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Evaluation of the Impact of Second Trimester Cervical Cerclage on Perinatal Outcomes: The Experience of a Single Tertiary Centre

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ABSTRACT

Objective: The aim of this study is to evaluate the outcomes of patients who underwent cervical cerclage and the contribution of this procedure to the continuation of pregnancy.

Materials and Methods: The records of patients who underwent cervical cerclage using the McDonald method at the perinatology clinic of Başakşehir Çam ve Sakura City Hospital (İstanbul, Türkiye) between October 2021 and September 2022 were evaluated retrospectively. The study included 58 cases diagnosed with cervical insufficiency who underwent cerclage between the 14th and 25th week of pregnancy. Patients were divided into two groups according to the indication for cerclage: elective cerclage (with indication for medical history) and emergency cerclage (with indication for physical examination and ultrasound). The demographic characteristics, pregnancy and neonatal outcomes of the cases were recorded.

Results: Of the 58 cases included in the study, 57 were singleton pregnancies and one was a twin pregnancy. The mean age of the patients was 29.7±5.3 years. The elective cerclage group consisted of 23 cases and the emergency cerclage group of 35 cases. Of the patients who underwent cerclage, 8 (15.1%) gave birth before 24 weeks, 5 (9.4%) between 25and 28 weeks, 3 (5.7%) between 29and 32 weeks, 10 (18.9%) between 33and 36 weeks and 27 (50.9%) at 37 weeks or later. The elective cerclage patients had a lower mean gestational age (15.6±2.5 weeks) than the emergency cerclage patients (20.9±2.7 weeks), and the interval for elective cerclage (17.1±7.5 weeks) was statistically longer than that for emergency cerclage (12.6±6.9 weeks) (p: 0.031).

Conclusions: According to our study, early diagnosis and intervention of cervical insufficiency through history, physical examination and transvaginal cervical length measurement may improve pregnancy and neonatal outcomes.

KEYWORDS
Cervical cerclage; cervical insufficiency; Mc Donald method; pregnancy outcome.

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Introduction

Cervical insufficiency is one of the most important causes of premature birth and affects around 0.1% to 1.8% of all pregnancies. It is also responsible for 8% of recurrent miscarriages in the second trimester of pregnancy[1,2]. Cervical insufficiency is defined as the inadequate ability of the cervix to maintain a pregnancy without signs and symptoms of uterine contractions and labor in the second trimester. It is usually diagnosed retrospectively in women who have experienced painless second trimester miscarriages or preterm labor[3]. In recent years, measuring the length of the cervical canal using transvaginal ultrasound has become a diagnostic tool. Another diagnostic method is to pass a Hegar dilator number 8 through the cervical canal during the pre-pregnancy cervical examination. Conditions associated with the etiology of cervical insufficiency include congenital abnormalities of the uterus, surgical trauma from repeated dilation and curettage, cervical conization and trachelectomy, diethylstilbestrol exposure, Ehlers-Danlos syndrome and similar connective tissue disorders[4,5]. Although non-surgical methods such as bed rest, pharmacological interventions and cervical rings can be used in treatment, the most commonly used method remains the insertion of sutures around the cervix via the vaginal route to tighten it. Since McDonald's description of the cerclage technique named after him, this procedure has remained popular as it can be performed quickly in emergency situations[6].

The aim of our study was to investigate patients who underwent cervical cerclage and their pregnancy outcomes.

Material and Methods

In this study, a total of 1081 pregnant women who presented to the perinatology out-patient clinic of Başakşehir Çam and Sakura City Hospital (İstanbul, Türkiye) between October 2021 and September 2022 were evaluated retrospectively, and 107 of them were diagnosed with cervical insufficiency.

Patients with fetal abnormalities, active vaginal bleeding, uterine contractions, ruptured membranes and clinical chorioamnionitis were excluded from the study. Cases with one or more pregnancy losses in the second trimester or cervical cerclage in previous pregnancies were included in the group of patients for whom elective treatment was indicated. Patients with a painless cervical dilatation in the current pregnancy or a history of preterm labor (less than 34 weeks) and a short cervix on physical examination and ultrasound (less than 25 mm) were included in the group of medically examined and ultrasound-indicated emergency cerclage.

Cerclage was performed to 58 of these patients. The patients underwent cervical cerclage between the 14th and 25th week of pregnancy. The cervical sutures were performed in the lithotomy position with Mersilene or Prolene sutures as close as possible to the inner cervix under spinal or general anesthesia. Before the procedure, patients received a single dose of 1 g cefazolin for prophylaxis and 100 mg rectal indomethacin. Postoperatively, 25 mg indomethacin was administered orally every 6 hours for 24 hours as tocolytic therapy. The cerclage was removed at 37 weeks unless spontaneous labor, rupture of membranes or the need for preterm delivery occurred.

Statistical analysis of the data was performed using SPSS software version 25 (Statistical Package for the Social Sciences, Chicago, IL, USA). Descriptive statistics were presented as mean ± standard deviation, median (minimum–maximum) and number (percentage), p-values less than 0.05 were considered statistically significant. The analysis included the patients' age, gestational weeks, history of miscarriage, previous cerclage, cervical length measurement before surgery, type of cerclage and pregnancy outcomes.

Results

Of the 58 cases included in the study, 57 were singleton pregnancies and one was a twin pregnancy. In 23 patients (39.7%) an elective cerclage was performed based on medical history, while in 35 patients (60.9%) an emergency cerclage was performed based on ultrasound and clinical findings. The cerclage was placed between the 14th and 25th week. The age of the patients ranged from 18 to 43 years. The demographic characteristics of the cases are listed in Table 1. In 4 cases (7%), the patients had a history of uterine anomaly (3 with uterine septum, 1 with uterus didelphys). During the application, 33 patients (56.9%) were asymptomatic, and the most common symptoms were pelvic pain in 16 patients (27.6%) and bleeding in 6 patients (10.3%). Cervical dilatation was not detected in 40 patients (69%), while dilatation of at least 1 cm or more was observed in 18 patients (31%).

Table 1. Demographic characteristics of the patients

Patient Characteristics	Findings
Age (years) (mean±S.D.)	29.7±5.3 (min-max: 18-43)
Gravida (median)	3 (min-max: 1-10)
Parity (median)	1 (min-max: 0-5)
History of second-trimester abortion (n)	29 (50%)
History of preterm birth (n)	21 (22.1%)
History of cerclage (n)	4 (6.9%)
Gestational week	18.8 ± 3.7 (min-max: 14-25)

Table 2. Pregnancy outcomes of the patients

Pregnancy Outcomes	Findings n (%)
Delivery weeks	
Before 24 weeks	8 (15.1%)
Between 24-≤28 weeks	5 (9.4%)
Between 29- ≤32 weeks	3 (5.7%)
Between 33-≤ 37 weeks	10 (18.9%)
After 37 weeks	27 (50.9%)
Birth weight (g)	2551.6±1069.4
APGAR score	
APGAR score 1th minute	6.5±2.3
APGAR score 5th minute	7.82±2
Cerclage-delivery interval (weeks)	14.4 ± 7.4

The average length of the cervix at the time of cerclage was 15.8±13.7 mm. The average interval between cerclage and delivery was 14.4 ± 7.4 weeks. The pregnancy outcomes of the cases are shown in Table 2.

It was found that the average week of gestation was lower in patients who underwent elective cerclage (15.6 ± 2.5) than in those who underwent emergency cerclage (20.9 ± 2.7). Consequently, the interval for elective cerclage procedures (17.1 ± 7.5 weeks) was statistically longer than for those performed under emergency conditions (12.6 ± 6.9 weeks), and this difference was found to be statistically significant (p: 0.031).

No complications were observed after cerclage in 36 patients (69.2%). Premature rupture of membranes (PPROM) occurred in 10 patients (19.2%), hemorrhage in 10 patients (9.6%) and chorioamnionitis in 1 patient (1.9%).

Discussion

Numerous studies are being carried out to prevent premature births, which are the main cause of neonatal morbidity and mortality. Cervical cerclage is one of the treatments used to prevent cervical insufficiency and associated preterm birth[7]. In 1955, Shirodkar, and shortly thereafter McDonald introduced cervical cerclage as a surgical method for recurrent second trimester losses. Both methods have been widely used for many years[8]. The choice of procedure depends on the surgeon's experience and the particular case. We have used the McDonald method in all our patients because it is relatively easy to perform.

There is no complete consensus on the diagnosis and treatment approach for cervical insufficiency. The obstetric history and ultrasound measurement of the length of the cervix are the most important criteria for the diagnosis of cervical insufficiency. Classical cervical insufficiency is diagnosed when there is a history of recurrent fetal loss in the 2nd or early 3rd trimester, painless cervical dilatation, expulsion of an immature fetus due to prolapse or rupture of the membranes[9]. In our study, 23 patients underwent elective cerclage.

Although transabdominal, translabial and transvaginal ultrasound are used in the assessment of cervical length, transvaginal ultrasound is the gold standard[10]. In our study, we performed all cervical length measurements with transvaginal ultrasound. Berghella et al. showed that a cervical length of less than 25 mm is associated with preterm labor[11]. Zilianti et al. reported that it is more useful in the diagnosis of cervical insufficiency to ultrasonographically detect a U-shaped funnel in the cervix in addition to the length of the cervix[12].

Fetal abnormalities incompatible with life, active uterine bleeding (e.g. placental abruption), intrauterine infection, active preterm labor, cervical dilatation of > 4 cm or rupture of membranes, fetal death are contraindications for emergency cerclage[13]. In our study, 18 of the 35 patients who underwent emergency cerclage had a cervical dilatation of at least 1 cm or more, while 17 had a short cervix (less than 25 mm).

Although the effects of preoperative antibiotics and postoperative tocolytics on the procedure and infection are not known, we administered preoperative prophylaxis with a single dose of cefazolin and postoperative tocolysis with indomethacin in all our patients.

The complications of cerclage include Spontaneous abortion, premature rupture of membranes (PPROM), chorioamnionitis, cervicovaginal fistula and cervical laceration[14]. In our study, premature rupture of membranes (PPROM) was observed in 10 patients, hemorrhage in 10 patients and chorioamnionitis in 1 patient after placement of a cerclage.

The study by Ikimalo et al. showed a miscarriage rate of 9.4 %, a preterm birth rate of 21.8 % and a term birth rate of 68.8 % [15]. Similarly,

in our study we experienced 15.1% miscarriages, 34% preterm births and 50% of patients delivered at term.

Most cerclages are placed between 12 and 24 weeks gestation. There is no consensus on the exact lower and upper limits of gestational age for performing the procedure. In the study by Akselim et al, the gestational week at which the cerclage was performed was set at 13.9±0.1 and 20.8±0.7 weeks, and the interval between cerclage and delivery was 21.5±0.9 and 3.3±2.6 weeks for the elective and emergency groups, respectively[16]. A review by Hashim et al. analysing the results of 40 studies reported that emergency cerclage prolonged the duration of pregnancy by 4-5 weeks on average and reduced the risk of preterm delivery before 34 weeks by twofold[17]. In our study, the gestational week at which the cerclage was placed was 15.6±2.5 and 20.9±2.7 weeks for the elective and emergency groups, respectively. In agreement with the literature, we found that the interval of elective cerclage (17.1±7.5 weeks) was longer than that of emergency cerclage (12.6±6.9 weeks).

There is a general consensus that emergency or elective cerclage has no influence on the mode of delivery[18]. Of the 58 patients included in our study, 30 had a caesarean section and the remainder had a vaginal delivery.

Conclusion

Early diagnosis of cervical insufficiency by history, physical examination and transvaginal cervical length measurement and appropriate intervention may reduce the risks of preterm birth and improve pregnancy and neonatal outcomes.

Conflict of interest

The authors declare that they have no conflicts of interest.

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