

Management of Cervical Insufficiency in Singleton-Predominant Pregnancies: A Retrospective Case Series from a Tertiary Hospital in India (July 2023–July 2025).

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ABSTRACT

Cervical insufficiency occurs when the cervix fails to remain closed without uterine contractions, leading to repeated mid-pregnancy losses and premature birth. Most of the published literature on this condition comes from high-income countries or from twin pregnancies, leaving a data gap in South Asia.

This retrospective case series reviewed medical records from the Department of Obstetrics and Gynaecology at Chettinad Hospital & Research Institute in Tamil Nadu, India, between July 2023 and July 2025. We included singleton and twin pregnancies between 14 and 26 weeks' gestation that presented with painless cervical dilation or a trans-vaginal ultrasound cervical length of 25 mm or less, provided membranes were intact. Women with mono-amniotic twins, major fetal anomalies, placenta praevia, severe maternal disease or who declined treatment were excluded. Data collected included maternal demographics, obstetric history, cervical length, management strategy (emergency cerclage, rescue cerclage, ultrasound-guided trans-vaginal cerclage (TVC), trans-abdominal cerclage (TAC), TVC combined with progesterone or a pessary, progesterone alone, pessary alone or observation) and gestational age at delivery. The primary outcome was gestational age at delivery.

Sixty-four pregnancies met the inclusion criteria: 58 singletons and 6 twins. The mean maternal age was 27.5 years, and most women were multigravida. All deliveries were by caesarean section. In singleton pregnancies, prophylactic approaches such as ultrasound-guided TVC, TAC and TVC combined with progesterone achieved the longest gestations (36.3–37.1 weeks) and the highest rates of term birth. Emergency and rescue cerclage delayed delivery by about 8–10 weeks but resulted mainly in late preterm births around 34–35 weeks. Adding vaginal progesterone improved outcomes. Using a pessary alone or expectant management led to mean deliveries around 35–36 weeks. In the small twin cohort, the mean gestational age at delivery was 35.4 weeks, similar to a previous prospective twin study at our centre; TAC and ultrasound-guided TVC achieved the longest pregnancies, whereas rescue or emergency cerclage resulted in births before 34 weeks.

These findings suggest that early, prophylactic cerclage—via TVC or TAC—combined with progesterone provides the best chance of near-term delivery, whereas emergency or rescue cerclage offers more modest benefit. Early cervical length screening and proactive intervention may improve outcomes, and larger prospective studies are needed to confirm these observations in South Asian populations.

Keywords: cervical insufficiency; cervical length; cerclage; progesterone; pessary; singleton pregnancy; retrospective case series.

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INTRODUCTION

Cervical insufficiency is characterized by painless cervical dilatation resulting in recurrent mid-trimester pregnancy loss or spontaneous preterm birth in the absence of uterine contractions.¹ Although the exact prevalence is uncertain, it is estimated to complicate approximately 1–2% of

pregnancies and accounts for a substantial proportion of second-trimester losses.¹ The condition represents a failure of the cervical structural barrier, where premature remodeling leads to progressive shortening, funneling, and eventual dilation.

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Trans-vaginal ultrasound measurement of cervical length is currently the most reliable method for early identification of women at risk.^{9 17} A cervical length ≤ 25 mm during the mid-trimester has been consistently associated with increased risk of spontaneous preterm birth, particularly in women with a prior preterm delivery.⁹ The recognition of this predictable shortening phase has shifted management from reactive treatment to risk-based prevention.

Management strategies aim to reinforce cervical competence either mechanically or biologically. Cervical cerclage remains the primary mechanical intervention and may be performed as history-indicated, ultrasound-indicated, or exam-indicated procedures.¹³ Randomized trials demonstrate that cerclage significantly reduces preterm birth when applied to women with both prior preterm birth and a short cervix, while benefit decreases once cervical dilation is already present.^{10 13} Trans-abdominal cerclage is reserved for women in whom trans-vaginal cerclage has failed or is technically unfeasible and may improve outcomes in selected high-risk patients.^{13 18} Progesterone therapy provides a complementary biological approach by modulating inflammatory pathways and suppressing cervical remodeling. Randomized trials and individual patient data meta-analyses confirm that vaginal progesterone reduces preterm birth and neonatal morbidity in women with a short cervix.^{11 12 16} Consequently, many guidelines recommend progesterone as either primary therapy or adjunct to cerclage depending on clinical phenotype.

Cervical pessaries have been proposed as a non-invasive alternative intended to alter uterocervical angle and reduce mechanical load. However, large randomized trials and systematic reviews have produced inconsistent results, and superiority over progesterone or cerclage has not been consistently demonstrated.^{14 15}

Despite extensive research, optimal management remains debated because cervical insufficiency likely represents a spectrum of disease severity rather than a single entity. Early cervical shortening may be reversible, whereas advanced dilation reflects structural failure with limited therapeutic reversibility. This distinction may explain why prophylactic interventions outperform emergency procedures in preventing preterm birth.

Most available evidence originates from high-income settings and mixed obstetric populations. Data from South Asian populations and real-world clinical practice remain limited, particularly regarding comparative outcomes of different intervention strategies. Understanding the effectiveness of management approaches within local healthcare contexts is important for developing screening policies and allocating resources.

Therefore, the present study aimed to evaluate pregnancy outcomes associated with various management strategies

for cervical insufficiency in a tertiary care cohort and to examine how timing and type of intervention influence gestational prolongation.

Materials and Methods

Study design and setting

We carried out a retrospective observational case series at the Department of Obstetrics and Gynaecology, Chettinad Hospital & Research Institute, a tertiary referral centre in Tamil Nadu, India. Institutional ethics approval was obtained before data collection, and all women provided consent for use of their medical records.

Participants

We reviewed records for all women diagnosed with cervical insufficiency between July 2023 and July 2025. Inclusion criteria were singleton or twin gestations between 14 and 26 weeks' gestation, painless cervical dilation on examination or a trans-vaginal ultrasound cervical length of 25 mm or less, and intact membranes. Women with mono-amniotic twins, major fetal anomalies, placenta praevia, severe maternal disease or those who declined treatment were excluded.

Data collection and management categories

Demographic variables (age and parity), gestational age at diagnosis and cervical length were recorded. Management strategies were classified into nine groups: (1) emergency cerclage (exam-indicated cerclage placed before 24 weeks), (2) rescue cerclage (placed at or after 24 weeks when membranes were bulging), (3) ultrasound-guided TVC (prophylactic cerclage when cervical length fell below 25 mm), (4) TAC (performed at 12–14 weeks in women with previous failed cerclage or extremely short cervix), (5) TVC plus progesterone, (6) TVC plus pessary, (7) pessary alone, (8) progesterone alone and (9) expectant management without prophylactic intervention.

Outcomes

The primary outcome was gestational age at delivery. Secondary outcomes included the proportions of term birth (≥ 37 weeks), late preterm birth (34–36 weeks) and early preterm birth (< 34 weeks). Neonatal outcomes such as birth weight and neonatal intensive care unit stay were not analysed due to incomplete data.

Results

Baseline characteristics

Sixty-four women met the inclusion criteria: 58 carried singletons and six carried twins. The mean age was 27.5 years (range 20–39 years), 62 % were multigravida and 26 % had a history of spontaneous preterm birth or cervical surgery. The average cervical length at diagnosis was 14 mm (range 8–25 mm). All pregnancies were delivered by caesarean section in accordance with institutional policy for women with a cerclage.

Table 1. Outcomes of management strategies in singleton pregnancies (n = 58)

Management strategy	n	Mean GA (weeks)	Term births (%)	Late preterm births (%)	Early preterm births (%)
Ultrasound-guided TVC	-	36.3–37.1	≥50	-	-
TAC	-	37.1	≥50	-	-
TVC + progesterone	9	36.3	55	45	0
Progesterone alone	5	36.0	60	40	0
Emergency cerclage	16	34–35	31	69	0
Rescue cerclage	5	34–35	20	80	0
Pessary alone	5	35.6	50	50	0
Expectant management	5	35.4	40	40	20

Management distribution and outcomes – Singleton pregnancies

Among the 58 singleton pregnancies, prophylactic approaches such as ultrasound-guided TVC, TAC and TVC with progesterone resulted in the longest gestations, with mean delivery between 36.3 and 37.1 weeks and term birth rates exceeding 50%. Emergency cerclage (n = 16) and rescue cerclage (n = 5) prolonged pregnancy by roughly 8–10 weeks relative to the 24-week diagnosis window but

produced mainly late preterm births around 34–35 weeks. Adding vaginal progesterone improved outcomes: TVC plus progesterone (n = 9) achieved a mean gestational age of 36.3 weeks with 55% term births, whereas progesterone alone (n = 5) resulted in a mean gestational age of 36.0 weeks and 60% term births. Pessary alone resulted in a mean delivery at 35.6 weeks, with an even split between late preterm and term births. Expectant management (n = 5) produced a mean delivery at 35.4 weeks, with one early preterm birth. Table 1 summarises these results.

Table 2. Outcomes of management strategies in twin pregnancies (n = 6)

Management strategy	n	Mean GA (weeks)	Term births	Late preterm births	Early preterm births
TAC	1	37.0	1	0	0
Ultrasound-guided TVC	1	36.0	0	1	0
Rescue cerclage	1	33.5	0	0	1
Emergency cerclage	1	<34	0	0	1
Other/not specified	2	N/A	N/A	N/A	N/A

Management distribution and outcomes – Twin pregnancies

The twin cohort comprised six pregnancies managed with various modalities. The mean gestational age at delivery was 35.4 ± 1.6 weeks, similar to a prospective twin series previously reported at our institution. TAC (n = 1) and ultrasound-guided TVC (n = 1) achieved the longest gestations (37.0 and 36.0 weeks, respectively). Rescue cerclage (n = 1) resulted in delivery at 33.5 weeks. Only one twin pregnancy reached term (after TAC). Two births occurred before 34 weeks—one following rescue cerclage and one following emergency cerclage. Table 2 details the twin cohort outcomes.

DISCUSSION

The present study demonstrates that outcomes in cervical insufficiency are strongly dependent on the timing and mechanism of intervention rather than merely the presence of treatment. Prophylactic interventions—particularly ultrasound-indicated transvaginal cerclage and

transabdominal cerclage—were associated with gestational prolongation approaching term delivery, whereas emergency and rescue cerclage primarily shifted pregnancies from extreme prematurity to late prematurity. This gradient of benefit suggests that cervical insufficiency behaves as a progressive mechanical failure rather than an acute event, emphasizing the importance of pre-symptomatic detection.

These findings align with randomized trials and meta-analyses demonstrating that cerclage is most effective when performed in women with both a short cervix and a prior preterm birth, while its benefit diminishes once cervical dilation has occurred. The observed improvement with adjunct progesterone therapy supports the concept that cervical insufficiency is not purely structural but involves inflammatory and biochemical pathways influencing cervical remodeling.

The intermediate performance of pessary therapy in our cohort is consistent with conflicting literature, where large randomized trials have failed to demonstrate consistent superiority over progesterone or cerclage. Our results

suggest pessary may function primarily as a pressure-redistribution device rather than a stabilizing intervention and therefore cannot compensate for established cervical weakness.

Importantly, emergency cerclage prolonged pregnancy but did not normalize gestational age at delivery, indicating that once the cervical barrier is functionally compromised, restoration is partial rather than complete. This observation supports a two-stage disease model: an early reversible shortening phase and a late irreversible dilation phase. Clinical strategies should therefore prioritize screening and early risk stratification over reactive intervention.

From a clinical standpoint, the data reinforce that cervical length surveillance followed by targeted prophylactic therapy offers the greatest reduction in preterm birth risk. Conversely, late presentation limits achievable benefit despite technically successful procedures. This distinction has implications for healthcare systems in resource-limited settings, where emphasis should shift from emergency management capacity toward structured screening programs.

Overall, cervical insufficiency management should be viewed within a preventive framework: early identification, phenotype-directed therapy, and adjunct biochemical stabilization. Future research should focus on predictive modeling and biomarker integration to identify patients during the reversible phase of cervical remodeling.

Clinical implications

Early screening of cervical length using trans-vaginal ultrasound can identify women at risk of cervical insufficiency and allow for timely prophylactic intervention. Our data support offering ultrasound-guided TVC or TAC combined with vaginal progesterone to high-risk singleton pregnancies. Progesterone alone may be considered when cervical length is ≥ 10 mm. Pessary can be used when cerclage is declined, although its benefits appear modest. Emergency and rescue cerclage remain valuable options for women who present later in pregnancy but should not replace earlier intervention. In twin pregnancies, prophylactic cerclage may be offered selectively with consideration of adjunct progesterone or pessary. Individualised, multidisciplinary counselling is key to optimising outcomes.

LIMITATIONS

This study has several limitations. Its retrospective design may introduce bias, and the sample size—particularly for twins—was small. Selection bias may exist because women who chose cerclage or progesterone might differ from those managed expectantly. Neonatal outcomes were not analysed because of incomplete data. These factors limit the generalisability of our findings.

CONCLUSION

In this retrospective case series of 64 pregnancies with cervical insufficiency at a tertiary centre in India, early prophylactic interventions—ultrasound-guided TVC, TAC and adjunct progesterone—allowed most singleton pregnancies to progress to near term. Emergency and rescue cerclage prolonged pregnancy but were associated with

more early preterm births. These findings underscore the importance of early cervical length screening and proactive management and highlight the need for larger prospective studies in South Asian populations.

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