Feto Maternal Outcome after Cervical Cerclage in a Tertiary Level Hospital, Bangladesh

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Abstract: *Background:* Cervical incompetence poses significant challenges in obstetrics, often leading to preterm labor or pregnancy loss. Cervical cerclage is a surgical intervention aimed at reinforcing the cervix to prevent premature delivery. This study evaluates the fetomaternal outcomes of cervical cerclage in a tertiary hospital setting in Bangladesh. *Objective*: To assess the fetomaternal outcomes following cervical cerclage in patients with cervical incompetence at Rajshahi Medical College Hospital. *Method*: A cross-sectional descriptive study was conducted with a sample size of 21 patients, purposively selected from the Gynae ward of Rajshahi Medical College Hospital. Data were collected from January 1, 2017, to December 31, 2018. Cervical cerclage was performed using the McDonald purse string suture technique. *Results*: Out of the 21 patients who underwent cervical cerclage, 6 had undergone in vitro fertilization (IVF). The procedure resulted in a 70.58% term delivery rate, with 12 patients delivering via caesarean section. Preterm labor occurred in 23.52% of cases. The overall fetal salvage rate was 88.23%. Among the patients, 66.67% were aged 31-35 years, 71.42% were nulliparous, and 9.52% experienced bleeding complications. Notably, 66.67% had a history of mid-trimester losses, and 70.58% achieved term delivery. Neonatal outcomes included 2 neonatal deaths and 6 admissions to the Neonatal Intensive Care Unit (NICU). *Conclusion*: Cervical cerclage appears to be an effective treatment for managing cervical incompetence, including in IVF pregnancies, demonstrating a high rate of fetal salvage and a favorable term delivery rate.

Keywords: Cervical incompetence, Cervical cerclage, Term delivery, Fetal salvage, IVF pregnancies.

Article at a glance:
Study Purpose: Evaluate the fetomaternal outcomes of cervical cerclage in managing cervical incompetence and IVF pregnancies.
Key findings: Cervical cerclage effectively prolongs pregnancy and improves fetal outcomes, with a high fetal salvage rate and successful term deliveries.
Newer findings: Provides updated insights into the efficacy of prophylactic cerclage in IVF pregnancies and highlights the need for standardized diagnostic criteria and improved management practices.
Abbreviations: IVF - In Vitro Fertilization, NICU - Neonatal Intensive Care Unit, PROM - Premature Rupture of Membranes, SPSS - Statistical Package for the Social Sciences, CBC - Complete Blood Count, FBS - Fasting Blood Sugar, PPBS - Postprandial Blood Sugar.

INTRODUCTION

Cervical incompetence, characterized by the premature dilation of the cervix leading to second-trimester pregnancy loss or preterm birth, has been a critical focus in obstetric care since the early 20th century. The concept of cervical cerclage as a treatment for cervical incompetence was first introduced by Herman in the early 1900s.[1] This procedure has evolved significantly over the decades, with various techniques developed to improve outcomes for affected pregnancies. In 1951, Shirodkar advanced the field by introducing

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the transvaginal cervical cerclage, which involves placing a stitch around the cervix to provide additional support.[2] This method marked a significant improvement in managing cervical incompetence, offering a more effective means of preventing pregnancy loss compared to earlier approaches. A few years later, in 1957, McDonald refined the procedure further by developing the McDonald cervical cerclage technique. This technique is performed when there is evidence of cervical dilatation and bulging fetal membranes during the second trimester.[3] The McDonald technique became widely adopted due to its relative simplicity and effectiveness.

The efficacy of cervical cerclage in preventing pregnancy loss and preterm birth has been supported by several observational studies. These studies have consistently demonstrated that cervical cerclage can significantly improve outcomes for patients with diagnosed cervical incompetence. Despite this, the role of prophylactic cervical cerclage, particularly in the context of assisted reproductive technologies (ART) such as in vitro fertilization (IVF) and intrauterine insemination (IUI), remains a subject of debate.[4] The increasing use of ART has led to a rise in multiple pregnancies, which are associated with a higher risk of both maternal and neonatal complications. According to recent data from the European Society of Human Reproduction and Embryology (ESHRE), 21.71% of combined IVF and intracytoplasmic sperm injection (ICSI) cycles resulted in multiple deliveries in 2008.[5] Multiple pregnancies present unique challenges, including an elevated incidence of preterm labor and other complications. Prophylactic cervical cerclage in these high-risk cases is proposed as a means to mitigate the risks associated with cervical incompetence and prevent preterm birth. However, the effectiveness and necessity of this intervention in such contexts remain contentious. Some studies suggest that cervical cerclage might be unnecessary in certain cases, while others report clear benefits, highlighting the need for careful evaluation of its use.[6]

In our tertiary hospital, Rajshahi Medical College Hospital, there is limited information available regarding the outcomes of cervical cerclage, particularly in high-risk populations such as those undergoing ART. The present study aims to address this gap by documenting the fetomaternal outcomes of cervical cerclage in patients at high risk of cervical incompetence.[7] By examining the results of cervical cerclage procedures performed at our institution, we hope to contribute valuable insights into the effectiveness of this intervention in preventing preterm birth and improving pregnancy outcomes in high-risk cases. This study will provide a clearer understanding of the role of cervical cerclage in managing cervical incompetence, particularly in the context of modern fertility treatments and high-risk pregnancies. The findings will be instrumental in guiding clinical decision-making and optimizing care for patients with cervical incompetence in our setting.

OBJECTIVES
General Objective
To evaluate the outcomes of cervical cerclage in patients with cervical incompetence at Rajshahi Medical College Hospital.

Specific Objectives
To determine the rate of term deliveries following cervical cerclage.
To identify the incidence of preterm labor and related complications.
To assess neonatal outcomes, including survival rates and NICU admissions.
To analyze the effectiveness of cervical cerclage in ART pregnancies.
To explore the relationship between maternal demographics and the success of cervical cerclage.

MATERIAL AND METHODS
Study Design
This cross-sectional descriptive study was conducted at Rajshahi Medical College Hospital from January 1, 2017, to December 31, 2018. A total of 21 women with cervical incompetence or IVF pregnancies were purposively selected. Inclusion criteria encompassed a history suggestive of cervical incompetence and documented uterine anomalies, while exclusion criteria included idiopathic abortions, antiphospholipid syndrome, and specific fetal or maternal conditions. Baseline investigations and obstetric assessments were performed, followed by cervical cerclage under

spinal anesthesia. Post-procedural care included bed rest and medication.

Inclusion Criteria
History of cervical incompetence or recurrent mid-trimester losses.
IVF pregnancies requiring prophylactic cerclage.
Documented uterine anomalies.
Written informed consent.
Appropriate gestational age for cerclage.

Exclusion Criteria
Idiopathic abortions.
Antiphospholipid syndrome.
Lethal fetal abnormalities.
Membrane prolapse beyond the external os.
Placental abruption.
Unexplained vaginal bleeding.
Chorioamnionitis.

Data Collection
Data were collected from 21 women at Rajshahi Medical College Hospital between January 1, 2017, and December 31, 2018. Initial baseline investigations included complete blood count (CBC), blood grouping, urine examination, fasting and postprandial blood sugar, and viral serology. Obstetric ultrasound was performed transabdominally to assess cervical length and dilatation. Cervical cerclage procedures were documented, including intraoperative details and immediate postoperative care. Follow-up data included maternal demographics, complications, birth weight, neonatal morbidity (NICU admissions), and perinatal death (stillbirths and deaths within the first 7 days).

Data Analysis

Data were analyzed using SPSS (Version 26). Descriptive statistics were employed to summarize maternal demographics, complications, birth weight, neonatal morbidity, and perinatal death. Frequencies and percentages were calculated for categorical variables, while mean and standard deviation were used for continuous variables. The analysis focused on identifying patterns and correlations between cervical cerclage outcomes and various factors such as maternal age, previous obstetric history, and IVF status. Comparisons between groups were performed using appropriate statistical tests to determine the significance of observed differences. Results were presented in tables and figures to facilitate interpretation and reporting.

Ethical Considerations
The study adhered to ethical standards, ensuring all participants provided written informed consent before inclusion. Confidentiality of patient information was maintained throughout the study. The research protocol was reviewed and approved by the institutional ethics committee to ensure compliance with ethical guidelines. All procedures were conducted with respect to patient rights, and the potential risks and benefits of cervical cerclage were clearly communicated to participants.

RESULTS
A total of 21 patients were included in the study. Of these, 15 had a history of recurrent mid-trimester abortions and were diagnosed with cervical incompetence based on clinical examination, while 6 had IVF pregnancies. The pregnancy outcomes were analyzed for 17 patients.
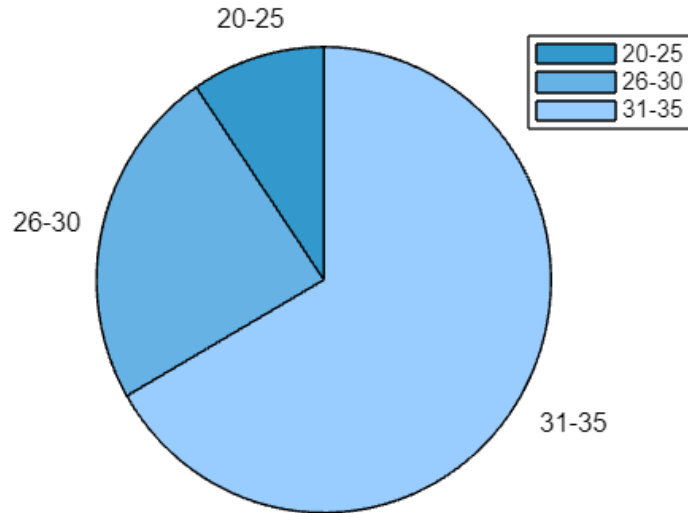
Figure 1: Distribution of Patients According to Maternal Age

The distribution of patients by maternal age. The majority (66.7%) were aged 31-35 years, with 23.8% aged 26-30 years and 9.5% aged 20-25 years. This indicates that cervical incompetence and cerclage procedures are more common in older women within the study cohort.

Table 1: Distribution of Patients According to Parity

Parity	Number of Patients	Percentage (%)
Nullipara	15	71.4
Multipara	6	28.6

The distribution of patients by parity. A significant majority (71.4%) were nulliparous, while 28.6% were multiparous. This highlights that cervical cerclage was predominantly applied to women who had not previously given birth, suggesting a higher prevalence of cervical incompetence in nulliparous patients within this study.
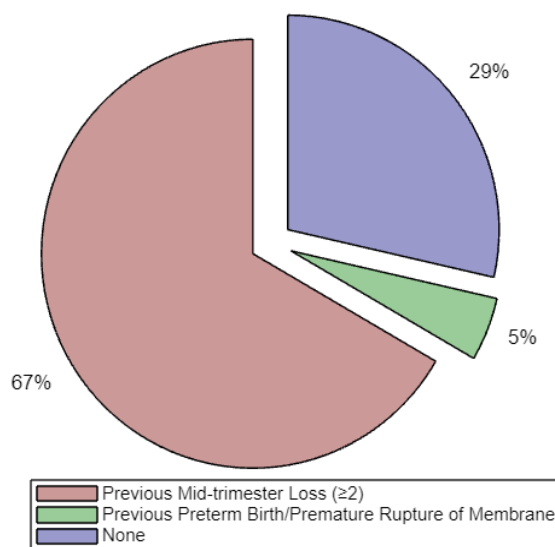

Figure 2: Previous Obstetrical & Gynecological History of Patients

A majority (66.7%) had experienced two or more mid-trimester losses, indicating a history of cervical incompetence. Only 4.8% had a history of preterm birth or premature rupture of membranes, while 28.6% had no significant previous complications.

Table 2: Pregnancy Outcome by Gestational Age at Delivery

Gestational Age at Delivery (Weeks)	Number of Patients	Percentage (%)
<28	1	5.9
28-36	4	23.5
Term Delivery	12	70.6

Shows pregnancy outcomes based on gestational age at delivery. A majority of patients (70.6%) delivered at term, indicating a successful prolongation of pregnancy. A smaller proportion delivered between 28-36 weeks (23.5%), while 5.9% delivered before 28 weeks. These results suggest that cervical cerclage is effective in achieving term deliveries but also highlights that some pregnancies still ended preterm.
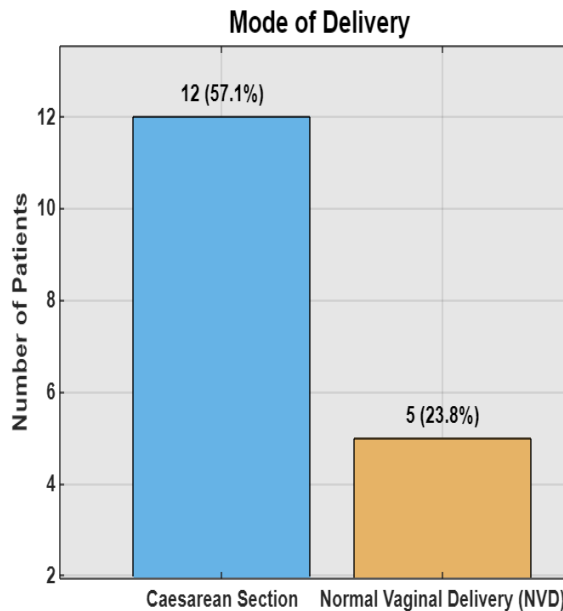

Figure 3: Mode of Delivery

A majority (57.1%) underwent caesarean sections, while 23.8% had normal vaginal deliveries (NVD). This suggests a preference or need for surgical delivery in over half of the cases, possibly due to the high-risk nature of the pregnancies managed with cervical cerclage.

Table 3: Neonatal Outcomes

Neonatal Outcome	Number of Patients	Percentage (%)
Neonatal Death	2	9.5
NICU Admission	6	28.6
No Complications	9	42.9

Summarizes neonatal outcomes. Of the neonates, 9.5% experienced neonatal death, while 28.6% required admission to the Neonatal Intensive Care Unit (NICU). A majority (42.9%) had no complications. These findings highlight the variability in neonatal outcomes following cervical cerclage and the need for ongoing monitoring and care.
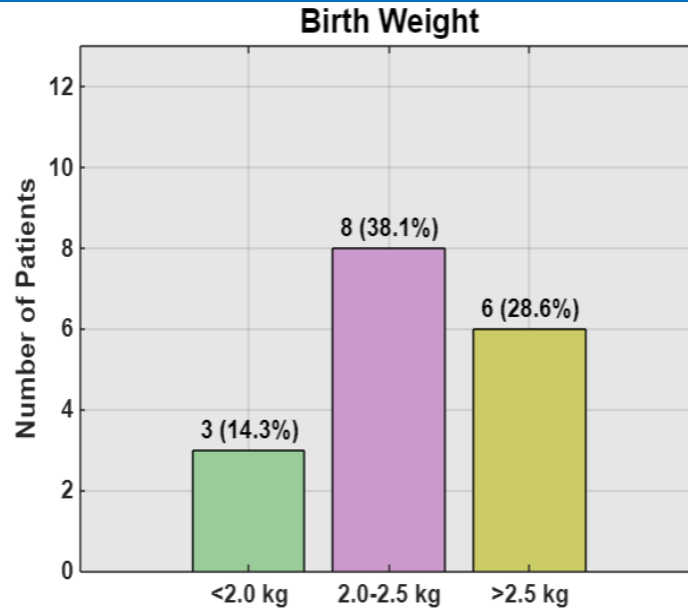
Figure 4: Average Birth Weight

The distribution of birth weights. The average birth weight for 14.3% of neonates was less than 2.0 kg, 38.1% were between 2.0 and 2.5 kg, and 28.6% were over 2.5 kg. These results indicate a range of neonatal weights, reflecting varied growth outcomes despite cervical cerclage.
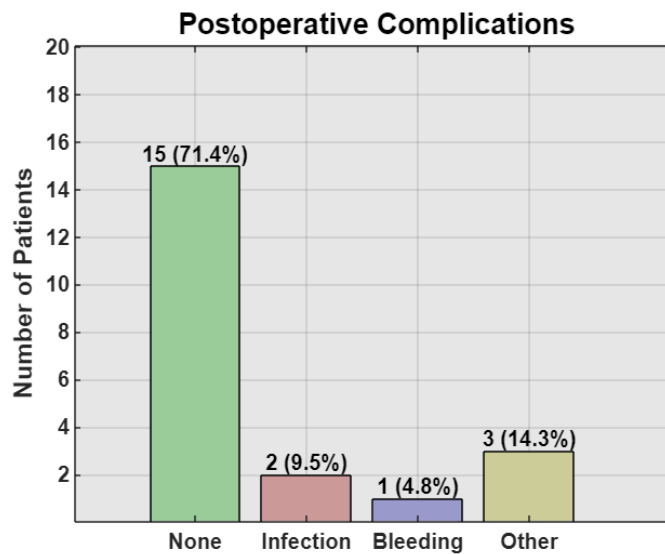

Figure 5: Postoperative Complications

The majority of patients (71.4%) experienced no complications. Infection occurred in 9.5% of cases, bleeding in 4.8%, and other complications in 14.3%. These findings suggest that while most patients had uncomplicated recoveries, a small proportion faced issues that require careful monitoring and management.
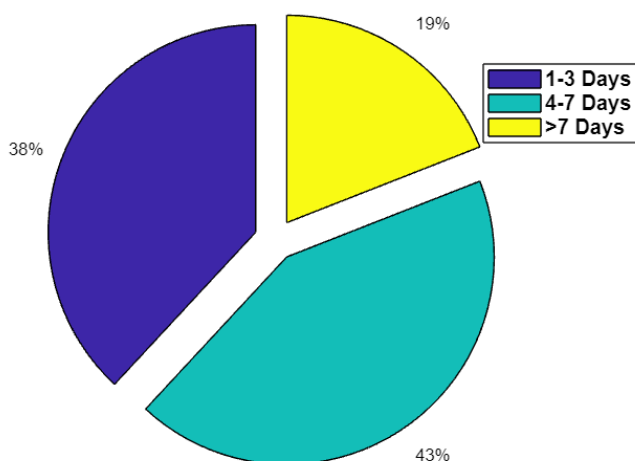
Figure 6: Duration of Bed Rest Post-Procedure

Most patients (42.9%) rested for 4-7 days, 38.1% adhered to 1-3 days of bed rest, and 19.0% were advised to rest for more than 7 days. This variation highlights differing recovery times post-cerclage, with most patients following standard rest recommendations.

Table 4: Follow-up Visits

Number of Follow-up Visits	Number of Patients	Percentage (%)
1-2	10	47.6
3-4	7	33.3
>4	4	19.0

The frequency of follow-up visits post-cerclage. Nearly half of the patients (47.6%) had 1-2 follow-up visits, while 33.3% attended 3-4 visits. A smaller proportion (19.0%) had more than 4 follow-ups. This distribution reflects varied follow-up adherence and highlights the importance of ongoing monitoring to ensure successful outcomes and address any complications that may arise after the procedure.

DISCUSSION

Cervical incompetence is a condition characterized by the weakness of the internal cervical os sphincter, leading to painless cervical effacement and dilation. This condition often results in recurrent mid-trimester abortions or preterm labor and affects approximately 1-2% of pregnancies.[8] With the increasing prevalence of multiple pregnancies due to assisted reproductive technologies (ART), which are associated with a higher risk of neonatal prematurity, the role of cervical cerclage has garnered significant interest.[9,10] This study aimed to evaluate the fetomaternal outcomes of cervical cerclage in a tertiary hospital setting. The results of this study reveal that a significant proportion of patients (71.4%) were nulliparous, which is consistent with previous research indicating that cervical incompetence is often diagnosed in women with no prior successful pregnancies.[11] The age distribution of the patients, with most being between 30 and 35 years old, aligns with findings from other studies suggesting that cervical incompetence commonly presents in women in their 30s. The mean gestational age at which cervical cerclage was performed was 14 weeks, which is in line with current guidelines recommending early placement of cerclage to maximize its efficacy.[12,13]

Our study found that 28.57% of the patients had undergone IVF, reflecting the increasing use of ART and its association with cervical incompetence.[14] The high rate of prophylactic cerclage procedures in this study, compared to emergency cerclage, is consistent with the practice of placing cerclage early in pregnancies at high risk for cervical incompetence.[15] The overall success rate of 70.58% in prolonging pregnancy to term is promising. This success rate is supported by an impressive fetal salvage rate of 88.23%, indicating

that cervical cerclage is effective in improving pregnancy outcomes in high-risk patients. Comparison with previous studies reveals variability in success rates. For instance, research from Tanzania reported a term delivery rate of 43.8%, while studies from Zambia and Saudi Arabia reported rates of 76.8% and 90% respectively.[16] These differences can be attributed to several factors, including sample size, patient demographics, and healthcare practices. Variability in success rates may also result from differences in the definitions of success, such as whether term delivery or fetal survival is the primary outcome measure.

The findings of this study indicate that preeclampsia and premature rupture of membranes (PROM) were significant contributors to preterm delivery. This observation is consistent with Shamshad et al., who identified severe preeclampsia as a leading cause of preterm birth following cerclage.[17] The association of preeclampsia with preterm delivery highlights the need for vigilant monitoring of these patients, as preeclampsia can significantly impact pregnancy outcomes. A notable finding from our study is the high rate of cesarean deliveries (70.58%), which aligns with Drakeley et al.'s observations of an increased cesarean section rate in the cervical suture group. Although this increase was not statistically significant in Drakeley's study, it suggests that the presence of a cervical cerclage may contribute to a higher tendency towards cesarean delivery.[18] One possible explanation is that the presence of a cerclage may lead to increased medicalization of the pregnancy, with healthcare providers opting for cesarean delivery to mitigate perceived risks associated with cervical incompetence. This increased medicalization could be driven by the desire to avoid potential complications related to the cerclage or a heightened anxiety to expedite delivery.

Despite being considered a relatively simple and safe procedure, cervical cerclage is not without risks. In our study, only one patient experienced pervaginal bleeding, which was managed conservatively. This low complication rate supports the view that cervical cerclage is a generally safe procedure.[19] However, the findings from suggest that inpatient management may be associated with better outcomes compared to outpatient management, with higher rates of live neonate delivery and fewer premature contractions observed in the inpatient group.[20] This emphasizes the importance of close monitoring and proper management of patients undergoing cervical cerclage to optimize outcomes.

The results of this study contribute valuable information to the understanding of cervical cerclage outcomes in a tertiary hospital setting. The high fetal salvage rate and favorable pregnancy outcomes underscore the effectiveness of cervical cerclage in preventing preterm birth and improving pregnancy outcomes in high-risk patients.[21-28] However, the increased rate of cesarean deliveries and the need for careful monitoring of complications highlight the importance of individualized patient management and close follow-up. Future research with larger sample sizes and diverse populations will be essential to further validate these findings and explore the impact of cervical cerclage on different patient groups. Additionally, studies comparing various management strategies for cervical cerclage, such as inpatient versus outpatient care, could provide further insights into optimizing the procedure and improving patient outcomes.

CONCLUSION

We conclude that, despite the inconsistencies in the diagnosis and management of cervical incompetence, cervical cerclage proves to be an effective treatment option. It successfully addresses recurrent mid-trimester miscarriages due to cervical incompetence and is beneficial for patients undergoing IVF pregnancies. Our findings support its role in improving pregnancy outcomes, highlighting its value in prolonging gestation and enhancing fetal survival. Continued research is essential for refining its application and addressing any existing gaps in practice.

Recommendations
Implement consistent criteria for diagnosing cervical incompetence.
Evaluate the benefits of prophylactic cerclage in high-risk pregnancies.
Continuously refine cerclage management based on new evidence.

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