Original Article

Frequency of Preterm Birth After Cervical Cerclage

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Abstract

Objective: The purpose of this research was to find out how often preterm births occur following cervical cerclage.

Methodology: This descriptive study was done at Gynecology and Obstetrics Department, LRH Peshawar for a period of six months (from 21/12/2020 to 21/6/2021). A total of 101 individuals were chosen for the study, and their BMI using the formula Kg/m2 was recorded along with their age, weight on a weighing scale in a standing position, height on a height scale in a standing posture, parity, gestational age, obstetrical history, and history of current pregnancy. Cervical cerclage under general anesthesia following Macdonald's techniques was performed and the participants were observed till their delivery to determine the frequency of preterm births after cervical cerclage.

Results: In the present study among 101 participants, the mean age was 30 ± 8.31 years. The selected 46% of the participants were primipara while 54% participants were multipara, in which 89% delivered at term, while 11% had preterm deliveries.

Conclusion: The study concludes that frequency of preterm birth in participants having cervical incompetence, after cervical cerclage was 11%.

Keywords: Preterm delivery, Cervical cerclage

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Introduction

Preterm birth, classified as delivery before competition of 37 weeks of pregnancy, is one of the significant issues in newborn health complications and fatalities, and accounts for one million neonatal deaths each year.[1-3] Low income and middle income countries are disproportionately affected due to limited access to specialized care.[4] Preterm delivery often results in conditions such as neurological disorder, neurodevelopmental delay and persistent pulmonary disorders, with risk increasing as gestational age decreases.[5] Thus, understanding the biologic processes that governs cervical changes in pregnancy is essential to reduce preterm birth rates and developing policies to prevent early cervical dilation.[6]

Cervical insufficiency often termed as cervical incompetence is among the key etiologies linked to preterm birth.[7] This condition is characterized by painless cervical dilation during second trimester without labor, causes weakened cervix, leading towards preterm delivery.[7, 8] If left untreated, this condition often results in recurrent pregnancy loses, specifically in second trimester, and preterm births.[7] Although the etiology of cervical insufficiency is due to multiple factors such as congenital cervical anomalies, cervical surgeries, or cervical trauma.[7, 9] Timely identification and treatment of the affected women has become crucial to improve pregnancy outcomes.

A very typical method to address cervical inefficiency is cervical cerclage, a surgery that is minimally invasive and during which the cervix is stitched tight to prevent miscarriage or premature birth.[10] The McDonald and Shirodkar procedures are the two primary techniques designed in order to prolong pregnancy and give the cervix mechanical assistance.[10, 11] While cerclage has been relatively a common procedure, it may reduce the possibility of preterm birth with a past experience of preterm deliveries and recurrent second trimester pregnancy loses.8 According to research[12] it was revealed 7.5% risk of miscarriages following cervical cerclage,18.7% preterm births, and 73.3% term deliveries. In accordance to research, 80% of cervical cerclage procedures were successful.[13]

Despite of a large number of research in this area, there is still a scarcity of data on the results of cervical cerclage in the population of Pakistan. The effectiveness of such interventions is affected by the regional factors, which includes healthcare infrastructure, socioeconomic factors and patients' education. This study had been carried out at the department of Gynecology and Obstetrics at LRH Peshawar, aims to determine the frequency of preterm births in the patients after cervical cerclage. The results of the study may inform clinical guidelines and improve patient care practices in the area. The results will highlight the need for management strategies and enhancing patient care and hence reducing the rate of preterm births and associated neonatal complications.

Methodology

This study was done at the department of Gynecology and Obstetrics at Lady Reading Hospital, Peshawar for a period of six months from 21st of December 2020 to 21st of June 2021. Pregnant women of age 18 to 40, with a past record of preterm deliveries, calculated from the latest menstrual cycle, the fetal age is at or before 24 weeks., and a transvaginal ultrasonography cervical length of below twenty-five mm were the study's selection criteria.

Using WHO sample size software, sample size of 101 was determined by with 95 % confidence interval and 6 % margin of error with expected frequency of pre term birth by 10.56% after cervical cerclage.[15] As part of ethical practice, informed written consent was obtained after receiving approval from the ethics committee. Age, history of current pregnancy, obstetrical history, gestational age, parity and weight on weighing scale in

standing position, height on height scale in standing position and BMI with formula Kg/m2 was recorded. Under general anaesthesia, a cervical cerclage was carried out following Macdonald's methods. They were monitored in the ward for two days following surgery and further examination was also done after discharge and during routine antennal visits.

The study excluded pregnant women who had more than one gestation, who were in labor, experiencing vaginal bleeding at presentation, had clinical or imaging evidence of intrauterine infection, anomalies of the uterus, anomalies of the fetus congenitally, had cervical cerclage in their current pregnancy, or were contraindicated by surgery or anesthesia. Incomplete medical records and failure to give informed consent were also excluded.

All the selected patients were examined till their deliveries, delivery before 37 weeks of pregnancy based on latest menstrual cycle was recorded and documented on a proforma specially designed for it. Each participant was admitted for postoperative observation for two days following cervical cerclage and was subsequently followed through scheduled antenatal clinic visits until childbirth. Follow-up was ensured through hospital records and review of delivery outcomes. As the study was conducted at a single tertiary-care center, no participants were lost to follow-up

SPSS version 23 was used for statistical analysis. Quantitative variables including age, gestational age at delivery, height, weight, parity, and BMI were expressed as mean ± standard deviation, while categorical variables such as preterm birth were presented as frequencies and percentages. Gestational age at delivery was the primary outcome measure, and preterm birth was defined as delivery before 37 completed weeks of ges-

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tation. Stratification of preterm birth was performed with respect to maternal age, parity, and BMI to assess effect modification. Post-stratification chi-square test was applied, and a p-value ≤ 0.05 was considered statistically significant.

Results

The average age of the participants was 30 ± 8.31. The majority of women were of the age group 18-30 years. The average gestation time of birth was 37 ±3.217 weeks.

The study was limited to women who had a history of preterm birth or a sonographic history of cervical insufficiency (cervical length less than 25 mm before 24 weeks). This inclusion criterion made it possible to enroll primiparous women who were found to be cervically shortening even without history of any obstetric.

Among the 101 respondents, 46 (46 %) were primiparous, and 55 (54 %) were multiparous. About half of the women had a BMI ≤27 kg/m2 and the rest had a BMI >27 kg/m2.

Overall, 11 % of the respondents gave birth at preterm, with the maximum number (89 %) giving birth at term. Table 1-9 provide detailed distributions and stratified analysis according to age, gestation age, parity, and BMI.

Table 1. Distribution of age (n=101)

Age (years)	Frequency	Percentage (%)
18-30	64	63
31-40	37	37
Total	101	100

Average age was 30 years with SD ± 8.316

Table 2. Gestational age (n=101)

Gestational age (weeks)	Frequency	Percentage (%)
≤ 37	11	11
>37	90	89
Total	101	100

Average POG was calculated 37 weeks with SD ± 3.217

Discussion

Several recent Pakistani case-series have provided term and preterm delivery rates following cerclage. Indicatively, a 2020 study (Nishtar Hospital) of 156 women (mean age ≈28 y) with cervical incompetence reported preterm birth in 32 cases (20.5%), and term birth in 124 cases (79.5%).[14] Sixty-seven percent of cerclages in that cohort were elective (inserted prophylactically at around 12-14 weeks) and 27% emergency.[14] A study carried out in Peshawar (N = 97) in 2021 (Khyber Teaching Hospital) indicated 21 preterm births (22%) and 76

Table 3. Parity distribution(n=101)

Parity	Frequency	Percentage (%)
Primi Para	46	46
Multi Para	55	54
Total	101	100

Table 4. BMI distribution (n=101)

BMI (Kg/m^2)	Frequency	Percentage (%)
≤ 27	48	48
> 27	53	52
Total	101	100

Mean BMI was 27 Kg/m2 with SD ± 5.61

Mean weight was 74 Kg with SD ± 11.85

Mean height was 1.5 meters with SD ± 0.88

Table 4. Preterm birth (n=101)

Preterm birth	Frequency	Percentage (%)
Yes	11	11
No	90	89
Total	101	100

Table 6. Stratification of preterm birth with reference to age distribution (n=101)

Preterm birth	18-30 years	31-40 years	Total
Yes	7	4	11
No	57	33	90
Total	64	37	101

The chi square test revealed a P value of 0.9842.

Table 7. Stratification of preterm birth with reference to parity distribution (n=101)

Preterm birth	Primi para	Multi para	Total
Yes	5	6	11
No	41	49	90
Total	46	55	101

Chi square test was applied in which P value was 0.9949

Table 9. Stratification of Preterm birth with reference to BMI distribution (n=101)

Preterm birth	≤ 27 Kg/m²	> 27 Kg/m²	Total
Yes	5	6	11
No	43	47	90
Total	48	53	101

The chi square test revealed a P value of 0.8841

term births (78).[13] The maternal age was measured at an average of 30 years, 63% were nulliparous, and the signs were either a previous midtrimester loss or short cervix on ultrasound.[13] In a 2023 Peshawar series (Indus J Biosci Res, N = 166), preterm birth rates (13.9) and mid-trimester losses (11.4) were 13.9% and 11.4% with McDonald cerclage respectively.[15] Conversely, a 2020 study reported success rate of term delivery to be 84.9% of of 93 cerclage patients (implicating a 15.1% preterm rate) demonstrated a success rate of 2020.[16] In (16) study cerclages were inserted at 21-22 weeks and compared with a progesterone arm; there also were high term rates in both arms. Combined, the Pakistani rates of preterm birth are between 14-22 percent, term (37 wk) rates are between 78-95 percent.[13, 16]

Patient profiles varied across studies. The cohort of Multan was with mean BMI = 23.4 kg/m2, 13.5% diabetic and 19.9% hypertensive.[14] The majority of them were multigravid (mean gravidity =5), and the average gestational age at cerclage was =12.6 weeks.[14] Otherwise, the Khyber Teaching Hospital series reported no BMI or medical comorbidity but a mean age of 30 years and 63% nulliparity.[13] The CMH Lahore study presented the mean cerclage gestation as approximately 21.8 weeks; the proportion of cerclage in their study were all prophylactic (no emergent) and half of the patients, too, were receiving vaginal progesterone.[16] Each research involved the use of a McDonald (transvaginal purse-string) procedure. Practice differences (prophylactic vs emergency/urgent) seem to have a role: e.g., Multan series (27% emergency cerclages)[14], but the CMH and Indus (2023) series were mostly elective.

The current 11% rate of preterm is low as compared to these reports (ranging between 14-22%). It lies nearest to CMH Lahore (≈15%) and Khyber Peshawar (13.9%) cohorts[15, 16] and highest when compared to Multan (20.5%) and Peshawar KTH (22) cohorts.[13, 14] The reasons could be found in the differences in indication and timing: Early, elective cerclage in women with isolated cervical shortening was most commonly performed by CMH and Indus groups and accompanied by progesterone, and the higher-preterm groups included more women with prior losses or emergent cerclage indication. Indicatively, in the Multan study, co-morbidities (diabetes, hypertension, obesity) as well as emergency cerclage were significantly found to be related to preterm birth (14). On the contrary, the CMH series did not note any significant complications or low term success, which is probably because of the strict selection of patients and the use of adjunct progesterone.[16] The differences in parity and obstetric history were also different: the KTH 2021 series primarily consisted of patients with mostly nulliparous pregnancies,[13] whereas the Multan cohort consisted of a large number of multigravidas. Lastly, gestational age when cerclage was placed was different (e.g. ~12 wk vs ~22 wk) and this could be a factor.

The current research has its strengths, which involve full follow up of all participants to achieve correct documentation of delivery outcome, and standardized McDonald cerclage technique, which was carried out by seasoned clinicians to reduce the variability of investigative procedures. The internal validity of the results was also enhanced by the use of clear and consistent inclusion criteria, restricted to the use of both women with records of cervical shortening or preterm delivery. In addition, the study was a single-center one which enabled the similarity of clinical protocols, postoperative care, and antenatal follow-ups to all the participants. There are, however, some limitations which are to be taken into consideration. This single-center design does not allow extrapolation to the wider populations that have different demographic or healthcare parameters. The research failed to consider the possibility of the confounding factors like subclinical infection, progesterone use, or cervical tissue characteristics that might affect the result of cerclage. Furthermore, history-indicated, ultrasound-indicated and emergency cerclage were not distinguished in the analysis, which could have given more understanding of the differences in outcomes. Finally, this research was limited to gestational age at birth without the evaluation of neonatal morbidity or long-term outcomes which limits the knowledge of clinical effects of cerclage in their entirety.

Conclusion

This study indicates that cervical cerclage is correlated with a comparatively low rate of preterm births of 11% in women with cervical insufficiency. Compared to Pakistani data in the recent past, the results are favorable and they support the effectiveness of early diagnosis, standard surgical procedure, and routine antenatal follow-up. Although the results prove the continued use of cerclage as a preventive measure of preterm births, bigger multicenter researches, including more clinical variables, are suggested to further improve patient selection and finalize better results.

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Authors' Contribution Statement

SP contributed to the conception, design, acquisition, analysis, interpretation of data, drafting of the manuscript, critical review of the manuscript, and final approval of the version to be published. RN contributed to the acquisition, analysis, interpretation of data, and drafting of the manuscript. HG contributed to the interpretation of data, drafting of the manuscript, and critical review of the manuscript. N contributed to the acquisition, analysis, and interpretation of data. SG contributed to the acquisition, analysis, and interpretation of data. SB contributed to the analysis, interpretation of data, and drafting of the manuscript. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Conflict of Interest

Authors declared no conflict of interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.