

# Pregnancy Outcomes of Patients with Ultrasound-indicated and History-indicated McDonald Cervical Cerclage

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## ABSTRACT

**Objective:** To assess pregnancy outcomes of patients with ultrasound-indicated and history-indicated McDonald cervical cerclage.

**Materials and methods:** This was a cross-sectional study of pregnant women who had cervical cerclage performed at Aga Khan University Hospital, Karimabad campus. We obtained Institutional Review Board approval and reviewed the medical records of patients. A purposive continuous sampling technique was used. A total of 88 patients were included. There were no exclusion criteria. Outcome data were collected from the medical record of patients from January 2010 to December 2016.

**Results:** Analysis reported a statistically significant lower gravidity and parity in the scan-indicated group as compared with other groups ( $p = 0.000$  and  $p = 0.001$ , respectively). Previous history of cervical cerclage, history of mid-trimester miscarriage, and preterm labor were significantly associated with indication for cerclage ( $p = 0.001$ ,  $0.046$ , and  $0.001$ , respectively). Cervical length was also significantly associated with the indication for cerclage ( $p < 0.001$ ). Lower gestational age at previous abortion in the history-indicated group as compared with other groups ( $p = 0.003$  and  $< 0.001$ , respectively). Pregnancy prolongation was significantly lower in the scan-indicated group as compared with other groups ( $p = 0.04$  and  $0.004$ , respectively).

**Conclusion:** Our study showed that patients with a history suggestive of cervical incompetence or short cervix on ultrasound should be offered cerclage to prevent preterm birth and to improve neonatal outcomes. Ultrasound-indicated cerclage after the first trimester indicates that universal cervical-length screening by transvaginal ultrasound in the mid-trimester can pick silent cases, and inserting cerclage can prolong pregnancy to term.

**Clinical significance:** Screening cervical length will help clinicians to reduce preterm birth rate, especially in resource-limited underdeveloped countries.

**Keywords:** Cervical cerclage, Cervical incompetence, Cervical length.

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## INTRODUCTION

Preterm birth remained a leading cause of poor outcomes in the neonatal period. Cervical incompetence can lead to preterm delivery and is defined as the failure of the cervix to hold a pregnancy without uterine contractions or labor. Literature reported its incidence as 1% of women,<sup>1</sup> and the common presentation is painless cervical dilation. This condition is an important ongoing condition for healthcare providers as it has major implications on the family, obstetrician, and healthcare system. It was first described by Greem in 1865.<sup>2</sup> The insertion of cerclage is probably the only best option of management in the treatment of cervical incompetence, performed with either elective procedure or as an emergency procedure when the patient presented with cervical changes.

The actual incidence of this condition in the first trimester is not easy to predict because of unclear diagnostic criteria, and thus there is controversy about the ideal optimum treatment.<sup>3</sup> There are no standard criteria for the diagnosis of incompetent cervix, cerclage is indicated when there is a history of cervical incompetence and/or short cervix on ultrasound.<sup>4,5</sup> Clinical presentation of the patient also varies, and not all patients present with typical history. The patient may present with lower abdominal pain, per vaginal bleeding, and sometimes asymptomatic.<sup>6</sup> The most appropriate classification recommended by Royal College of Obstetrician Guideline on cervical cerclage is based on indication of the procedure.<sup>7</sup>

Besides the ambiguities in the management and diagnosis, there is a difference of opinion among the obstetricians on the

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application of cerclage and length of the cervix.<sup>8</sup> Most of the obstetricians take cervical length longer than 30 mm for competent cervix, and cervical length of 15 mm or less is associated with 50% chance of preterm birth <33 weeks of gestation.<sup>9</sup>

## MATERIALS AND METHODS

This is a retrospective study of patients with cervical incompetence in whom cervical cerclage was performed at Aga Khan University Hospital, Karimabad campus. We obtained Institutional Ethical Review Board approval, and medical records of patients were reviewed to collect data. A total of 88 patients were included, and outcome data were collected from the medical record of

the patients from January 2010 to December 2016. A purposive continuous sampling technique was used, and all patients with McDonald cerclage were included in the study. There were no exclusion criteria.

Data were collected on basic demographics, indications of cerclage, symptoms of the patient at presentation to hospital, past history of mid-trimester loss or preterm delivery, past history of cerclage, ultrasound measurement of cervical length, elective or emergency cerclage, infection screening, gestation at cerclage applied, type of progesterone used, mode and gestation at the time delivery, and neonatal outcomes.

Data analyses were done through SPSS version 22. Categorical data were reported as frequency and percentages, while continuous data were reported as means and standard deviations. One-way ANOVA test was used to assess the statistical significance of obstetric risk factors and pregnancy outcomes across the three groups (i.e., history-indicated cerclage, history and scan-indicated cerclage, and scan-indicated cerclage only). A *p*-value of <0.05 was used to assess statistical significance.

## RESULTS

A cervical cerclage procedure was carried out on 88 patients at our center. The patients were divided into groups depending on the indication of cerclage. The demographic data for each of the three groups, i.e., history-indicated cerclage, history and scan-indicated cerclage, and scan-indicated cerclage, are presented in Table 1.

### Demographic Data of the Subgroups

Tukey's *post hoc* analysis reported a statistically significantly lower gravidity and parity in the scan-indicated group as compared with the group with history and scan-indicated cerclage ( $p = 0.000$  and  $p = 0.001$ , respectively). There was no difference in gravidity and parity between the history as compared to history and scan-indicated and scan-indicated groups. The presenting complaints were also significantly different between the three groups (Table 1).

### Obstetric Risk Factors for Cervical Cerclage

Previous history of cervical cerclage, history of mid-trimester miscarriage, and preterm labor was significantly associated with

indications for cerclage ( $p = 0.001$ ,  $0.046$ , and  $0.001$ , respectively). Cervical length was also significantly associated with the indication for cerclage ( $p < 0.001$ ). There was no statistically significant association between history of vaginal infection and HVS screening with this indication.

Tukey's *post hoc* analysis reported statistically significantly lower gestational age at previous abortion in the history-indicated group as compared with the group with scan-indicated and history and scan-indicated cerclage ( $p = 0.003$  and  $< 0.001$ , respectively). Gestational weeks at cerclage were significantly lower in the history-indicated as compared with the history and scan-indicated group ( $p = 0.046$ ). After the cerclage, all patients were on progesterone support. Ninety-nine percent of patients were on cyclogest, while one patient was put on beta HCG along with Duphaston.

Delivery-outcome data were available for 61 patients (73%), while 7 patients were lost to follow-up, 2 came for elective cerclage only, and 6 patients were referred due to PPRM or preterm labor >32 weeks and care of prematurity, 4 referred due to severe preeclampsia at 32 weeks to tertiary care center for the follow-up and delivery, and 8 patients had ruptured of membranes before 24 completed weeks of gestation and ended up in abortion (Table 2).

### Pregnancy Outcomes of Cerclage

Pregnancy prolongation (calculated as gestational age at delivery – gestational age at cerclage) was significantly lower in the scan-indicated group as compared with the group with history-indicated and history and scan-indicated cerclage ( $p = 0.04$  and  $0.004$ , respectively) (Table 3).

## DISCUSSION

This study was carried out to evaluate the pregnancy outcomes of applying a cervical cerclage for different indications. The ultrasound-indicated group of patients has symptoms of lower abdominal pain and vaginal bleeding, whereas the majority of patients in the other two groups were asymptomatic. These symptoms were mild but were associated with early signs of cervical dilatation and warranted to go for an ultrasound, and cervical dilatation was picked.

Table 1: Demographic data of the subgroups

Variables	History-indicated cerclage (N = 18)	History and scan-indicated cerclage (N = 47)	Scan-indicated cerclage (N = 23)	p-value
	Mean ± SD	Mean ± SD	Mean ± SD	
Age, years	28.7 ± 4.7	29.8 ± 4.8	28.9 ± 4.3	0.64
BMI, kg/m <sup>2</sup>	29.3 ± 4.2	26.7 ± 6.1	26.1 ± 4.4	0.22
Gravidity	2.9 ± 1.6	3.8 ± 1.6	2.1 ± 1.3	<0.001
Parity	1.2 ± 1.2	1.7 ± 1.2	0.7 ± 0.9	0.001
Presenting complaints*				
Asymptomatic	15 (83)	43 (91.5)	9 (39.1)	
Lower abdominal pain	3 (17)	4 (8.5)	9 (39.1)	<0.001
Vaginal bleeding	0 (0)	0 (0)	5 (21.8)	
Co-morbidities*				
Diabetes	6 (33.3)	8 (17)	2 (8.7)	
Hypertension	3 (16.7)	1 (2.2)	0 (0)	0.08
Others	3 (16.7)	8 (17)	4 (17.4)	
None	6 (33.3)	30 (63.8)	17 (73.9)	

\*Reported as n (%); BMI, body mass index

**Table 2:** Obstetric risk factors for cervical cerclage

Variables	History-indicated cerclage (N = 18); n (%)	History and scan-indicated cerclage (N = 47); n (%)	Scan-indicated cerclage (N = 23); n (%)	p-value
History of cerclage	6 (33)	21 (45)	0 (0)	0.001
History of mid-trimester miscarriage	5 (28)	22 (47)	4 (17)	0.046
Gestational age at previous abortion (weeks)*	12.4 ± 9.1	20.7 ± 3.1	15.4 ± 9.4	0.049
History of preterm labor	11 (61)	24 (51)	2 (9)	0.001
History of vaginal infection	1 (6)	4 (8)	0 (0)	0.39
Cervical length (cm)				
<2	1 (6)	3 (6)	4 (17.4)	<0.001
2–2.5	0 (0)	14 (30)	13 (56.5)	
>2.5–3	15 (83.3)	30 (64)	6 (26.1)	
Not checked	2 (11)	0	0	
Gestational age at cerclage (weeks)*	15.4 ± 4.4	14.8 ± 2.8	19.3 ± 4.2	<0.001

\*Reported as mean ± SD

**Table 3:** Pregnancy outcomes of cerclage

Variables	History-indicated cerclage (N = 12); n (%)	History and scan-indicated cerclage (N = 33); n (%)	Scan-indicated cerclage (N = 16); n (%)	p-value
Pregnancy prolongation (weeks)*	20.7 ± 5.5	20.9 ± 5.5	15.4 ± 6.1	0.004
Onset of labor				
Spontaneous	8 (89)	15 (71)	8 (80)	0.7
Induced	1 (11)	6 (29)	2 (20)	
Mode of delivery				
SVD	10 (83.3)	23 (70)	8 (54)	
Vacuum delivery	–	–	1 (7)	
Forceps delivery	–1 (8.3)	–1 (3)	1 (7)	0.1
Elective LSCS	1 (8.3)	9 (27)	2 (9)	
Emergency LSCS			3 (13)	
Chorioamnionitis	0 (0)	0 (0)	0 (0)	–
Weight of newborn (kg)*	2.9 ± 0.5	3.0 ± 0.5	2.9 ± 0.3	0.9

\*Reported as mean ± SD

The group where cerclage was applied due to incidental findings on ultrasound showed statistically lower gravidity and parity has some symptoms compared with other groups where more than 80% of patients were asymptomatic and based on history, they were screened early to decide for elective cerclage. In this group, cervical length was found to be short in more than 75% of patients, and that justifies placement of cerclage as an emergency procedure.

The literature is suggesting the beneficial effect of cerclage when there are contraindications like chorioamnionitis, in terms of both prolongation of pregnancy and neonatal outcomes.<sup>10</sup> In the absence of preterm labor, elective removal at 36–37 weeks of gestation is advisable owing to the potential risk of cervical injury in labor and the minimal risk to a neonate born at this gestation.<sup>11</sup>

Cervical length in the history alone group was found between 2.5 cm and 3 cm in 83% of patients, and in 6%, it was <2 cm. However, in history and scan-indicated group, 40% of patients were found to have significantly short cervix (<2.5 cm). In a subset of patients with

a history of preterm delivery, mid-trimester screening of cervical length and applying cervical sutures have been associated with good neonatal outcomes.<sup>12</sup> The data available are mixed, and that different authors have different suggestions and controversies in placing cerclage.

To et al.<sup>13</sup> compared outcomes in both groups in high-risk pregnancies and found that cervical cerclage reduces the incidence of preterm birth. This finding was also supported by other studies where cerclage placed after scan showed cervical length of <15 mm or less.<sup>14</sup> However, few studies have not shown sufficient improvement compared with bed rest.<sup>15</sup>

## CONCLUSION

Our study showed that patients with past history indicating cervical incompetence or short cervical length on transvaginal ultrasound should be offered cerclage to reduce the risk of preterm birth and to improve neonatal morbidity and mortality. There was a group

where there was no history-indicating incompetence was picked on ultrasound and received cerclage after the first trimester. This indicates that cervical-length screening by transvaginal ultrasound in the mid-trimester should be done in all patients. By doing this, we can pick some silent cases, and inserting cerclage can allow pregnancy to carry on and prevent preterm delivery.

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