

Retrospective Review Of Emergency Cervical Cerclage: A Case Series

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ABSTRACT

Background: Women presenting with painless cervical dilatation in the second trimester stand a very high risk of spontaneous abortion. In the absence of infection, emergency cervical cerclage offers the best chance of prolonging the pregnancy to viability.

Aim: To determine the latency period, and to study various patient characteristics such as maternal age, parity, ethnicity and gestation type, cervical dilation, admission to operation time delay in those who delivered live-births before 28 weeks and comparing these to those who delivered live-births at or after 28 weeks gestation for emergency cerclages performed at KK Women's and Children's Hospital.

Methods: We reviewed all cases of emergency cervical cerclage performed at KK Women's and Children's Hospital over 6 years between 2001 and 2006.

Results: 30 women with advanced cervical dilatation and bulging fetal membranes had placement of McDonald's cerclage following reduction of fetal membranes. The average latency between cerclage and delivery period was six weeks. Eighty percent (n=24) delivered live-births after 24 weeks and 50% (n=15) of the women delivered live-births at or after 28 weeks. Forty percent (n=12) of the cases delivered within 2 weeks.

Mean cervical dilatation greater than 5 cm (p-value <0.01) and nulliparity (p-value = 0.03) were significantly associated with delivery before 28 weeks.

Conclusions: Emergency cervical cerclage allowed prolongation of pregnancy beyond 28 weeks in 50% of cases. Forty percent delivered in the first 2 weeks following the procedure. A cervical dilatation of greater than 5 cm and nulliparity appeared to be poor prognostic features for emergency cervical cerclage.

Key words: emergency, rescue, salvage cervical cerclage and outcomes

INTRODUCTION

An emergency (salvage or rescue) cerclage is a cerclage placed when advanced cervical changes are evident on digital or visual examination. Prospective

studies suggest that performing an emergency cerclage can significantly prolong pregnancy and can be considered in previable pregnancies with significant cervical findings^{1,2,3}. The placement of an emergency cerclage at 24 to 28 weeks gestation is controversial as the procedure itself may cause accidental rupture of membranes with resultant iatrogenic extreme preterm delivery with its accordant high neonatal morbidity and mortality. Therefore, the decision to perform emergency cerclage should be individualized, weighing the risks of the procedure, the likely outcome of expectant management as well as the possible benefits of the procedure in prolonging pregnancy.

Preoperatively, contraindications such as the presence of ruptured membranes, established labour, abruption, chorioamnionitis, and lethal fetal abnormalities should be excluded.

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As the risk of iatrogenic rupture of the membranes is high when emergency cerclage is performed in the presence of fetal membranes having prolapsed through the external cervical os, various techniques have been used to reduce the membranes prior to cerclage placement with varying results. These include placing the patient in a Trendelenburg position, use of uterine relaxants (e.g. tocolysis, nitric oxide, and anesthesia), retro filling the maternal bladder, decompression amniocentesis, placing stay sutures or ring forceps around the external os and/or gently pushing the fetal membranes with a gloved finger, Foley catheter balloons or other devices. Prophylactic antibiotics and tocolysis are commonly administered pre and postoperatively, although objective evidence assessing their efficacy is lacking. Indomethacin given perioperatively may reduce the procedure-induced rise in prostaglandin levels, which may cause preterm labour in theory ^{4,5}.

There are no prospective randomized trials comparing one surgical technique of cerclage placement to the other and most nonrandomized series do not indicate a difference in outcome between McDonald or Shirodkar procedure ^{6,7,8,9,10}. Rupture of membranes intraoperatively or in the immediate postoperative period is a major concern of emergency cerclage due to the prolapsed fetal membranes and/or advanced cervical dilatation, occurring in up to 65 percent (median 28 percent) of such procedures ^{11,12,13}. Other complications include chorioamnionitis (25 percent risk in emergency cerclage) ¹¹, suture migration ¹⁴, cervical laceration, haemorrhage and fistula formation.

Outcomes such as gestational age at delivery, PPRM and chorioamnionitis have been reported to be comparable to, or worse in urgent or emergency cerclage than prophylactic cerclage ^{13,15,16}, although emergency cerclage performed in the presence of advanced cervical changes and prolapsed membranes have the worst outcome. Emergency cerclage placement when mean cervical dilatation is greater than or equal to 3cm is associated with lower perinatal survival (mean 60 percent) in several studies ^{12,13,17,18} and visible fetal membranes also correlate with a higher risk of perinatal loss after procedure ^{19,20}.

The aim of the study was to review all emergency cerclages performed at KK Women's and Children's Hospital between October 2001 and October 2006, and to determine the latency period (procedure-to-delivery interval), as well as to study various patient characteristics such as maternal age, parity, ethnicity and gestation type (singleton or multiple), cervical dilation, admission to operation time delay in those who delivered live-births before 28 weeks and comparing these to those who delivered live-births at or after 28 weeks gestation.

MATERIALS AND METHODS

The obstetrics and gynaecology operation record log books were searched to identify all cases of emergency cerclages performed at KK Women's and Children's Hospital between October, 2001 and October, 2006. The history, examination, cardiotocography, maternal blood tests, and ultrasound results, at presentation and preoperatively, were reviewed. Our criteria for inclusion for emergency cerclage were cervical dilatation with visible bulging or prolapsed fetal membranes at visual or digital examination in the absence of regular uterine contractions. The presence of ruptured fetal membranes, chorioamnionitis or gross lethal fetal anomalies constituted exclusion criteria.

When the diagnosis of probable cervical insufficiency was made, a maternal-fetal medicine consultant counselled the couple. The couples were informed of the high risk of spontaneous miscarriage with expectant management, and the option of emergency cerclage as a possible means to prolong pregnancy. A 50 percent success rate was quoted, with a high risk of iatrogenic fetal membrane rupture contributing to preterm labour and extreme preterm delivery with the associated neonatal mortality and serious neurodevelopmental disability. Other significant risks of chorioamnionitis, cervical laceration, excessive bleeding and suture migration, as well as postoperative care, timing and indication for cerclage removal, were discussed before written consent was obtained for couples who agreed to proceed with salvage cerclage.

All the patients were routinely placed in Trendelenburg position, received pre and post operative tocolysis (oral nifedipine and/or salbutamol infusion and four days of indomethacin); and antibiotics (ampicillin, erythromycin for those with penicillin allergy, and metronidazole).

Emergency cerclage was performed by a maternal-fetal medicine consultant. Either regional or general anesthesia was administered after which the patient was placed in the lithotomy position with a head-down tilt. After thorough cleansing with povidone iodine, the cervix was grasped at the anterior and posterior lips. The fetal membranes were reduced with a Foley's balloon (in some instances membrane reduction or retraction was required prior to visualising the cervix). The McDonald suture was placed, taking six partial thickness bites into the substance of the cervix using Mersilene tape. The knot was tied anteriorly at 12 o'clock position after the cervical canal was occluded and the Foley's catheter removed. The external os was closed with a catgut suture.

Statistical Package for Social Sciences version 14.0

software (SPSS Inc, Chicago , IL, USA), was utilized to present data as mean (\pm standard deviation [SD]). P-values were calculated using independent sample t-test for maternal age, Mann-Whitney U test for cervical dilatation and delay in admission to operation time, Pearson Chi-Square test for parity and, Fisher's Exact test for ethnicity and gestation type (singleton or multiple). A p-value of less than or equal to 0.05 was considered to be statistically significant.

RESULTS

Thirty-three cases in whom emergency cerclage was attempted were identified during the 6-year period and reviewed. Twenty-four (73%) cases were booked at KK hospital and 9 (27%) were referrals from other hospitals. Twenty-nine (88%) were singleton pregnancies and 4 (12%) were multiple pregnancies. All patients had cervical dilatation associated with bulging fetal membranes beyond the external os, which was confirmed by ultrasound and speculum examination. One patient subsequently delivered overseas and outcome data was not available. The procedure was abandoned in one patient as the cervix was fully effaced and dilated, and one procedure was abandoned as membrane rupture occurred during the procedure. The overall rate of successful completion of emergency cerclage was 93.9%. Emergency placement of McDonald cerclage was performed in all the remaining patients who had follow-up and delivery at KK hospital. Overall, the mean latency period was 6.8 ± 6.8 weeks and the delivery rate of live-births at or after 24 weeks ($n=24$) was 80%. Fifteen (50%) patients delivered live-births at or after 28 weeks gestation. Table 1 shows the percent of cases with various latency period in weeks. In Table 1, 23% of cases had a latency period less than or equal to a week, 40% had a latency of up to two weeks and about 50% had a latency of 4 weeks or more. Figure 1 shows the correlation between gestation at procedure and gestational age at delivery for all the cases. The mean and p-value of demographic characteristics, cervical dilatation and admission to operation time delay for those who delivered less than 28 weeks gestation and those who delivered at or after 28 weeks gestation are shown in Table 2. No significant difference was found in maternal age, delay between admission and procedure, and gestational age at the procedure between the women who subsequently delivered before 28 weeks and those who delivered at or after 28 weeks. There was a significant difference in the mean cervical dilatation ($p < 0.01$) and the parity ($p=0.03$) between those that delivered before 28 weeks gestation and those at or after 28 weeks gestation.

DISCUSSION

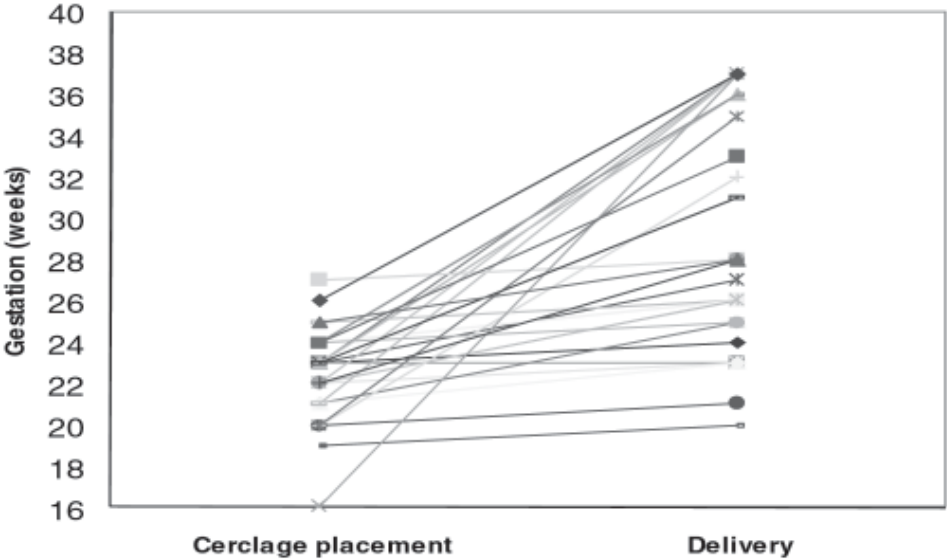
Although emergency cerclage can be beneficial in prolonging pregnancy and improving perinatal survival, the risks of complications such as premature preterm rupture of membranes and chorioamnionitis are high. Intra-operative PPRM occurred in 1 case in our series (3.0%). Few pregnancies achieve full term following the procedure and there is a significant risk of severe preterm birth. Over a period of 6 years, 31 women had emergency placement of McDonald's cerclage performed at a tertiary hospital. Our findings show that use of an emergency cerclage can be effective in prolonging pregnancy, with a mean latency period of 6 weeks. Twenty-three percent of the women had their pregnancy prolonged by one week while 33% had latency period of more than 10 weeks. In two prospective studies, emergency cerclage was associated with a 4 week prolongation of pregnancy compared to women who did not have surgical intervention^{1,2}. The latency period for our patients in whom the procedure was abandoned was 3 days (for the patient who was found to have a completely dilated cervix), and 2 days for the patient in whom iatrogenic membrane rupture occurred. Peroperative rupture of membranes is a major concern of emergency cerclage and has been reported in up to 65% (median 28%) of emergency procedures¹¹⁻¹³.

Our findings might suggest that there are two outcome groups from emergency cerclage, one group that is likely to deliver before 28 weeks gestation and the other after 28 weeks gestation. Analysis of these two groups showed that emergency cerclage performed in nulliparous women with mean cervical dilatation greater than 5 cm is significantly associated with poorer prognosis. A possible hypothesis is that cervical dilatation is more likely to be pathological in nulliparous women, and be associated with a higher risk of preterm delivery compared to multiparous women in whom some degree of cervical dilatation may be physiological. Maternal age, gestation type (singleton or multiple), delay in procedure or gestational age at procedure did not affect delivery outcome. Several studies have reported lower perinatal survival, ranging from 13 to 100 percent (mean 60 percent) in emergency cerclage performed in women with mean cervical dilatation greater than or equal to 3 cm^{12,13,17,18}. In a retrospective study of 42 patients, the use of emergency cerclage was not supported in women with bulging fetal membranes and dilatation greater than or equal to 4 cm¹⁸. We believe that these data will allow better counseling of affected couple at our centers and assist them in making informed decision regarding emergency cerclage.

Table 1. Latency Period

Latency Period (Weeks)	Frequency	Percentage
0-1	7	23.33%
1-2	5	16.67%
2-3	1	3.33%
3-4	3	10.00%
4-5	1	3.33%
5-6	1	3.33%
6-7	0	0.00%
7-8	1	3.33%
8-9	1	3.33%
9-10	0	0.00%
>10	10	33.33%

Figure 1. Gestation at procedure and delivery



* Each line represents the gestational age for one patient at cerclage placement and at delivery

Table 2. Clinical Data

	Delivery ≤ 28 weeks	Delivery >28 weeks	p-value
Maternal age (years)			
Mean (SD)	32.1 (4.8)	33.3 (3.4)	0.41
Ethnicity			
Chinese	93.3%	80.0%	0.16
Malay	6.7%	10.0%	
Indian	0.0%	6.7%	
Others	0.0%	3.3%	
Parity			
Nulliparous	73.3%	26.7%	0.03
Multiparous	26.7%	73.3%	
Gestation type			
Singleton	93.3%	86.7%	0.60
Multiple	6.7%	13.3%	
Cervical dilatation at cerclage (cm)			
Mean (SD)	5.2 (2.6)	2.3 (0.8)	<0.01
Time delay from admission to procedure (hours)			
Mean (SD)	46.9 (39.5)	57.4 (99.7)	0.52
Gestation at cerclage (weeks)			
Mean (SD)	22.4 (1.7)	22.5 (2.7)	0.87

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DISCLOSURE OF INTERESTS

The investigators have no conflicts of interest nor require funding for the work.

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