Role of Bishop score and cervical length by transvaginal ultrasound in induction of labour in primigravidae

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Abstract:
Aim: To evaluate the role of Bishop score, cervical length by transvaginal ultrasound in predicting the success of induction of labour.
Method: It is a prospective study done at Government general Hospital, Kurnool, Andhra Pradesh, India over a period of one year from May 2008 to April 2009. Hundred primigravidae with 37 to 42 weeks of gestation who underwent induction of labour for different indications were taken. Bishop score followed by cervical length in centimeters by transvaginal ultrasound were assessed in all patients.
Results: Bishop score of 5 and cervical length by transvaginal ultrasound of 2.8 cm are considered as cutoff values. Bishop score ≤ 5, cervical length above > 2.8 cm are considered unfavorable. Among the women with Bishop score ≤ 5, 62.5% of women had vaginal delivery within 24 hours. In women with Bishop score > 5, 78.5% had successful induction. When cervical length is considered, among the women with cervical length > 2.8cm, 48.9% had successful induction, whereas in women with cervical length ≤ 2.8 cm 84% had successful induction. Whereas when both Bishop score and cervical length are considered when both factors unfavorable, 40.62% women had successful induction. In women with Bishop score ≤ 5 and cervical length ≤2.8 cm, 79.48% had successful induction. Among the women with Bishop score > 5 and cervical length ≤2.8 cm, 72.2% had successful induction. When Both factors are favourable 90.9% of them had successful induction.
Conclusion: Bishop score when complimented with cervical length by transvaginal ultrasound could predict the success of induction of labour better compared with assessment by Bishop score alone.
Key words: Bishop score, cervical length, success of induction, transvaginal ultrasound, vaginal delivery.

I. Introduction

The transcendent objective of Obstetrics is that ' every pregnancy should culminate in healthy baby and healthy mother'. In order to achieve this objective we cannot wait for the spontaneous onset of labour in all the cases but resort to induction of labour in certain cases for either maternal or fetal conditions.

Induction of labour means deliberate termination of pregnancy beyond 28 weeks i.e. period of viability, by various methods which aim at initiation of labour and delivery per vaginum. Occasionally induced labour may end in instrumental delivery or cesarean section.

The decision of induction depends upon the assessment of the obstetric balance by weighing the risks of continuation of pregnancy against the risks of pregnancy interrupted.

Success of induction of labour depends on proper selection of cases. Before induction cervical ripening is denoted by Bishop scoring which was introduced by Bishop in 1964 [1].

Jodie et al [2] and David PJ et al [3] studies suggested that Bishop score of less than 5 requires further ripening, while a score of 9 or greater suggests that ripening is completed. Good Bishop score indicates the likelihood that induction of labour will be effective[4].

Table 1 - Bishop score

Parameter	0	1	2	3
Position	Posterior	Intermediate	Anterior	-
Consistency	Firm	Intermediate	Soft	-
Effacement	0 to 30%	40 to 50%	60 to 70%	≥80%
Dilatation	<1cm	1 to 2 cms	2 to 4 cms	> 4 cms
Fetal station	- 3	- 2	-1 to 0	+1 to +2

Recently measurement of cervical length by transvaginal ultrasonography for prediction of success of induction of labour is being used which is having more reproducibility[5]. It has been investigated as a way of

predicting the likely outcome of induced labour as an alternative to clinical digital examination described by Anderson in 1991 [6] and also by others [7,8,9,10]

The elective induction can be done in various methods. The use of intravenous oxytocin in induction of labour increased gradually since 1950 after the discovery of oxytocic effect of the posterior pituitary extract by Dale in 1906 and the synthesis of the uterotonin by Du vigneud in 1950 [11]. The first systemic study of prostaglandin was by Kurzork and Liebin in 1930. At present prostaglandins are used in big way in induction of labour[12]. Oxytocin and prostaglandins are used for induction of labour in this study as these are considered safe and effective.

There are many maternal and fetal indications for induction of labour among them postdated pregnancy is probably the commonest indication [12]. In our study we have taken past dates, pregnancy induced hypertension and post term as indications for induction. Though induction of labour has its own hazards like iatrogenic prematurity and associated perinatal mortality etc, but it has always been that the gains are on higher side in selected cases.

The present study was undertaken to evaluate the role of Bishop score, cervical length by transvaginal ultrasound in induction of labour in primigravidae by the use of oxytocin and misoprostol tablets. The predictability of success of induction was noted down with regards to Bishop cervical scoring and cervical length by transvaginal ultrasonography.

II.   Aims and objectives

To evaluate the role of Bishop score and cervical length by transvaginal ultrasonography in predicting the success of induction of labour in primigravidae.
Successful induction i.e. delivery within 24 hours after induction was taken as primary outcome in the study.

III.   Materials and methods

The present study was carried out on 100 primigravidae admitted in Antenatal ward for induction of labour in government General Hospital, Kurnool during one year period that is May 2008 to April 2009.

3.1. Inclusion criteria:

Pregnant women age between 20 to 30 years.
Single live foetus in cephalic presentation with intact membranes. Gestational age from 37 to 42 weeks.
Pregnancy induced hypertension.

A detailed history was taken from all patients followed by general and systemic examinations. Obstetrical examination to assess the lie of the fetus and engagement of head, and per vaginal examination for cervical and pelvic assessments according to Bishop score was done followed by vaginal ultrasound assessment of cervical length. Bishop score $\leq$ 5 was taken has unfavourable score and cervical length by tranvaginal ultrasound of   > 2.8 centimetres was taken as unfavourable cervix.

When Bishop score and cervical length were unfavourable, induction was done with 25 micrograms of Misoprostol tablet vaginally repeating the dose in every 6 hours until maximum of four doses. Patients with favorable Bishop score and cervical length were induced with oxytocin or misoprostol. All cases followed with partographic representation.

The primary outcome was taken as vaginal delivery within 24 hours with or without instrumental delivery. Cases landed in cesarean section and delivered after 24 hours were considered as failed inductions.

IV.   Results

Hundred primigravidae with gestational age between 37 weeks to 42 weeks admitted in Government General Hospital Kurnool during May 2008 to April 2009 for induction of labour were taken in the present study. The indications for induction of labour were past dates(70%), pregnancy induced hypertension (22%) and post term (8%).

In present study, 67 women had successful induction i.e. vaginal delivery within 24 hours. In 33 failures, 23 were vaginal deliveries after 24 hours and 10 were cesarean sections.

Table 2 - Comparing the BS[*]and CL[*] by TVS[*] in predicting primary outcome.

Parameters		No of women	Vaginal delivery within 24 hours	
			No of women	Percentage
BS	$\leq$ 5	72	45	62.5%
	>5	28	22	78.5%
CL	> 2.8 cm	49	24	48.9%
	$\leq$ 2.8 cm	51	43	84%

*BS-Bishop score, CL- Cervical length, TVS-Transvaginal ultrasound

When Bishop score was taken into consideration, among the 100 women, BS ≤5 was seen in 72 women. In them 45 (62.5%) women had vaginal delivery within 24 hours. BS > 5 was seen in 28 women among them 22 (78.5%) women had successful induction.

When cervical length by transvaginal ultrasonography was taken into consideration, 49 women had cervical length > 2.8 cm, in them 24 (48.5%) women had vaginal delivery within 24 hours. Whereas 51 women had cervical length ≤ 2.8 cm, in them 43 (84%) women had successful induction.

Whereas when both the factors combined, 32 women had both factors unfavourable i.e. BS ≤ 5 and cervical length >2.8 cm, in them 13 (40.62%) had vaginal delivery within 24 hours. Thirty nine women had BS ≤5 and cervical length ≤2.8 cm, in them 31 (79.48%) had successful induction. Eighteen women had BS > 5 and CL> 2.8 cm in them 13 (72.2%) women had successful induction. Whereas 11 women had both factors favorable, in them 10 (90.9%) had successful induction.

Table 3 - Assessing the combined effect of BS[*]and CL[*]by TVS[*]in predicting primary outcome.

Total no. of women	BS	No of women	CL	No of women	Vaginal delivery within ≤ 24 hrs	Percentage
100	BS ≤ 5	72	CL > 2.8 cm	32	13	40.62%
			CL ≤2.8 cm	39	31	79.48%
	BS > 5	28	CL > 2.8 cm	18	13	72.2%
			CL ≤2.8 cm	11	10	90.9%

*BS-Bishop score, CL- Cervical length, TVS-Transvaginal ultrasound

By using chi square test statistical analysis was done. According to the analysis, compared with Bishop score (P=0.1302), cervical length alone (P=0.0001) and Bishop score combined with cervical length (P=0.0001) had shown significant relation with successful induction i.e. vaginal delivery within 24 hours.

V. Discussion

The current method of evaluation of cervical condition before induction of labour is by Bishop score. But this score can differ from person to person due to more number of variables.

This study primarily focused on detecting cervical change and likelyhood of success of induction of labour by comparing the cervical length in cms measured by transvaginal ultrasound and Bishop score in primigravidae.

This study has taken primigravidae to compare the Bishop score and cervical length by transvaginal ultrasound as in studies of Daskalakis et al[13] and Anish et al[14]. In studies of Yang et al[15] and Gomes et al[16] also, primigravidae were more in number than multigravidae with 74% and 68.1% respectively.

In our study we have taken women with gestational age of 37 to 42 weeks like in studies of Daskalakis et al, PC Tan et al[17], Yang et al and Halil et al[18].

We have taken past dates, pregnancy induced hypertension and post term as the causes of induction as in studies of Yang et al, Gabriel et al[19], Halil et al, Gomes et al and Anish et al study.

Bishop score of 5 was taken as cutoff value in present study like in studies of Anish et al, PC Tan et al, Elgorori et al[20], Daskalakis et al and Gabriel et al.

Whereas studies of Gomes et al and Strobel et al[21] were taken 6 as cutoff value, and in studies of Ware et al[22], Yang et al and Halil et al cutoff was 4.

In present study cervical length of 2.8 cms was taken as cutoff value, which is comparable with Halil et al, Daskalakis et al, Gabriel et al, Strobel et al and Gomes et al studies. Whereas in studies of Anish et al, Ware et al and Yang et al the cutoff was 3 cm.

In present study primary outcome i.e. vaginal delivery within 24 hours of induction was achieved in 67 women. The remaining 33 were failures, among them 23 were vaginal deliveries after 24 hours and 10 were cesarean sections.

Primary outcome of this study correlates with Ware et al (69%), Chandra et al (70.8%)[23] and Daskalkis et al (64.9%). The percentage of primary outcome was high in Yang et Al study as the study included both primigravidae and multigravidae. The percentage of primary outcome was less in Halil et al and Strobel et al studies as Halil had taken gestational age > 41 weeks for their study and Strobel et al had taken > 42 weeks for their study compared to average of 40 weeks in present study.

Halil et al, Ware et al, Anish et al and Daskalakis et al studies showed that cervical length and Bishop score combined with cervical length having better predictability (P <0.001) than Bishop score alone as in present study. Whereas Gomes et al and strobel et al studies showed both BS and cervical length by transvaginal ultrasonography had equal predictability (viz 0.000 and 0.000) and (viz <0.0001 and 0.001) respectively with vaginal delivery within 24 hours.

Table - 4 : Comparison of statistical analysis of similar studies

S.no	Study	Primary outcome (VD[*] ≤24 hrs)	Mode of delivery		Statistical analysis	Better predictor
			VD	C/S[*]		
1.	Ware et al (2000)		69%	31%	Logistic regression CL[*] (r2=0.28, p <0.02)	CL
2.	Chandra S et al (2001)	70.8%	80%	20%	Logistic regression, BS[*] (p <0.01)	BS
3.	Gabriel et al (2001)		70.4%	29.6%	ROC CL (p=0.006)	CL
4.	S H Yang et al (2003)		75%	25%	X^2 test, CL (p=0.001), BS (p=0.045)	CL
5.	Gomes et al (2005)	61.8%	72.8%	27.2%	X^2 test, BS(p=0.000) CL(p=0.000)	CL, BS
6.	Halil et Al (2006)	56.6%	69.9%	30.1%	Logistic regression CL (p=0.0101)	CL
7.	Daskalakis et Al (2006)	64.9%	67.1%	32.9%	AOC, CL (p <0.01)	CL
8.	Elghorori et Al (2006)		83.7%	16.3%	CL (Sen-62.1%, Spe-100%)	CL
9.	Strobel et Al (2006)	40%	94%	6%	Logistic regression, CL (p <0.0001), BS (p=0.001)	CL, BS
10.	Anish et Al (2007)		76.8%	23.2%	Logistic regression, CL (p=0.000)	CL
11.	PC Tan et Al (2007)		77.9%	22.1	Logistic regression, CL (p=0.005)	CL
12.	Present study (2008)	67%	90%	10%	X^2 test, CL (p=0.00001)	CL, BS combined with CL.

[*] BS-Bishop score, CL- Cervical length, VD-Vaginal delivery, CS-Cesarean section

VI. Conclusion

Cervical length by transvaginal ultrasonography proved to be better in predicting the success of induction of labour by having significant relation with vaginal delivery within 24 hours.

Bishop score is also good in predicting the success of induction of labour but it is having comparatively less significant relation with vaginal delivery within 24 hours because of many variables and person to person variability in assessment.

Cervical length by transvaginal ultrasonography can be used as an adjuvant to Bishop score in assessment of cervix before induction of labour because of its higher predictive value and better tolerability. But cost of the equipment and experience in ultrasound are the drawbacks.

Conflict of interest : The authors have no conflict of interest.

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