Review

# Evaluation and Management of Short Cervix during Pregnancy

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## ABSTRACT

Cervical shortening and cervical insufficiency are significant risk factors for spontaneous preterm birth, a leading cause of neonatal morbidity and mortality. Cervical shortening is typically defined as a cervical length of less than 25 mm before 24 weeks of gestation, as measured by transvaginal ultrasound. This condition may reflect underlying structural or functional cervical weakness and is often asymptomatic. Cervical insufficiency, on the other hand, refers to the painless dilatation of the cervix in the absence of contractions or labor, leading to recurrent second-trimester pregnancy losses or early preterm births.

The etiology of cervical insufficiency is multifactorial, including congenital factors, trauma from previous surgical procedures, or biochemical changes in cervical tissue. Diagnosis is primarily clinical but can be supported by imaging and obstetric history. Management strategies include the use of progesterone supplementation, cervical cerclage, and pessary placement, depending on the patient's risk profile and obstetric history. Timely identification and intervention are critical for improving pregnancy outcomes.

Recent advances in imaging and biomarker research offer potential for earlier and more accurate prediction of cervical dysfunction. However, standardization of screening protocols and individualized management remain challenges in clinical practice. Further research is needed to better understand the pathophysiology and to develop effective, evidence-based preventive strategies.

**Anahtar Kelimeler:** Cerclage; Cervical insufficiency; Cervical shortening; Preterm delivery; Progesterone; Remove cerclage; Ultrasound

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## Introduction

In the 2022 guidelines, both the National Institute for Health and Care Excellence (NICE) and the Royal College of Obstetricians and Gynaecologists (RCOG) define the presence of regular uterine contractions causing cervical changes before the 37th week of gestation as preterm labor (1). In the 2016 guidelines of the American College of Obstetricians and Gynecologists (ACOG), preterm labor before 37 weeks of gestation is defined as the presence of regular uterine contractions accompanied by at least 2 cm of cervical dilation or cervical effacement and/or the presence of regular uterine contractions causing cervical changes (2). While the importance of evaluating the cervix via transvaginal ultrasound (TV-US) or using the fetal fibronectin test to assess the risk of preterm birth is emphasized, it is specifically noted that neither of these methods alone, nor their combined use, is sufficient to diagnose preterm birth. The most crucial factor in diagnosing preterm labor is the presence of cervical changes, particularly if there is a dilation of 2 cm or more, in conjunction with regular uterine contractions. In all guidelines, it is recommended that the diagnosis of the preterm birth should be based on the gestational age.

Risk factors for the prediction of preterm birth: The major

risk factors are obstetric history, multiple pregnancies, cervical and uterine factors, demographic characteristics, environmental factors, and infections. The obstetric history is one of the most important risk factors in predicting preterm birth. In pregnancies without a history of preterm birth, the risk of delivery before 32 weeks is 0.85%, while the risk of delivery before 37 weeks is 8.8% (3). In pregnancies with any history of preterm birth, the risk of preterm delivery is increased by 2.5 times (3). In women with a history of induced abortion in previous pregnancies, there is also a small but statistically significant increase in the risk of preterm birth (4). One of the most common risk factors is multiple pregnancies, which account for 2-3% of all births, but represent 23% of births before 32 weeks of gestation (5). In multiple pregnancies, the increased risk of preterm birth is attributed to many factors, such as higher uterine tension, elevated estrogen, progesterone, and sex steroid levels, and an increase in circulating relaxin hormone (6). There are some demographic factors for preterm birth; it is more common in Black populations compared to other populations. Additionally, lower socioeconomic status and living in areas with inadequate prenatal care are associated with an increased risk of preterm birth (3). Adolescent pregnancies and pregnancies in older women are also risk factors for preterm birth (7).

Cervical shortening is the most important predictor of preterm birth. Cervical length measurement is inversely correlated with the risk of preterm birth (8). The risk of preterm birth is 3.79 times higher (95% CI: 2.32-6.19) in women whose cervical length is below the 25th percentile (less than 30 mm) during the midtrimester (8). A history of cervical surgery (e.g., cone biopsy, LEEP) or dilation and curettage (D&C) also increases the risk of preterm birth (9). Müllerian anomalies such as the presence of a uterine septum (risk increased by 4.06 times), a bicornuate uterus (risk increased by 4.98 times), and a unicornuate uterus (risk increased by 3.74 times) have been shown to increase the risk of preterm birth (10). In these anomalies, the frequency of second-trimester spontaneous abortion is also increased 2.9 times. The presence of uterine fibroids increases the risk of both preterm labor and preterm birth by 1.5-1.9 times (95% CI 1.3-1.7 and CI 1.5-2.3) (11). Factors such as the number of fibroids, their size (particularly those >5 cm), and the location of the placenta affect this risk. Early and recurrent decidual bleeding, especially in the early weeks of gestation, increases the risk of preterm birth and preterm premature rupture of membranes by promoting the release of decidual thrombin, soluble fms-like tyrosine kinase, and monocyte chemoattractant proteins (12,13).

Numerous studies across various disciplines have demonstrated that infections and inflammation, mediated by prostaglandins, can lead to preterm birth. Studies examining asymptomatic bacteriuria and periodontal disease have established an epidemiological link to preterm birth, although no causal relationship has been conclusively proven (14,15). However, infections such as chlamydia, gonorrhea, and syphilis increase the risk of preterm birth up to 1.17 times (16). Lastly, smoking, malnutrition, obesity, high work stress, and maternal exposure to stress during pregnancy have been discussed in various epidemiological studies, with a slight increase in the risk of preterm birth. However, a definitive causal connection has not been established (17-19).

Importance of the cervical length and the measurement: The majority of preterm births are spontaneous, and cervical length screening can serve as a tool to identify high-risk patients who may benefit from preventive interventions. A short cervix, as measured by TV-US, is associated with an increased risk of preterm birth (8,20,21). The cervical length measurement is inversely related to the risk of spontaneous preterm birth; the shorter the cervical length, the higher the risk of preterm birth. The Society for Maternal-Fetal Medicine (SMFM) defines the threshold for "short" cervix as being between 20 and 30 mm, depending on the population and gestational age being evaluated (22). Cervical length (CL) ≤25 mm between 18 and 24 weeks of gestation is considered a short cervix (23-25). When the cervical length threshold is set at ≤20 mm, the specificity for predicting early delivery is 99.9% (95% CI 99.8-100.0), while this specificity decreases to 90.1% (95% CI 89.0-91.2) when the threshold is raised to 30 mm (50). Regardless of previous obstetric history, the presence of a short cervix has been consistently and reproducibly associated with an increased risk of spontaneous preterm birth at different gestational weeks (26).

The cervical length can be measured ultrasonographically through transvaginal, transabdominal, or transperineal routes (Figure 1,2). The transvaginal (TV) method is considered the gold standard by several obstetrics and gynecology organizations, including ACOG, the World Association of Perinatal Medicine (WAPM), and The International Society of Ultrasound in Obstetrics and Gynecology (ISUOG), as it is not affected by maternal obesity, the position of the cervix, or fetal parts' shadows, and it is reproducible across practitioners. TV-US is safe, and when applied with the correct technique, the inter-observer variation is between 5-10% (23,24). Furthermore, TV-US allows the detection of additional risk markers such as funneling, intra-amniotic debris, or chorioadesidual separation, which may be helpful in predicting preterm birth (23).

The necessary steps for accurate measurement are outlined by ISUOG and SMFM; first, after the bladder is emptied, the transvaginal probe is placed at the anterior fornix, and the cervix is positioned to be viewed in the long axis sagittally (22-24). To avoid excessive pressure on the cervix, the transducer should be gradually retracted to allow visualization of the entire endocervical canal, and the cervix should be magnified to cover 2/3 of the screen. The cervical canal appears as a hypoechoic line between the internal and external os. For ac-

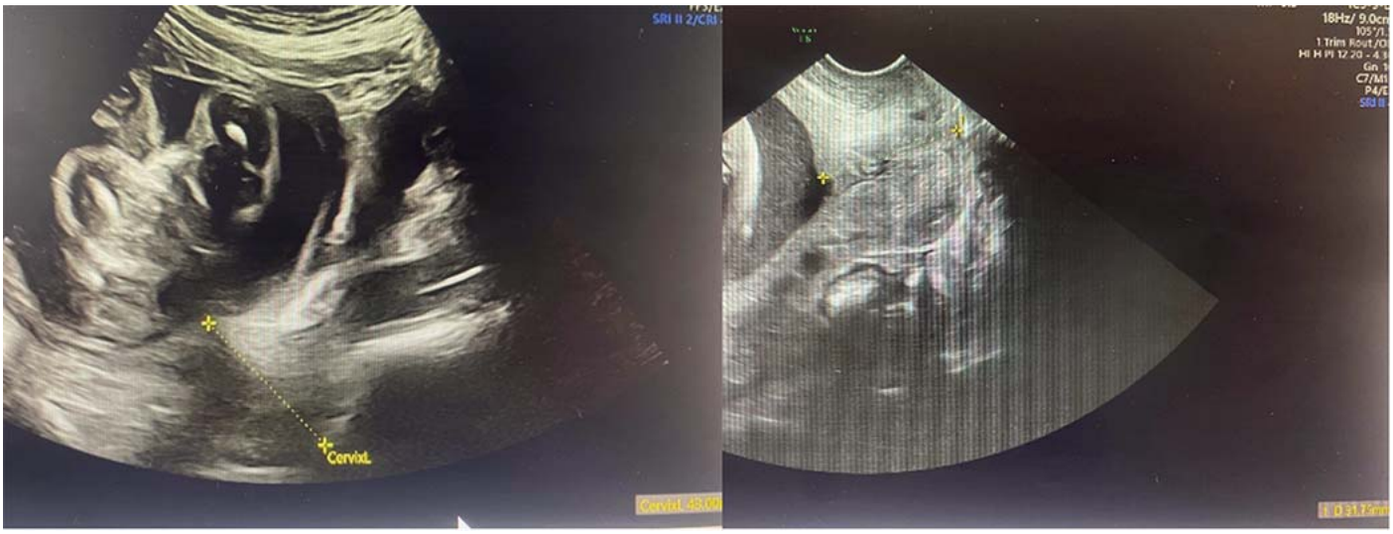


***Figure 1:*** *Pictures 1a and 1b depict the cervical length measurement by transabdominal and transvaginal ultrasound, respectively.*

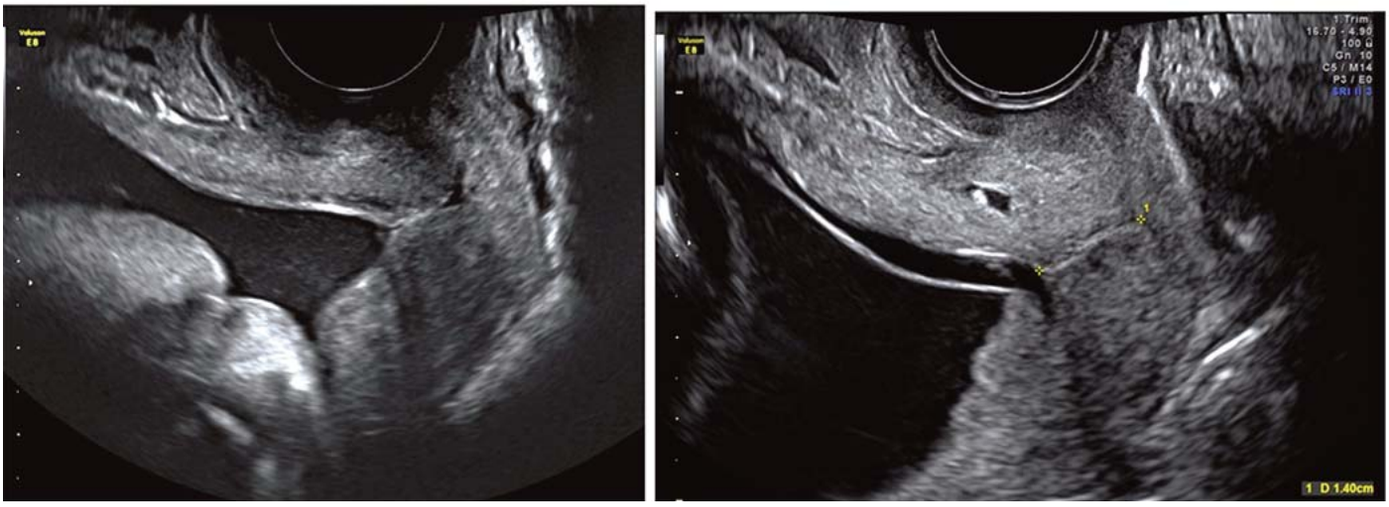


***Figure 2:*** *The 'V' shaped funneling of the short cervix by transvaginal ultrasound is shown in 2a. The amniotic sludge is depicted as a 'white asterisk' in 2b.*

curate measurement, it must be ensured that both of them are visible. Measurement is done by placing markers on the internal and external os. In cases where the cervix shows significant curvature, the cervical length can be measured in two parts, or the length can be manually drawn between two points instead of measuring the straight line. Since the cervix is a dynamic structure, ideally, three measurements should be taken within a 5-minute period, and the shortest accurate measurement should be recorded (22,24).

The advantages of the transabdominal (TA) approach include ease of application, shorter examination time, and less discomfort for the patient (22). However, technical limitations include the inability to fully visualize the internal and external os, bladder fullness artificially making the cervix appear longer, acoustic attenuation due to high body mass index, shadowing caused by fetal structures, and operator dependence (27). When comparing cervical length measurements between the TA and TV approaches, the measurements of both methods show compatibility with each other; therefore, the use of the transabdominal method may be considered in initial assessments (27,28). When the bladder is full, transabdominal measurement is possible in 97% of cases, but there is a likelihood of measuring approximately 6 mm longer than with transvaginal measurement (29). The sensitivity of TA-US in detecting a short cervix is lower than that of TV-US, and there are no guidelines supporting the routine use of TA-US in cervical length screening (22). If the transabdominal method is chosen for the initial assessment of the cervix, it is essential to confirm with TV-US in cases with high risk, suspicion, or when technical difculties are present, as well as in cases where the cervical length is measured below 36 mm by TA-US (27).

***Obstetric risk factors and management of the short cervix***

1. Asymptomatic short cervix without a history of preterm birth

a. Singleton gestations

In asymptomatic patients without a history of preterm birth, cervical length evaluation is sufficient as a single measurement between the 18th and 24th weeks; however, serial screening is not recommended (23). In singleton pregnancies without symptoms or a history of preterm birth, a cervical length of <25 mm before the 24th week is considered the threshold for predicting preterm birth (24). Guidelines from several national and international organizations, including ISUOG, SMFM, and FIGO (International Federation of Gynecology and Obstetrics), recommend cervical length measurement by transvaginal (if possible) or transabdominal ultrasound during the second-trimester anomaly screening, between the 18th and 24th weeks of gestation (22,24,30). Before 18 weeks, the lower segment is not sufficiently visible to identify the internal os, and the cervix tends to be measured as longer than it actually is (22,24). The 24th week of gestation generally serves as the upper limit in screening strategies, as it corresponds to the commonly accepted threshold for the application of preventive measures against preterm birth (22,24).

The mechanism of action of progestogens used to prevent preterm birth involves extending myometrial quiescence, inhibiting cervical maturation by suppressing cytokine production, and exerting anti-inflammatory effects on the chorioamniotic membranes (31). Several guidelines, including ISUOG, ACOG, FIGO, The Society of Obstetricians and Gynaecologists of Canada (SOGC), and NICE, recommend the use of vaginal natural progesterone (200 mg) when a short cervix is detected by TV-US before the 24th week of gestation in asymptomatic singleton gestations until the 36th week of pregnancy (1,24,32,33). This management has been shown to reduce preterm birth rates before the 28th and 36th weeks, consequently decreasing total neonatal morbidity and mortality (34,35).

Cervical cerclage is a surgical procedure performed to mechanically support the cervix by placing a suture as close as possible to the internal os (Figure 3). In singleton pregnancies without a history of preterm birth, when the cervical length is <25 mm, cervical cerclage has not been associated with a reduction in preterm birth risk before the 35th week (36). Therefore, FIGO and RCOG do not recommend cerclage in cases of a short cervix in asymptomatic singleton pregnancies without a history of preterm birth (36). However, in the same low-risk group, when the cervical length is found to be severely shortened (<10 mm), studies have shown that cerclage significantly reduces the risk of preterm birth before 35 weeks, neonatal mortality, and morbidity (36). As a result, ACOG does not recommend cerclage when the cervical length is between 10-25 mm in asymptomatic singleton pregnancies without a history of preterm birth, but suggests that cerclage may be considered if the cervical length is <10 mm due to potential benefits (23). Similarly, in patients who have cervical shortening despite progesterone treatment, cerclage has been shown to extend pregnancy duration and positively impact perinatal outcomes, positively (37,38).

Women with a history of cervical surgery, such as a loop electrosurgical excision procedure (LEEP) or cold conization,

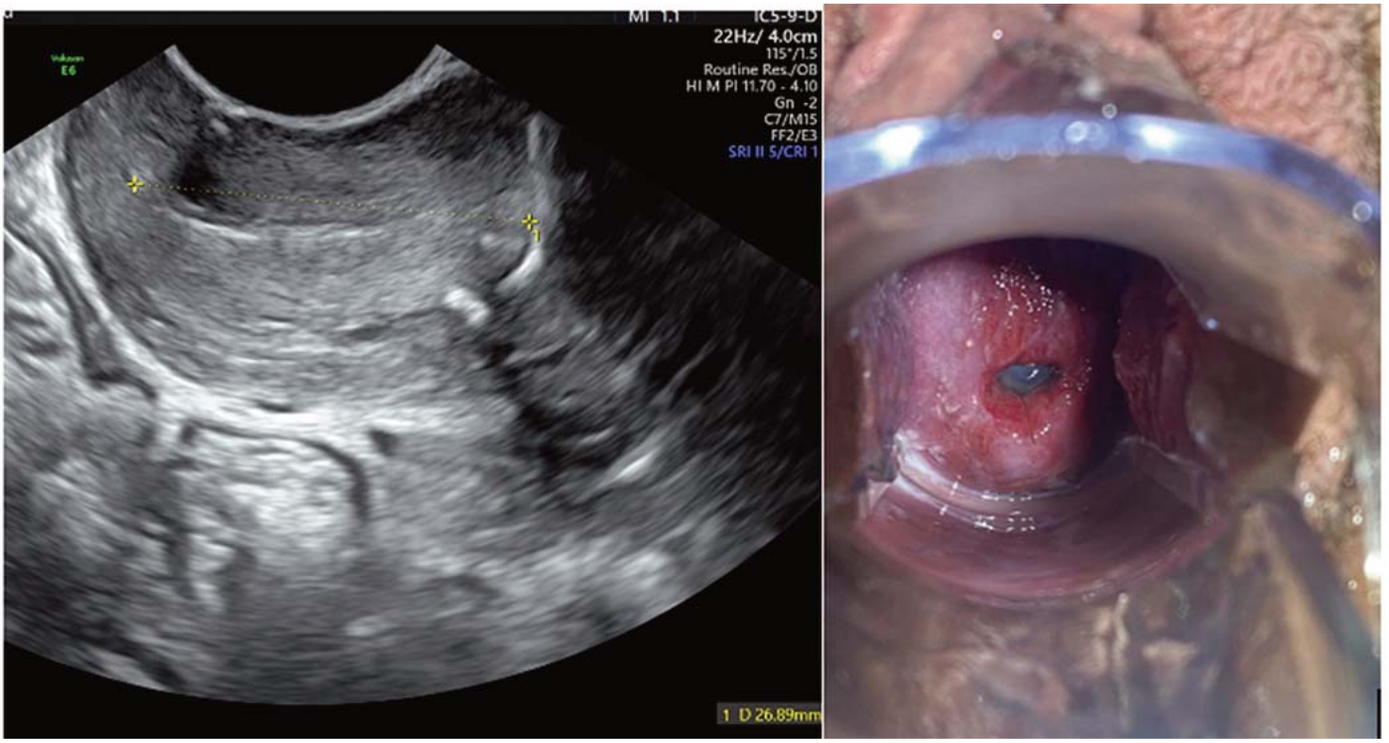


***Figure 3:*** *The measurement of the cervix after cervical cerclage procedure (Shirodkar technique) by transvaginal ultrasound is shown in 3a. The 3b shows the dilated external cervical os before the cervical cerclage procedure.*

may have a higher risk of preterm birth (33). Currently, ISUOG and the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) recommend a single cervical length measurement by TV-US in the second trimester, similar to patients without such a history (24,39). In terms of preventive strategies, they support the initiation of 200 mg vaginal micronized progesterone if a cervical length of <25 mm is detected.

The presence of a congenital uterine anomaly (such as a didelphic or septate/bicornuate uterus), fibroids, or any medical condition that disrupts the cervical connective tissue may increase the risk of preterm birth (24,33). As such, ISUOG recommends adopting the same prevention and prediction strategies used for patients with a history of LEEP/conization in this group as well (24).

b. Multiple gestations

In ACOG guidelines, it is stated that a single TV-US measurement of cervical length during fetal anatomy screening between the 18th and 24th weeks is an appropriate approach in asymptomatic multiple pregnancies (23). According to the NICE and RCOG 2019 guidelines, routine measurement of cervical length by TV-US in asymptomatic multiple pregnancies is not recommended (40,41). The rationale for this is the insufficient evidence in the current literature regarding the prediction and prevention of preterm birth in multiple pregnancies, and it has been stated that vaginal progesterone support does not reduce the risk of preterm birth, whether cervical shortening is present or not (40,41). The use of pessaries in asymptomatic multiple pregnancies is emphasized as not having a place in clinical practice. Additionally, it is acknowledged that data regarding the use of vaginal progesterone or cerclage is complex and should be indivualized (39).

2. Asymptomatic short cervix with a history of preterm birth

a. Singleton gestations

In patients who have had a history of preterm birth, the likelihood of recurrence in subsequent pregnancies is as high as 35% (1,23). All guidelines recommend cervical length measurement in pregnancies with a history of spontaneous preterm birth (1,23). Although there is no clear recommendation on the specific gestational week to begin cervical length measurement in this group, the general consensus is to start the measurement at 16 weeks of gestation (1,23). These serial measurements should be performed at 1-2 week intervals up to 24 weeks (1,23,42). Regardless of cervical length measurement, the use of vaginal progesterone is recommended for asymptomatic women with a history of preterm birth starting at 16 weeks of gestation (34,43). Two meta-analysis of randomized controlled trials found a 41% reduction in the risk of preterm birth in high-risk pregnancies (those with a history of preterm birth) in the group using progesterone compared to those not using it (RR, 0.59; 95% CI, 0.40-0.88) (34,43). It was determined that progesterone should be given to 14 women in the high-risk group to prevent one preterm birth (43).

If cervical length is ≤25 mm during measurements, cerclage or progesterone should be considered (1,23). In a meta-analysis of four large randomized controlled trials, it was found that cerclage performed due to short cervical length did not provide benefit to patients. However, subgroup analysis in women with a history of preterm birth and cervical length <25 mm showed that cerclage reduced deliveries before 35 weeks by 40% (RR, 0.61; 95% CI, 0.40–0.92) (44).

In the most comprehensive multicenter PROLONG trial comparing 17-hydroxyprogesterone caproate (17-OHP) and placebo in subsequent pregnancies of women with a history of preterm birth, no statistically significant difference was found in preventing birth before 35 weeks (11% vs. 11.5%) (45). In two randomized controlled trials comparing vaginal progesterone and 17-OHP, the group receiving vaginal progesterone had a lower rate of early preterm birth (17.5% vs. 25%, RR: 0.71; 95% CI, 0.53–0.95) (46-48). However, a lack of efficacy for 17-OHP treatment was found in the analysis of a variety of secondary outcomes in the PROLONG study and the MFMUN trial. The secondary outcomes findings of the studies did not verify the clinical benefit of 17-OHP on neonatal outcomes, and the evidence did not demonstrate that it is effective for its approved indication, which was preterm birth prevention (45,48). Hence, in 2023, the U.S. Food and Drug Administration (FDA) withdrew approval for all forms of 17-OHP for the prevention of preterm birth, and associations have since endorsed the use of vaginal progesterone (49).

No randomized studies have directly compared cerclage and vaginal progesterone. However, in a meta-analysis comparing five studies of vaginal progesterone versus placebo and five studies of cerclage versus placebo, it was found that both methods had similar efficacy in women with a history of preterm birth and a short cervix. The relative risk (RR) for progesterone was 0.68 (95% CI, 0.50–0.93), and for cerclage, it was 0.50–0.93 (50). In conclusion, for patients with a history of preterm birth and short cervical length, if they are not on progesterone prophylaxis, vaginal progesterone (200 mg nightly) should be started, and it should be continued until 34-36 weeks of gestation (1,23). If cervical length continues to shorten (<15 mm) on progesterone therapy, cerclage should be discussed with the patient (1,23).

b. Multiple gestations

Approximately 10% of twin pregnancies have a history of preterm birth in a previous pregnancy (50). Goldenberg et al. found that the risk of recurrent preterm birth before the 37th week in twin pregnancies with a history of preterm birth is 1.6 times higher (51). The week of preterm birth in the previous pregnancy determines the risk of preterm birth in the subsequent twin pregnancy. The earlier the birth in the previous pregnancy, the higher the risk in the next pregnancy (52).

The most important risk factor for preterm birth in twin pregnancies is the short cervix (<25 mm) before the 24th week of gestation (53). Both ISUOG and SOGC recommend prophylactic vaginal progesterone for multiple gestations with a cervical length ≤25 mm. However, FIGO states that the efficacy of progesterone in preventing preterm birth in multiple pregnancies with a history of preterm birth is unknown (32,51,54).

The benefit of prophylactic cerclage in twin pregnancies with a history of preterm birth has not been demonstrated. CNGOF, SOGC, FIGO, and RCOG do not recommend cerclage for multiple pregnancies with a history of preterm birth (55-57,60). ACOG reports that cerclage in twin pregnancies, particularly when cervical length is <25 mm, is associated with an increased risk of preterm birth (58). However, in a review, it is concluded that cerclage is ineffective in twin pregnancies with a cervical length between 15-25 mm or when the cervix is normal (59). Cerclage is recommended if the cervix is dilated >1 cm in twin pregnancies (53,60,61).

In summary, for twin pregnancies with a history of preterm birth, cervical length measurement should start at 16 weeks, and if cervical length is <25 mm, the options of vaginal progesterone or cerclage may be considered, especially if the cervix is dilated >1 cm. The role of pessary remains unclear, but there is some evidence supporting its potential benefit in reducing preterm birth in certain cases (62).

***Cerclage indications***

1. History indicated cerclage

Cervical cerclage is an intervention typically performed between the 11th and 14th weeks of gestation in a history of second-trimester fetal loss or short cervix (57). A history-based cerclage is especially recommended for asymptomatic women with a history second second-trimester fetal loss.

RCOG, FIGO, CNGOF, SOGC: These organizations recommend history-based cerclage for asymptomatic women who have had three or more mid-trimester losses or preterm births (RCOG evidence 1+, strength B-CNGOF Grade A) (55-57,60).

ACOG: In contrast to the other guidelines, ACOG recommends that cerclage for patients who have a history of one or more unexplained second-trimester losses, painless cervical dilation before 24 weeks, or cerclage placed previously in the absence of labor or placental abruption (58).

FIGO's Recommendations: Individualized treatment should be considered for women with a history of cervical surgery or Müllerian anomalies. Cerclage may be considered if the cervical length is <25 mm (56). If history-based cerclage fails and the patient delivers before 28 weeks, abdominal cerclage is recommended for subsequent pregnancies (56).

NICE Guidelines: NICE recommends prophylactic cerclage between the 16+0 and 24+0 weeks of pregnancy if cervical length is ≤25 mm, particularly in women with a history of cervical trauma, surgery, cone biopsy, or wide excision of the transformation zone, as well as a history of preterm premature rupture of membranes in a previous pregnancy (1).

2. Ultrasound indicated cerclage

Based on the data, ISUOG recommends cerclage, rather than progesterone, for patients with a cervical length of <10 mm and no history of preterm birth (24,36). Routine cervical length monitoring after cerclage is not recommended (22). In preoperative evaluation, clinicians should first assess fetal conditions, complete aneuploidy screening if not already done, and exclude any gross fetal sonomorphological anomalies. For maternal evaluation, routine cervical cultures are not recommended; however, if the pregnant woman exhibits symptoms of infection, screening for Chlamydia and N. gonorrhoeae should be performed, and treatment should be administered if the tests are positive. Due to the lack of sufficient randomized controlled studies on ultrasound-indicated cerclage, amniocentesis is not recommended prior to the procedure to rule out intra-amniotic infection (63). If there is a suspicion of rupture of membranes or the presence of uterine contractions, or placental abruption, the patient should be observed for 24 hours before the preoperative evaluation to exclude these conditions.

3. Physical examination indicated cerclage

In cases where cervical dilation is detected upon physical examination, cerclage extends pregnancy by an average of 34 days (64). In patients with detected painless cervical dilation in the early second trimester, it is necessary to exclude the presence of contractions and chorioamnionitis. In cases where cervical dilation exceeds 2 cm, the incidence of intra-amniotic subclinical infection ranges from 13% to 28%. Therefore, amniocentesis can be planned to exclude infection, helping to identify the group of patients who will benefit from cerclage (57,65,66). After excluding intra-amniotic infection markers (e.g., glucose, leukocyte count, lactate dehydrogenase, interleukin-6) from the amniotic fluid, cerclage can be safely performed. While the SOGC recommends taking vaginal cultures, the RCOG does not (57,60). Similarly, routine urine cultures are not recommended by these associations. The procedure should not be performed if clinical signs of intraamniotic infection are present. Similar to cerclage performed due to ultrasound indications, in cases where cerclage is indicated by physical examination, the patient should be monitored preoperatively for 24 hours to exclude conditions such as rupture of membranes, uterine contractions, placental abruption, and clinical infection. Neither ACOG nor FIGO provides any supporting recommendations regarding routine antibiotic therapy or the use of indomethacin (56,58). However, the SOGC and RCOG recommend indomethacin use due to studies indicating that it prolongs pregnancy (57,60). Although, cerclage is commonly performed before 24 weeks, the RCOG has stated that

cerclage can be considered up to the 27th week on a case-by-case basis (57).

Surgical Procedures: In cases where cerclage is indicated by physical examination, the presence of prolapsed amniotic membranes increases the risk of iatrogenic PPROM (Preterm Premature Rupture of Membranes). In the presence of membranes, the goal is to push them back into the cavity and place the suture as close to the internal os as possible. There is no randomized controlled study regarding which method is ideal. However, it is the consensus of all societies that transvaginal cerclage should be preferred, and abdominal cerclage should be reserved for patients with a history of failed cerclage (56-58,60). The only randomized controlled trial comparing Shirodkar and McDonald cerclage techniques found no differences in preterm birth rates or perinatal outcomes (67) (Figure 3). The choice of surgical technique and suture material should be made based on the method that the surgeon feels most comfortable with. The consensus of all societies is that cerclage should be removed at 36–37 weeks of gestation, or earlier in the presence of clinical chorioamnionitis, ongoing vaginal bleeding, or PPROM (56-58,60).

Management of additional ultrasonographic findings: Funneling and sludge: Amniotic fluid sludge refers to the aggregates of hyperecogenic particulate matter appearing in the proximity of the internal cervical os by ultrasound (TV-US) (Figure 2). It has been shown that the presence of this debris is associated with an increased risk of preterm birth (68,69). The composition of debris includes blood elements, meconium, vernix, and cellular material related to infection/inflammation, and it varies with gestational age (70). In studies, the presence of debris has been detected in 5-20% of pregnant women who need cervical measurement (69,71). In cases where debris is present, the frequency of membrane rupture, chorioamnionitis, and postpartum endometritis also increases (72). The presence of debris also affects the prognosis following cerclage; the debris is more frequently observed in those giving birth before 32 weeks (73). Numerous studies have investigated the role of antibiotic therapy in the presence of debris when cervical measurements are performed, but no positive effect has been demonstrated (74-76). Therefore, the antibiotic therapy should be individualized regarding the clinical circumstances.

Funneling refers to the process in which the internal cervical os changes, leading to cervical dilation and the membranes extending towards the os. As the cervical canal effaces, the axis of the lower uterine segment and cervical canal changes, and depending on its shape, funneling is observed in "U", "T", "Y", or "V" configurations. Studies investigating the relationship between the shape and presence of funneling have shown that in patients with funneling, preterm birth occurs earlier compared to those without funneling (77,78). However, the shape or size of the funneling does not contribute to predicting preterm birth (79,80). In patients with funneling, the appropriate treatment should be determined based on the remaining cervical length.

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