

Cervical Cerclage to Prevent Recurrent Mid-Trimester Miscarriage- A Retrospective Study in A Private Hospital

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DOI: [10.36347/sjams.2024.v12i03.002](https://doi.org/10.36347/sjams.2024.v12i03.002)

| Received: 08.01.2024 | Accepted: 13.02.2024 | Published: 06.03.2024

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Abstract

Original Research Article

Background: Cervical insufficiency (CI) poses significant risks to pregnancy outcomes, including recurrent mid-trimester miscarriages and preterm births. Cervical cerclage, a primary preventive technique, aims to mitigate these risks by preserving cervical length and structural integrity. **Objective:** This retrospective study evaluates the effectiveness of cervical cerclage in preventing recurrent mid-trimester miscarriages. **Method:** Conducted over two years at a private hospital, the study analyzed 92 cases of mid-trimester cervical cerclage. Data included patient demographics, cervical parameters, and pregnancy outcomes. Statistical analysis employed descriptive statistics and odds ratios. **Results:** Term deliveries (45.65%) predominated over preterm (33.70%) and abortion (20.65%) outcomes. Notably, cervical length inversely correlated with preterm birth risk (odds ratio: 0.25), while cervical dilatation increased preterm birth likelihood (odds ratio: 34). Maternal complications were infrequent, with hemorrhage (3.3%), infection (1.1%), and cervical lacerations (2.1%) reported. **Conclusion:** Cervical cerclage demonstrates promise in preventing mid-trimester miscarriages, with term deliveries comprising the majority of successful outcomes. However, challenges persist, including the lack of standardized treatment timing and potential complications. The study underscores the importance of individualized care in managing CI and highlights the need for further research to optimize treatment protocols.

Keywords: Cervical insufficiency, cervical cerclage, preterm birth, pregnancy outcomes, obstetric complications.

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INTRODUCTION

Cervical function refers to a biological process that aligns with the various stages of pregnancy. This process involves the gradual softening of the cervix as gestational weeks progress, accompanied by a steady shortening of the cervix in response to fetal growth. Additionally, as contractions arise and intensify, there is a progressive occurrence of both cervical shortening and dilatation. Instances where cervical maturation processes deviate from the expected softening, shortening, or dilatation without an apparent cause are categorized as instances of cervical insufficiency (CI) [1]. CI poses a risk factor for adverse pregnancy outcomes and can lead to habitual abortion between weeks 16 and 28 [2]. The incidence of CI ranges from 0.05% to 2% among the obstetric population, but in women with recurrent mid-trimester losses, it is estimated to occur in 8% of cases [3]. It plays a crucial role in the preterm birth syndrome, being a major cause of miscarriage and preterm fetal birth in mid-to-late pregnancy [4-6]. CI typically manifests before 27 weeks of gestation. Regardless of the cause of parturition onset, the common pathway leading to premature loss involves cervical shortening and

dilatation, making cervical cerclage a primary preventive technique. While cerclage provides some structural support to a "weak cervix," its main role lies in preserving cervical length and the endocervical mucus plug as a mechanical barrier against ascending infections [7]. After undergoing the McDonald surgery for cervical incompetence, women receiving cervical cerclage experienced an increase in term births to 95.4%, with a mean gestational age of delivery at 35 weeks.^[8] However, there is a lack of standardized definitions for the current timing of surgical treatment.

OBJECTIVE

Our study seeks to investigate the effectiveness of Cervical Cerclage in preventing recurrent mid-trimester miscarriages through a retrospective analysis conducted at a private hospital.

METHOD

The study titled "Extending Gestational Period to Enhance Positive Pregnancy Results: Evaluating the Efficacy of Cervical Cerclage" was carried out in the

Department of Obstetrics and Gynecology at a private hospital, spanning two years from October 21, 2021, to October 20, 2023, and involving multiple centers. Throughout the research period, a total of 92 cases were included, comprising patients who underwent mid-trimester cervical cerclage. Detailed examination of medical records was conducted, with cervical length measured within a sealed endocervical canal. Fundal pressure was applied for 30 seconds to detect cervical shortening and funneling. Patients with cervical length below 25 mm before the 27th week of gestation were considered at risk for preterm delivery. Exclusions from the study group included women with multifetal gestations, significant vaginal bleeding, preterm premature rupture of the membranes, or persistent uterine contractions. Cerclage placements followed the McDonald technique. Post-procedure, patients received 100 mg of indomethacin suppository, 1 gram of intravenous ampicillin every 6 hours, and 500 mg of intravenous metronidazole every 12 hours for 24 hours,

and were confined to bed rest for 48 hours. Prophylactic tocolysis was not administered. Cerclage sutures were removed at 36 weeks gestation or upon membrane rupture. Descriptive statistics, including frequencies and percentages, summarized participant demographics and pregnancy outcomes, while odds ratios were calculated to assess the relationship between cervical parameters and preterm delivery. Statistical analysis was performed using the SPSS statistics Package.

RESULTS

The distribution of age among participants was as follows: 26 individuals (28.26%) were aged 21-25, 29 individuals (31.52%) were aged 26-30, and 37 individuals (40.22%) were aged 31-35. The mean age was 30.67 years with a standard deviation of 4.49 years. The average BMI (Body Mass Index) among participants was 25.5 with a standard deviation of 3.32.

Table-1: Age distribution

Variable	Frequency	Percentages
Age		
21-25	26	28.26
26-30	29	31.52
31-35	37	40.22
Mean ± SD	30.67 ± 4.49	
BMI (Body mass index)	25.5 ± 3.32	

The results are divided into "Abortion," "Preterm Delivery," and "Term Delivery," with corresponding frequencies of 19 (20.65%), 31 (33.70%), and 42 (45.65%) respectively. The data indicates that

term deliveries were the predominant outcome, trailed by preterm deliveries, with abortions representing the smallest fraction of cases.

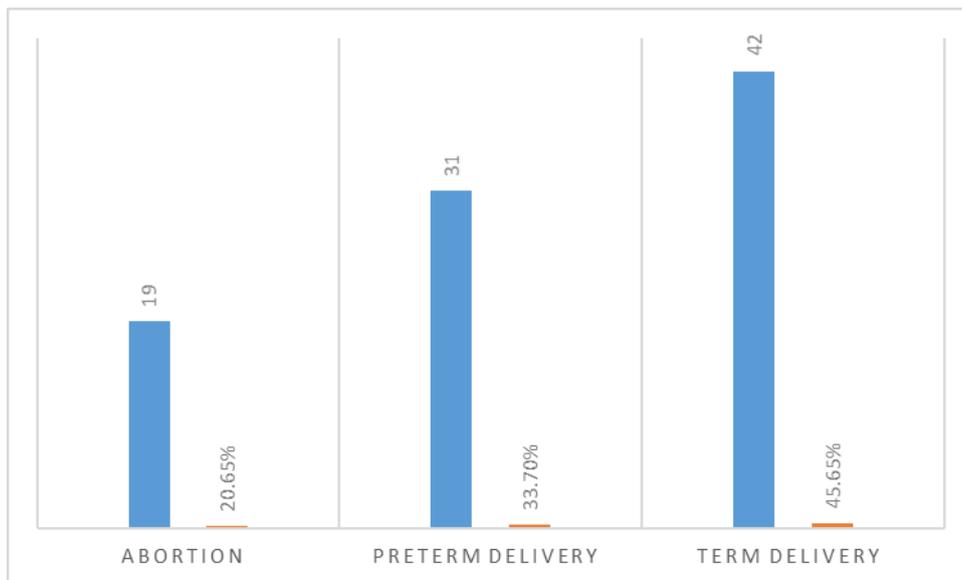


Figure-1: Pregnancy outcome based on cervical cerclage

Based on the data presented, for cases of recurrent pregnancy loss (RPL) (n=49), 20.41% resulted in abortion, 40.82% in preterm birth, and 38.77% in term

delivery. In IVF pregnancies (n=19), 15.79% ended in abortion, 31.58% in preterm birth, and 52.63% in term delivery. For cases with a short cervix (TVS) (n=24),

25.00% ended in abortion, 20.83% in preterm birth, and 54.17% in term delivery.

Table-2: Inclusion Criteria and Pregnancy Outcomes

Inclusion criteria	Outcome	Number of cases	Percentages
Recurrent pregnancy loss (RPL) (n=49)	Abortion	10	20.41
	Preterm	20	40.82
	Term	19	38.77
IVF pregnancy (n=19)	Abortion	3	15.79
	Preterm	6	31.58
	Term	10	52.63
Short Cervix (TVS)(n=24)	Abortion	6	25.00
	Preterm	5	20.83
	Term	13	54.17

The study observed preterm births across various gestational ages: 9.68% occurred at 28-31 weeks, 29.03% at 32-33 weeks, and the majority, 61.29%, at 34-

36 weeks. In total, preterm births accounted for 31 cases, constituting 100% of the observed preterm births.

Table-3: Cervical cerclage and pregnancy outcome based on gestational age

Gestational Age	Number	Percentages
Preterm Births (28-31 weeks)	3	9.68
Preterm Births (32-33 weeks)	9	29.03
Preterm Births (34-36 weeks)	19	61.29
Preterm Birth (Total)	31	100%

In our analysis, the odds ratio for cervical length(mm) was 0.25 (95% CI: 0.01-5.2), indicating a lower likelihood of adverse outcomes associated with longer cervical length. Conversely, cervical dilatation

(mm) exhibited an odds ratio of 34 (95% CI: 1.3-8.5), suggesting a significantly higher risk of adverse outcomes with increased cervical dilatation.

Table-4: Characteristics of patients delivered before 36 weeks gestation

Variables	Odds Ratio	95% CI
Cervical length(mm)	0.25	0.01- 5.2
Cervical dilatation (mm)	34	1.3-8.5

In our study, maternal death did not occur. Hemorrhage occurred in 3 cases (3.3%), while infection was observed in 1 case (1.1%). Laceration of the cervix

was reported in 2 cases (2.1%). The majority of cases, 86 (93.5%), experienced no complications associated with cervical cerclage.

Table-5: Maternal Complication of cervical cerclage

Complications	Incidence number	Incidence rate (%)
Maternal death	00	00
Hemorrhage	3	3.3
Infection	1	1.1
Laceration of cervix	2	2.1
No complication	86	93.5

DISCUSSION

Preterm birth and its complications may be avoided with the application of cervical cerclage. In this research, we looked at how well cerclage worked and what outcomes were obtained. Patients having two or more recurrent mid-trimester abortions or premature births were the subjects of this descriptive cross-sectional research that lasted three years [10]. After cervical cerclage was applied, 74% of the babies were born at full term, 19% were born prematurely, and 7.5%

were miscarried. Another research found that 76% of pregnancies ended in term, 12% in premature birth, and 10% in abortions [11]. Results from the research of 92 individuals who had cervical cerclage throughout their pregnancies show that term births make up 45.65% of the total, preterm deliveries 33.70%, and abortions 20.65% [12]. These rates show that cerclage was effective in increasing the number of pregnancies that went to term. Cervical cerclage has been effective in reducing miscarriages and premature deliveries in a number of

documented instances. Cervical incompetence is a common cause of repeated miscarriages, however the efficacy and appropriateness of cerclage in this context remain controversial [13-17].

This research draws attention to the fact that different inclusion criteria led to different pregnancy outcomes. Recurrent pregnancy loss (RPL) instances included abortions in 20.41 percent of cases, preterm births in 40.82 percent, and full-term deliveries in 38.77 percent. There were 15.79% abortions in IVF pregnancies, 31.58% preterm deliveries, and 52.63% full-term births. Abortions accounted for 25.00% of cases with a short cervix, whereas term births accounted for 54.17% and preterm deliveries for 20.83%. Preserving the cervix's architectural structure allows for an optimal gestational age to be reached, which in turn improves the perinatal outcome by extending the gestational week. Since cervical cerclage does not need incisions, it causes less damage to the surrounding tissue and is therefore an effective treatment for CI. The percentage of term births improved to 95.4%, with a mean gestational age at delivery of 35 weeks, due to the success of cervical cerclage in women with cervical incompetence utilizing McDonald's method.

We found a significant range of preterm deliveries when we analyzed the data relating cervical cerclage to pregnancy outcomes by gestational age. From the 31 preterm deliveries that were recorded, 9.68% were within the 28-31 week range and 29.03% were between the 32-33 week range. Among preterm deliveries, the group that occurred between 34 and 36 weeks represented an astonishingly enormous 61.29%. A well-established approach for assessing the risk of preterm labor and delivery (cervical length 25 mm) was found during the present pregnancy, which included the discovery of cervical shortening. Women who are going through cervical cerclage procedures should only undertake this procedure if their ultrasound-indicated cervical measurement is less than 25 mm, whether or not there is funneling. This should be done before the gestational age of 24 weeks.

Owing to a history of spontaneous abortion between 16 and 24 weeks of gestation, screening for length is necessary. In addition to cervical shortening, patients may also exhibit symptoms of premature membrane rupture or cervical dilatation. Cervical insufficiency is the official diagnosis when cervical dilatation is detected without a history of contractions in the mother, regardless of whether the membranes have ruptured or not. A number of variables were shown to impact the success rate of CI cervical cerclage [15]. These include cervical dilatation, membrane prolapse, obstetric history, and signs of infection.

Important odds ratios and confidence intervals are included in our study's overview of patient variables linked to preterm birth (defined as delivery occurring

before 36 weeks of gestation). The association between a longer cervical length and a decreased risk of preterm birth is supported by a lower odds ratio of 0.25 for "Cervical Length (mm)". On the flip side, increased cervical dilatation is associated with a greater risk of premature birth (odds ratio of 34). According to an earlier systematic review, some of the risks that can occur right after cervical cerclage is traumatic membrane rupture (0.4%), vaginal bleeding (1.4%), premature foetal membrane rupture (15.6%), suture detachment (1.4%), premature delivery (16.4%), cervical lacerations (8.9% to 25%), cervical dystocia (7.2%), uterine rupture (6.3%), and postpartum hemorrhage (2.8%) [18]. Our research found an incidence rate of 4.8% for hemorrhage, which happened in 3 instances. There was an incidence rate of 1.1% due to the presence of infections in 1 case. Two instances, representing a 2.1% incidence rate, included cervix lacerations.

Study Restrictions: Strict inclusion criteria and possible obstetricians' unwillingness to perform emergency cervical cerclage due to reported high failure rates are the limitations of this research. The limited number of patients is another restriction. There may also be some bias in the patients chosen, which would make the results less applicable to a broader population.

CONCLUSION

In summary, this extensive investigation delves into the effectiveness and results of cervical cerclage placement as a preventive strategy against preterm delivery and its related challenges. The results shed light on the promising capacity of cervical cerclage to foster full-term pregnancies, notably observed across various scenarios, particularly among individuals with cervical incompetence.

The research underscores the intricate interplay between cervical attributes and pregnancy outcomes, underscoring the significance of cervical length and dilatation in forecasting the probability of preterm delivery. While the study unveils a relatively successful cerclage procedure, it also acknowledges the intricate web of risk factors and potential complications linked with this intervention.

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