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EVALUATION OF ANTERIOR UTEROCERVICAL ANGLE AND CERVICAL LENGTH IN PREDICTING SPONTANEOUS PRETERM BIRTH IN THE DEPARTMENT OF OBSTETRICS & GYNAECOLOGY, S.M.S. MEDICAL COLLEGE, JAIPUR

Obstetrics & Gynaecology

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KEYWORDS

INTRODUCTION

Preterm birth (PTB) is defined as birth between 20th week to 37th week of gestation. Neonates born before 37 weeks GA are at risk for serious morbidity and mortality. The identification of the patient at higher risk for preterm birth would allow the development of effective interventions to prevent adverse perinatal outcomes associated with preterm birth, and better understanding of the mechanisms of disease leading to spontaneous preterm parturition.

There isn't any ideal predictive test for preterm birth. The test should be simple, non-invasive and rapid like measurement of cervical length and uterocervical angle. Spontaneous preterm birth is associated with undesired cervical changes, which manifest clinically as cervical shortening, effacement and dilation. The mechanisms underlying premature cervical change in pregnancy are poorly understood, and therefore current clinical protocols to assess preterm birth risk are limited to surrogate markers of mechanical function, such as sonographically measured cervical length.

Uterocervical angle (UCA) represents a novel ultrasonographic marker that is defined as the triangular segment measured between the lower uterine segment and the cervical canal. It is measured using a line that starts from the internal cervical os (that is extended along the cervical canal) and a second line that tracks the internal segment of the anterior uterine wall. At the present time, this study aims to establish that a single measurement of transvaginal sonographic CL and UCA <22 weeks of gestation appears to meet several characteristics to be considered a good predictive test for preterm birth among asymptomatic women.

MATERIAL AND METHODS

Study universe: All pregnant women attending OPD in SMS Medical College.

Study Population: All pregnant women between 14-22 weeks of gestation attending ANC OPD in Department of Obstetrics & Gynaecology, SMS Medical College.

Study Place: SMS Medical College, Jaipur.

Study Design: Prospective study.

Study Type: Hospital based descriptive type of observational study.

Study Duration: From April 2019-March 2020

SAMPLE SIZE: 225 spontaneous delivery cases

SELECTION CRITERIA

INCLUSION CRITERIA: All primi and multigravida, normotensive, non-morbid pregnant women who will have their visit between 14-22 weeks with singleton pregnancy, and who are willing for institutional birth at term with written and informed consent.

EXCLUSION CRITERIA

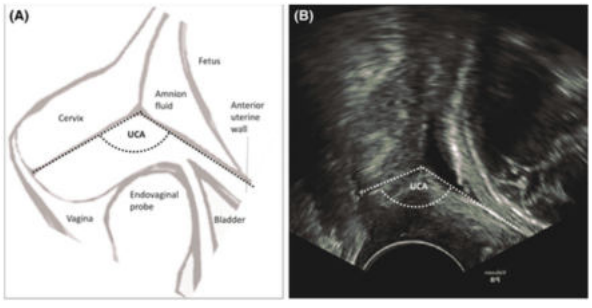
History of preterm birth, Multiple pregnancy, Polyhydramnios, Uterine anomalies, Fibroids, History of cervical excision treatment, rupture of membranes, Uterine specific infections (chorioamnionitis, bacteria etc.), Cigarette smoking, substance abuse, physical abuse, all other systemic illnesses.

METHODOLOGY

All eligible pregnant women fulfilling inclusion criteria were explained about nature and purpose of study. A complete history was taken regarding present pregnant and previous pregnancy as well. At first detailed history was taken regarding age, parity, residence, socioeconomic status, past obstetrical history, LMP, EDD, past and present medical history. USG was done in pregnant women in 2nd trimester (14-22 weeks) attending ANC clinic to know the anterior uterocervical angle and cervical length. All these women were followed to see whether term or preterm delivery was the outcome. The correlation of preterm birth and term birth and its relation to cervical length and uterocervical angle was analyzed.

ULTRASOUND EXAMINATION

With advancing pregnancy, the force of pregnant uterus is shifted towards the cervix and depending on angle of inclination, the cervical canal is either pressed shut in case of an acute angle or pressed open in case of an obtuse angle. The shift in cervical angle is used by as one of the most effective interventions in preventing spontaneous preterm birth.[1] Anterior uterine wall was imaged, the internal and external os including the isthmus was identified and a line between them was drawn. A second line was drawn parallel to the lower aspect of the anterior uterine wall passing through the internal cervical os. The angle ceased by the two lines at internal os was measured.



For cervical length, the external os is identified as the point at which the anterior and posterior lips of the cervix come together. The point at which the cervical mucosa ends is considered to be the internal cervical os. In a curved cervix, the length is underestimated with a straight line. If the cervix is curved and the straight-line cervical length measurement is short, measurement obtained in two or more segments provides a more accurate estimation of length.

RESULTS AND ANALYSIS

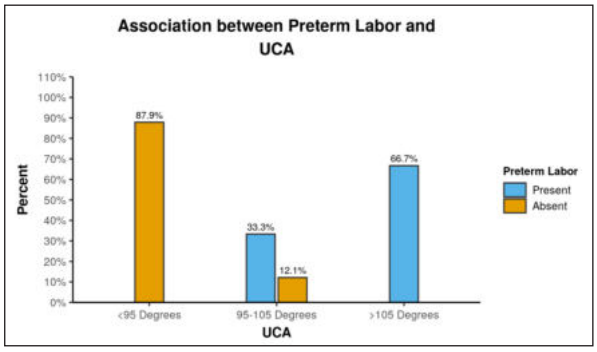
Table 1: Association between Preterm Labor and Cervical Length (n = 225)

Cervical Length	Preterm Labor			Chi-Squared Test	
	Present	Absent	Total	$\chi 2$	P Value
≤2 cm	71 (100.0%)	0 (0.0%)	71 (100.0%)	193.547	<0.001
2-2.5 cm	13 (100.0%)	0 (0.0%)	13 (100.0%)		
2.5-3 cm	9 (15.3%)	50 (84.7%)	59 (100.0%)		
>3 cm	0 (0.0%)	82 (100.0%)	82 (100.0%)		
Total	**93 (41.3%)**	**132 (58.7%)**	**225 (100.0%)**		

All the cases in the group which had Cervical Length: ≤2 cm and between 2-2.5cm had Preterm Labour. Participants in the group Cervical Length: ≤2 cm, 2-2.5 cm had the largest largest proportion of Preterm Labour. Preterm labour was absent in cases who had cervical length >3cm.

Table 2: Association between Preterm Labor and UCA (n = 225)

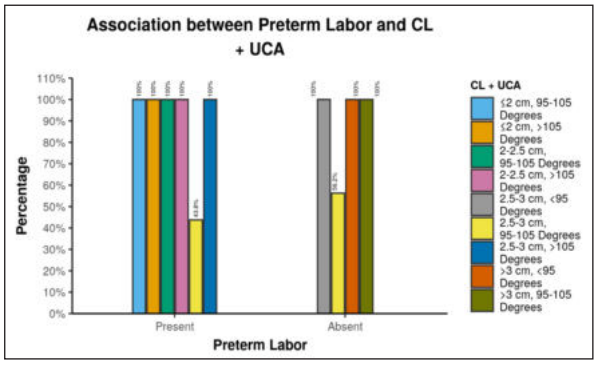
UCA	Preterm Labor			Chi-Squared Test	
	Present	Absent	Total	χ2	P Value
<95 Degrees	0 (0.0%)	116 (87.9%)	116 (51.6%)	181.480	<0.001
95-105 Degrees	31 (33.3%)	16 (12.1%)	47 (20.9%)		
>105 Degrees	62 (66.7%)	0 (0.0%)	62 (27.6%)		
Total	**93 (100.0%)**	**132 (100.0%)**	**225 (100.0%)**		



Preterm Labor was absent in cases which had UCA<95 Degrees. 33.3%. of the cases which had UCA between 95-105 degrees had preterm labor. 62% Participants in which UCA was >105 degrees had preterm Labor.

Table 3: Association between Preterm Labour and CL + UCA (n = 225)

CL + UCA	Preterm Labour			Chi-Squared Test	
	Present	Absent	Total	χ2	P Value
≤2 cm, 95-105 Degrees	18 (100.0%)	0 (0.0%)	18 (100.0%)	208.762	<0.001
≤2 cm, >105 Degrees	53 (100.0%)	0 (0.0%)	53 (100.0%)		
2-2.5 cm, 95-105 Degrees	6 (100.0%)	0 (0.0%)	6 (100.0%)		
2-2.5 cm, >105 Degrees	7 (100.0%)	0 (0.0%)	7 (100.0%)		
2.5-3 cm, <95 Degrees	0 (0.0%)	41 (100.0%)	41 (100.0%)		
2.5-3 cm, 95-105 Degrees	7 (43.8%)	9 (56.2%)	16 (100.0%)		
2.5-3 cm, >105 Degrees	2 (100.0%)	0 (0.0%)	2 (100.0%)		
>3 cm, <95 Degrees	0 (0.0%)	75 (100.0%)	75 (100.0%)		
>3 cm, 95-105 Degrees	0 (0.0%)	7 (100.0%)	7 (100.0%)		
Total	**93 (41.3%)**	**132 (58.7%)**	**225 (100.0%)**		



Participants in the group CL + UCA: ≤2 cm, 95-105 Degrees, ≤2 cm, >105 Degrees, 2-2.5 cm, 95-105 Degrees, 2-2.5 cm, >105 Degrees, 2.5-3 cm, >105 Degrees had the largest proportion of Preterm Labor. Majority of Participants in the group CL + UCA: 2.5-3 cm, <95 Degrees, >3 cm, <95 Degrees, >3 cm, 95-105 Degrees had term delivery. None of the participants in the group [CL + UCA: ≤2 cm, 95-105 Degrees] had Preterm Labor. None of the participants in the group [CL + UCA: ≤2 cm, >105 Degrees] had Preterm Labor.

DISCUSSION

Preterm birth (PB) is an important subject for being one of the leading causes of neonatal mortality and its long term neurologic and developmental problems. All the cases in the group which had Cervical Length ≤2 cm and between 2-2.5cm had Preterm Labor (100%). Participants in the group Cervical Length ≤2 cm, 2-2.5 cm had the largest proportion of Preterm Labor. Pretem labor was absent in cases who had cervical length >3cm. The results were coherent with Iams *et al.*(1996) [2] who performed secondary analysis on data collected for the Preterm Prediction Study, and found that the rate of cervical shortening was higher in women who went on to have spontaneous preterm birth. In our study preterm labor was present in 31 cases out of 47 which had UCA between 95-105 degrees. 100% cases in the group which had UCA >105 degrees delivered preterm. This was coherent with the results observed by George Daskalakis et al. (2018)[3] which stated that second trimester UCA measurement might be used as a predictive factor of PTB <34 weeks. UCA alone has predicted 41.3% of preterm birth in our study. In our study cases who had CL<2cm and between 2-2.5cm and UCA between 95-105 degrees and >105 degrees had the largest proportion of preterm birth. The study concluded that both CL and UCA had impact on predicting preterm birth. The study conducted by Martinez et al.(2017) [4] confirmed that pregnant women with a wide UCA are prone to deliver preterm (<34 weeks) compared to women that delivered at term (106.1° versus 99.5°)[5]. They also mentioned that UCA was independent of the CL measurement and thus could be used in predictive models combined with CL. A model combining maternal history, CL and ACA at 20^{+0}-24^{+6} weeks of gestation can predict approximately 40% of the severe preterm births.

CONCLUSION

To conclude, the study shows that when CL is >3cm or UCA is <95 degrees, there is no fear of preterm labour. If both CL and UCA is <2.5 cm and >105 degrees respectively, 100% chance of preterm labour is present but when CL is between 2.5-3cm and UCA is 95-105 degrees, there is danger of preterm birth. This group should be targeted for timely intervention, preparation of in-utero transfer and counselling of patients. The present study demonstrates that preterm delivery is still a challenging maternal health problem. This calls upon to reinforce antenatal care and services for better birth outcomes by early prediction of preterm labour followed by appropriate and innovative preventive intervention, customized individuals need may prevent preterm births and improve foetal outcomes. Therefore, secondary prevention in terms of screening for Uterocervical angle and cervical length which are ultrasonographically directed preventive strategies. Ultrasound, with its ability to penetrate the cervical tissue and display its anatomy, makes an ideal modality. This is a non invasive, easily reproducible and cost effective screening method. It has the potential and feasibility, and becomes of utmost importance to combat preterm birth. In order to reach an effective decrease of prematurity, two premises are necessary: to identify women who are at risk by screening with sonogram, measurement of uterocervical angle and cervical length and to institute measures that serve to extend pregnancy by timely intervening and instituting measures, thus avoiding prematurity.

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