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Transvaginal ultrasonographic cervical length in predicting induction to delivery interval

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Abstract
A recent study well designed blinded multicenter study of Maternal Fetal Medicine Units Network of the National Institute of Child Health and Human Development on TVU in patients with a history of PTB <23 weeks demonstrated that the best predictive accuracy was achieved with serial TVUs, and including the shortest cervix ever after spontaneous or transfundal pressure elicited changes. 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 was 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 cervicallength was taken and then average cervical length in mm will be considered for the study. After sonography, modified Bishop's score was determined by digital examination. Transvaginal Ultrasonographic Cervical Length at >23 had highest validity in predicting the success of labour.

Keywords: Transvaginal ultrasonographic cervical length, prediction, induction to delivery interval

Introduction
Ultrasound measurement of the cervical canal in the second and early third trimester has been reported to range from 10 to 50 mm. Iams *et al* measured cervical length at 24 and 28 weeks gestation in nearly 3000 women not selected for risk of preterm delivery. At 24 weeks mean cervical length in nulliparous women were 34±7.8 mm and 36±8.4 mm in parous women. At 28 weeks, the cervix shortened slightly to 32.6±8.1 mm in nulliparous women and 34.5±8.1 mm in parous women. The tenth percentiles cervical length measurement at 24 weeks was found to be 25 mm and this increased the risk of preterm delivery six fold [1].
Ultrasound measurement of the cervical canal can also be used for prediction of preterm birth. Studies have proved the usefulness of TVU for predicting PTB and found that shorter the cervix, the higher the risk of PTB. Using different cut-offs for CL ranging from 15mm to 34mm, the positive predictive values ranged from 6% to 44%.This relatively low value is likely due at least in part to the low incidence of PTB in these studies (0.8% - 15%) [2].
A recent study well designed blinded multicenter study of Maternal Fetal Medicine Units Network of the National Institute of Child Health and Human Development on TVU in patients with a history of PTB <23 weeks demonstrated that the best predictive accuracy was achieved with serial TVUs, and including the shortest cervix ever after spontaneous or transfundal pressure elicited changes. The sensitivity and positive predictive value reached 69% and 55% respectively. Compared with singleton pregnancies, twin pregnancies that deliver at term have been shown to have a similar TVU CL at 14 to 19 weeks; but have a progressively much shorter cervix starting after 20 weeks gestaton. Cervical shortening occurs after 20 weeks gestation even in twin pregnancies destined to delivery at term, so sonographic examination of the cervix before 20-24 weeks may lead to better prediction of PTB. A recent study found that the predictive value of sonographic CL determination in twins between 24-34 weeks gestation was low [3]. In a preterm prediction study in twin gestation, Goldenberg found that a cervical length ≤25 mm at 24 weeks gestation to be the best of all the predictors of PTB that they evaluated, including fetal fibronectin and bacterial vaginosis [4].
TVU of the cervix has been studied extensively as a predictor of PTB in patients with symptoms of PTL. Rageth showed that using TVU in symptomatic patients for management could decrease the incidence of hospitalization and costs, but did not decrease PTB. Zalar reported a decrease in incidence of birth weight <2,500 gms when TVU of the cervix was used to triage patients to bed

rest and tocolysis, compared with historic controls [5]. Fetal Fibronectin (FFN) concentrations in the cervical transudate represent a laboratory approach and have been shown to correlate with induced labour outcome with concentration <50 mcg/ml associated with a favorable cervix (Ekman *et al* 1995). A positive FFN was associated with significantly shorter delivery intervals than when a negative FFN result is obtained (Kiss *et al*. 2000). TVU of the cervix has been used extensively in patients with prophylactic, therapeutic or emergent cerclage in place. Most studies have shown that transvaginal cerclage is placed in the middle part of the cervix in a majority of cases. Evaluation of pre-and post - cerclage TVU CL has shown that CL usually increases post cerclage, and that an increase in CL is associated with a higher rate of term delivery [6].

Many studies show that TVU cervical parameters are predictive of PTB CL<25 mm and upper cervix (the closed portion above the cerclage) <10 mm are probably the two best predictive parameters.

Many studies have proved the utility of TVU of the cervix in patients with preterm premature rupture of membranes (PPROM). Rizzo studied 92 women with PPROM between 24 and 32 weeks and demonstrated that a CL ≤ 20 mm was associated with a latency of 2 days versus 6 days if the CL was >20 mm. Carlan proved in a randomized trial the safety of performing TVU. In patients studied between 24-34 weeks, he found that the latency was 2 days shorter if the CL was ≤ 30 mm.

Methodology

- **Study Design:** Comparative study
- **Sample Size:** 100 primigravida admitted in Depatrment of OBG, VIMS, Bellari.

Inclusion Criteria

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

Exclusion Criteria

- Scarred uterus
- Antepartum hemorrhage
- Non reassuring fetal heart rate
- Contracted pelvis
- <37 weeks and >42weeks of gestation
- Multiple pregnancy
- Congenital malformation of the fetus
- Intrauterine fetal demise
- Any contraindications to vaginal delivery
- 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 was 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 was taken and then average cervical length in mm will be considered for the study. After sonography, modified Bishop's score was determined by digital examination. Induction will be done by Prostaglandin E2 gel. Maximum of 3 doses 6hrs 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 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 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: Mean Age distribution comparison between two groups

	Group	N	Mean	SD
Age	Group A	50	21.38	2.147
	Group B	50	21.64	2.447

Mean Age (years), In Group A was 21.38±2.147 and in Group B was 21.64±2.447.

Table 2: Transvaginal Ultrasonographic Cervical Length distribution

		Count	%
Transvaginal Ultrasonographic Cervical Length	19	2	4.0%
	20	4	8.0%
	21	3	6.0%
	22	4	8.0%
	23	8	16.0%
	24	17	34.0%
	25	2	4.0%
	26	4	8.0%
	27	4	8.0%
	28	2	4.0%

Mean Transvaginal Ultrasonographic Cervical Length was 23.58±2.223 mm. In the study, 34% had Transvaginal Ultrasonographic Cervical Length of 24mm.

Table 3: Transvaginal Ultrasonographic Cervical Length in Predicting Induction to delivery interval Area under the ROC curve (AUC)

Area	SE	P value	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
0.837	0.069	0.001*	0.703	0.972

Transvaginal Ultrasonographic Cervical Length at >23 had highest validity in predicting the success of labour.

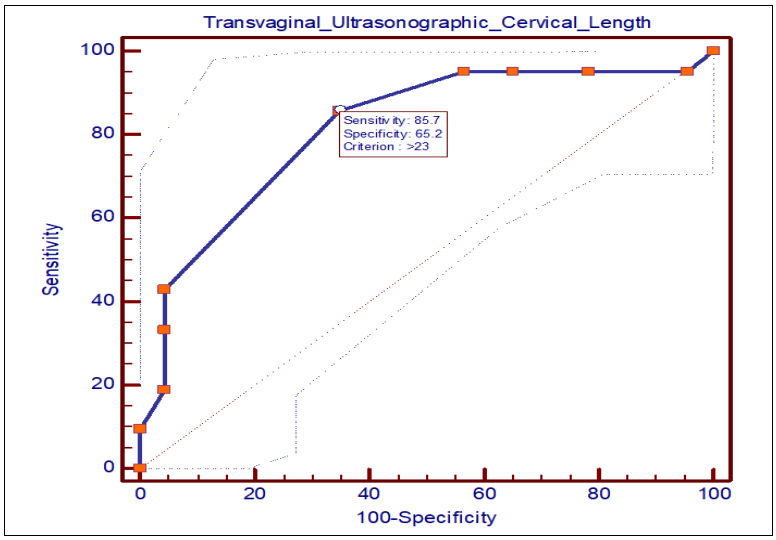

Fig 1: ROC Curve showing Transvaginal Ultrasonographic Cervical Length in Predicting Induction to delivery interval

Discussion

ROC curves were constructed to determine appropriate cut off for modified bishop score and transvaginal cervical length in predicting the labour induction, shown 4 is the best cut off for modified Bishop Score and 23mm is for transvaginal cervical length.

Sujata *et al* [7] conducted study on 122 patients and their ROC curves failed to identify an appropriate cut off for continuous variables relating to sonographic cervical measurements. These variables were, therefore, analyzed as continuous variables in the regression model. Independent predictors of vaginal delivery included Bishop Score, cervical position, and maternal age. In their study transvaginal ultrasound does not predict successful labour induction as well as digital cervical examination.

In our study the sensitivity of the cervical length measured transvaginally in predicting the successful labour induction is higher (85.71%) compared with that of modified bishop's score (62.5%).

Kanwar S N *et al* (2015) [8] showed that measurement of cervical length by transvaginal ultrasonography provides better prediction of the likelihood of vaginal delivery within 24hrs of induction

El- Mekkawi SF *et al* (2016) [9] concluded that Cervical length <28mm measured by TVS was significantly more specific with more PPV compared to Modified Bishop's score in prediction of success of labor induction. Both transvaginal cervical length & Modified Bishop's score were complementary tool and associated with successful induction.

Shameera banu *et al* (2016) [10] concluded that that transvaginal cervical length provides better prediction of the likelihood of vaginal delivery within 24hrs of induction. Subjective variations may occur in Modified Bishop's score by different observers. TVS cervical length is the objective method, so better predictor of success of labor induction.

Interestingly, a recent randomised study comparing use of transvaginl sonographic assessment and modified Bishop Score to guide preinduction cervical ripening with prostaglandins has shown a reduction in prostaglandin use without affecting successful labour induction with transvaginal ultrasonography.

But the limitations for obtain TVS cervical length are that the expensive equipment and also the technical expertise in measuring the cervical length in standard and reproducible manner is required, so as to avoid the errors in the measurement. It is also an expensive test.

In the setting where Transvaginal sonographic measurement of cervical length can be achieved easily, correctly and with minimal discomfort to the patient, it provides a useful prediction of the likelihood of vaginal delivery within 24hrs of induction and of the induction to delivery interval. It helps in counseling the women regarding the outcome of labour induction.

Women with a cervical length of less than 2.3 cm can be counseled that delivery will possibly occur within 24hrs of induction, whereas those with cervical length of 3cm can be advised that they hav take longer duration to deliver. Modified Bishop Score still remains a useful test in the setting where the equipment and experts are not available as it is a simple, inexpensive test and does not required technical expert.

Conclusion

Transvaginal Ultrasonographic Cervical Length at >23 had highest validity in predicting the success of labour.

References

1. Burger M, Weber-Rossler T, Willmann M. Measurement of the pregnant cervix by transvaginal sonography: an interobserver study and new standards to improve interobserver variability. Ultrasound Obstet Gynecol. 1997;9:188-193.
2. Yost NP, Bloom SL, Twickler DM, *et al*. Pitfalls in ultrasonic cervical length measurement for predicting preterm birth. Obstet Gynecol. 1999;93:510-516.
3. Iams JD, Goldenberg RL, Meis PJ, *et al*. The length of the cervix and the risk of spontaneous premature delivery. N Engl J Med. 1996;334:567-572.

4. Heath VCF, Southall TR, Souka AP, *et al*. Cervical length at 23 weeks of gestation: relation to demographic characteristics and previous obstetric history. Ultrasound Obstet Gynecol. 1998;12:304-311.
5. Owen J, Yost N, Berghella V, *et al*; National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Can shortened mid-trimester cervical length predict spontaneous preterm birth? JAMA. 2001;286:1340-1348.
6. Kushnir O, Izquierdo LA, Smith JF, *et al*. Transvaginal sonographic measurement of cervical length: evaluation of twin pregnancies. J Ultrasound Med. 1995;40(5):380-382.
7. Chandra S, Crane JM, Hutchens D, Young DC. Transvaginal ultrasound and digital examination in predicting successful labor induction. Obstet Gynecol. 2001;98:102-106.
8. Kanwar SN, Kaur S, Kaur N, *et al*. A comparative study of transvaginal sonography and modified Bishop's score for cervical assessment before induction of labour. Scholars J Appl Med Sci. 2015;3(6B):2284-2288.
9. El-Mekkawi SF, Hanafi S, Abou-Gamrah A, *et al*. Cervical length versus modified Bishop's score for prediction of successful labor. J Basic Clin Reprod Sci. 2017;6:117-122.
10. Banu S, Fatima S, Begum S, *et al*. Comparison of transvaginal ultrasonographic cervical length with modified Bishop's score in predicting success of labor. Int J Mod Res Rev. 2016;4(11):1375-1378.

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