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Original research article

Maternal and Neonatal Outcomes in Emergency Cervical Cerclage- An Observational Study

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Abstract

Purpose: The purpose of this study was to analyse the maternal and neonatal outcomes of emergency cervical cerclage performed among the antenatal women with opened cervix and prolapsed membranes in their late second trimester.

Methodology: This prospective observational study included 20 pregnant women with opened cervix and prolapsed membranes, who underwent emergency cervical cerclage at a single tertiary care centre for infertility and high-risk pregnancy. Study data were collected for a period of two years from 2019 to 2021. ECC was done by an experienced senior obstetrician. Modified Shirodhkars cerclage was done in 19 study subjects and McDonald's technique was preferred for 1 study subject. Surgical complications like bleeding or sepsis were not reported. All study subjects received a single dose of prophylactic antibiotic and an injection of hydroxy progesterone caproate 500mg before the procedure.

Result: All 20 study subjects were undergone emergency cervical cerclage. At the time of ECC, the mean ±SD maternal age of the study subjects was 30.20±4.927 years and the mean± SD gestational age was 19.865± 3.5423weeks. The mean interval between cerclage and delivery days was 95.65±42.458 days with a mean gestation at delivery of 30±4 weeks and a mean birth weight of 2196.15 ±868.214 g. As per the result, pregnancies were prolonged by an average of 95±42 days and no surgical complications occurred.

Conclusion: This study showed that emergency cervical cerclage has a place in prolonging pregnancy to a salvageable gestational age. This study further demonstrated that emergency cervical cerclage performed among patients presented with opened cervix and prolapsed membranes in late second trimester has positive perinatal and neonatal outcomes.

Keywords: Emergency cervical cerclage, Cervical insufficiency, perinatal and neonatal outcomes, pregnancy, preterm labor, Preterm premature rupture of membranes

Introduction

Cervical insufficiency is a major cause of preterm delivery and pregnancy loss in the second trimester. It is defined as the inability of the cervix to support a full-term pregnancy due to functional or structural impairment.[1] Despite the improvements in antenatal and perinatal care, the incidence of abortion and preterm labour continues to be high. Due to cervical insufficiency, 15% of recurrent pregnancy losses between 16 and 28 weeks were recorded[1-2]. According to WHO, preterm complications are the leading cause of death among children under 5 yrs of age responsible for approximately 1 million deaths in 2015 worldwide[3].

Factors which are considered as the cause of cervical insufficiency are repeated cervical dilatations, hysteroscopic procedures, conisation, and Mullerian anomalies. In case of cervical insufficiency, the patients usually present with bulging membranes. Mechanical support of a weak cervix is considered the most essential part of maintaining a pregnancy in cases of cervical insufficiency. It was first reported by Shirodkar and later modified by McDonald[4-5].

Emergency cervical cerclage (ECC) is a surgical procedure in the mid-trimester in order to prolong the pregnancies presented with cervical insufficiency to a viable gestation[6]. It is a salvage treatment to prolong pregnancy in women with dilated cervix and prolapsed membranes in the second trimester[7]. The purpose of this study is to analyse the maternal and neonatal outcomes of ECC performed among pregnant women presented with opened cervix and prolapsed membranes in the mid-trimester.

Aim and Objective

To evaluate the maternal and neonatal outcomes of emergency cervical cerclage performed among the antenatal women with opened cervix and prolapsed membranes in the late second trimester.

Methodology

This prospective observational study included 20 pregnant women with the opened cervix and prolapsed membranes, who underwent emergency cervical cerclage at a single tertiary care centre for infertility and high-risk pregnancy. Study data were collected for a period of two years from 2019 to 2021. The institutional ethical board has approved the data collection and publication. Modified Shirodhkars cerclage was done in 19 study subjects and McDonald's technique was preferred for 1 study subject. Surgical complications like bleeding or sepsis were not reported.

Inclusion Criteria

Patients, who were subjected to emergency cervical cerclage, with a gestational age of 13 weeks to 25 weeks

Exclusion criteria.

1. Patients with opaque membranes
2. Patients with blood investigation showing evidence of infection
3. Patients with pain or clinical evidence of contractions
4. Patients with ruptured membranes and
5. Patients with gestational age above 26 weeks.

In this study advanced cervical dilatation was detected by speculum/physical examination done in patients with symptoms of mucoid vaginal discharge, or sense of pelvic pressure.

Women with advanced cervical dilatation and exposure of fetal membranes to a diameter of 1.5cm were taken for ECC. ECC was done by an experienced senior obstetrician.
Clinical and demographic information, gestational age, cervical dilation at the time of cerclage, cerclage-delivery interval, gestational age at delivery, foetal survival rate, neonatal birth weight, and maternal problems were the variables studied. Miscarriage, gestational age at delivery, birth weight, and duration of pregnancy extension were among the pregnancy outcomes evaluated.

The personal identifiers of the patients (patients' names and addresses) were kept confidential and secure. Each patient was given a Unique ID number to make each entry anonymous. After diagnosing cervical dilatation and exposed foetal membranes, emergency cervical cerclage was performed. All cervical cerclage surgeries were performed under spinal anaesthesia. For the procedure, the patient was positioned in the lithotomy position. Sterile saline was used for cleaning. The lips of the cervix were caught with long Allis forceps, prolapsed membranes were pushed with an inflated Foley bulb after giving head low position. Anterior and posterior incisions were made in the cervicovaginal junction. Anteriorly the bladder is pushed up by entering the vesicocervical space. Posteriorly the vagina is incised at the cervicovaginal junction, and the vagina was separated above the cervix in the centre without incising the uterosacral. Using umbilical cotton tape threaded to the needle, the suture was inserted from anterior to posterior and recovered through the posterior incision. It is again taken from posterior to anterior through the opposite side. The knot was tied anteriorly, and thread cut about 2 cm in length. The anterior and posterior incisions were closed with delayed absorbable sutures, leaving the cut end of the Shirodhkar suture outside.

Patients were normally discharged from the hospital after 5 – 7 days of the ECC procedure. All the patients received a single dose of prophylactic antibiotic and an injection of hydroxyprogesterone caproate 500mg.

Patients were encouraged to avoid strenuous physical activity after the treatment, but they were not placed on complete bed rest. Patients were followed up regularly until the suture was removed, or earlier if the patient presented with preterm labour or preterm premature rupture of the membranes.

Statistical Analysis
For statistical analysis, IBM SPSS Software version 26.0 was used. Data were entered in Microsoft excel. Descriptive and inferential analyses were done. Two-sample t-test and the chi-squared test were used for the statistical test. Independent sample t-test and Chi-square test have been calculated. The results of the analysis are reported as number and percentage or mean and standard deviation. 0.05 P value was considered significant.

Result
A total of 20 study subjects were included in this study. Out of 20 study subjects, an emergency Modified Shirodhkars cerclage procedure was performed on 19 study subjects and McDonald's technique was used on one study subject.

Table 1: Clinical and demographic data (N=20)

Variables	Mean ±SD	Range
Maternal age	30.20±4.927	25-43
Gestation at cerclage (weeks)	19.865 ± 3.5423	14.0-26.0
Cervical dilatation (cm)	2.40±1.0834	1.0-5.0

History of live birth	0.05±.224	0-1
Number of previous miscarriages (1st trimester)	0.40±.598	0-2
Number of previous miscarriages (2nd trimester)	0.10±.308	0-1
Maternal Weight	66.30±11.508	45-85
maternal height	158.30±5.027	146-168
2nd Trimester GCT	135.47±22.041	96-184

Table 1 shows the clinical and demographic data of the study subjects. At the time of cerclage, the Mean ±SD maternal age of the study subjects was 30.20±4.927years (range: 25-43years), the Mean ±SD gestational age was 19.865± 3.5423weeks (range: 14.0-26.0 weeks), and the Mean ±SD cervical dilatation was 2.40±1.0834cm (range: 1.0-5.0cm).
The Mean ±SD history of live birth was .05±.224 (range: 0-1), Mean ±SD number of previous miscarriages in 1st trimester was .40±.598 (range: 0-2), Mean ±SD number of previous miscarriages in 2nd trimester was .10±.308 (range: 0-1), Mean ±SD maternal weight was 66.30±11.508 (range: 45-85), Mean ±SD maternal height was 158.30±5.027 (range: 146-168, Mean ±SD and Mean ±SD 2nd Trimester GCT were 135.47±22.041(range: 96-184).

Table 2: Neonatal and Maternal outcomes of emergency cerclage (N=20)

Variables	N (%)	Range
Survival (%) **Yes** **No**	 17(85%) 3(15%)	
Birth weight (g)	2196.15 ±868.214	520-3700
Gestation at delivery (weeks) **<27 weeks** **28-31 weeks** **32-34 weeks** **>35 weeks**	 2(10.0%) 2(10.0%) 1(5.0%) 15(75%)	
Gestation at delivery (weeks)	30±4 weeks	26-38
Suture to delivery interval (days)	95.65±42.458	2-142
Comorbidities **Yes** **No**	 16(80%) 4(20%)	
Maternal blood loss	19.75±7.159 ml	10-30
Maternal death	0	
sepsis	0	
Laceration of cervix	0	
Membrane damage **Yes** **No**	 1(5%) 19(95%)	
Mode of delivery **Vaginal delivery** **Cesarean delivery**	 3(15%) 17(85%)	

Table 2 shows the neonatal and maternal outcomes after ECC. As per the result, ECC led to live births, with a success rate of 85%. The mean interval between cerclage (suture) and delivery was 95.65±42.458 days (range: 2-142 days) with a mean gestation at delivery of 30±4 weeks (range: 26-38 weeks) and a mean birth weight of 2196.15 ±868.214 g (range: 520-3700g). At the time of cerclage, majority of the study subjects (16 subjects/80%) were suffering from comorbidities such as Gestational diabetes mellitus (8 subjects/40.0 %), PCOS (5 subjects /25.0%), APLA (2 subjects /10.0%), Hypothyroid (1 subject/5.0%). As shown in Table 3 below, there were no severe maternal complications such as maternal death, sepsis and laceration of the cervix. Only one study subject had membrane damage. At the time of cerclage, mean blood loss was 19.75±7.159 ml (range: 10-30). The majority of the subjects (17 subjects/85%) were delivered by C section and 3 subjects (15%) subjects delivered vaginally.

Table 3: Pregnancy outcome related to clinical features (N=20)

Variables	C section (17)	V delivery (3)	P-value
Maternal age in years	30.06±4.981	31.00±5.568	0.80
1st Trimester Number of miscarriages	.35±.493	.67±1.155	0.002*
2nd Trimester Number miscarriages	.12±.332	.00±.000	0.18
Cervical dilatation (cm)	2.382±1.0830	2.500±1.3229	0.2
Gestation at cerclage (weeks	19.841±3.7445	20.00±2.6458	0.7
Maternal Weight	66.35±12.475	66.00±3.606	0.13
SBP	117.06±13.117	113.33±11.547	0.8
DBP	72.50±6.831	70.00±.000	0.7
Suture to delivery interval (days	85.33±68.857	85.33±68.857	0.17
2nd Trimester GCT	137.38±21.823	125.33±24.846	0.7
Comorbidities	70% (14/16)	10% (2/3)	0.5

As shown in Table 3, statistical analysis revealed there is no significant correlation between pregnancy outcome, cervical dilatation, maternal age, previous miscarriages, gestational at cerclage, maternal weight, comorbidities, 2nd-trimester GCT age and suture to delivery interval days (P-value is greater than 0.05). However, analysis of miscarriages in 1st Trimester showed there is a significant correlation in women with V delivery vs. C section outcome (P=0.002*).

Table 4: Pregnancy outcome related to clinical features: based on cervical dilatation (N=20)

Variables	Cervical Dilation less than 3cm(14)	Cervical Dilation more than 3cm(6)	P-value
Maternal age	30.21±5.646	30.17±3.061	0.19
Maternal Weight	65.14±12.599	69.00±8.832	0.34
Suture to delivery interval (days	112.43±24.044	56.50±52.149	0.00**
Birth weight (g)	2401.64±558.88	1716.67±1287.702	0.09
Survival	70% (14/14)	15% (3/6)	0.01*

Out of the 20 cases, 14 subjects had cervical dilatation ≤3 cm and 6 subjects had cervical dilatation >3 cm at the time of cerclage. When comparing the clinical features and the outcome within these two groups (shown in Table 4), it was noted that there were significant differences in the suture to delivery interval (days), survival and neonatal outcomes. The

suture-to-delivery interval was longer and neonatal outcomes (survival and birth weight) were better in patients with cervical dilatation <3 cm (P<0.00, P=0.01).

Discussion

In the study center, a significant number of pregnant women were found with cervical insufficiency, therefore, there was routine follow up at 16 weeks of pregnancy to assess the cervical length. Many of the cases remain asymptomatic even when there is advanced cervical dilatation and prolapsed membranes. ECC was performed in all such patients. The purpose of performing ECC is to prolong the pregnancy to a salvageable gestational age and consequently it helps to increases the infant survival rate. This study included 20 antenatal women with opened cervix and prolapsed membranes in their late second trimester. All study subjects underwent ECC. The study showed that ECC helped to advance the pregnancy to an average of 95±42 days and to increase the infant survival rate to 85%. Among the study subjects, 75% of women could prolong pregnancy to > 35 weeks and the average gestational age was 30±4 weeks.

A study by Maira Marinho et al[6], demonstrates that ECC was associated with longer latency, a significant impact on gestational age at delivery and a reduction in the fetal death rate. In this study, the surgery was performed using McDonald's technique. The mean gestational age at delivery was 28.6 ± 6.9 weeks in the cerclage group and 23.3 ± 4.3 weeks in the rest group. The mean latency period was 48.6 ± 47.1 days for the cerclage group and 16 ± 19.2 days for the rest group. In this study, the emergency cerclage presented better gestational outcomes with a more extended latency period. The findings of Maira Marinho et al can be linked with the findings of the present study. In the current study, the mean gestational age at delivery was 30±4 weeks.

Another study by Qi Pang et al[7] demonstrated that ECC was associated with favorable perinatal results, and it can be safe and effective. This study included 50 patients with singleton pregnancies. The mean gestational age at cerclage was 21.3±2.2 weeks. The mean operation time was 60.5 min. The mean blood loss was 20 ml. None of the patients had membrane damage due to surgery. No surgical complications were reported in the study population. Five (10%) patients had chorioamnionitis and received antibiotic treatment, but this did not affect the pregnancy outcome. The mean suture delivery interval was 11.2±7.1 weeks. The mean gestational age at delivery was 34.1 weeks. Among the 50 neonates delivered after 24 gestational weeks, there was only 6 preterm deliveries at less than 28 gestational weeks. The rate of preterm delivery at less than 32 weeks was 60%. There were 10 patients who had pregnancies lasting more than 36 weeks. Only 1 neonatal death occurred in the perinatal period due to preterm delivery. The mean neonatal delivery weight was 2510.7 g. As per the present study findings, the mean gestational age at cerclage was 19.8 ± 3.5 weeks, mean blood loss was 19.8±7.2 ml and suture delivery interval 95.65±42.458 days. The study by Qi Pang et al agreed with the findings of the present study.

The present study result is in line with a study by Christos et al[8] as well. This study demonstrated that emergency cerclage in pregnant women with painless cervical dilatation seems to decrease preterm births, prolong the pregnancy, and decrease the neonatal deaths and fetal losses, but does not increase the risk of chorioamnionitis and premature rupture of membranes. A study by Gundabattula et al [9] demonstrates that after rescue cerclage, pregnancy extended from pre viability to prematurity in most of them. The mean gestational age at cerclage was 21.9 ± 2.7 weeks for the 74 women in the study. The McDonald's technique was the preferred method for rescue cerclage (91.9%). The mean prolongation of

pregnancy was 7.4 weeks with 42.0% of women delivering after 28 weeks and 30.4% after 34 weeks. The take-home-baby rate was 50.7% (95% confidence interval). In our study there was one case of Preterm premature rupture of membranes **(**PPROM)& no case of chorioamnionitis were reported. Postoperative vaginal infection was present in 16.2% of women, preterm premature rupture of membranes in 31.1% of women and neonatal sepsis in 5.8% of neonates. As per the result of the present study, the mean SD of gestational age at cerclage was 19.8 ± 3.5 weeks and an average of 95±42 days prolonged. The findings of this agreed with the finding of the present study. However, in the present study, there were no complications such as postoperative vaginal infection, preterm premature rupture of membranes and neonatal sepsis.

Conclusion

This study showed that ECC has a place in prolonging pregnancy to a salvageable gestational age. This study further demonstrated that emergency cervical cerclage performed among patients presented with opened cervix and prolapsed membranes in late second trimester has positive perinatal and neonatal outcomes. It seems the current standard of neonatal treatment coupled with a very prudent and meticulous surgical technique of emergency placement of a cervical suture justifies the performance of cerclage in patients presented with cervical insufficiency. This study concluded that emergency cervical cerclage among patients who present opened cervix and prolapsed membranes presenting in mid-trimester has positive perinatal and neonatal outcomes.

Conflict of interest: Nil

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