

ORIGINAL RESEARCH

A Prospective Observational Study for the Evaluation of Uterocervical Angle in Second Trimester to Predict Spontaneous Preterm Birth

¹Dr. Megha Omar, ²Dr. Vibha Dhruw, ³Dr. Paribhashita Mishra, ⁴Dr. Archana Maurya

¹Senior Resident, ²P.G. Resident, ³Associate Professor, ⁴Professor, Department of Obstetrics and Gynaecology, Kamla Raja Hospital, G.R. Medical College Gwalior, Madhya Pradesh, India

Corresponding Author

Dr. Megha Omar

Senior Resident, Department of Obstetrics and Gynaecology, Kamla Raja Hospital, G.R. Medical College Gwalior, Madhya Pradesh, India

Email: meghaomar@gmail.com

Received: 03/04/2024

Accepted: 04/05/2024

ABSTRACT

Introduction: Preterm birth is a leading cause of neonatal morbidity & mortality worldwide & is estimated to complicate approximately 10-12% of pregnancies. The concept of anterior Uterocervical Angle can add more possibility to diagnosing preterm birth. **Materials and Methods:** It is a Prospective Observational study conducted in the Department of Obstetrics and Gynaecology, Kamla Raja Hospital, G.R.M.C, Gwalior, M.P during a period of January 2021 to June 2022. The aim of this study is to measure uterocervical angle by transvaginal sonography between 12-24 week of gestation for prediction of spontaneous preterm birth, **Results:** Recently, the potential of UCA as an ultrasound marker to predict sPTB has been identified. In this study, UCA in the second trimester was significantly wider in the preterm group compared with the term group and there was a significant association between obtuse UCA and risk of spontaneous preterm labor. **Discussion:** In the present study 69.7% women had anterior uterocervical angle <95 degree while 30.3% women had angle more than >95 degree. Out of 85 women measuring angle <95 degree 90.6% women had term birth and 9% women had suffered preterm birth. Obtuse anterior uterocervical measurement >95 degree was observed in 37 women out of which 29 women (78%) had spontaneous preterm birth (<37week). The obtuse uterocervical angle further divided in two groups having angle between 95- 105 and > 105. Out of 29 people 22 women (75%) were delivered preterm having angle between 95-105 while out of 8 women with angle >105, 7 women (90%) had preterm delivery. **Conclusion:** This study suggests that the UCA is a potential novel screening tool for the prediction of sPTB. However, detection rates of sPTB can further be improved if combined with other parameters such as CL, maternal demographic and obstetric history.

Keywords: Uterocervical Angle, Preterm, Women, Pregnancy

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution- Non Commercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

INTRODUCTION

Preterm birth is a leading cause of neonatal morbidity & mortality worldwide & is estimated to complicate approximately 10-12% of pregnancies. Gestational age at birth is inversely related to neonatal death & morbidity. It accounts for neonatal death - 75% & long-term morbidity - 50%.¹ According to WHO estimated 15 million babies born preterm (<37 weeks of gestation) every year in the world & this is equal to 1 in 10 live birth.²

Every year 1 million children die due to preterm birth complications & most of the surviving children have visual & hearing problem & mental & physical disabilities.⁴⁻⁵ The concept of anterior Uterocervical

Angle can add more possibility to diagnosing preterm birth.⁶

The uterocervical angle is a new ultrasonic finding that is defined as segment between anterior uterine wall & the cervical canal. With advancing pregnancy there is variation in geometry of cervix the hypothesis is that the cervix can be easily funneled or opened by gravid uterus when the uterocervical angle is obtuse. According to previous study the mean uterocervical angle in 2nd trimester in term group was (less than 95*) as compared to preterm group was >95. The shift in cervical angle is used as most effective method in preventing spontaneous preterm birth (sPTB).

METHODOLOGY

The angle is measured using a line starting from cervical canal between internal & external os & a second line tracts the internal segment of anterior uterine wall (3 cm from internal os).⁷

- The present study was conducted in the Department of Obstetrics and Gynaecology, Kamla Raja Hospital, G.R.M.C, Gwalior, M.P during a period of January 2021 to June 2022.

This was a Prospective Observational study. A total of 122 singleton pregnant women who are at low risk for preterm birth at gestational age between 12 -24 week who presented at the antenatal clinic were assigned for study.

INCLUSION CRITERIA

- Singleton pregnancy
- Patient coming to O.P.D. between 12-24 week period of gestation

OBSERVATION AND RESULTS**Table 1: Distribution of Study subject according to age**

Age Group(year)	No. of Cases	Percentage
19-25 year	67	54.9%
26-30 year	39	32.0%
More than 30 year	16	13.1%
Total	122	100.0%

Out of 122, 67(54.9%) patients were in the age group 19-25 years, 39(32.0%) patients were in 26-30 years and 16(13.1%) patients were in the age group more than 30 years. Majority of the patients were in the age group 19-25 years. The mean age of the patients was 26.02±3.70 years

Table 2: Distribution of Study Subject over Books status

Booked/Unbooked	No. of Cases	Percentage
Booked	18	14.8%
Unbooked	104	85.2%
Total	122	100.0%

Out of 122 cases, there were 104(85.2%) unbooked cases and rest 18(14.8%) were booked cases.

Table 3: Distribution of Subject over Referral status

Referred/Unreferrd	No. of Cases	Percentage
Referred	15	12.3%
Unreferred	107	87.7%
Total	122	100.0%

Out of 122 cases, 104(85.2%) patients were not referred and rest 18(14.8%) were referred cases.

Table 4: Distribution of Study Subject According to Gravida

Gravida	No. of Cases	Percentage
G1	75	61.5%
G2	37	30.3%
G3	10	8.2%
Total	122	100.0%

Out of 122 cases, 75(61.5%) cases were primigravida and rest 47(38.5%) were multigravida cases

Table 5: Distribution of study subject on the basis Period of Gestation at Time of Measurement

Gestational Age	No. of Cases	Percentage
16-20weeks	21	17.2%
20-24weeks	101	82.8%
Total	122	100.0%

EXCLUSION CRITERIA

- Cases of multiple pregnancy
- Polyhydramnios,
- Uterine anomaly
- Fibroid
- Placenta previa
- History of previous 2nd Trimeste Abortion

The transvaginal sonography measurement method as follows

- The participants are asked to empty her bladder. In lithotomy position The TVS probe introduced into anterior fornix of vagina and adjusted to obtain a saggital view with lowest pressure on cervix. The uterocervical angle was measured by defining the lower uterine segment and cervical canal as a traingular picture.

Participant's demographic data recorded. Potential risk factors for spontaneous preterm birth including underlying disease and obstetric complications are followed until delivery .The mode of delivery, onset of labour and gestational age of baby is recorded.

Out of 122 cases, 21(17.2%) cases had 16-20 weeks of period of gestation cases and rest 101 (82.8%) belong to 20-24 weeks of period of gestation cases at the time of measurement.

Table 6: Distribution of study subject on the basis of Term/Preterm

Term/ Preterm	No. of Cases	Percentage
<37weeks(Preterm)	37	30.3%
≥37weeks(Term)	85	69.7
Total	122	100.0%

Out of 122 cases, 37(30.3%) cases were <37 weeks gestation and rest 85(69.7%) were more than equal to 37 weeks period of gestation cases at the time of delivery.

Table 7: Distribution of study subject on the basis of Uterocervical Angle measurement

Uterocervical Angle measurement	No.of Cases	Percentage
<95 degree	85	69.7%
>95 degree	37	30.3%
-95-105	29	6.55%
->105	8	23.77%
Total	122	100.0%
Mean±SD	88.16±9.76(Range70-112)	

Out of 122 cases, 85(69.7%) cases had Uterocervical Angle measurement were <95 degree and 37(30.3%) cases had Uterocervical Angle measurement >95 degree. Out of 37 cases of Uterocervical Angle measurement, there were 29 cases measuring 95 -105 degree and 8 cases belong to >105 degree of Uterocervical Angle measurement.

Table 8: Distribution of spontaneous preterm birth <37 weeks and term birth in study subject according to Uterocervical

Uterocervical Angle	Term/Preterm				Total	
	Delivered at <37weeks		Delivered at ≥37weeks			
	No.	%	No.	%	No.	%
<95 degree	8	21.6%	77	90.6%	85	69.7%
95-105degree	22	59.5%	7	8.2%	29	23.8%
>105degree	7	18.9%	1	1.2%	8	6.6%
Total	37	100.0%	85	100.0%	122	100.0%
Mean ± SD	97.22±8.46		84.22±73.3		88.16±9.76	

Angle measurement: Obtuse Uterocervical Angle measurement ≥95 degrees was observed in 37 women out of which 29(78.4%) had of spontaneous preterm birth (<37 weeks). Uterocervical Angle measurement in the second trimester was wider in the preterm group (97.22±8.46 degrees) compared with term group (84.22±73.39 degrees) (p-value <0.001)

Table 9: Mode of Delivery

Mode of Delivery	No. of Cases	Percentage
LSCS	49	40.2%
ND	73	59.8%
Total	122	100.0%

Out of 122 cases, 49(40.2%) cases had Lower Segment caesarean section and rest 73(59.8%) had Normal delivery

Table 10: Association between age and Term/Preterm Delivery

Age Group (years)	Term/Preterm				Total	
	Deliver at <37weeks		Deliver at ≥37weeks			
	No.	%	No.	%	No.	%
19-25 year	21	56.8%	46	54.1%	67	54.9%
26-30 year	11	29.7%	28	32.9%	39	32.0%
More than 30year	5	13.5%	11	12.9%	16	13.1%
Total	37	100.0%	85	100.0%	122	100.0%

Out of 122 cases, 21 (56.8%) cases of age between 19-25 years, 11 (29.7%) cases of between 26-30 years and 5 (13.5%) cases age more than 30 years of age delivered at <37 weeks of gestation. The above association found to be statistically not significant ($p>0.05$) which shows that age and term/preterm delivery are comparable.

Table 11: Association between booking status and Term/Preterm Delivery

Booking status	Term/Preterm				Total	
	Delivered at <37 weeks		Delivered at \geq 37 weeks			
	No.	%	No.	%	No.	%
Booked	6	16.2%	12	14.1%	18	14.8%
Unbooked	31	83.8%	73	85.9%	104	85.2%
Total	37	100.0%	85	100.0%	122	100.0%

Out of 122 cases, 6 (16.2%) cases were booked, 31 (83.8%) cases were unbooked delivered at <37 weeks of gestation. The above association found to be statistically not significant ($p>0.05$) which shows that booking status and term/preterm delivery are comparable.

Table 12: Birth weight of Baby

Birth weight(kg)	Term/Preterm				Total	
	Delivered at <37 weeks		Delivered at \geq 37 weeks			
	No.	%	No.	%	No.	%
1.5-2.0kg	10	27.0%	0	0.0%	10	8.2%
2.1-2.5kg	26	70.3%	43	50.6%	69	56.6%
2.6-3.0kg	1	2.7%	40	47.1%	41	33.6%
3.1-3.5kg	0	0.0%	2	2.4%	2	1.6%
Total	37	100.0%	85	100.0%	122	100.0%
Mean \pm SD	2.13 \pm 0.26		2.58 \pm 0.28		2.44 \pm 0.34	
P value	0.000					

Out of 37 cases in preterm delivery 10 (27.0%) baby were 1.5-2.0 kg, 26 (70.3%) cases of birth weight of baby were 2.1-2.5 kg, 1 (2.7%) cases of birth weight of baby were 2.6-3.0 kg. Out of 85 cases in term delivery 43 (50.6%) cases of birth weight of baby were 2.1-2.5 kg, 40 (47.1%) cases of birth weight of baby were 2.63.0 kg and 2 (2.4%) cases of birth weight of baby were belong to 3.1-3.5 kg. The above association found to be statistically significant ($p<0.05$)

DISCUSSION

Preterm birth is one of the leading causes of neonatal mortality in the absence of congenital anomalies in developing countries. Hence measure should be taken to identify, prevent preterm deliveries and treat this preterm neonates as early as possible. Recently, the potential of UCA as an ultrasound marker to predict sPTB has been identified.⁸ A wide UCA detected during the second trimester is associated with an increased risk of spontaneous preterm labor. The rationale behind this association is based on the mechanical properties of the UCA. An acute UCA acts as a preventive mechanical barrier against sPTB.⁹ In present study most of females were in age group of 19-25yr which is 54.9%. 32% women were in age group of 26 -30yr. In our study 56.8% female delivered at <37week of gestation of age group 19-25 y. This is comparable to similar study by Bijay Sur, Sujata Misra, Sanghamitra Das et al, Leyla Torabzade , Zahra Mahboubi-Fooladi Mehdi Khazaeiand et al, Alba Farràs Llobet. This study had showed that sPTB occurs more in YOUNGER age group.

In present study most of women were unbooked. 83% women were unbooked who delivered at <37 week of gestation as compared to booked patient which was

16% . In study group ONLY 13% WOMEN were booked. Similar results were shown in study done by Leyla Torabzade et al.

In present study most of women were unreferred. In our Study 87% women were unreferred and 12.3% were referred.

In my study spontaneous preterm birth occurred in 83.8% women who were unreferred and 16.2% women were referred who delivered at <37 week of gestation.

In present study most of cases were primigravida [63.9%] and 36% women were multigravida. In my Study 23 mothers (62.4%) were primigravida , while 14 (37%) mothers exhibited spontaneous preterm birth (PTB group) were multigravida comparable to similar study Leyla Torabzade et al. 83.9%, Trinya Chaiwongsa et al, Khadije Rezaie Keikhaie et al.

In present study 82.8% women had 20-24 week of gestation at the time of measurement of uterocervical angle while 17.2% women belong to 16-20 week of gestation. This is comparable to a study conducted by Alba Farràs Llobet et al whose mean age of gestation at the time of measurement of uterocervical angle were (20.4). Sedighe Borna et al, Johannes van der

Merwe et al also had similar study. This implies that the uterocervical angle measurement work better in late second trimester.

In the present study 69.7% women had anterior uterocervical angle <95 degree while 30.3% women had angle more than >95 degree. Out of women measuring angle <95 degree 90.6% women had term birth and 9% women had suffered preterm birth. Obtuse anterior uterocervical measurement >95 degree was observed in 37 women out of which 29 women (78%) had spontaneous preterm birth (<37week). the obtuse uterocervical angle further divided in two groups having angle between 95- 105 and >105. out of 29 people 22

women were delivered preterm having angle between 95-105.while the 90% women with angle >105 had preterm delivery This is similar to the study reported by Dziadosz et al.

In the present study in out of 122 women 59.8 % delivered vaginally, 40.2% delivered by LSCS. In women having spontaneous preterm birth 35.1% women delivered by LSCS 54.9% delivered vaginally. While the 57.6% women delivered by LSCS have term gestation. This is contrary to study conducted by Pramod Kumar Singh et al.

In this study, UCA in the second trimester was significantly wider in the preterm group compared with the term group and there was a significant association between obtuse UCA and risk of spontaneous preterm labor. We found UCA >105 degrees to be significantly associated with sPTBs at <34 week. UCA in the range 95 to 105 degrees was found to be significantly associated with sPTBs at 34 to 37 weeks with a sensitivity of 81%, specificity of 88.24%, and p-value<0.001. In present study, out of preterm delivery 27% babies has very low birth weight 1.5 -2.0 kg and 70% babies had birth weight of around 2.0- 2.5 kg .Out of 85 cases of term delivery 50% had baby wt. 2.1-2.5 kg and 47% cases have birth weight of 2.6-3 kg. This is similar to study done by Alba Farràs Llobet et al, Pramod Kumar et al.

CONCLUSION

Timely recognition of pregnant women at risk of preterm labor can facilitate timely interventions for its management such as surgical closure of cervix with cervical cerclage, maternal progesterone supplementation, and pessaries. Several factors such as ethnicity, race, and sociodemographic conditions of the patients can potentially affect cervical properties including CL and UCA.

REFERENCES

1. <https://www.who.int/news-room/fact-sheets/detail/preterm-birt>
2. National Health Portal Gateway to authentic health information. Available from: www.nhp.gov.in
3. F. Dos Santos and J. Daru, "Accuracy of fetal fibronectin for assessing preterm birth risk in asymptomatic pregnant women: a systematic review and meta-analysis, 2018".

4. A. Keepanasseril, V. Suri, R. Bagga, and N. Aggarwal, "Preinduction sonographic assessment of the cervix in the prediction of successful induction of labour in nulliparous women," Australian and New Zealand Journal of Obstetrics and Gynaecology, vol. 47, no. 5, pp. 389–393, 2007.
5. A. Farras Llobet, L. Reginc `os Mart ´i, T. Higuera et al., "The uterocervical angle and its relationship with preterm birth," e Journal of Maternal-Fetal & Neonatal Medicine, vol. 31, no. 14, pp. 1881–1884, 2017.
6. Preterm labour and birth, "NICE guideline [NG25]," 2015, <https://www.nice.org.uk/guidance/ng25/chapter/Recommendations#prophylactic-vaginal-progesterone-and-prophylactic-cervical-cerclage> A South Asian Perspective. Arias Practical Guide to high risk pregnancy and delivery. Editors Arias F, Bhide A, Arulkumaran S, Damania K, Daftary S. (4th Ed); 2015 Chapter 8:135.
7. Crane JMG. Pregnancy outcome after loop electrosurgical excision procedure: systematic review. Obstetrics & Gynecology. 2003;102(5):1058–1062.
8. Hoyert DL, Mathews TJ, Menacker F, Strobino DM, Guyer B. Annual summary of vital statistics: 2004. Pediatrics. 2006;117(1):168–83.