. The suggested cutoffs for the prediction of successful IOL were a PCA of more than 100°, a cervical length of less than 31 mm, and a Bishop score of more than four. The areas under the receiver operating characteristics curves for these three measures were not significantly different. However, a PCA of more than 100° had the best sensitivity (87.80%), specificity (86.21), positive predictive value (90%), negative predictive value (83.3%) compared with the other two predictors.

Conclusion: posterior cervical angle had the best accuracy in predicting successful induction of labor compared with the cervical length and the Bishop score.

Keyword: Posterior cervical angle, Cervical length, Induction of labour



Protocol of a Thesis for Partial Fulfilment of Master Degree in Obstetrics and Gynaecology

Title of the Protocol:

**POSTERIOR CERVICAL ANGLE AND CERVICAL
LENGTH IN PREDICTING THE SUCCESSFUL INDUCTION
OF LABOUR IN NULLIPAROUS WOMAN**

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What is already known on this subject?

In pregnant woman at term measurement of cervical length by transvaginal ultrasonography can predict the success of labor induction accurately in some cases.

What does this study add?

In pregnant woman at term, does the sonographic measurement of the posterior cervical angle can predict the success of induction of labor accurately?

1) INTRODUCTION

Induction of labour nowadays is a common procedure in obstetric practice: it is used in 30–40% of women in labour (*Harper et al., 2012*). Induction of labour is defined as an iatrogenic stimulation of uterine contraction to accomplish delivery prior to the onset of spontaneous labor.

Failure of induction of labour is not uncommon it is approximately about 25% in nulliparous and 5% in multiparous cases Therefore, the accurate selection of candidates for successful induction of labour represents an important issue in obstetric practice (*Bahadori et al., 2013*).

Successful induction depends largely on cervical characteristics or simply on the cervical ripening. The Bishop Score by digital cervical examination is the gold standard established method of assessing favourability of the cervix in predicting whether an induced labour will result in successful

vaginal delivery or not (*Faltin-traub et al., 2004*).

However, some investigators have raised concerns about the value of the Bishop score in predicting the induction of labor outcome.

Because it is a subjective measure with great variability affected by a physician's clinical experience (*Kolkman et al., 2013*).

Also because a digital examination may not measure the length of the cervix very accurately because the supravaginal portion of cervix comprises about half the length of cervix which is difficult to assess digitally and it's highly variable among subjects. Other parameters of the score such as consistency, position and effacement of the cervix is also highly subjective and varies considerably among examiners (*Keepanasseril et al., 2007*).

According to these limitations, it is important to find a better alternative to the established method.

Transvaginal ultrasound appears promising because of its availability, reproducibility, and ability to provide images for accurate documentation and inter observer comparison. (*Ezebialu et al., 2015*).

Several ultrasonography parameters have been mentioned as substitutes to the traditional Bishop score. In particular, investigators have looked at the role of the cervical length and the cervical stiffness measured by transvaginal ultrasonography prior to induction of labor

(*Alvarez-Colomo et al., 2016*).

Some of these studies like (*Hatfield et al., 2007*) concluded in a review of 20 trials that the cervical length measured by ultrasonography is not effective in predicting the induction of labor outcome and does not offered any helpful information over the Bishop score.

Other studies like (*Papillon-Smith and Abenhaim, 2015*) took a different view in analysis of 32 observational studies: they determined the superiority of ultrasonography cervical length measured over traditional digital examination in predicting the induction of labor outcome.

Only a few studies have focused on the value of pre induction measurement of posterior cervical angle in prediction the induction of labor outcome (*Gokturk et al., 2014*) (*Akram M.Aladwy et al., 2018*).

Because results are conflicting. More studies are needed to evaluate the cervical characteristics before the induction of labour and to recognize reliable predictors for success of induction.

2) AIM OF THE WORK

The aim of the present study is to assess the value of pre-induction sonographic assessment of the posterior cervical angle and cervical length in the prediction of successful induction.

3) MATERIALS AND METHODS

- ***Study design and Study population***

A prospective observational study, **70** patients will be included. They will be selected from the patients admitted for induction of labor to Ain Shams University Maternity Hospital over a period of 1/8/2018 till 28/2/2019

- ***Sample Size Justification***

- Sample size is calculated using PASS program version 15, setting alpha error at 5% and power at 90%.
- Result from a previous study (Al-Adwy et al, 2017) showed that posterior cervical angle has good prediction for success of labor with AUC = 0.939 .

- ***Inclusion criteria***

- 1-18-35 years old
- 2-singelton pregnancy
- 3- 37-41 week's gestation
- 4- Living fetus
- 5-Cephalic presentation
- 6-Absence of active labor
- 7-No history of uterine scar

- ***Exclusion criteria***

- 1-Malpresentation
- 2-Dead fetus
- 3-Twins pregnancy
- 4- Any medical history contraindicating vaginal delivery
- 5- Fetal anomaly
- 6-placenta previa

- 7-Antepartum hemorrhage
- 8-cephalopelvic disproportion
- 9- Fetal macrosomia (fetal weight of 4 kg)
- 10- Body mass index >40 (calculated as weight in kilograms divided by the square of height in meters)

- **METHODS**

All cases will be subjected to:

- 1- **Initial evaluation**

- History taking to fulfill selection criteria:
 - (A) Personal history
 - (B) Menstrual history

(C) Present history

Any warning symptoms as headache, visual symptoms, edema of lower limbs, epigastric pain, vaginal bleeding, reduced fetal movement ,first ,second ,and

third trimester antenatal visits, complains and complication.

(D) Obstetric history

Marital history, history of abortion, history of present pregnancy.

- General examination:
 - Vital data measurement; blood pressure, pulse, temperature and respiratory rate.
 - Chest and heart examination for any abnormalities.
 - Lower limb examination for bilateral extensive edema and varicose veins.

- Abdominal examination:
 - Assessment of fundal level and presentation.
 - Presence of scars of previous abdominal or pelvic surgeries.
- Digital examination will be done to assess:
 - Cervical dilatation ,length, position, consistency, and station (Bishops score)
 - Condition of membrane
 - Pelvic adequacy
 - Ensure presentation

***Bishop score system**

Score	Dilatation of cervix	Cervical effacement	Position of cervix	Consistency of cervix	Station of head
0	closed	0-30%	Posterior	firm	-3
1	1-2	40-50%	Mid posterior	medium	-2
2	3-4	60-70%	anterior	soft	-1
3	>5	>80%	-	-	+1,+2

Ultrasound:

- All women will undergo ultrasonography examination by using a Medison SonoAce R5 ultrasonography machine.
- Trans abdominal ultrasonography will done first to check the fetal number, viability, biometry, presentation, adequacy of amniotic fluid, and placental Site.
- Then, the vaginal probe will gently insert into the vagina. A sagittal plane of the cervix is obtained to ensure visualization of the entire length of the cervical canal.

- Once the view is optimal, the depth is increased so that the image will occupied approximately two-thirds of the screen then, cervical length will be measured; It's defined as a line between the internal and the external cervical orifices.

- After measuring cervical length, the Posterior cervical angle is measured with the software for measuring angle in an ultrasonography.

- Picture will be taken in the sagittal plane at the level of the internal cervical os and the angle will be assessed at the junction of line measuring the cervical length and posterior uterine wall [figure 1].

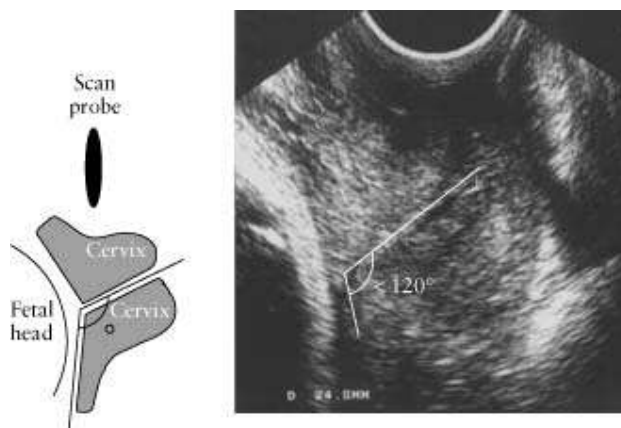


Figure (1): Reference points for measuring posterior cervical angle and ultrasound picture demonstrating this measurement.

2- Further evaluation:

- Induction of labour will do to women with closed or firm cervixx by using misoprostol (vagiprost25mcg) two tablets (50 microgram), they will be inserted in the posterior vaginal fornix and the cervix will be reassess after 4 hours.

- If no cervical ripening is achieved, second dose of one tablet