Transvaginal Sonographic Measurement of Cervical Length as a Predictor of the Success of Induction of Labor

Thesis

Submitted for partial fulfillment of the M.Sc.
in Obstetrics and Gynecology

By

Ghada Mohamed Abdelazim Ibrahim
M.B.B.CH. (2006)
Faculty of Medicine,
Cairo University
Resident at Omm El-Masrieen Hospital

Under Supervision of

Prof. Ali Farid Mohamed Ali
Professor of Obstetrics and Gynecology
Faculty of Medicine – Ain Shams University

Dr. Mohamed Osama Taha
Lecturer Obstetrics and Gynecology
Faculty of Medicine – Ain Shams University

Faculty of Medicine
Ain Shams University
2016

Acknowledgments

First and foremost, I feel always indebted to ***Allah,*** *the Most Beneficent and Merciful.*

I wish to express my deepest gratitude and thanks to **Prof. Ali Farid Mohamed Ali,** *Professor of Obstetrics and Gynecology, Faculty of Medicine – Ain Shams University,, for his constructive criticism, unlimited help and giving me the privilege to work under his supervision.*

My most sincere gratitude is also extended to **Dr. Mohamed Osama Taha,** *Lecturer Obstetrics and Gynecology, Faculty of Medicine – Ain Shams University, for his enthusiastic help, continuous supervision, guidance and support throughout this work.*

Last but not least, I can't forget to thank all members of my Family, especially my ***Parents*** *and my* ***Husband,*** *for pushing me forward in every step in the journey of my life.*

Candidate

Ghada Mohamed Abdelazim Ibrahim

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List of Abbreviations

Abbr.	Full-term
ACOG	: American College of Obstetricians and Gynecologists
BMI	: Bady mass index
CS	: Cesarean section
EASI	: Extraamniotic saline infusion
ECM	: Extracellular matrix
EDS	: Ehlers-Danlos syndrome
FFN	: Fetal fibronectin
GA	: Gestational age
GAGs	: Glycosaminoglycans
GBS	: Group B streptococcus
IGFBP-1	: Insulin-like growth factor binding protein-1
NICU	: Neonatal intensive care unit
NO	: Nitric Oxide
PCA	: Posterior cervical angle
PGE2	: Prostaglandin E2
PGHS-2	: Prostaglandin synthase
PGs	: Prostaglandins
PIH	: Pregnancy induced hypertension
PTB	: Preterm birth

List of Abbreviations (Cont.)

Abbr.	Full-term
ROC	: Receiver Operating Characteristic
ROM	: Rupture of membrane
SEM	: Scanning electron microscopy
TVS	: Transvaginal sonography
TVUS	: Transvaginal ultrasound
VD	: Vaginal deliveryH
VEGF	: Vascular endothelial growth factor
WHO	: World Health Organization

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Abstract

Background: Induction of labor is conducted in special fetal or maternal conditions. Labor is induced in about 20% of women. Pregnancy termination by induction increases the percent of cesarean sections compared with spontaneous delivery by 25% in nulliparous and 5% in multiparous cases. It seems ideal to determine the cesarean risks before starting induction**.** Cesarean delivery not only carries operative risks in the index pregnancy, but also increases risks for future pregnancies. The continuous rise in rates of Cesarean section gives cause for concern to both obstetricians and policy makers**.**

Aims: This study aims to assess the accuracy of transvaginal measurement of cervical length prior to induction of labor in prediction of successful induction resulting in vaginal delivery.

Methodology: In this prospective study, 100 pregnant women were included. They were selected from the women admitted for induction of labor to Ain Shams University Maternity Hospital.

Results: This study is a prospective study was conducted at Ain Shams University Maternity Hospital, 100 women with singleton term pregnancies cephalic presentation scheduled to undergo labor induction at ≥37 gestation were recruited to this study, Transvaginal investigation was done for all participants prior to induction of delivery. Cervical length and posterior cervical angle were measured by transvaginal sonography, to assess the accuracy of transvaginal measurement of cervical length as a predictor of the success of Induction of Labor.

The results obtained in the present study are represented in tables and figures. Descriptive and comparative statistics of all studied parameters are included.

Conclusion and Recommendations: The results of the present study indicate that the use of ultrasonographic cervical length instead of Bishop Score for pre-induction cervical assessment is a useful tool in predicting labor outcome. Data including cost analysis are needed before sonographic assessment of cervical length can be recommended for choosing candidates for induction. The cervical posterior angle was a predicting factor for vaginal delivery. Further studies are needed to combine ultrasonographic factors in predicting induction results.

Keywords: Transvaginal sonographic, cervical length, induction of labor

Introduction

Induction of labor is conducted in special fetal or maternal conditions. Labor is induced in about 20% of women. Pregnancy termination by induction increases the percent of cesarean sections compared with spontaneous delivery by 25% in nulliparous and 5% in multiparous cases. It seems ideal to determine the cesarean risks before starting induction ***(Bahadori et al., 2013).***

Before 41 0/7 weeks of gestation, induction of labor generally should be performed based on maternal and fetal medical indications. Inductions at 41 0/7 weeks of gestation and beyond should be performed to reduce the risk of cesarean delivery and the risk of perinatal morbidity and mortality ***(ACOG, 2014).***

Cesarean delivery not only carries operative risks in the index pregnancy, but also increases risks for future pregnancies. The continuous rise in rates of Cesarean section gives cause for concern to both obstetricians and policy makers ***(Verhoeven et al., 2013).***

Because of high risks of both emergency and elective cesarean section (CS), several maternal and fetal factors have been investigated regarding the success of induction of labor ***(Prado et al., 2016).***

The prelabor condition of the cervix is believed to be one of the most important predictors of successful induction ***(Park et al., 2009).*** Predicting induction success is one of the important and challenging issues for the doctor**.** So it is important to investigate the factors affecting it. The Bishop score by digital cervical examination has been the most popularly used method for cervical assessment before induction of labor. However; digital examination has limitations on objectivity and reliability. In addition, the predictive value of the Bishop score for successful labor induction has been reported to be poor, especially in cases with low scores ***(Bahadori et al., 2013).***

The pre-induction Bishop score, which is the traditional method of predicting whether an induced labor will result in successful vaginal delivery (VD), is subjective and has a poor predictive value for the outcome of induction. In contrast, measurement of cervical length by transvaginal sonography (TVS) is objective and provides useful prediction of the likelihood of vaginal delivery within 24 h of induction (***Rane et al., 2003).***

Measurement of cervical length by transvaginal ultrasonography is a useful and independent predictor of successful labor induction and the duration of induction and performs better as a method of preinduction cervical

assessment than the Bishop score when the occurrence of active labor is considered as the final outcome of labor induction ***(Yang et al., 2004).***

Using pre-induction parameters and maternal characteristics to predict the outcome of induction enables the clinician to provide precise information to the mothers, and accordingly, plan further management of the pregnancy ***(Rane et al., 2004).*** Also might lead to a reduction in cesarean delivery and thereby its complications ***(Groeneveld et al., 2010).***

Transvaginal sonographic measurement of cervical length is a good predictor of successful labor induction at term in nulliparas ***(Daskalakis et al., 2006).*** Theoretically, transvaginal ultrasongraphic measurements could represent a more accurate assessment of the cervix than digital examination because the supravaginal portion comprises about 50% of cervical length but this is highly variable among individuals. This portion is difficult to assess digitally. In addition, effacement is subjective and can vary considerably among examiners, and is difficult to determine in the closed cervix**.** In contrast transvaginal ultrasonographic cervical measurement is quantitative and easily reproducible ***(Ware and Raynor, 2000).*** Digital examination underestimates cervical length compared with ultrasound measurement ***(Olson-Chen & Hackney, 2013).***