OBSTETRICS

Interval to spontaneous delivery after elective removal of cerclage

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OBJECTIVE: The purpose of this study was to estimate the time interval between elective cerclage removal and spontaneous delivery.

METHODS: Singleton pregnancies with McDonald cerclage were evaluated for the interval between elective cerclage removal (36-37 weeks) and spontaneous delivery. We also compared spontaneous delivery within 48 hours after cerclage removal between women with ultrasound-indicated vs history-indicated cerclage.

RESULTS: We identified 141 women with elective cerclage removal. The mean interval between removal and delivery was 14 days. Only 11% of women delivered within 48 hours. Women with ultrasound-indicated cerclage were more likely to deliver within 48 hours, compared with women with history-indicated cerclage (odds ratio, 5.14; 95% confidence interval, 1.10-24.05).

CONCLUSION: The mean interval between elective cerclage removal and spontaneous delivery is 14 days. Women with cerclage who achieved 36-37 weeks should be counseled that their chance of spontaneous delivery within 48 hours after elective cerclage removal is only 11%.

Key words: cerclage, interval to delivery, preterm birth.

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Approximately 1% of patients receive cerclage per year for the prevention of preterm birth. Most of these pregnancies are successful and go to term or near-term with cerclage still in place. When Dr Shirodkar[1] originally described his technique, he removed the cerclage suture prophylactically before labor onset, which is still the most common practice in the United States. There is very limited information regarding the interval of time between the elective removal of a cerclage suture and spontaneous delivery. This information may be helpful in treatment and for counseling women who undergo elective cerclage removal, because many women have questions regarding this interval and some women are under the impression that they may deliver soon after the cerclage is removed.

Our objectives were to estimate the interval of time between elective cerclage removal and spontaneous delivery, to compare delivery within 48 hours after cerclage removal between women with an ultrasound-indicated cerclage and women with a history-indicated cerclage, and to estimate whether a longer interval between elective cerclage removal and delivery was associated with better outcome in the future pregnancy.

Materials and Methods

A chart review of women at Thomas Jefferson University was conducted between 1995 and 2007. The Institutional Review Board of Thomas Jefferson University approved this study. Pregnancies with a McDonald cerclage, either history-indicated or ultrasound-indicated, were evaluated for the interval between elective cerclage removal (usually 36-37 weeks) and spontaneous delivery. Women received a history-indicated cerclage usually at approximately 12-15 weeks on the basis of poor obstetric history (usually ≥ 2 previous second-trimester losses). Women received an ultrasound-indicated cerclage at approximately 16-23 weeks for ≥ 1 previous preterm births and transvaginal ultrasound cervical length of < 25 mm.[2] These women were under ultrasound surveillance of cervical length because of their obstetric history of previous second-trimester losses, history of cold knife cone, Müllerian defect, diethylstilbestrol (DES) exposure and multiple dilation and evacuation. Exclusion criteria were preterm birth at < 35 weeks that necessitated cerclage removal, removal at time of labor, multiple gestation, removal at the time of cesarean delivery before onset of labor, fetal death, loss to follow-up evaluation, and voluntary termination. No woman who went to labor with cerclage in place was included in our analysis.

All cerclage procedures were performed with the McDonald technique. In general, Mersilene tape was used, with 4 or 5 "bites" around the cervix at least 1-2 cm from the external os, and tied anteriorly. All procedures were done with the use of spinal anesthesia. Antibiotics were not administered at the time of cerclage. The usual practice at Thomas Jefferson University is to remove the cer-

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TABLE 1
Demographics and outcome variables

Variable	Cerclage		*P* value
	Ultrasound-indicated (n = 67)	History-indicated (n = 74)	
Age (y)[a]	28.8 ± 6.0	31.5 ± 5.4	.005[b]
African American race (%)	70	50	.030[c]
Previous preterm birth (%)	60	85	.002[c]
Preterm births (n)[a]	0.7 ± 0.9	1.0 ± 0.8	.009[b]
Spontaneous pregnancy loss at 14-24 wks (%)	46	80	.005[c]
Smoking (%)	22	9	.102[c]
History of cold knife cone (%)	6	8	.748[c]
History of Müllerian defect (%)	3	1	.604[c]
Diethylstilbestrol exposure (%)	2	7	.259[c]
Gestational age of cerclage removal (wk)[a]	36.7 ± 1.1	36.7 ± 1.3	.939[b]
Gestational age at delivery (wk)[a]	38.3 ± 1.7	38.5 ± 1.6	.946[b]
Delivery within 48 h (%)	18	5	.038[c]
Time from elective cerclage removal to delivery (d)[d]	13.4 ± 10.2	15.0 ± 8.9	.341[e]

[a] Data are given as mean ± SD; [b] Student *t* test; [c] χ^2 or Fisher exact test; [d] data are given as median ± SD; [e] Mann-Whitney *U* test.

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clage suture in asymptomatic women at approximately 36-37 weeks of gestation in an outpatient setting. The patient is then counseled for labor precautions and sent home with a follow-up visit scheduled in 1 week. Gestational age was confirmed by ultrasound examination < 24 weeks.

Primary outcome was the interval, in days, between elective cerclage removal and spontaneous delivery. Secondarily, we compared delivery within 48 hours after cerclage removal between women with ultrasound-indicated and a history-indicated cerclage. Additionally, we estimated whether a longer interval between elective cerclage removal and delivery was associated with better outcome in the future pregnancy. To accomplish this goal, we evaluated gestational age at delivery in the subsequent pregnancy comparing the interval between elective cerclage removal and spontaneous delivery of ≤ 7 days or > 7 days. Continuous data were compared with the use of the Student *t* test and Mann-Whitney *U* test. The Fischer exact test and Pearson χ^2 test were used when to compare categoric data. A probability value of < .05 was considered statistically significant. We then took all univariable with univariate associations ($P \leq .20$) and entered them into the multiple logistic regression model. The variables were removed in a stepwise fashion, with a probability value of .15 as criterion for removal. Statistical analysis was performed with SPSS 14.0 software (version 16; SPSS Inc, Chicago, IL).

RESULTS

Between 1995 and 2007, 299 cerclages that were eligible for inclusion in this study were identified. They represented 1.1% of all births (299/27,779) at Thomas Jefferson University. One hundred fifty-eight women were excluded for preterm birth (n = 117), labor at time of removal (n = 15), multiple gestation (n = 13), removal at time of cesarean delivery (n = 7), fetal death (n = 3), loss to follow-up (n = 2), and voluntary termination (n = 1), which left 141 women for analysis. Seventy-four women had a history-indicated cerclage, and 67 women had an ultrasound-indicated cerclage. Demographic characteristics and outcome variables are presented in Table 1. The incidence of previous preterm birth (14-35 weeks) overall in this analysis was 73%: 60% of patients who received an ultrasound-indicated cerclage, and 85% of patients who received a history-indicated cerclage. The overall gestational age at elective removal was 36.7 ±1.2 weeks (SD), and gestational age at delivery was 38.4 ± 1.6 weeks. No women had rupture of membranes at elective removal of cerclage. The mean interval between elective cerclage removal and spontaneous delivery was approximately 14.2 ± 9.6 days . Only 11% of patients spontaneously delivered within 48 hours after elective removal of cerclage, and no women had precipitous deliveries outside the hospital after elective cerclage removal.

We then compared women who had an ultrasound-indicated cerclage with those who had a history-indicated cerclage. No significant difference was detected between both groups with respect to smoking, history of cold knife cone procedure, Müllerian defect, DES exposure, smoking, gestational age of cerclage removal, and gestational age at delivery. The mean interval in days between elective cerclage removal and delivery was