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Original Research Article

A Prospective Comparative Analysis of History-Indicated versus Ultrasound-Indicated Cervical Cerclage in the Prevention of Preterm Birth

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Conflict of interest: Nil

Abstract

Background: Preterm birth is a significant cause of neonatal illness and death worldwide. Cervical cerclage is a recognized treatment for women with risk factors for cervical insufficiency. It can be based on a woman's obstetric history or ultrasound results.

Objective: This study aims to compare the effectiveness and safety of history-indicated and ultrasound-indicated cervical cerclage in preventing preterm birth.

Methods: We conducted a prospective comparative study involving 50 pregnant women at risk of preterm birth who had cervical cerclage at a tertiary care center. The patients were divided into two equal groups: history-indicated cerclage (n=25) and ultrasound-indicated cerclage (n=25). We evaluated and compared maternal outcomes, obstetric outcomes, neonatal outcomes, and complications related to the procedure.

Results: Most patients in both groups delivered at term, with 18 in the history-indicated group and 20 in the ultrasound-indicated group delivering at or after 37 weeks of gestation. Preterm birth happened in 7 patients from Group A and 5 from Group B. Maternal complications, such as PPROM, cervical infection, and early labor pains, were low in both groups. We observed one minor cervical tear in the history-indicated group during labor after removing the cerclage. Neonatal outcomes were positive in both groups, with low rates of NICU admissions and no cases of neonatal death.

Conclusion: Both history-indicated and ultrasound-indicated cervical cerclage were effective in prolonging pregnancy and improving neonatal outcomes in high-risk women with cervical insufficiency. Most patients achieved delivery at or beyond 37 weeks with low and manageable maternal complications. The ultrasound-indicated cerclage group showed slightly better outcomes, including fewer preterm deliveries, fewer maternal complications, and no second trimester pregnancy loss. Overall, ultrasound-guided surveillance with timely cerclage placement may provide additional benefit in selected high-risk pregnancies.

Keywords: Cervical cerclage, cervical insufficiency, preterm birth, ultrasound-indicated cerclage, history-indicated cerclage, cervical length.

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Introduction

Preterm birth, defined as delivery before 37 completed weeks of gestation, is a leading cause of neonatal illness and death worldwide. It significantly contributes to perinatal deaths, long-term developmental problems, and increased healthcare costs.

Despite improvements in obstetric care, the rate of preterm birth remains high, particularly in developing countries. One important cause of spontaneous preterm birth is cervical insufficiency, which involves painless cervical dilation, leading to recurrent second-trimester pregnancy losses or early preterm deliveries. Diagnosis can rely on a woman's obstetric history or ultrasound findings of cervical shortening through transvaginal sonography.

Cervical cerclage is a common surgical procedure that aims to support the cervix and prevent premature dilatation. The McDonald cerclage technique is the most frequently used method due

to its simplicity and effectiveness. Cervical cerclage can be categorized based on the indication:

1. History-indicated cerclage – performed as a preventive measure for women with a history of recurrent mid-trimester losses or preterm births that suggest cervical insufficiency.
2. Ultrasound-indicated cerclage – performed for women with a short cervical length, usually less than 25 mm, found through transvaginal ultrasound during the second trimester.
3. Rescue cerclage – performed for women with significant cervical dilation without active labor.

With the increased use of transvaginal ultrasonography, assessing cervical length through ultrasound has become key for identifying women at risk for preterm birth. Ultrasound-indicated cerclage allows for timely intervention in cases of cervical shortening, avoiding unnecessary procedures in low-risk patients. However, there is still uncertainty about whether history-indicated or ultrasound-indicated cerclage leads to better pregnancy outcomes. Previous studies have presented mixed results regarding rates of preterm birth, maternal complications, and neonatal outcomes. Additionally, there is limited prospective comparative data from Indian populations. Hence, this study was conducted to compare history-indicated and ultrasound-indicated cervical cerclage regarding maternal, obstetric, and neonatal outcomes, along with complications in 50 pregnant women treated at a tertiary care teaching hospital.

Materials and Methods

This prospective comparative study was carried out in the Department of Obstetrics and Gynecology at C.U. Shah Medical College and Shrimad Rajchandra Sarvamangal Hospital, Surendranagar, Gujarat. The study included 50 pregnant women at risk of preterm birth, who were divided equally into two groups:

- Group A: History-indicated cervical cerclage (n=25)
- Group B: Ultrasound-indicated cervical cerclage (n=25)

Inclusion Criteria

- Singleton pregnancy
- Gestational age between 12 and 24 weeks
- Women requiring cervical cerclage based on their obstetric history or ultrasound results

Exclusion Criteria

- Multifetal gestation
- Active labor
- Ruptured membranes
- Signs of intrauterine infection
- Major fetal abnormalities

All cerclage procedures used the McDonald technique and were performed under sterile conditions. Patients were followed throughout their pregnancies until delivery.

Outcome Measures

Obstetric Outcomes

- Term delivery (≥37 weeks)
- Delivery between 34-37 weeks
- Delivery before 34 weeks
- Second trimester abortion/Pregnancy loss

Maternal Outcomes

- PPROM
- Chorioamnionitis
- Preterm labor pains requiring hospitalization
- Cervical infection/discharge
- Cervical tear
- Post procedure fever

Bleeding/spotting after Cerclage

Neonatal Outcomes

- NICU admission
- Respiratory distress syndrome
- Low birth weight
- Neonatal sepsis
- Neonatal mortality

We performed a comparison of maternal and neonatal outcomes between the two groups to assess the effectiveness and safety of both cerclage methods.

Results

Table 1: Primary Obstetric Outcomes

Outcome	Group A (History-indicated)	Group B (USG-indicated)
Delivery ≥37 weeks	18 patients	20 patients
Delivery between 34–37 weeks	4 patients	3 patients
Delivery <34 weeks	2 patients	2 patients
Second trimester abortion / pregnancy loss	1 patient	0 patient

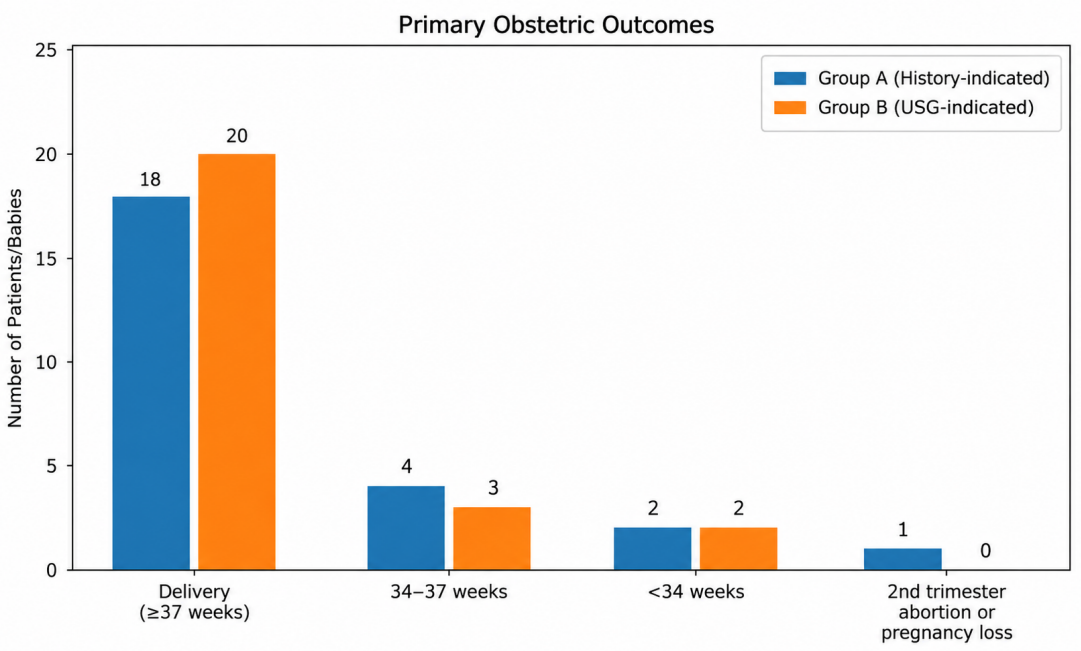

Figure 1: Primary Obstetric outcomes

Interpretation: Most women in both groups achieved delivery at or beyond 37 weeks. The ultrasound-indicated cerclage group demonstrated slightly better pregnancy prolongation, with fewer late preterm deliveries and no second trimester pregnancy loss. The incidence of delivery before 34 weeks was similar in both groups.

Table 2: Maternal Complications

Maternal Complication	Group A (History-indicated)	Group B (USG-indicated)
PPROM	3 patients	2 patients
Chorioamnionitis	1 patient	1 patient
Preterm labour pains requiring admission	4 patients	3 patients
Cervical infection/discharge	2 patients	1 patient
Bleeding/spotting after cerclage	2 patients	1 patient
Cervical tear during labour/removal	1 patient	0 patients
Cerclage removal due to labour	2 patients	1 patient
Postprocedure fever	1 patient	0 patie

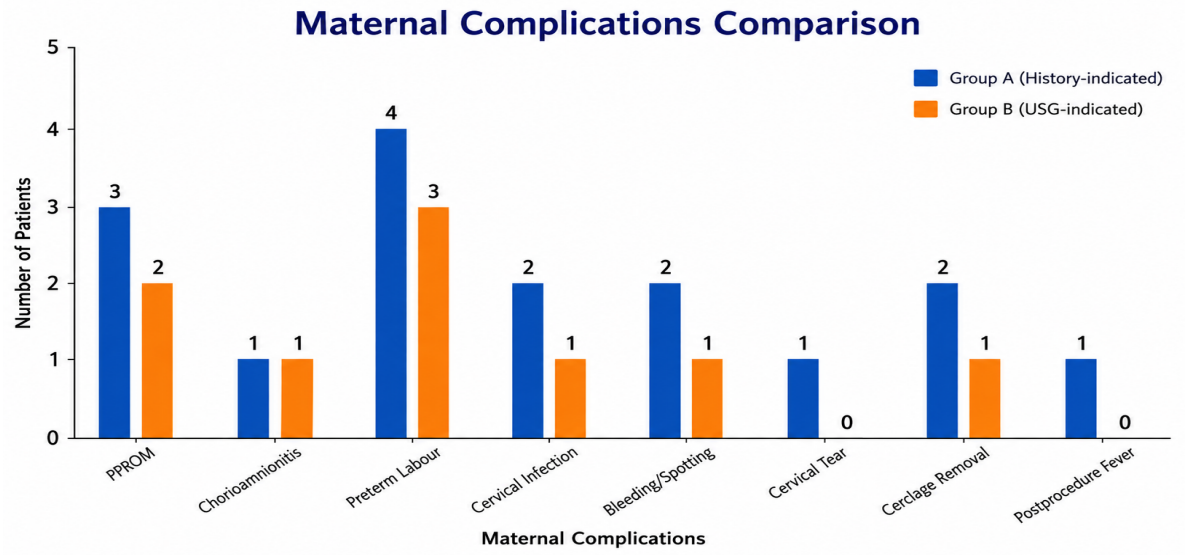

Figure 2: Maternal complications comparison

Interpretation: Maternal complications were generally low in both groups, showing that cervical cerclage was a safe procedure for the study population. Preterm labor pains that needed admission and PPROM were the most commonly seen complications. A few patients experienced mild bleeding or spotting after cerclage, which was managed conservatively without negative maternal outcomes. Infections such as chorioamnionitis, cervical infection, and postoperative fever were rare. Overall, the ultrasound-indicated cerclage group had slightly fewer maternal complications than the history-indicated group.

A minor cervical tear occurred in one patient from the history-indicated group during labor after cerclage removal. This was managed successfully without significant maternal issues.

Table 3: Neonatal Outcomes

Neonatal Outcome	Group A	Group B
NICU admission	3 babies	3 babies
Neonatal respiratory distress syndrome (RDS)	2 babies	1 baby
Low birth weight babies	4 babies	3 babies
Neonatal sepsis	1 baby	1 baby
Neonatal mortality	0	0
Healthy babies discharged	24 babies	25 babies

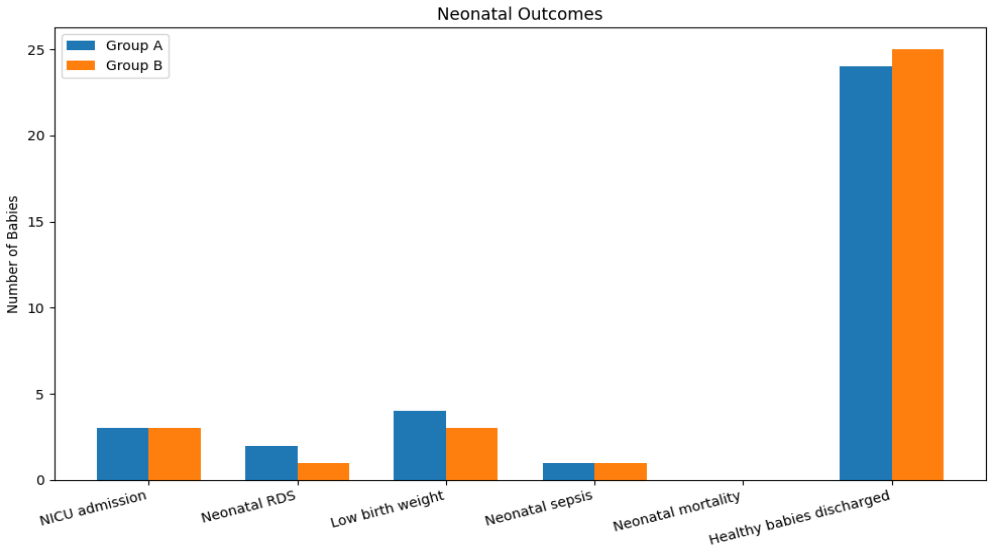

Figure 3: Neonatal outcomes

Interpretation: Neonatal outcomes were good in both groups. NICU admissions mainly resulted from prematurity and respiratory distress. No neonatal deaths were observed in either group, and most babies were discharged healthy. This indicates a positive overall fetal outcome after cervical cerclage.

Discussion

This comparative study looked at how effective history-indicated and ultrasound-indicated cervical cerclage is for preventing preterm birth in 50 high-risk pregnant women, with 25 patients in each group. Most women in both groups delivered at or after 37 weeks. This shows that cervical cerclage effectively extends pregnancy for those at risk of cervical insufficiency. The ultrasound-indicated cerclage group had slightly better outcomes. Fewer women delivered between 34 and 37 weeks, and there were no cases of pregnancy loss in the second trimester. The rate of delivery before 34 weeks was similar for both groups. These results suggest that regular ultrasound checks and timely cerclage placement based on cervical shortening can help lengthen pregnancy and lower negative outcomes.

Maternal complications were generally low and manageable in both groups. The most common issues were premature rupture of membranes and preterm labor pains that required hospital admission. A small number of patients experienced mild bleeding or spotting after the cerclage, but these cases were managed conservatively without serious health problems. Infectious complications, including chorioamnionitis, cervical infection or discharge, and fever after surgery, were rare and responded well to treatment and antibiotics. One patient in the history-indicated group had a minor cervical tear during labor after removing the cerclage. This issue was found early and treated successfully without significant bleeding or long-term effects. A cervical tear is a rare but known complication related to labor after cerclage.

Neonatal outcomes were good in both groups. Babies were mostly admitted to the NICU due to prematurity and respiratory distress syndrome.

A few low birth weight infants and isolated cases of neonatal sepsis were reported; however, all the babies received the right care and recovered well. Notably, there were no reports of neonatal deaths in either group. This highlights how cervical cerclage can improve fetal survival and neonatal outcomes in high-risk pregnancies.

In summary, both history-indicated and ultrasound-indicated cervical cerclage effectively reduced preterm birth and improved pregnancy outcomes. However, ultrasound-indicated cerclage showed slightly better overall results, including fewer maternal complications, fewer late preterm deliveries, and no second trimester pregnancy loss. This suggests that tailored ultrasound monitoring may provide added benefits for certain high-risk patients.

Limitations

- Small sample size
- Single-center study
- No long-term neonatal follow-up

Future Recommendations

- Larger multicentric studies
- Inclusion of biochemical markers
- Assessment of long-term neonatal outcomes

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