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## REVIEW ARTICLE

## A review of the contemporary evidence on rescue cervical cerclage

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## ABSTRACT

**Background:** Rescue cervical cerclage (RCC) is essentially a salvage procedure to prolong pregnancy in women with advanced cervical changes and prolapsed membranes in the second trimester. However, its effectiveness and safety remain controversial. **Objectives:** To provide a comprehensive review of the contemporary evidence on RCC and evaluate which treatment modalities can be offered to pregnant women based on the best available evidence. **Search strategy:** A PubMed search of published studies on RCC and perinatal outcome was conducted using defined keywords. **Selection criteria:** Clinical studies were included with priority for level I evidence (randomized controlled trials [RCTs]) followed by other evidence levels. **Data collection and analysis:** Abstracts of 141 articles were screened and 40 articles were selected. **Main results:** Evidence from retrospective and nonrandomized prospective trials shows a benefit of RCC. It may prolong pregnancy by an average of 4–5 weeks, with a 2-fold reduction in the chance of preterm birth before 34 weeks. A higher chance of failure is expected if cervical dilatation exceeds 4 cm or if membranes are bulging into the vagina. **Conclusions:** The decision for an RCC should be individualized after comprehensive counseling by a senior obstetrician. Further research in the form of robust RCTs is recommended.

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## 1. Introduction

Cervical cerclage is a well-known surgical procedure, commonly used during pregnancy for the management of women considered to be at high risk of second-trimester abortion and spontaneous preterm birth (PTB). The procedure can be categorized as elective (history-indicated) cerclage, urgent (ultrasound-indicated) cerclage, or emergency or emergent (rescue) cerclage [1]. Elective or history-indicated cerclage is inserted as a prophylactic measure in asymptomatic high-risk women, usually at 12–14 weeks of pregnancy. By contrast, an urgent or ultrasound-indicated cerclage is inserted as a therapeutic measure in women with a short cervix and particularly in the presence of funneling of the membranes into the endocervical canal as discovered by transvaginal ultrasound, usually in asymptomatic women before 24 weeks of pregnancy [1,2].

Emergency or rescue cervical cerclage (RCC) is essentially a salvage procedure to prolong gestation in women with advanced cervical changes and prolapsed membranes in the second trimester identified by transvaginal ultrasound, speculum, or manual examination carried

out in the presence of symptoms such as vaginal bleeding, discharge, or pelvic pressure sensation [1,2]. Importantly, the effectiveness and safety of this procedure remain controversial. The present review was conducted to examine the contemporary evidence on RCC and to evaluate which treatment modalities can be offered to pregnant women based on the best available evidence.

## 2. Materials and methods

A PubMed search was performed with the following search terms: “emergency cervical cerclage” OR “emergent cervical cerclage” OR “rescue cerclage” and “perinatal outcome.” The search included articles published between January 1, 1974, and January 14, 2013, and was not restricted by language or other search limits.

In total, 141 articles were retrieved (Fig. 1). The abstracts were screened to identify articles on clinical trials in which RCC was performed for women with cervical dilatation and bulging membranes and fetal outcome was assessed. A study with multiple treatment groups was included if it had an RCC treatment arm; however, only information from that treatment arm was used. Each retrieved manuscript was carefully evaluated, and any relevant references cited in these reports were also obtained and reviewed. Different aspects of RCC including preoperative, operative, and postoperative considerations as well as predictors of success were reviewed separately.

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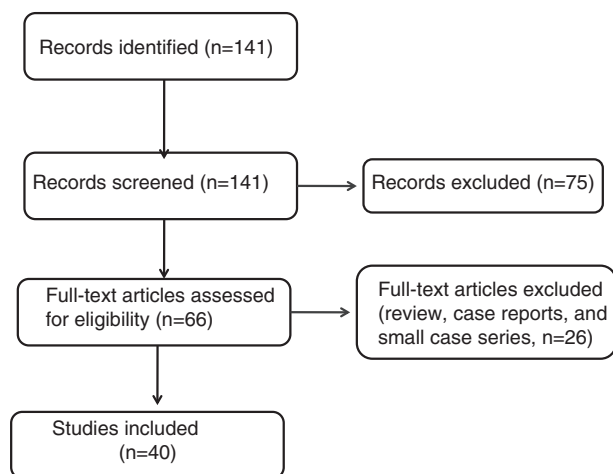


Fig. 1. Flow chart of study selection process.

The original clinical studies were selected for inclusion after a quality assessment based on the hierarchy of evidence. Level I evidence (systematic reviews, meta-analyses, and randomized controlled trials [RCTs]) was included where available. In the absence of RCTs investigating a particular aspect of RCC, analytic data from prospective or retrospective studies were reviewed. Finally, observational data, nonsystematic reviews, and committee opinions were evaluated in the absence of either experimental or analytic data. Case reports were not considered to provide sufficiently robust evidence and were excluded. The final selection included 40 studies (Fig. 1). Articles of clinical importance that were published after 14 January 2013 were also added.

### 3. Results

#### 3.1. Preoperative issues

##### 3.1.1. What information should be given at counseling for RCC insertion?

Rescue cervical cerclage performed in women with advanced cervical dilatation with bulging membranes in the second trimester has been referred to as a heroic procedure because of its poor success rate [1,3]. Therefore, all women undergoing this procedure should be informed that there is a lack of RCTs that can sufficiently demonstrate advantages of RCC over a “wait and see” management approach. On the other hand, expectant management can result in a median delay of birth of 2–4 weeks, and if prolapsed membranes are found at 22–23 weeks of pregnancy, a viable neonate may result [4–6].

In view of this uncertainty, a senior obstetrician should be involved in the decision-making process and the selected management approach should aim to prolong the pregnancy as much as possible while at the same time minimizing the risks for mother and neonate, for example chorioamnionitis [7]. Importantly, all contraindications to RCC should be excluded, namely signs of established PTB, evidence of chorioamnionitis, heavy vaginal bleeding, preterm premature rupture of membranes (PPROM), evidence of fetal compromise, major fetal anomalies, and fetal death [2,3].

##### 3.1.2. Which investigations are required before RCC insertion?

It is good practice to check that a recent anomaly scan has been performed [2]. Measurement of the maternal white blood cell count and C-reactive protein (CRP) level on a routine basis to diagnose subclinical chorioamnionitis before performing an RCC is not recommended [2]. Several authors [8,9] have reported an association between histologic evidence of chorioamnionitis in women with PTB or PPRM and a raised maternal CRP level. However, the poor sensitivity and specificity of CRP levels hinders the clinical usefulness of this

parameter [8,9]. Therefore, these tests should be carried out according to the overall clinical picture [2].

Owing to a lack of evidence from RCTs, routine amniocentesis to rule out infection is not recommended before inserting an RCC. However, a retrospective study [10] showed that amniocentesis before an RCC may be useful because inflammation markers in the amniotic fluid help to predict adverse pregnancy outcomes. Multivariate regression analysis [11] demonstrated that the performance of amniocentesis prior to cerclage was not an independent contributor to PTB before 28 weeks of pregnancy.

Notably, many retrospective and uncontrolled studies [12,13] have demonstrated a prolongation of pregnancy with amnioreduction performed before RCC. However, these studies may be affected by many biases, in particular selection bias, making it difficult to confirm or refute the value of amnioreduction. Additionally, there are no studies supporting the benefit of routine screening for genital tract infection before RCC insertion [2].

#### 3.2. Operative issues

##### 3.2.1. Timing: When to insert an RCC?

An observation period of 12–24 hours before RCC insertion has been reported [14] to ensure that PTB, abruption, and infection are excluded. However, this has the potential to increase the risk of an ascending infection by exposure of the fetal membranes to vaginal bacteria [15,16].

In a French retrospective study [17] that evaluated the outcome of RCC among 32 patients, the observation period before RCC comprised less than 48 hours in 16 patients and more than 48 hours in the remaining 16 patients. Among the 32 women, the perinatal outcome was significantly improved if there was absence of bleeding, an unripe cervix, cervical dilatation of less than 2 cm, absence of protruding membranes, and a more advanced pregnancy duration at the time of the procedure. Delivery occurred at a mean of 33.1 weeks of pregnancy, with an 80% postnatal infant survival rate. Notably, the authors found that an observation period of 48 hours before the procedure did not significantly improve perinatal outcomes ( $P = 0.1$  for the gestational age at birth and  $P = 0.3$  for the infant survival rate) among women without uterine contraction and without maternal blood inflammation (no leukocytosis, no CRP increase) at admission. However, selection bias is a major concern with this study owing to its retrospective nature.

Accordingly, before advocating more immediate RCC insertion in clinical practice, the results of the French group [17] need to be replicated in a different setting to confirm their external validity. Ideally, an RCT should be performed. Therefore, we need to be honest with our patients and advise that we do not know the best timing for RCC insertion.

##### 3.2.2. Technique

If the decision is made to attempt an RCC placement, the prolapsed membranes must be replaced in the uterine cavity before the procedure to avoid the high risk of iatrogenic PPRM. This is accomplished least traumatically by placing the patient in the lithotomy position with a steep Trendelenburg tilt, combined with the administration of tocolytics, and allowing gravity to retract the membranes. Bladder overfilling through a urinary catheter can also help to reposition the membranes in the uterus. However, a full bladder tends to reduce exposure of the operative field and push the cervix higher up into the pelvis [18]. Another option is to place a ring forceps or stay sutures of 00 silk or polyglycolic acid around the circumference of the external os, followed by gently pulling and shaking the cervix or traction on all stay sutures gathered in a parachute fashion to help ease the membranes back into the uterus [19,20].

Invasive methods for reducing the fetal membranes include directly pushing them back with a smooth-surfaced device, such as a Foley catheter balloon (a 25-mL inflated bulb of a size-22 Foley catheter can be used to hold the membranes in the uterus while the cerclage is placed; it is deflated and removed just before the knot is secured) [21], an

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