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Original Research Article

Elective and emergency cervical cerclage and pregnancy outcomes - a prospective observational study

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ABSTRACT

Background: Aim of the study was to analyze the prolongation of pregnancy (the mean cerclage to delivery interval) after elective and emergency cervical cerclage and to analyze the maternal and fetal outcome following cerclage.
Methods: It is a prospective observational study conducted in the Department of Obstetrics and Gynecology at Sri Ramachandra Medical College among 130 patients who underwent cervical cerclage at our hospital. History of previous preterm deliveries, abortions, recent ultrasonography (USG) cervical length findings noted. The USG findings of cervical length, funneling, ballooning of membrane and internal os diameter has been recorded. Cerclage related details like gestational age at suture, cerclage to delivery interval, type of suture material, method of cerclage, gestational age at delivery and neonatal outcomes has been noted.
Results: In the USG and history-based cerclage group, prolongation of pregnancy was a mean of 21 weeks, and majority-77.8% delivered at term, compared to the rescue cerclage group where prolongation was a mean of 10 weeks, and majority-76.2% had late preterm deliveries.
Conclusions: Albeit rescue cerclages known to be associated with infections, rupture of membranes, preterm labor/preterm premature rupture of membranes (PPROM), it has significantly reduced the perinatal morbidity and mortality by prolongation of pregnancy to at least late preterm, in most patients, in this present study.

Keywords: Cervical length, Cerclage, Gestational age at delivery

INTRODUCTION

Cervical insufficiency or incompetent cervix is a discrete obstetric entity characterized classically by painless effacement and dilatation in the second trimester. Cervical incompetence can also be defined as the inability of the uterine cervix to retain pregnancy in the absence of uterine contraction.[1] If the cervix length is less than 25 mm, the woman is regarded to be a high risk of preterm labor, hence cervical cerclage is offered at that point of gestation. If cervix length is less than 30 mm in nuchal translucency (NT) scan, then the patients must be serially monitored at 16 weeks, and decision taken.

Shirodkar described the use of cervical cerclage in the prevention of premature birth in 1955, and McDonald two years later.[8] Cervical cerclages may be done as a preventive measure in the first trimester if the clinical history indicates a risk of mid - trimester loss or if cervical resistance testing demonstrates poor cervical resistance. It may also be conducted if an ultrasound reveals a short cervix of less than 25 mm or cervical shortening.[2] When the patient appears with a cervix that is already dilated and the membranes bulging into the vagina but no symptoms of labor, infection, or excessive vaginal bleeding, a rescue cervical suture may be performed.[3]

The goal of this study was to assess and compare the immediate pregnancy outcomes of individuals who had

elective, ultrasound- indicated, and rescue cervical cerclage. This information may assist the patient and her caregiver in making an educated decision about whether to undergo cervical cerclage as an elective or emergency operation.[4]

Aim of the study

Aim of the study was to analyse the prolongation of pregnancy (the mean cerclage to delivery interval) after elective and emergency cervical cerclage, and also to analyse the maternal and fetal outcome following cerclage.

METHODS

Study type

It was a prospective observational study.

Place

The study was conducted at the Department of Obstetrics and Gynecology at Sri Ramachandra Medical College.

Sample size

130 patients who underwent cervical cerclage at our hospital were included as sample size. Sample size was calculated using n Master software version 2. 0 where standard deviation in both groups is 15 and mean difference is 10.

Samples collected

130 samples were collected, out of which 72 patients had elective cerclage and 58 patients had emergency cerclage, which was done by random sampling method.

Study period

The duration of the study was from December 2020 to December 2022.

Selection criteria

Inclusion criteria

All cerclages placed at the institution – SRIHER were included.

Exclusion criteria

Prophylactic cerclages done for IVF pregnancies were excluded.

Procedure

Written and informed consent from all patients has been taken. At the time of visit, detailed history recorded in the pro-forma. Patients were followed up till delivery and outcomes noted. In the history previous preterm deliveries, abortions, recent ultrasonography (USG) cervical length findings noted. The USG findings of cervical length, funnelling, ballooning of membrane and internal os diameter has been recorded. Cerclage related details like gestational age at suture, cerclage to delivery interval, type of suture material, method of cerclage, gestational age at delivery and neonatal outcomes has been noted. All these details have been compared and compiled.

Definitions

Elective cerclage

History based which is done based on previous obstetric outcomes- usually done between 12-14 weeks; and ultrasound indicated cerclage (short cervix) in which cerclage was performed immediately following a diagnosis of cervical length <25 mm, at any point during pregnancy less than 24 weeks gestation, without any clinical symptoms (in multiple pregnancies-15 mm is considered significant).

Emergency cerclage

USG showing typical features of impending cervical incompetence (T, Y, V, U pattern of the internal os), with closed external os; or rescue cervical cerclage-done as an emergency procedure, done in patients presenting with symptoms of cervical incompetence in second trimester, with open os, and bulging membranes.

Outcomes observed

Maternal outcomes were cerclage to delivery interval and mode of delivery. Neonatal outcomes are gestational age at delivery, birth weight and Apgar.

Statistical analysis

Data were presented as mean, standard deviation, frequency and percentage. Continuable variables were compared using independent sample t test. Categorical variables were compared using Pearson Chi-square test. Significance was defined by p values less than 0. 05 using a two-tailed test. Data analysis was performed using IBM statistical package for the social sciences (SPSS) version 21.0 (IBM-SPSS Science Inc., Chicago, IL).

RESULTS

Comparison of maternal demographic data in patients treated with elective versus emergency cerclage

Women aged 26-30 years received the highest number of cerclages in both elective and emergency groups, minimum age was 21 years, and maximum age was 41 years in this study. However, there was no statistical

significance among the type of cerclage and age group of women (Table 1).

Table 1: Age distribution (n=130).

Age (years), n=130	Elective cerclage (72) (%)	Emergency cerclage (58) (%)
<20	0	0
21-25	19 (26.4)	12 (20.7)
26-30	33 (45.8)	26 (44.8)
31-35	17 (23.6)	17 (29.3)
36-41	3 (4.2)	3 (5.2)
>41	0	0

Comparison between elective and emergency cerclage groups

Elective and emergency cerclages were more common amongst multigravidas (Table 2).

Table 2: Gravida.

Gravida, n=130	Elective cerclage (72) (%)	Emergency cerclage (58) (%)
Primigravida	31 (43.1)	26 (44.8)
Multigravida	41 (56.9)	32 (55.2)

Distribution of sample size

Amongst elective cerclages, history indicated was 15, USG based short cervix (<25 mm) was 57. Amongst emergency cerclages, USG showing funneling (impending incompetence) was 35, and rescue cerclages was 23.

Delivery outcomes

Total abortions were 7 patients, out of which-3 patients after elective and 4 patients after emergency cerclage, 62 patients had normal delivery-36 patients after elective cerclage and 26 patients after emergency cerclage. 61 patients had LSCS, 33 patients after elective cerclage and 28 patients after emergency cerclage.

LSCS done for failed induction was totally for 7 patients. Rest of the LSCS in both the groups were due to fetal and other obstetric indications. The number of LSCS and abortions in both the groups were similar in my study (not statistically significant).

Prolongation of pregnancy (cerclage to delivery interval)

Comparison of gestational age at cerclage placement in elective and emergency groups

Most commonly elective cerclage was placed between 12-16 weeks (59.7%) of gestation. Most commonly emergency cerclage was placed between 20-24 weeks (43.1%) of gestation (Table 3).

Table 3: Gestational age at cerclage.

Gestational age (weeks), n=130	Elective cerclage (72) (%)	Emergency cerclage (58) (%)
12-16	43 (59.7)	9 (15. 5)
16+1 to 20	13 (18.1)	12 (20.7)
20+1 to 24	14 (19.4)	25 (43.1)
24+1 to 26	2 (2.8)	12 (20.7)

Comparison of gestational age at delivery in elective and emergency groups

Elective cerclage group- most commonly delivered at 37-40 weeks. Emergency cerclage group- most commonly delivered at 34-36 weeks (Table 4).

Table 4: Gestational age at delivery.

Gestational age (weeks), n=123 (delivered)	Delivered in elective cerclage (69) (%)	Delivered in emergency cerclage (54) (%)
<28	1 (1.4)	3 (5.2)
28 to 30	0	1 (1.7)
30+1 to 32	0	2 (3.4)
32+1 to 34	1 (1.4)	4 (6.9)
34+1 to 37	11 (15.3)	34 (48.3)
37+1 to 40	56 (77.8)	10 (44.8)

Comparison between USG impending incompetence indicated cerclage and rescue cerclage

Deliveries amongst the USG impending incompetence group had more term deliveries (27.3%) compared to rescue cerclage. Amongst rescue cerclage group, majority had late preterm deliveries (76.2%) in this present study (Table 5).

Table 5: Gestational age at delivery in emergency cerclage subgroup.

Gestational age (weeks), n=54 (delivered)	USG impending incompetence (33) (%)	Rescue cerclage (21) (%)
<28	0	3 (14. 3)
28+1 to 30	1 (3)	0
30+1 to 32	2 (6.1)	0
32+1 to 34	3 (9.1)	1 (4.8)
34+1 to 37	18 (54.5)	16 (76.2)
>37+1 to 40	9 (27.3)	4.8

Comparison between elective and emergency groups

In the elective cerclage group, mean suture placement was at 15 weeks, mean gestational age at delivery was 37 weeks, with a prolongation of pregnancy to term in majority of the patients in the present study (Table 6).

Table 6: Mean cerclage to delivery interval.

Variables, n=123	Delivered in elective (69)	Delivered in emergency (54)
Mean cerclage to delivery interval (weeks)	20.65	11.80
Standard deviation	6.25	3.15

Comparison between USG impending incompetence and rescue cerclage

In the USG impending cerclage group, mean gestational age at suture placement was at 24 weeks, mean gestational age at delivery was at 34 weeks, with a prolongation of pregnancy to late preterm in majority of the patients in the present study. Although rescue cerclage had an abortion rate of 8.6%, and very preterm delivery rate of 14.3% in this study (Table 7).

Table 7: Mean cerclage to delivery interval in emergency cerclage.

Variables, n=54 (delivered in emergency subgroup)	Delivered in USG impending incompetence (33)	Delivered in rescue cerclage (21)
Mean cerclage to delivery interval (weeks)	12.78	10.23
Standard deviation	2.78	3.01

Most common technique in cerclage was Mc Donald's in our hospital (93%). There was no statistical significance between the technique of cerclage and outcomes of pregnancy observed in this study (Table 8).

Table 8: Technique of cerclage.

Cerclage technique, n=130	Elective cerclage (72) (%)	Emergency cerclage (58) (%)
Mc Donald's	65	56
Modified Shirodkar	7	2

Most common material used for cerclage was prolene (93%) in our hospital. However, there was no statistical significance noted between the type of suture material and outcomes in this present study (Table 9).

Table 9: Suture material (n=130).

Suture material, n=130	Elective cerclage (72) (%)	Emergency cerclage (58) (%)
Prolene	64	57
Umblical tape (linen)	5	1
No. 1 Sutu pack (silk)	3	0

Comparison of mean birth weight and mean Apgar at 1 minute between elective and emergency cerclage groups

The comparison is given in Table 10.

Table 10: Neonatal outcomes.

Variables, n=123 (delivered)	Delivered in elective cerclage (69)	Delivered in emergency cerclage (54)
Mean birth weight (kg)	3.18 (range-2.7-3.8 kg)	2.47 (range-1.1-3. 8 kg)
Mean Apgar at 1 minute	8	6

DISCUSSION

Cervical cerclage, a low-risk treatment done at the end of the first trimester, has effectively lowered the risk of preterm labor in women with a higher risk of cervical incompetence. In situations of cervical shortening or even dilatation, emergency cerclage performed in mid-trimester may relate to a greater likelihood of complications such as chorioamnionitis and membrane rupture.[5,6]

There aren't many large randomized controlled studies to help doctors and patients decide whether to place a cervical suture. Therefore, the objective of this study was to evaluate and contrast the immediate pregnancy outcomes of women who underwent elective, ultrasound - indicated, and rescue cervical cerclage. This information may aid the patient in making an educated decision about whether to have cervical cerclage as an elective or emergency procedure.[7,8]

According to this study, among the causes of indications for cerclage insertion, the short cervix (79.2%) was closely followed by impending cervical incompetence in USG. There were also abundant records of rescue and history (23 cases and 15 cases). As a result of the lowered rates of history-and rescue-indicated cerclages, the data adequately demonstrated the value of sonography in the early identification of cerclage indication. Additionally, it has been demonstrated in earlier investigations that sonographic monitoring might cut down on unneeded cerclage by 50%.[9-11] This was also supported by Adewole et al in a 5-year survey on cerclage in Nigeria, which showed a greater incidence of reports of rescue cerclage indications in women with history and without USG surveillance.[12,13]

Gestational age at cerclage

Within the treatment groups, there was a strong statistical association with GA of cerclage implantation. According to our findings of cerclage placements by gestational age, 59.7% were carried out between GA of 12 and 16 weeks in the elective cerclage group. Only 19.4% of the women in the elective group received cerclage implantation at GA

20+1 to 24 weeks, compared to 43.1% of the women in the emergency group. Similar research indicates that the GA for receiving emergency cerclage is 22 (±3.3) weeks, which is consistent with our findings.[14-16]

Gestational age at delivery

Cerclages placed between 12-16 weeks were more common amongst elective cerclage, and pregnancy was prolonged up to term (gestational age at delivery >37 weeks in most patients (77.8%) in this study. In the emergency subgroup, most commonly, USG impending cerclages were placed between 16-20 weeks, and rescue sutures were placed more commonly at 20-24 weeks, in which we were able to prolong pregnancy till late preterm in most patients.[17,18]

The suture-to-delivery interval was significantly longer in the elective group (20.65 weeks) compared to the emergency group (11.80 weeks) in our study. A likely longer suture-to- delivery interval in the elective group rather than in the emergency group was reported earlier by Wang and Feng.[19,20] Rescue cerclage had a mean cerclage to a delivery interval of 10.2 weeks, which helped prolong pregnancy to late preterm. If an ultrasound shows a short cervix or a history of repeated spontaneous mid-trimester losses, bolstering the cervix with mechanical support should prolong pregnancy and lower the risk of premature delivery and associated complications.[21-23]

Rescue cerclage

Cerclage may lessen preterm birth, according to a recent meta-analysis by Berghella et al.[24,25] Emergency cerclage may have contributed to significant prolongation of pregnancy and fewer preterm births and lesser neonatal morbidity.

Various researchers reported that a similar pregnancy prolongation associated with cerclage.[26,27] Cervical cerclages, both elective and emergent, lowered the risk of recurrent abortion or preterm delivery and effectively extended the length of the pregnancy with live deliveries. Early cerclage placement in the elective group led to a greater rate of term vaginal deliveries.

In addition, the elective group raised birth weight with a significant APGAR score and extended pregnancy to >36 weeks. Cervical cerclage appears to have low complication rates and high live birth rates for elective and emergency procedures. Nevertheless, cervical cerclage is a useful surgical method for preventing recurrent abortion or late fetal loss.[28-30]

Limitations

The sample size is small and a larger sample size has to be studied in order to generalize the criteria for general population.

CONCLUSION

Amongst elective cerclages placed as history indicated and USG indicated (cervix <25 mm), pregnancy was prolonged to term gestation in majority of the patients. Albeit rescue cerclages known to be linked with infections, rupture of membranes, preterm labor/PPROM, it has significantly reduced the perinatal morbidity and mortality by prolongation of pregnancy to late preterm or by reaching period of viability in most patients in this present study. Hence placement of rescue cerclages and prophylactic cerclages for IVF, or multiple pregnancies must be individualized.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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