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The efficiency of emergency cerclage for the prevention of pregnancy losses and preterm labor

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Abstract

Objective: To analyze the gestational outcomes of the cases who underwent emergency cerclage in our clinic.

Methods: The cases which underwent emergency cerclage in Memorial Şişli Hospital between 2005 and 2017 were analyzed retrospectively. Of the cases with singleton pregnancy, those without pain and uterine contraction, those with visible cervical dilatation and amniotic membrane or those with prolapsed to vagina were included in the study. The cases without cervical dilation, multiple pregnancies, the cases which clinically have chorioamnionitis, preterm premature rupture of membrane, vaginal bleeding and ablatio placentae and the pregnant women with a chronic disease were excluded from the study. The clinical characteristics and gestational outcomes of the cases were analyzed.

Results: We included a total of 28 cases in our study. Mean week of gestation was 20.9±3.2 during the cerclage procedure, delivery week was 32.4±5.5, and mean period between cerclage and delivery was 81.1±42.5 days (11.6±6.08 weeks). Late pregnancy loss was seen in two (7.1%) cases. The rates of preterm labor (<37 weeks) and extremely early preterm labor (<28 weeks) were 76.9% and 14.3%, respectively. Mean birth weight was found 2268±984 g. It was reported that three cases died at the intensive care unit, and the neonatal mortality rate was 11.5%. The rate of bringing infants to home was 82.1% (23 infants).

Conclusion: In our study, we showed that the rates of pregnancy loss and preterm labor can be decreased by cerclage procedure in the cases with cervical insufficiency requiring emergency cerclage.

Keywords: Emergency cerclage, pregnancy loss, preterm labor, cervical insufficiency

Özet: Gebelik kayıpları ve preterm doğumun önlenmesinde acil serklajın etkinliği

Amaç: Kliniğimizde yapılan acil serklaj olgularının gebelik sonuçlarını değerlendirmek.

Yöntem: 2005–2017 yılları arasında Memorial Şişli Hastanesinde acil serklaj yapılan olgular retrospektif olarak değerlendirildi. Olgulardan, ağrısı ve uterin kontraksiyonu olmayan, servikal açıklığı ve amniyotik membranı görünen veya vajene prolabe olan tekil gebelikler çalışmaya dahil edildi. Servikal açıklığı olmayan olgular, çoğul gebelikler, klinik olarak koryoamnionit, preterm erken membran rüptürü, vajinal kanama ve plasenta dekolmanı olan olgular ve yine kronik hastalığı olan gebeler çalışma dışı bırakıldı. Olguların klinik özellikleri ve gebelik sonuçları analiz edildi.

Bulgular: Çalışmamıza 28 olgu dahil edildi. Serklaj işleminin yapıldığı ortalama gebelik haftası 20.9±3.2, doğum haftası 32.4±5.5 ve serklaj ile doğum arasındaki ortalama süre 81.1±42.5 gün (11.6±6.08 hafta) olarak bulundu. İki olguda (%7.1) geç gebelik kaybı saptandı. Preterm (<37 hafta) doğum oranı %76.9 ve aşırı erken (<28 hafta) preterm doğum oranı da %14.3 olarak saptandı. Ortalama doğum kilosu 2268±984 g bulundu. Üç olgunun yoğun bakımda ex olduğu ve neonatal ölüm oranının da %11.5 olduğu bildirildi. Bebeğini evine götürme oranı %82.1 (23 bebek) bulundu.

Sonuç: Çalışmamızda acil serklaj gereksinimi ve servikal yetmezliği olan olgularda yapılan serklaj işlemi ile gebelik kaybı ve erken doğum oranlarının azaltılabileceği gösterilmiştir.

Anahtar sözcükler: Acil serklaj, gebelik kaybı, preterm doğum, servikal yetmezlik.

Introduction

Cervical insufficiency is one of the most important reasons of second trimester pregnancy losses and preterm labor, and it is defined as the condition where cervix is unable to maintain pregnancy without uterine contraction. Typically, it is characterized by acute and painless cervical dilation and pregnancy loss at the second trimester.[1] The incidence of cervical insufficiency is

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0.1–2% while it is 15% in pregnancies with the history of recurrent pregnancy loss between 16 and 28 weeks of gestation.[2] The reason of cervical insufficiency is not known mostly, but it is considered to be a structural defect in cervicoisthmic junction. It has also been reported that decidual inflammation, intrauterine infection, hemorrhage, excessive uterine distension, acquired and structural functional defects (cervical conization, cervical laceration etc.), Mullerian anomalies, and Ehlers-Danlos syndrome may be associated with cervical insufficiency.[3–6]

Today, surgical and non-surgical methods are recommended for the treatment of cervical insufficiency. Surgical approaches include transvaginal and transabdominal cervical cerclage. Standard transvaginal cerclage method used widely was first defined by Shirodkar in 1955,[7] and it was modified by McDonald in 1957.[8] McDonald procedure was defined as the purse string suture from non-resorbed material to cervicovaginal junction. Cerclage indications in the singleton pregnancies are painless pregnancy loss or cerclage history at the second trimester (cerclage - prophylactic cerclage with history indication), spontaneous preterm labor history (<34 weeks), cervical length being less than 25 mm before 24 weeks of gestation (cerclage with ultrasound indication) and painless cervical dilation at the second trimester (emergency or rescue cerclage).

In our study, we aimed to discuss the outcomes of the cases which underwent emergency cerclage.

Methods

The cases with 13–26 weeks of singleton pregnancy that were operated due to emergency cervical insufficiency at Memorial Şişli Hospital between 2005 and 2017 were analyzed retrospectively. Of the cases, those in need of emergency cerclage, those without pain and uterine contraction, those with 1–5 cm of cervical dilatation and visible amniotic membrane or those with prolapsed to vagina were included in the study. Cases with close cervix were excluded from the study. Also, multiple pregnancies and the cases which clinically have chorioamnionitis, preterm premature rupture of membrane, vaginal bleeding, ablatio placentae and chronic disease were excluded from the study

The patients were administered 1 dose of indomethacin (Endol) 100 mg suppository right after hospitalization and emergency cerclage was planned. The surgical procedure was performed under general anesthesia at dorsal lithotomy position. The cleaning of vulva and vagina was performed through two steps (after the skin first, the vagina which is not very deep and covering, deep vagina and fornices by using valve speculum). Retraction was performed by new valves by removing the tools used for cleaning. As suture material, 5 mm Mersilene tape (MERSILENE® Polyester Fiber Suture, ETHICON; Johnson &Johnson, New Brunswick, NJ, ABD) was used in all cases. McDonald technique was used as cerclage method. Cervical length and the position of suture material were evaluated by transvaginal ultrasonography (Voluson 730, General Electric Healthcare, Chicago, IL, USA). As intraoperative prophylactic, single dose cefazolin was administered intravenously. Later, cefuroxime (Zinnat, Zinacef) 500 mg 2×1 was administered orally for 5 days. Endol 100 mg suppository given at the hospitalization was administered for 3 days with the dose of 2×1. Progesterone or any other tocolytics was not administered for the follow-up. After 24 weeks, corticosteroid prophylaxis [Celestone Chronodose 1 ml (betamethasone acetate + betamethasone sodium phosphate)] 1×2 intramuscular, and a second dose 24 hours after the first dose) was administered. The patients were called for follow-up 1 and 3 weeks after their discharge. They were followed up with an interval of 2 weeks. In cases that reached the term, cerclage materials were removed at 37 weeks of gestation.

The demographic and clinical characteristics of the cases were provided from the patient files and hospital data system. Age, body mass index, obstetric history, gravida and parity, weeks of gestation, admission reasons, cervical dilation and effacement, cervical length measurements, presence of additional clinical characteristics, cervical length after cerclage and gestational outcomes of the patients were recorded. Missing items in the data were completed by contacting patients via phone.

SPSS 20 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Descriptive statistical analyses (mean, standard deviation, standard error) were performed. Parameters were evaluated by Kolmogorov-Smirnov test to understand if they have normal distribution. While independent samples t test was used for the comparison of the parameters displaying normal distribution, Mann-Whitney U test was used for the comparison of the parameters not displaying normal distribution. $p<0.05$ was considered statistically significant.

Table 1. Clinical characteristics of the cases.

	Mean	Std deviation	Median	Std error	Interval	Min	Max
Age	33.1	3.9	33.5	0.74	16	24	40
BMI (kg/m²)	23.1	1.8	23	0.41	6,6	20	26.6
Operation day	145.4	22	147	4.16	89	95	184
Cervical dilation (cm)	2.5	0.8	2	0.15	3	2	5
Preoperative CL (mm)	5.6	4.5	5	0.86	15	0	15
Postoperative CL (mm)	30.8	5.3	30	0.99	21	22	43
Interval period (day)	81.1	42.5	81	8.04	165	9	174
Labor day	226.5	38.7	237.5	7.31	160	116	276
Birth weight (g)	2268	984	2450	192.98	2730	850	3580

BMI: body mass index; **CL:** cervical length.

Results

Twenty-eight cases whose full results obtained were included in our study. One case was excluded from the study as her results and family could not be reached. Mean age of the pregnant women was 33.5±4.4 and their mean gravida was 1.75±1.2. While 24 cases were primigravida (85.7%) and 4 cases were multigravida (14.3%), one case had the history of cerclage. Mean week of gestation when cerclage procedure was conducted was 20.9±3.2, mean cervical dilation before the procedure was 2.5±0.8 cm, and transvaginal cervical length was 5.4±4.5 mm. Transvaginal cervical length after the procedure was 30.8±5.3 mm. The clinical characteristics of the cases are shown in **Table 1**. No case had cervical injury or bleeding complication during or after the cerclage procedure.

In the follow-up of 28 cases, abortion was observed in 2 (7.1%) cases. Twenty-six cases had live birth (92.9%). Vaginal delivery was preferred in 4 cases (15.4%) and cesarean section was performed in the remaining cases. Mean delivery week was 32.4±5.5 and the mean period between cerclage and delivery was 81.1±42.5 days (11.6±6.08 weeks). Preterm labor was seen in 76.9% (20/26) of the cases (<37 weeks). Of these cases, 4 (4/26; 14.3%) cases had excessively preterm labor (<28 weeks), 6 (6/26; 23.1%) had premature preterm labor (28–32 weeks) and 10 (10/26; 38.5%) had preterm labor between 32 and 37 weeks. Mean birth weight was 2268±984 g. Twelve cases needed intensive care (7–50 days). Of these cases, when 3 died at the intensive care, neonatal mortality rate was found 11.5%. Twenty-three (82.1%) infants were discharged with full health and without any complication.

The characteristics of five cases with poor outcomes (two cases of pregnancy loss, and three cases of neonatal death) are shown in **Table 2**. The clinical data of the cases with poor outcomes and the cases with successful outcomes were compared. However, no significant difference was found between two groups in terms of maternal age, week of gestation when the procedure was performed, cervical dilation before the procedure, cervical length and cervical length after the procedure ($p>0.05$) (**Table 3**).

Table 2. Clinical characteristics of the cases with poor outcomes.

Case	Procedure week	CD (cm)	Preoperative CL (mm)	Postoperative CL (mm)	IP (day)	DW	BW (g)	HDNICU (day)
Abortion 1	14w 2d	2	7	30	16	16w 4d		
Abortion 2	21h	5	0	30	9	22w 2d		
Death 1	18w 1d	2	15	27	79	29w 3d	980	14
Death 2	23w 1d	2	0	24	32	27w 5d	890	14
Death 3	21w 4d	3	0	25	31	26w	850	3

BW: birth weight; **CD:** cervical dilation; **CL:** cervical length; **DW:** delivery week; **HDNICU:** hospitalization duration at newborn intensive care unit; **IP:** interval period up to delivery.

Table 3. Characteristics of the cases with successful and unsuccessful outcomes.

	Group 1 (N=23)	Group 2 (N=5)	p-value
Age	32.9±4.2	34.2±1.9	0.489
BMI	23.2±1.5	22.9±3.4	0.648
Operation day	147.1±21.7	137.4±24.4	0.589
Cervical dilation (cm)	2.4±0.7	2.8±1.3	0.671
Preoperative CL (mm)	5.9±4	4.4±6.7	0.411
Postoperative CL (mm)	31.6±5.4	27.2±2.8	0.071
Interval period (day)	91.5±38.2	33.4±27.3	0.006
Labor day	238.7±27.2	170.8±35.8	0.002

Group 1: successful cases; **Group 2:** unsuccessful cases; **CL:** cervical length.

Discussion

Cervical insufficiency is among the significant reasons of second trimester pregnancy losses and preterm labor, and it is characterized by the dilation of cervix without uterine contraction. The success, reliability, and necessity of emergency cerclage procedure in the presence of cervical dilation are controversial. However, in cases where the procedure is not or cannot be done, high rate of pregnancy loss has been reported.[9–13] Ciavattini et al.[9] compared the clinical characteristics of 19 cases that are on bed rest and 18 cases that underwent emergency cerclage, who all received diagnosis at similar weeks. They found that the interval period (16.8±7.9 weeks) up to delivery was significantly higher in the group which underwent emergency cerclage. They reported that the rate of term labor was 66.7% in this group while it was 10.5% in the group which was on bed rest. They found the rate of late pregnancy loss 5.5% and 52.6% in the cerclage group and bed rest group, respectively.

Stupin et al.[10] retrospectively analyzed gestational outcomes of 182 cases with cervical insufficiency whose amniotic membrane prolapsed to vagina between 17 and 26 weeks of gestation, and they compared the gestational outcomes of 89 cases which underwent emergency cerclage with the gestational outcomes of 72 cases who underwent conservative procedure (bed rest, tocolysis and antibiotic treatment). They found that pregnancy was maintained significantly longer in cases which underwent cerclage (median period: 41 days vs. 3 days), and live birth rate was 72%. They found live birth rate 25% in the group which underwent conservative procedure, and they concluded that cerclage procedure improved gestational outcomes significantly. Similarly, Aoki et al.[11] found in their study that cerclage procedure significantly improved gestational outcomes. In this study, the authors reported that median week of gestation when the procedure was performed was 22.6 (range: 15.9–26.1 weeks), the procedure extended the pregnancy period for 44 (range: 4–165) days, and mean delivery week was 32.4 (range: 19.4–41.6) weeks. In the same study, the authors found pregnancy loss in 2 (2/15; 13.3%) cases, preterm labor rate as 80% and excessively premature preterm labor rate as 20%. Prasad et al.[12] analyzed 24 cases which underwent emergency cerclage in their study, and reported pregnancy loss 12.5%, and preterm labor rate 42%.

In our study, we also evaluated the cases which had cervical dilation and visible amnion membranes or prolapsed to vagina. The period extended by cerclage procedure was 81.1±42.5 days and mean delivery week was 32.4±5.5. We reported pregnancy loss in 2 (7.1%) cases. Similar to the literature, we found the rate of preterm labor 76.9% and the rate of excessively premature preterm labor 14.3%. With the loss of 3 cases out of 12 cases in need of intensive care, the neonatal mortality rate was 11.5% in our study. Twenty-three infants (82.1%) were discharged to their home. Zhu et al.[13] reported the success rate of cerclage procedure 82.3% in their study. Mean number of extended days after the cerclage procedure was 52.2±26.6 and mean delivery week was 30.3±4.7. In their study, the authors reported labor rate 8.3% below 24 weeks of gestation and 12.7% at 24–28 weeks of gestation, and they found term labor rate 10.8%. Çok et al.[14] published the results of 13 cases which underwent emergency cerclage (13–24 weeks) in their study and reported live birth in 11 (84.6% cases), mean waiting period 9 weeks and 4 days and mean delivery week 28 weeks and 3 days. They reported that the labor was carried out before 34 weeks of gestation in 8 cases (72.7%).

It has been reported in the literature that some indicators can be used to predict the success of cerclage procedure. Amniotic membrane prolapse, presence of intraamniotic or systemic infection finding, presence of clinical symptom, and cervical dilation being ≥3 cm have been considered to be poor prognosis indicators.[13,15–17] In our study, five cases had poor prognosis, there were two pregnancy loss cases, and three neonatal deaths due to prematurity-related problems. However, we did not find any significant difference between these cases and other successful cases in terms of cervical dilation, cervical length and cervical length after procedure. Insufficient number

of cases or being the cases chosen from those in need of emergency cerclage (with cervical dilation and visible or prolapsed amniotic membrane) can be the reason. There are inconsistencies in the literature for the definitions of emergency cerclage and case selection. Therefore, this prevents proper evaluation of study results.

Wong et al.[18] reported the complications that may develop due to cerclage procedure as bleeding, cervicovaginal fistula, perioperative membrane rupture, postoperative premature rupture of membrane, pulmonary edema (tocolysis-related), deep vein thrombosis, chorioamnionitis and ablatio placentae. Zhu et al.[13] followed up 158 cases in their study and reported cervical laceration in 2 (1.25%) cases, pulmonary edema in 1 (0.61%) case and deep vein thrombosis in 2 (1.25%) cases. We found late pregnancy loss in two cases during the follow-up of our cases, but we did not observe any maternal complication.

Conclusion

In our study, we showed that the rates of pregnancy loss and preterm labor are decreased by cerclage procedure in the cases with cervical insufficiency requiring emergency cerclage.

Conflicts of Interest: No conflicts declared.

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