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The role of cervical length measurement in predicting the need for hysterectomy in patients with placenta previa

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Abstract

Objective: To determine the association of cervical length with the need for peripartum hysterectomy in patients with placenta previa
Method: Patients with placenta previa totalis, which performed in 2021, were included in the study. Cervical length was measured by transvaginal technique after 28 weeks. ROC analysis was performed for the cervical length variable in patients requiring peripartum hysterectomy.
Results: Peripartum hysterectomy was performed in 26 out of 66 patients (39.4%). When ROC analysis was performed for cervical length in these patients, AUC was 0.999 (95% confidence interval 0.994-0.999) when the cut-off point was ≤26.5.
Conclusion: The risk of peripartum hysterectomy increases as cervical length shortens.
Keywords: Placenta previa, Cervical length, Peripartum hysterectomy

INTRODUCTION

Placenta previa refers to the abnormal placement of the placenta in the uterus where the placenta closes the cervical canal (1). The risk of placenta previa increases with the number of previous cesarean sections. Recently, it has been encountering more patients with previa due to the uncontrolled increase in the number of cesarean sections. Currently, the incidence is 1 in 200 pregnant women (2). In addition to causing preterm deliveries by causing severe antepartum bleeding, massive uncontrolled bleeding in previa surgeries may lead to hysterectomies and even maternal mortality (3). The need for hysterectomy is 33.26 times higher in patients with placenta previa than in patients with normally located placentas (4). Predicting which patients will require hysterectomy is important in order to be more prepared for cesarean sections. Various ultrasound parameters are used for this purpose. In this study, it was aimed to evaluate cervical length measurement, which is one of these parameters.

METHOD

The study was conducted prospectively in patients with a diagnosis of placenta previa delivered between January 2021 and December 2021 in the Gynecology and Obstetrics Clinic, Mustafa Kemal University Faculty of Medicine. Approval was obtained from the ethics committee of the university (decision number 09 dated 05.02.2021). Informed consent was obtained from all patients and the study was conducted in accordance with the Declaration of Helsinki.

Patients diagnosed with placenta previa totalis by transvaginal ultrasound after 28 weeks of gestation were included in the study. Cervical length measurement was performed by a single specialist physician using a Voluson 730 (Voluson 730, GEMS Kretz UltrasoundV R, Zipf/ Austria) ultrasound device with the standard technique defined by the National Institute of Child Health and Human Development, Maternal-Fetal Network (5).

Patients were asked to empty their bladder before the ultrasound. The vaginal probe was covered with a sterile

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condom and the distance between the internal os and external os of the cervix was measured three times in the sagittal section and the shortest distance was recorded. If there was funneling, the funnel was excluded and the distance between the tip of the funnel and the external os was measured.

Obstetric history and demographic data were recorded. All patients were delivered by the cesarean section. Artery ligation during cesarean section (hypogastric and/or uterine artery), peripartum hysterectomy status and transfusion amount during hospitalization were recorded.

Pregnant women with partial previa or inferior placenta, multiple pregnancies, pregnancies less than 28 weeks gestation, pregnant women who underwent cerclage or cervical excision procedures and pregnant women with abnormal amniotic fluid index were excluded

Statistical analysis

IBM SPSS Statistics 21.0 (IBM Corp, Armonk, NY, USA) program was used for statistical analysis. Mean±Standard Deviation values were used for descriptive data. Number (n) and percentage (%) values were used to show demographic characteristics. Receiver Operating Characteristic (ROC) analysis was performed for the cervical length variable, which is clinically predicted to be effective in determining the risky group, with reference to patients who underwent peripartum hysterectomy, and ROC graph was drawn, area under the curve (AUC) and 95% confidence intervals of this area were determined.

RESULTS

Between January 2021 and December 2021, 66 patients with a diagnosis of placenta previa totalis were performed by the cesarean section. The mean age was 31.6±4.9 years, the mean number of pregnancies was 4.7±1.8 (min:2-max:13) and the mean number of deliveries was 2.8±1.3 (min:0-max:8). One patient was nulliparous, and 55 (83.3%) patients had a history of previous cesarean section. Demographic and obstetric data of the patients are given in Table 1.

Placenta previa totalis was diagnosed by transvaginal ultrasound in all patients. The mean cervical length at this time was 29.2±5.6 cm. All patients were delivered by cesarean section. The mean gestational age at delivery was 35.5±1.7 weeks.

In our clinic, our approach in placenta previa surgeries is primarily in favor of organ-sparing surgery. For bleeding control, uterine arteries and/or hypogastric arteries are ligated. Arterial ligation was necessary in 41 of patients (62.1%). Peripartum hysterectomy was performed in 26 (39.4%) patients in whom bleeding control could not be achieved. Bladder perforation occurred in 5 (7.6%) patients and bowel serosa damage occurred in 2 (3%) patients in relation to surgery and was recognized perop and necessary procedures were performed. Patients received a mean of 1.6±1.8 (min:0, max:7) units of blood transfusion during hospitalization. Surgical-related data are presented in Table 2.

The ROC curve was drawn for the power of cervical length in determining the need for peripartum hysterectomy. In the analysis, the area under the curve (AUC) was 0.99 when the cut-off point was taken as ≤26.5 mm. The relevant table and ROC curve are given in Table 3 and Figure 1.

DISCUSSION

Placenta previa surgeries are an important reason for peripartum hysterectomies because they can cause massive obstetric bleeding. In this case, an important condition to reduce morbidity and mortality is to decide which patients will require hysterectomy preoperatively and to refer them to a multidisciplinary center and to perform surgery in these centers by taking precautions for both blood preparation and surgical-anesthesia team (6). Ultrasound findings such as the presence of lacunes, thinning of the myometrium in the retroplacental area, and bridge vessels between the placenta and myometrium are among the ultrasound findings indicating that the possibility of bleeding during cesarean section is high and hysterectomy may be required (7).

Cervical length measurement is an ultrasound parameter that has been extensively studied especially in terms of predicting preterm delivery. Measurement of cervical length is a recommended approach, especially in patients with a risk of preterm delivery (5). Because of theories that antepartum bleeding in patients with placenta previa may be the result of cervical effacement, there are studies in which cervical shortening is associated with unfavorable obstetric outcomes in patients with previa (8). Based on these studies, it was aimed to investigate the role of cervical shortening in the prediction of emergency peripartum hysterectomy.

In this study it was found that a short cervix is a risk factor for peripartum hysterectomy in pregnant women with placenta previa. 26 (39.4%) patients required peripartum hysterectomy. Cervical length measurement may be valuable in predicting these patients and according to this study, it can be said that 26.5 mm measurement is the most appropriate value in terms of hysterectomy prediction. In a similar study, it was found that a short cervix was a risk factor for peripartum hysterectomy by Mimura et al. It is recommended that 25 mm is the most appropriate cut-off point by Mimura (9).

Table 1. Demographic and obstetric data of patients

		n (66)	%
Age		31.6±4.9	
Gravity	2	2	3%
	3	17	25.8%
	4	14	21.2%
	5	13	19.7%
	6	11	16.7%
	7	5	7.6%
	8	2	3%
	9	1	1.5%
	13	1	1.5%
Parity	0	1	1.5%
	1	4	6.1%
	2	25	37.9%
	3	17	25.8%
	4	12	18.2%
	5	6	9%
	8	1	1.5%
Mode of delivery	Nullipar	1	1.5%
	Only Vaginal	10	15%
	Only Sectio	45	68.5%
	Vaginal+Sectio	10	15%
Prior section number	0	11	16.7%
	1	4	6.1%
	2	21	31.8%
	3	20	30.3%
	4	7	10.6%
	5	3	4.5%

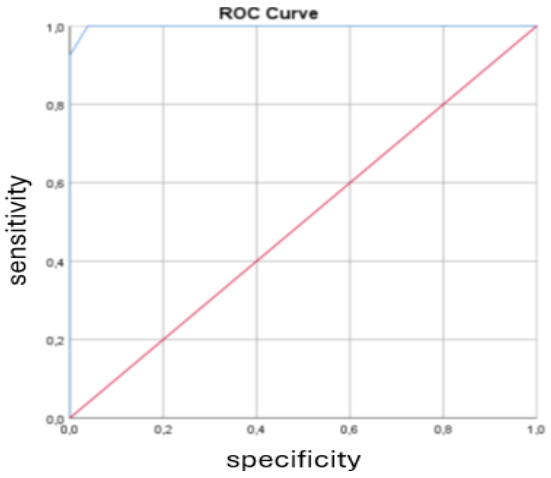

Figure 1. Receiver operating characteristic (ROC) curve of cervical length

Table 2. Surgery-related data

		n:66	%
Pregnancy week at labor		35.5±1.7	
Cervical length (mm)		29.2±5.6	
Blood transfusion (unity)	0	25	37.9%
	1	15	22.7%
	2	11	16.7%
	3	3	4.5%
	4	4	6.1%
	5	6	9.1%
	7	2	3%
Artery ligation	Yes	41	62.1%
	No	25	37.9%
Peripartum hysterectomy	Yes	26	39.4%
	No	40	60.6%
Complication	None	59	89.4%
	Bladder perforation	5	7.6%
	Bowel injury	2	3%

Table 3. Detection power of cervical length for peripartum hysterectomy

Variables	AUC±SD	%95 CI	Cut-off point (cm)	p	Spesifity (%)	Sensitivity (%)
Cervical Length	0.999± 0.002	0.994-0.999	≤26.5	<0.001	99.9	96.2

Abbreviations: AUC: The area under the ROC curve, SD: Standard deviation, CI: Confidence interval

When we look at the literature, there are studies associating cervical shortness with antepartum bleeding in patients with placenta previa. Hessami et al. in their meta-analysis, a shortened cervix was associated with antepartum hemorrhages and an increased risk of preterm delivery due to these hemorrhages (8). However, there was heterogeneity in the studies in this meta-analysis and the cut-off point for the short cervix was taken as 30 mm in some studies and 25 mm in others. When we ignore this heterogeneity, In a multicenter study by Dang et al. cervical length was divided into 4 groups (<2 cm, 2-2.5 cm, 2.5-3 cm, > 3 cm) and it was found that the rate of severe postpartum bleeding and hysterectomy increased as the cervix shortened (10).

Zheng et al. in his study, it was found that antenatal bleeding, emergency cesarean delivery, postpartum bleeding and the need for blood transfusion increased in previa patients with a cervix length shorter than 30 mm (11). Similar to other studies, this suggested that short cervix length is associated with adverse pregnancy outcomes. In a study performed with

MR imaging, it was similarly found that cervical length below 30 mm was associated with adverse pregnancy outcomes (12).

The uterus is structurally weaker than the myometrium in the lower segment. This causes an increase in the amount of bleeding due to inadequate contractions in this region after delivery. In cases of placenta previa, after the placenta located on the cervix is detached at birth, bleeding may be observed from the cervix due to insufficient contraction of the vessels that remain open. In short cervixes, the lower segment becomes wider and longer due to retraction (9). It may be attributed that the need for hysterectomy in patients with a short cervix to the lengthening of the lower segment.

Surgical complications were observed in seven patients in this study. All of these complications were in the group of patients who underwent hysterectomy. Hysterectomy in patients with short cervix is thought to be associated with increased complications. Bladder dissection, clamping and ligating the lateral and medial vascular peduncles, dissection of the pararectal and paravesical spaces, and freeing the ureter are technically more difficult in patients with short cervix (13).

Limitations of the study

This study has some limitations. Heterogeneity among patients is one of them. Another limitation is that there is no distinction between elective and emergency cesarean sections. Emergency cesarean sections performed for antenatal bleeding may have been more liberal in terms of hysterectomy. However, a single cervical measurement was performed. Because of the possibility that the cervical length may have shortened after contractions, serial measurements would be more appropriate.

CONCLUSION

Shortened cervical length is associated with increased peripartum hysterectomy in patients with placenta previa. The Maternal-Fetal Medicine Society does not recommend routine cervical length measurement in patients with placenta previa (14). However, measurement of cervical length with a simple uncomplicated technique on transvaginal ultrasound performed in the antepartum period is valuable in clinical decision-making and informing the patient in terms of showing both preterm delivery due to antenatal bleeding and the risk of peripartum hysterectomy in patients with placenta previa. In this respect, its routine use in patients with placenta previa will be beneficial.

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Ethical Declaration: Ethical permission was obtained from the Hatay Mustafa Kemal University, Clinical Ethics Committee for this study with date 05/02/2021 and number 09, and Helsinki Declaration rules were followed to conduct this study.

Athorship Contributions: Concept: ENT, KSD; Design: ENT, KSD; Supervising: KSD; Financing and equipment: ENT, KSD, OSK; Data collection and entry: ENT, KSD; Analysis and interpretation: ENT, KSD; Literature search: AB; Writing: AB; Critical review: AB, KSD

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