Cervical Length in 20th Week of Gestation in Relation with the Date of Delivery

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Abstract

Background: One of the first events that can cause labor is cervical shortening. In the same way, a decrease in cervical length during the second trimester is predictive of spontaneous preterm birth. The aim of this study is to analyze the influence of cervical length measured at the second trimester ultrasound exam in the onset of preterm birth.

Material and Methods: It has been carried out a retrospective study of 2846 pregnant women with childbirth in our hospital during the period from 2016 to 2019. The selected inclusion criteria were primiparous with single and spontaneous pregnancy and non-maternal-fetal pathology.

The main variable of our study was cervical length at the 20th week of gestation. The total of patients were divided in three groups (cervical length less than 30 mm, cervical length between 30 - 40 mm and cervical length greater than 40 mm).

Results: In relation to gestational age at the time of delivery, 5.34% of the patients had preterm birth.

In the group of pregnant women with cervical length < 30 mm, we appreciated a 9.67% of preterm deliveries compared to a 6.17% in the group of pregnant women with cervical length of 30 - 40 mm and a 3.21% in those of cervical length > 40 mm. When applying statistical analysis,

Statistical significance was obtained (p = 0.213) between the cervical length group lower than 30 mm and cervical length greater than 40 mm. A cervical length lower than 30 mm is a risk factor for preterm delivery in our population.

Conclusion: Cervical length at the 20th week of gestation is a preterm birth onset risk factor, being able to classify pregnant women in high and low risk groups by offering individualized monitoring to each of them.

Keywords: Cervical Length; Preterm Birth; Transvaginal Ultrasound; Second Trimester; Gestation

Abbreviations

SMFM: Society for Maternal-Fetal Medicine; ACOG: American College of Obstetricians and Gynecologists; FIGO: International Federation of Gynecology and Obstetrics

Introduction

Preterm birth is defined as a delivery that occurs before the 37th week of gestation. It is well known that it is associated with an increase of neonatal morbidity and mortality, increasing the risk of psychomotor development delay, neurological disorders during childhood and a decrease in survival and quality of life [1,2].

Preterm delivery is classically defined as the presence of regular uterine dynamics, associated with progressive cervical modifications from the 22.0th to 36.6th weeks of gestation. This entity can be caused by different etiologies, such as cervical shortening.

One of the first events that can cause labor is cervical shortening. Cervix is responsible of maintaining the pregnancy until it is considered full term.

In the same way, a decrease in cervical length during the second trimester is predictive of spontaneous preterm birth, with the highest risk in women with early and substantial cervical shortening [3-8]. There are many causes of preterm cervical shortening, such as occult uterine activity, uterine distention, cervical insufficiency, decidual hemorrhage of infection [9].

Cervical shortening begins at the internal cervical opening and progresses caudally [3-7]. It is often earlier visualized in an ultrasound exam than in a physical examination.

Universal cervical length screening continues to be discussed [10,11]. In this area, there are many different recommendations from the main scientific institutions: The Society for Maternal-Fetal Medicine (SMFM) and the American College of Obstetricians and Gynecologists (ACOG) do not recommend routine screening for women with a single pregnancy and without previous history of spontaneous preterm birth; while the International Federation of Gynecology and Obstetrics (FIGO) recommends sonographic cervical length screening in all women in 19+0 to 23+6 weeks of gestation using transvaginal ultrasound. However, all organizations recommend routine transvaginal ultrasound for the measurement of cervical length in women with a single pregnancy and previous history of spontaneous preterm birth [12].

In conclusion, measurement of cervical length should be based on the patient's previous obstetric history: in women without an obstetric history of preterm birth, the cervical measurement should be carried out at the 20th week of gestation, while in women with an obstetric history of preterm birth, the measurement should be carried out at the 16th week.

Finally, there are different ways of measuring cervical length. The most optimal technique to achieve the visualization of the cervix is the transvaginal ultrasound exam (American College of Radiology and the American Institute of Ultrasound in Medicine) [12-14].

To perform the transvaginal ultrasound exam, the patient should previously empty her bladder. Subsequently, the transducer is inserted into the anterior fornix until the cervix is visualized. Cervical length is represented by the line made between the interface of the mucosal surfaces (at the closed portion of the cervix). The distance is usually the one between the internal and the external os [9]. The procedure is completed with transboundary pressure and the evaluation of the appearance of the "funnel sign" (an opening and elongation of the internal os). At the 20th week of pregnancy, it is considered cervical shortening a cervical length less than 25 mm in single gestations, and less than 20 mm in multiple gestations.

Aim of the Study

The aim of this study is to analyze the influence of cervical length measured at the second trimester ultrasound exam in the appearance of preterm birth.

Materials and Methods

A retrospective study was conducted in a population of 2846 pregnant women who gave birth at the Hospital Universitario Fundación Jiménez Díaz during the period between 2016 and 2019.

Male Involvement in Prevention of Mother to Child Transmission (Pmtct) and Associated Factors in Ambo Town, Ethiopia

03

The study population was divided into three groups according to cervical length on the second trimester ultrasound (week 20 of gestation): pregnant women with cervical length less than 30 mm, pregnant women with cervical length between 30 - 40 mm and pregnant women with cervical length greater than 40 mm.

From the total sample included in the first group to study, the pregnant women with cervical length less than 25 mm, were selected for a study of a greater number of variables.

The inclusion criteria selected for the study sample are: singleton, spontaneous pregnancies, excluding from the study any pregnancy that presents during gestation a maternal-fetal pathology that interferes as a confounding factor in the results of the study.

The study variables were analyzed in clinical records of the prenatal diagnosis unit, obstetrics consultations and the delivery room.

The main study variable is the cervical length measured in the second trimester ultrasound (week 20 of gestation). As previously described, the total sample was divided into different groups, depending on the values of the main study variable.

Other variables analyzed in the study are: gestational age at the time of delivery, maternal age and type of delivery.

An analysis of other variables (type of treatment, emergency visits and admissions for threatened preterm birth) was performed in a subgroup of women with cervical length less than 25 mm.

We performed a descriptive study of the study population and a comparative analysis of the variables (gestational age at delivery, maternal age and type of delivery) of the three groups into which the total sample was divided.

The level of statistical significance for all statistical analyses was p (< 0.05).

Results

Of the total study population, 124 pregnant women (4.3%) were included in the group with cervical length less than 30 mm, 1975 pregnant women (69%) belonged to the group with cervical length between 30 - 40 mm and the other 747 pregnant women belonged to the group with cervical length greater than 40 mm (26.24%).
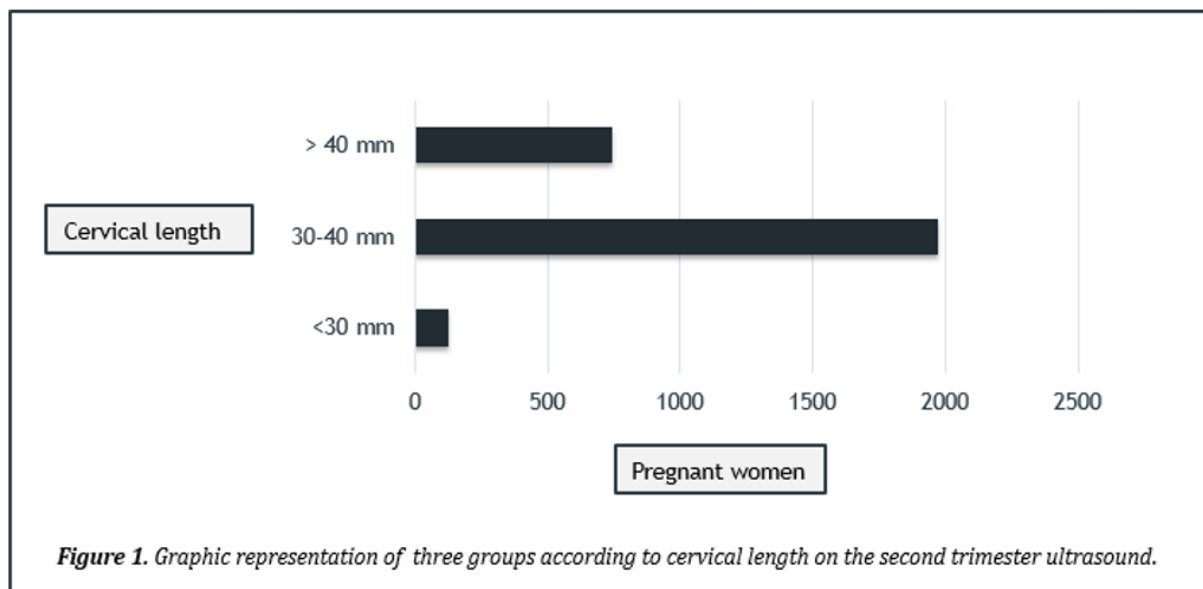

Figure 1. Graphic representation of three groups according to cervical length on the second trimester ultrasound.

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Gestational age

In relation to gestational age at delivery, in the total sample 158 pregnant women presented premature delivery (less than 37 weeks), corresponding to 5.34%, the other 2694 pregnant women (94.66%) presented gestational age greater than 37 weeks.

In the group of women with cervical length less than 30 mm, 9.67% (12 pregnant women) presented preterm delivery, and a total of 112 (91.37%) women presented gestational age greater than 37 weeks. In the subgroup of women with cervical length between 30 - 40 mm, 6.17% (122 pregnant women) presented gestational age below 37 weeks and the remaining 93.83% (1853 pregnant women) presented term deliveries. In the subgroup of women with cervical length greater than 40 mm, a total of 24 (3.21%) of the 747 women presented preterm delivery, for the 96.79% (723 pregnant women) who presented term delivery.

Analysis of the results shows a higher percentage of preterm delivery in the group of women with shorter cervical length (9.67%) in relation to the other two groups under study, with a decrease in the percentage of preterm delivery in the group of pregnant women with longer cervical length (6.17% cervical length between 30 - 40 mm, 3.21% cervical length greater than 40 mm). Performing a statistical analysis comparing gestational age, statistical significance is obtained ($p = 0.213$) between the group with cervical length less than 30 mm and cervical length greater than 40 mm).
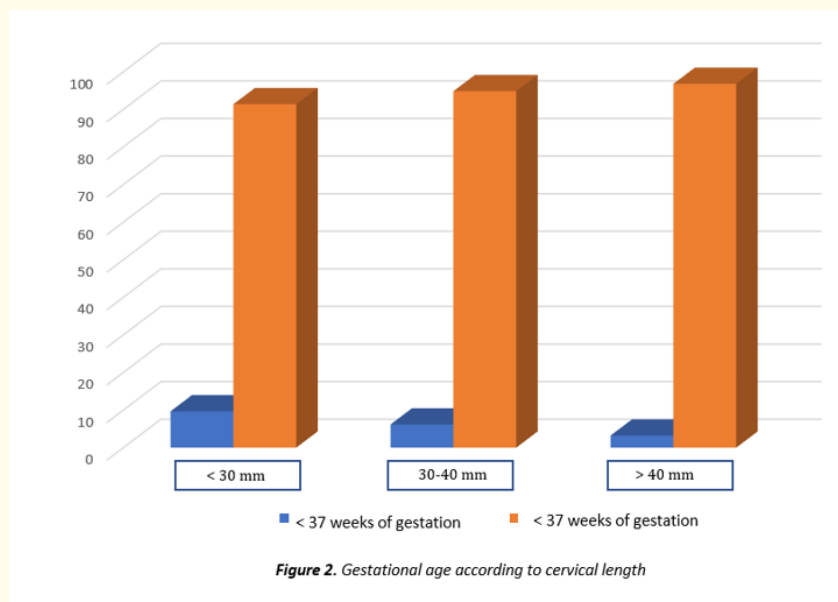

Figure 2. Gestational age according to cervical length

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Maternal age

With regard to maternal age, the total sample included 51 women in the under-20 age group (1.81%); 2576 (90.5%) were between 20 - 40 years old and 219 (7.69%) were over 40 years old.

In the group of women with cervical length less than 30 mm, 2.41% were under 20 years of age, 92.74% were between 20 and 40 years of age and 4.83% were over 40 years of age. In the group of women with cervical length over 40 mm, only 1% were under 20 years old, 90.09% were between 20 and 40 years old and 8.38% were over 40 years old.

When assessing the results, the group of pregnant women with cervical length greater than 40 mm had a higher percentage of women over 40 years than the group with cervical length less than 30 mm, without observing other significant alterations.

Type of delivery

In the total population under study, 1434 deliveries were euthiotic (50.38%), a total of 578 deliveries were instrumental (20.30%) and 833 births were by caesarean section (30%).

In the group of women with cervical length less than 30mm, 77 deliveries were euthiotic (62%), 26 deliveries were instrumental (20.9%) and a total of 19 deliveries were by caesarean section (18%). In the group of women with cervical length between 30 - 40 mm a total of 1005 births were euthiotic (50.8%), 22% (415 women) required instrumentation for birth and there were a total of 555 caesarean sections (28%). In the group of women with cervical length greater than 40mm, a total of 259 caesarean sections were performed (34.67%), 137 of the deliveries were instrumental (20%) and 46.98% of the deliveries were euthiotic (351 women).
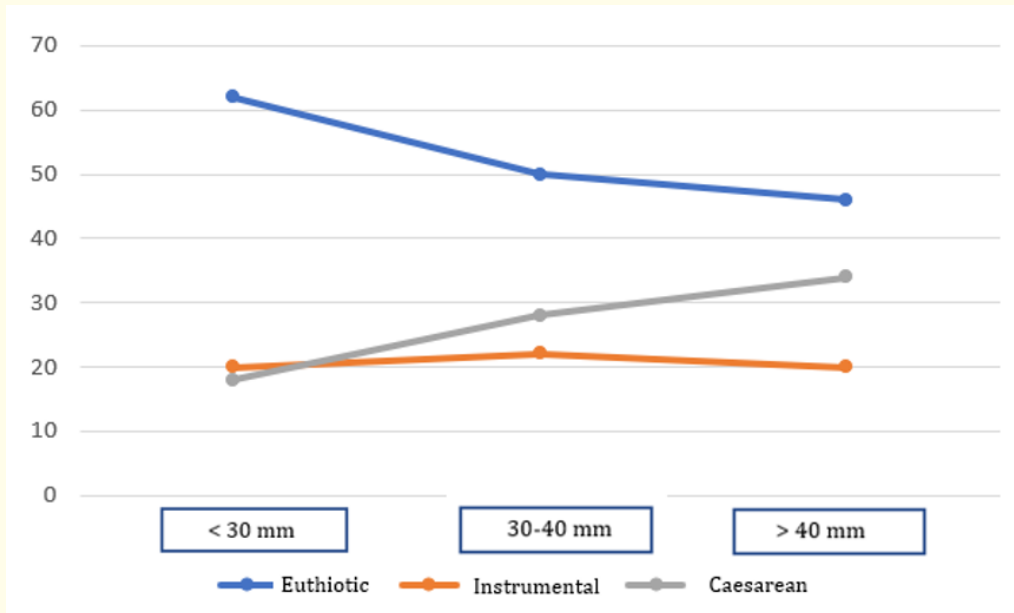

Figure 3: Type of delivery.

Therefore, an analysis of each of the groups showed that the rate of eutocic deliveries in the group of women with cervical length less than 30 mm reached 62%, while in the group with cervical length greater than 40 mm it dropped to 46%, a value in line with the higher rate of premature deliveries, in the pregnant women of the first group, this result is statistically significant (p = 0.01). The highest percentage of Caesarean sections (34.67%) in the group with cervical length over 40 mm (compared to 18% in the group with less than 30 mm) is also statistically significant (p = 0.04).

In the total population under study, six women presented cervical length less than 25 mm (a value considered pathological by international obstetric ultrasound guidelines) in the second trimester ultrasound (20 weeks of gestation) and therefore required treatment and biweekly ultrasound follow-up in fetal medicine consultations.

In relation to treatment in this subgroup of women, one pregnant woman required emergency cerclage, one pregnant woman required secondary cerclage (ultrasound) and another pregnant woman carried a pessary during pregnancy. The rest of the women were treated with progesterone via the vagina.

The percentage of visits to the emergency obstetrics department in this subgroup of women was 66%, and 30% required admission for threatened preterm delivery.
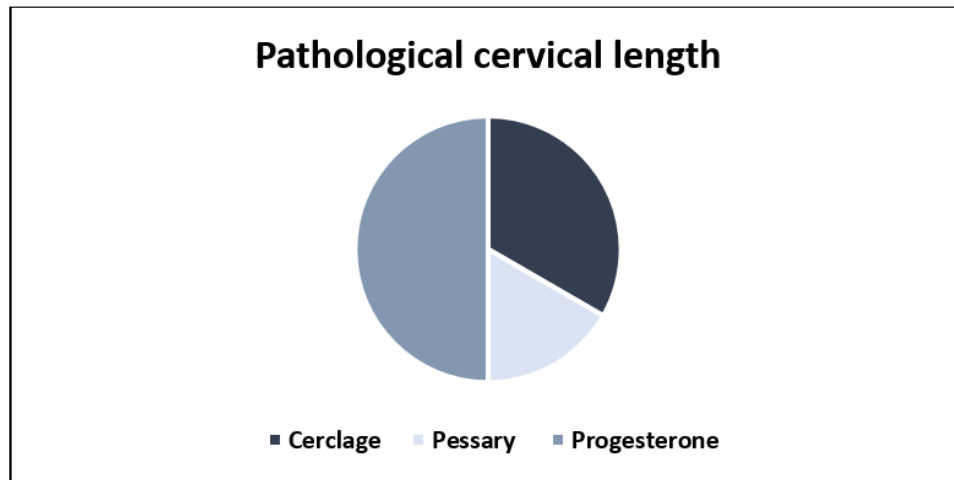
Figure

Discussion

Transvaginal ultrasound is one of the most optimal and least invasive methods to measure cervical length, since it can diagnose a threat of preterm birth when it is not yet objectifiable by physical examination or the symptomatology of the pregnant woman. This is shown by several studies, highlighting some such as Gómez., *et al.* [15] who evaluated symptomatic patients between the 20th and 35th week of gestation with a cervical dilation lower than 3 cm, so they found a relationship between preterm delivery and ultrasound findings, yet not with the digital exam findings.

On the other hand, it is important to highlight the directly proportional relationship between cervical length and preterm birth, as shown in the study published by Iams [16], which evaluated 60 patients with preterm labor symptoms between the 24th and 34th week. In all cases the gestations that achieved the term had a cervical length greater than 30 mm.

The study published by Erasmo., *et al.* [17] in which those pregnant women with a cervical length ≤ 15 mm had a relative risk of preterm delivery of 10.9 (95% CI 8.3 to 14.2; P ≤ 0.0001), while the relative risk for those with a cervical length ≤ 25 mm was 9.0 (95% CI 7.7 to 10.6; P ≤ 0.0001), showing that the risk of spontaneous preterm birth increases as cervical length decreases.

The results of this research are similar to these findings, since comparing the gestational age at birth, a statistically significant difference was observed between the cervical length group lower than 30 mm and the groups of pregnant women with cervical length greater or similar to 30 mm. Thus, a higher percentage of preterm birth was observed in the group of women with lower cervical length. However, other aspects that could also influence this risk, such as cervical funneling, were not taken into account. Thus, Skentou., *et al.* [18] confirm

the inverse association between cervical length and risk of spontaneous delivery before 33 weeks, but they also set that in women with cervical funneling, the risk of preterm delivery (about 7%) was considerably higher than in those without cervical funneling (0.7%). However, when cervical length was taken into account, cervical funneling did not provide any significant additional contribution in the prediction of spontaneous delivery before 33 weeks.

Finally, it is important to mention some strategies that may be useful in preventing preterm birth in asymptomatic patients: Progesterone, pessary and cerclage, as Rivera., *et al.* showed in their systematic review. Of the above, all were used in our analysis, being the progesterone the most commonly used, whose efficacy has been shown in multiple studies. Thus, Da Fonseca., *et al.* [19] confirms that progesterone reduced the frequency of uterine contractions and the rate of preterm delivery in women at high risk for prematurity.

Conclusion

Cervical length at the 20th week of gestation is a preterm birth onset risk factor, being able to classify pregnant women in high and low risk groups by offering individualized monitoring to each of them.

Acknowledgements

Conflict of Interest

The authors report having no conflict of interest.

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