



TRANSVAGINAL ULTRASONOGRAPHIC CERVICAL LENGTH AND MODIFIED BISHOP'S SCORE: COMPARISON OF OUTCOME

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Abstract:

Transvaginal cervical length measurement has primarily focused on detecting cervical changes in women at risk for preterm delivery. Theoretically, transvaginal ultrasonographic measurement of the cervix could represent a more accurate assessment of the cervix than digital examination because the supra vaginal portion of the cervix usually comprising about 50% of the cervical length is very difficult to assess digitally in a closed cervix. Transvaginal cervical length was measured in mm with the standard longitudinal view of the cervix after asking patient to empty bladder using PHILIPS HD 5 machine. The image will be enlarged so that the cervix occupies at least two-third of the image and external os and internal os are well seen. Three consecutive cervical images will be obtained and three separate readings of cervical length will be taken and then average cervical length in mm will be considered for the study. After sonography, modified Bishop's score will be determined by digital examination. There was a significant difference in Induction to delivery interval distribution comparison between two groups. Transvaginal Ultrasonographic Cervical Length Group had higher percentage of Induction to delivery interval within 12 hrs compared to Modified Bishops Score.

Keywords: Transvaginal Ultrasonographic Cervical Length, Modified Bishop's Score, Outcome

Introduction:

Induction of labour is the stimulation of uterine contractions during pregnancy before labor begins to achieve vaginal birth. Induction of labour is done in approximately 20% of pregnancies¹. The overall rate of induction of labor is increasing rapidly. Several studies have shown that induction, compared to expectant management, is associated with a substantial reduction in perinatal mortality. As per ACOG 2009, intracervical PGE₂ as a gel preparation is being widely used for induction of labour. It is well known fact worldwide, that there is no universally accepted criteria for failure of induction, though a time frame of 24 hours is often used for the same.

Prediction of outcome of labour induction is essential to avoid unnecessary induction and preventable cesarean section.²

Transvaginal cervical length measurement has primarily focused on detecting cervical changes in women at risk for preterm delivery. Theoretically, transvaginal ultrasonographic measurement of the cervix could represent a more accurate assessment of the cervix than digital examination

because the supra vaginal portion of the cervix usually comprising about 50% of the cervical length is very difficult to assess digitally in a closed cervix.³

In addition, the assessment of the effacement which starts at the internal OS will be difficult to predict in a closed cervix. In contrast transvaginal sonographic measurement of the cervical length is quantitative and easily reproducible method of assessing the cervix which can be achieved easily with minimal discomfort to the patient.

The examination should not be carried out with full bladder, If the bladder is full it falsely increases the cervical length by 4mm. Undue pressure will distort the architecture of the cervix, so the probe should be away from the fornix. The urinary bladder, fetal presenting part are identified on either side of the probe. This helps to ensure correct placement of the probe.⁴

Ultrasound assessment of preinduction cervical characteristics has gained lots of importance in recent years. In 1986, O'Leary and Ferrell proposed what they called as 'semi quantitative' ultrasound scoring system and evaluated this system against the modified Bishop score. In this study, the thickness and contour of the lower uterine segment, the length and dilation of the cervix, and the station of the presenting part was evaluated based on trans abdominal ultrasound findings. The authors found that the ultrasound scoring system correlated well with the modified Bishop score and that a favorable result with either digital or ultrasound assessment was associated with a high likelihood of successful induction.^{5,6}

Methodology:

STUDY DESIGN

Comparative study

SAMPLE SIZE

100 primigravida admitted in Department of OBG

INCLUSION CRITERIA

1. Primigravida with singleton pregnancy with 37-42 weeks of gestation.
2. Live fetus with cephalic presentation.

EXCLUSION CRITERIA

1. Scarred uterus
2. Antepartum hemorrhage
3. Non reassuring fetal heart rate
4. Contracted pelvis
5. <37 weeks and >42 weeks of gestation
6. Multiple pregnancy
7. Congenital malformation of the fetus
8. Intrauterine fetal demise
9. Any contraindications to vaginal delivery
10. Fetal mal-presentations

METHOD OF COLLECTION OF DATA

Transvaginal cervical length was measured in mm with the standard longitudinal view of the cervix after asking patient to empty bladder using PHILIPS HD 5 machine. The image will be enlarged so that the cervix occupies at least two-third of the image and external os and internal os are well seen. Three consecutive cervical images will be obtained and three separate readings of cervical length will be taken and then average cervical length in mm will be considered for the study. After sonography, modified Bishop's score will be determined by digital examination.

Induction will be done by Prostaglandin E2 gel. Maximum of 3 doses 6 hrs apart will be repeated. The induction active phase interval, induction to delivery interval and the mode of delivery will be noted. Failed induction is defined as an inability to achieve the active phase of labor corresponding

to cervical dilatation of $>4\text{cm}$ within 24hr of onset of induction. Study population will be divided in to group A and group B. Modified Bishop's score with equal to or >4 and Transvaginal ultrasonographic cervical length equal to or $<28\text{mm}$ will be induced. The data will be analysed to compare Modified Bishop's score and Transvaginal ultrasonographic cervical length for prediction of successful labor induction in term primigravida.

Results:

Table 1: Mode of Delivery distribution comparison between two groups

		Group					
		Group A		Group B		Total	
		Count	%	Count	%	Count	%
Mode of Delivery	LSCS	6	12.0%	6	12.0%	12	12.0%
	Vaginal	44	88.0%	44	88.0%	88	88.0%

In Group A and Group B , 12.0% had LSCS and 88.0% had Vaginal Delivery.

Table 2: Indication of LSCS comparison between two groups

		Group					
		Group A		Group B		Total	
		Count	%	Count	%	Count	%
Indication	Fetal distress	4	66.6%	3	50%	7	58.33%
	Arrest of dilatation	1	16.6%	2	33.3%	3	25%
	Arrest of descent	1	16.6%	1	16.6%	2	16.66%

Table 3: Induction to active phase interval distribution comparison between two groups

	Group						P value
	Group A		Group B		Total		
	Mean	SD	Mean	SD	Mean	SD	
Induction to active phase interval in minutes	509.70	142.31	434.89	101.52	472.30	128.53	0.006*

Mean Induction to active phase interval, In Group 1 was $509.7 \pm 142.31\text{min}$ and in Group 2 was $434.89 \pm 101.52\text{min}$. There was a significant difference in mean Induction to active phase interval comparison between two groups.

Table 4: Induction to delivery interval distribution comparison between two groups

	Group						P value
	Group A		Group B		Total		
	Mean	SD	Mean	SD	Mean	SD	
Induction to delivery interval in minutes	826.64	182.31	733.75	146.24	780.19	170.82	0.01*

Mean Induction to delivery interval, In Group 1 was $826.64 \pm 182.31\text{min}$ and in Group 2 was $733.75 \pm 146.24\text{min}$. There was a significant difference in mean Induction to delivery interval comparison between two groups.

Table 5: Induction to delivery interval distribution comparison between two groups

		Group			
		Group A		Group B	
		Count	%	Count	%
Induction to delivery interval	<12 hrs	12	27.3%	23	52.3%
	>12 hrs	32	72.7%	21	47.7%

p = 0.017*

In Group A, Induction to delivery interval was < 12 hrs in 27.3% and > 12 hrs in 72.7%.

In Group B, Induction to delivery interval was < 12 hrs in 52.3% and > 12 hrs in 47.7%.

There was a significant difference in Induction to delivery interval distribution comparison between two groups. **Transvaginal Ultrasonographic Cervical Length** Group had higher percentage of Induction to delivery interval within 12 hrs compared to Modified Bishops Score.

Table 6: NICU admission distribution comparison between two groups

		Group					
		Group A		Group B		Total	
		Count	%	Count	%	Count	%
NICU Admission	No	42	84.0%	47	94.0%	89	89.0%
	Yes	8	16.0%	3	6.0%	11	11.0%

In Group A, 16.0% got admitted to NICU and in Group B, 6.0% got admitted to NICU.

Table 7: Birth weight distribution comparison between two groups

		Group					
		Group A		Group B		Total	
		Mean	SD	Mean	SD	Mean	SD
Birth weight (kg)		2.73	0.30	2.78	0.28	2.76	0.29

Mean Birth weight (kg), In Group A was 2.73 ± 0.3 and in Group B was 2.78 ± 0.28 .

Table 8: APGAR Score distribution comparison between two groups

		Group					
		Group A			Group B		
		Mean	SD	Median	Mean	SD	Median
APGAR @ 1 min		5.98	0.74	6	6.16	0.74	6
APGAR @ 5 min		8.00	0.76	8	8.14	0.78	8

Mean APGAR 1 min, In Group 1 was 5.98 ± 0.74 and in Group 2 was 6.16 ± 0.74 .

Mean APGAR 5 min, In Group 1 was 8 ± 0.76 and in Group 2 was 8.14 ± 0.78 .

Table 9: Validity

VARIABLE	SENSITIVITY	SPECIFICITY	PPV	NPV
MODIFIED BISHOP SCORE ≥4	62.5%	91.67%	95.2%	47.8%
TVS CERVICAL LENGTH ≤23mm	85.71%	65.22%	69.2%	83.3%

Discussion:

Previous studies on the value of pre induction sonographic measurement of cervical length have reported conflicting results. Paterson Brown et al⁷. examined 50 pregnancies before induction and reported that, although the Bishop Score correlated significantly with successful vaginal delivery, the score fell well short of being a satisfactory predictor of successful induction. In addition they found that sonographically measured cervical length was not significantly associated with either the Bishop Score or the induction to delivery interval.

Boozarjomehri et al⁸. Examined 53 women before induction and reported that , although sonographically measured cervical length was correlated with the duration of the latent phase of the labour , there was no significant association with the induction to delivery interval or to cervical effacement measured by digital examination.

Watson et al⁹ examined 109 women before induction and reported a significant association between sonographically measured cervical length and clinical assessment of cervical effacement; however, neither of the two provided a useful prediction of the length of the latent phase of labour. Gonen et al¹⁰ examined 86 women before induction and reported significant association between both the Bishop Score and sonographically measured cervical length successful induction and induction to delivery interval. Ware and Raynor¹¹ examined 77women before induction and found that both sonographically measured cervical length and Bishop score predicted induction-to-delivery interval and likelihood of vaginal delivery. In a logistic regression model, only cervical length and parity were independent predictors of vaginal delivery.

Pandis et al¹² conducted a study on 240 women with singleton pregnancies at 37- 42wks of gestation Vaginal delivery occurred in 194(80.8%) women and in 142(73.2%) of these delivered within 24hrs of induction. In our study 97.7% delivered vaginally and 100% delivered within 24hrs.

Table 15 shows the comparison of the primary outcome measures in our study with the other study In our study we defined successful induction of labour as vaginal delivery occurring within 24 hrs. This end point has been traditionally used in several studies to examine the efficacy of an inducing method. P Rozenberg et al¹³ compared the Bishop score and sonographically assessed cervical length for the prediction of successful induction as delivery within 24 hrs of induction. Pandis et al also demonstrated that cervical length by ultrasound performed better than Bishop Score to predict vaginal delivery within 24hrs of induction.¹⁴

Both sonographic cervical assessment and the modified Bishop Score successfully predicted vaginal delivery within 24 hrs. As the cervical length increases the likelihood of delivering within 24hrs decreases whilst, as modified bishop score increase, the likelihood of delivering within 24hrs increases.

Conclusion:

There was a significant difference in Induction to delivery interval distribution comparison between two groups. **Transvaginal Ultrasonographic Cervical Length** Group had higher percentage of Induction to delivery interval within 12 hrs compared to Modified Bishops Score.

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