

Original Article

Success of rescue cervical cerclage at a single institution

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Abstract: Objective: To report the outcomes of rescue cervical cerclages performed at a single institution. Methods: A retrospective study was carried out at a single institution between 2006 and 2011. All patients presenting for cerclage placement were identified. From these patients, those undergoing rescue cerclage were studied. Results: 236 patients met inclusion criteria for cerclage placement. Of these patients, 38 singleton and 5 twin pregnancies underwent a rescue cervical cerclage. In singleton and multiple pregnancies, respectively, there was a significant risk of delivery before 24 weeks (26.3% and 40.0%), 28 weeks (36.8% and 80.0%), 32 weeks (52.6% and 80.0%) and 37 weeks (63.2% and 100.0%). Conclusion: A large percentage of pregnancies treated with a rescue cerclage will reach a gestational age of 24 weeks. However, these pregnancies remain at a high risk of preterm delivery.

Keywords: Cervical cerclage, preterm birth, preterm delivery, preterm labor, rescue cerclage

Introduction

Cervical cerclage became popular in the 20th century when several case series and papers detailing surgical technique for cerclage placement appeared in the literature [1]. Indications for the procedure and surgical technique vary by physician and institution. We present a retrospective study of women treated with rescue cervical cerclages at a single center. Our objective was to determine the effectiveness of this procedure at our institution.

Materials and methods

This was a retrospective study approved by the Palmetto Health Richland Institutional Review Board (Identification information: PH IRB #20-12-042; Project Number 00016960). The charts of 328 patients presenting for cerclage between 01/01/2006 and 12/31/2011 were identified in the USC/Palmetto Health Richland electronic medical database. A single reviewer (MH) analyzed each record utilizing electronic data created by physicians and nurses. 92 (28%) charts were excluded (**Table 1**). 236 patients (72%) met study criteria. Essential study data included details of cerclage placement and outcome data for the pregnancy.

Data was divided into the following groups: prophylactic (placed because of obstetric history or risk factors), indicated (for a short cervix) and rescue cerclage (placed in the setting of an open cervix) cohorts as described in the operative reports. Rescue cerclages were then assessed separately for outcomes. Rescue cerclages were defined as those placed in a cervix that was open to admit at least a fingertip, or where the membranes could be visualized by the surgeon (either superior to or prolapsing beyond the external cervical os), or where the membranes required elevation for placement of the cerclage.

Outcomes for patients were ascertained from the medical record. Gestational age at cerclage placement and removal was recorded as were details of pregnancy complications and delivery information for each pregnancy.

Rescue cerclages performed in singleton gestations and multiple gestations were analyzed separately. Numbers of patients as well as the corresponding percentage of the patients were calculated.

Results

Of the 328 pregnancies, 92 were excluded (**Table 1**).

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Table 1. Excluded Patients

Reason for exclusion	Number of patients
No delivery information available	42
Diagnosis code not matching procedure/Empty electronic medical record	19
No operative report available	16
Cerclage cancelled by operative team*	7
Cerclage performed outside study period	2
Patient decided to cancel cerclage and have induction of labor	2
Patient had cerclage at another institution	2
Patient declined cerclage after initially consenting	1
Dating of pregnancy not available in electronic medical record	1
Total	92

*Cerclages were cancelled by the physician for suspected infection or inability to perform the cerclage.

exclusions 38 singleton and 5 multiple gestations treated with a rescue cerclage were available for analysis. One of the rescue cerclages placed at 20 weeks was revised at 23 weeks. This patient was left in the analysis as her initial presentation had been for a rescue cerclage.

Rescue cerclages in singleton pregnancies

Seven of the 38 (18.4%) women with singleton pregnancies were nulliparas. 15 (39.5%) patients had a history of a prior term birth and 12 (31.6%) had a history of a prior pre-term delivery.

Membranes were reported as visualized either above or below the external os, or manipulated to place the cerclage, in 21 (55.3%) patients. One patient was described as 4-5 cm dilated in the operative report, giving a total of 22

(57.9%) patients who had progression of their pathology to some descent of the membranes.

Rescue cerclages were placed between 16 and 23 weeks and removed between 16 and 38 weeks in singleton gestations. One patient had a rescue cerclage placed at 20 weeks of gestation which was revised at 23 weeks of gestation.

Delivery occurred between 17 and 40 weeks of gestation in the singleton pregnancies. The patient who was treated with a rescue cerclage,

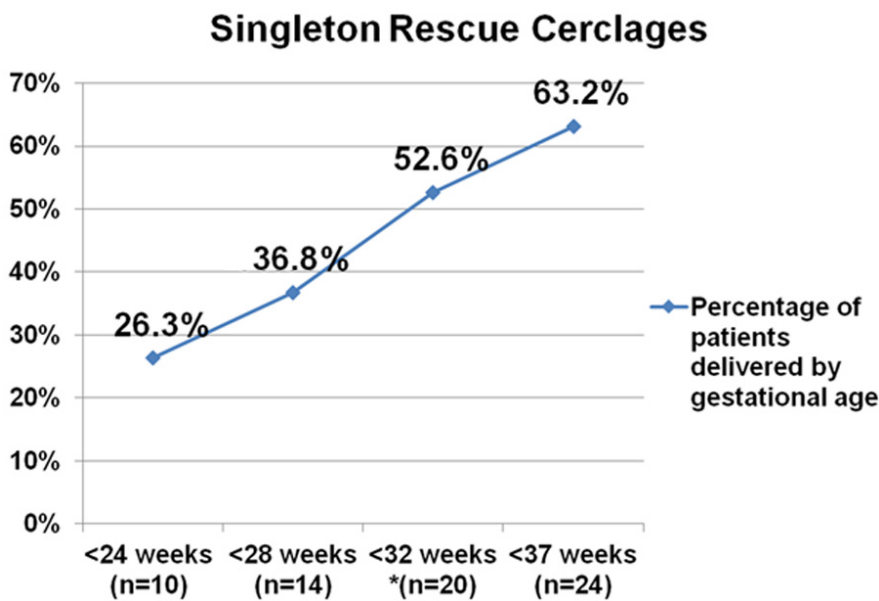


Figure 1. Illustration of patients with singleton pregnancies treated with Rescue Cerclage. The Y axis illustrates the percentage of patients delivered by the gestational age denoted on the X axis. *There was one intrauterine demise at 29 weeks of gestation.

Of the remaining 236 pregnancies, 41 singleton pregnancies and 5 multiple gestations received a rescue cerclage. One rescue cerclage was placed after a 'failed' prophylactic cerclage. This patient was excluded as her initial presentation had been for a prophylactic cerclage. Additionally, two cerclages were placed for 'open cervix' in the first trimester. These two patients were excluded as they did not fit the typical clinical picture of cervical insufficiency (a patient presenting with painless dilatation in the second trimester). After these

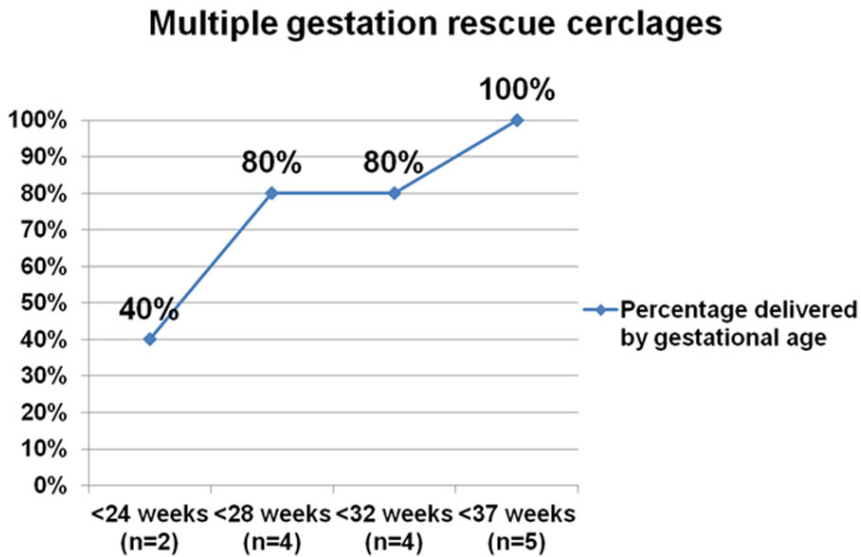


Figure 2. Illustration of patients with multiple pregnancies treated with rescue cerclage. The Y axis illustrates the percentage of patients delivered by the gestational age denoted on the X axis.

followed by a cerclage revision at 23 weeks delivered at 27 weeks of gestation. Delivery rates are illustrated as delivered by a gestational age of 24, 28, 32, and 37 weeks (**Figure 1**). There were two reported in-utero deaths. One occurred at 17 weeks of gestation, and the other at 29 weeks of gestation.

Tocolysis within the perioperative timeframe was utilized in 18 (47.4%) patients. Tocolytic agents used were magnesium sulfate, terbutaline, ketorolac, indomethacin, aspirin, sulindac, ibuprofen, nifedipine or a combination of the listed medications. Antibiotics were used in 28 (73.7%) of the patients in the perioperative setting. Sixteen (42.1%) patients received progesterone supplementation (injected or vaginal) during their pregnancies.

Thirty-six of the 38 (94.7%) rescue cerclages performed in singleton gestations were McDonald procedures. The remaining 2 (5.3%) were Shirodkar procedures. Types of suture material utilized varied by surgeon. The primary types of suture used were Ethibond (17 patients, 44.7%), Prolene (10 patients, 26.3%), Mersilene, often with a threaded ethibond or a silk tag (9 patients, 23.7%) and not listed (2 patients, 5.3%).

No surgical complications were reported for the singleton pregnancies treated with rescue cerclage. Chorioamnionitis was diagnosed in 8

(21.1%) women, 4 of whom delivered before 24 weeks of gestation. Of those diagnosed with chorioamnionitis, 3 delivered within one week of cerclage placement. The remaining 5 patients delivered between 3 and 14 weeks after cerclage placement. Preterm premature rupture of membranes, preterm labor or both of these diagnoses occurred in 20 (52.6%) of the women with singleton pregnancies treated with a rescue cerclage.

Rescue cerclages in multiple pregnancies

There were 5 rescue cerclages performed in multiple gestations. All were twin pregnancies. Four of these pregnancies had two viable fetuses at the time of cerclage placement. One of the twin pregnancies was treated with a cerclage after delivery of the first twin. Cerclages were placed between 16 and 23 weeks of gestation and removed between 19 and 35 weeks of gestation. Delivery occurred between 19 and 36 weeks in these gestations. Delivery rates are illustrated as delivered by a gestational age of 24, 28, 32, and 37 weeks (**Figure 2**). In the pregnancy where the cerclage was placed after delivery of the first twin at 22 weeks, 9 days were allowed to elapse. The cerclage was placed at 23 weeks and the remaining fetus was delivered at 25 weeks of gestation.

All multiple gestations were treated with McDonald cerclages. Ethibond was used in three of these cerclages, Prolene and Ethibond in one and the suture type was not listed in one patient. Tocolysis and antibiotics were used in the perioperative period in all twin gestations. Injected progesterone was used in one of the multiple pregnancies.

Discussion

Clinicians in the United States have clear guidelines for optimal management of the asymp-

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tomatic pregnant patient with either a history of cervical insufficiency or a shortened cervix [2, 3]. Guidelines are also available for these findings in multiple pregnancies [4]. However, appropriate management for the patient with an open cervix or visible membranes remains controversial. We present a retrospective series of patients who presented with these clinical scenarios.

Patients treated with rescue cerclage were not likely to reach a term gestation; however the majority (73.7% of singletons and 60% of multiple gestations) did have a continuation of pregnancy until viability (defined as 24 weeks of gestation) was reached. Though most patients delivered an infant with potential for survival, 10% of singleton pregnancies and 40% of multiple pregnancies treated with rescue cerclage in this cohort delivered between 24 and 28 weeks of gestation, underscoring that premature delivery represents an ongoing problem for patients treated with a rescue cerclage.

We were interested in the safety of the procedures performed. No cases of traumatic membrane rupture during the cerclage procedures were reported. However, a significant number of patients did go on to deliver at a pre-viable gestational age, and there was one fetal death after the age of viability had been reached.

Strengths of our study include the relatively large number of procedures performed at a single institution, and the consistency of operative report review by a single investigator.

The greatest limitation of this study was the lack of a standardized approach to the care of the patient undergoing cerclage. We were unable to control for several important variables, such as cerclage procedure performed (McDonald or Shirodkar), type of suture used, antibiotic administration or use of tocolytic therapy. Likewise the retrospective nature of the work makes it impossible to adjust for the clinical judgment of the physicians performing the procedures.

We did not control for whether the cerclage procedures were performed after an amniocentesis was carried out to exclude intra-amniotic infection. Preoperative amniocentesis the standard practice in many institutions around the country as intra-amniotic infection has been

associated with failure of cerclage [5]. During the study period at our institution, amniocentesis was rarely performed to rule out infection before cerclage placement; thus the possibility of intrauterine infection at the time of cerclage could not be excluded. It is possible that that patients who delivered with chorioamnionitis within a week of cerclage placement (n=3) may have been infected before the procedure.

When the operative report was not explicit, or the descriptors in the operative report did not match the category as defined for this study, the investigator allocated the patient to one of the groups ('prophylactic', 'indicated' or 'rescue'). In this way some patients were re-categorized after their operative report was reviewed. The decision to exclude the two first trimester patients was made as they did not have the typical patient presentation of painless cervical dilatation in the second trimester.

The rescue cerclages we focused on in this cohort are generally agreed to have the highest risk of failure, with this risk amplified if the membranes are past the external cervical os [6]. At our institution, most cerclages in which the membranes were prolapsing beyond the external cervical os were performed with membrane elevation utilizing a foley catheter as has been previously described with a variety of balloon devices [7]. However, the technique was not standardized and procedures were performed by several different surgeons.

Lastly, our study included only a small number of multiple gestations. The number of these cases was not sufficient to draw meaningful conclusions, though gestational age at delivery was lower in the multiple gestations overall. The American College of Obstetricians and Gynecologists now recommends that multiple gestations not be treated with cerclage for the indication of short cervix [4]. We offer our experience with multiple gestations and an open cervix for consideration. Though outcomes overall were not favorable, 3 of the 5 patients did reach a gestational age above 24 weeks. Further study is required to elucidate if medical management would offer better outcomes in this group of patients.

Conclusion

The majority of patients undergoing a rescue cerclage will deliver prematurely, with one quar-

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ter of singleton pregnancies delivering before viability and over a third of singleton pregnancies delivering before 28 weeks.

Disclosure of conflict of interest

None.

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References

- [1] Marshall BR, Evans TN. Cerclage For Cervical Incompetence. *Obstet Gynecol* 1967; 29: 759-763.
- [2] Committee on Practice Bulletins-Obstetrics, The American College of Obstetricians and Gynecologists. Practice bulletin no. 130: prediction and prevention of preterm birth. *Obstet Gynecol* 2012; 120: 964-73.
- [3] American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No.142: Cerclage for the management of cervical insufficiency. *Obstet Gynecol* 2014; 123: 372-9.
- [4] American College of Obstetricians and Gynecologists; Society for Maternal-Fetal Medicine. ACOG Practice Bulletin No. 144: Multifetal gestations: twin, triplet, and higher-order multifetal pregnancies. *Obstet Gynecol* 2014; 123: 1118-32.
- [5] Mays JK, Figueroa R, Shah J, Khakoo H, Kaminsky S, Tejani N. Amniocentesis for Selection Before Rescue Cerclage. *Obstet Gynecol* 2000; 95: 652-655.
- [6] Terkildsen MFC, Parilla BV, Kumar P, Grobman WA. Factors Associated with Success of Emergent Second-Trimester Cerclage. *Obstet Gynecol* 2003; 101: 565-569.
- [7] Tsatsaris V, Senat MV, Gervaise A, Fernandez H, Balloon Replacement of Fetal Membranes to Facilitate Emergency Cervical Cerclage. *Obstet Gynecol* 2001; 98: 243-246.