Evaluation of Outcomes Associated with Placement of Elective, Urgent, and Emergency Cerclage

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Abstract

Objectives The aim of this study was to assess pregnancy outcomes after cervical cerclage.

Methods A retrospective analysis of all cervical cerclages placed at Al Qassimi Hospital from 2004 to 2008 was performed. The primary outcome of interest was prolongation of pregnancy beyond 36 wks. Secondary outcomes were premature rupture of membranes, birth weight <1,500 g, and neonatal death.

Results Cerclage was placed in 145 women: 112 elective, 16 urgent, and 17 emergency groups. Delivery beyond 36 weeks occurred in 79.4, 73.3, and 47.1 % in the elective, urgent, and emergency groups, respectively, $p = 0.011$. When comparing between elective, urgent, and emergency groups, incidences of low birth weight were 9.8, 13.3, and 33.3 %, respectively, $p = 0.06$, and premature ruptures of membranes occurred in 7.2, 6.3, and 17.7 %, respectively, $p = 0.16$. There were five neonatal deaths.

Conclusion Therefore, although cerclage gives best results when it is performed as an elective procedure, emergency cerclage still confers some benefits.

Keywords Cerclage · Outcomes · Pregnancy

Introduction

Preterm delivery is a leading cause of neonatal morbidity and mortality. The care of a preterm baby consumes a substantial portion of the health budget; therefore, strategies are directed to reduce the incidence of preterm birth [1].

Cervical incompetency or cervical insufficiency is one of several factors that may contribute to preterm labor. This is probably due to loss of the cervical mucus plug which is important in preventing ascending vaginal infection, which in turn can result in preterm delivery [2].

The diagnosis of cervical incompetence is often made retrospectively, after a woman has suffered a painless dilatation of the cervix leading to late miscarriage or early preterm delivery; often the fetus is too small to survive. Thus, it is defined as the inability of the cervix to retain a pregnancy in the absence of contraction or labor and is likely to represent a continuum, associated with a number of factors [3, 4].

The true incidence of cervical insufficiency in early pregnancy is difficult to determine [4] because of unclear diagnostic criteria, and thus no ideal optimum treatment is currently recommended.

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Although controversial, the traditional mainstay in the management of cervical incompetence is the application of transvaginal cervical cerclage. The procedure is offered electively to women with early pregnancy having either previous history of preterm birth/second trimester loss or in those with high risk factors for inherent cervical weaknesses such as exposure to (diethyl stilbesterol) DES in utero, surgical trauma to the cervix by repeated dilatation and curettage, loop electrosurgical excision procedure (LEEP), knife conization, and trachelectomy [4].

The procedure is also performed on urgent basis if the ultrasound scanning indicates the cervical shortening in an otherwise asymptomatic woman [4, 5]. Sometimes patients present with dilatation of the cervix evident by the vaginal examination, i.e., in the later part of the continuum, in which case the occlusion of the cervix is achieved by the “emergency” cervical cerclage. The efficacy of the cervical cerclage has been shown in a multicentre randomized trial of cervical cerclage conducted at Medical Research Council/Royal College of Obstetricians and Gynaecologists, in patients with cervical length <25 mm [6].

The rate of cervical cerclage varies according to country, with the procedure being more common in developing countries [7]. Fleischmann et al. [8] found that all patients requiring cerclage in a multi-ethnic London District General Hospital were women who originated from developing countries. It is not clear whether women from developing countries have a greater incidence of cervical incompetence, or broader criteria for performing the procedure.

The aim of this study was to evaluate the outcomes of pregnancies in women who underwent the procedure of transvaginal cervical cerclage between Jan 1, 2004 and Dec 31, 2008 at Al Qassimi hospital, Sharjah. The primary outcome was prolongation of the pregnancy beyond 36 weeks of gestation in elective, urgent, and emergency categories.

Methods

This was a retrospective study of pregnant women who had cervical cerclage performed at Al Qassimi Hospital—Sharjah, in the period from January 1, 2004 until December 31, 2008. The study was approved by the Institutional Research Ethics Committee.

Patients were categorized into one of three groups as follows:

Elective Group

The elective group comprises women, who have a history of painless cervical dilatation resulting in delivery in the second trimester, or history of preterm delivery, or history

of placement of cerclage in the previous pregnancy, and who present to the obstetric department early enough in the pregnancy to plan subsequent placement of cerclage.

Urgent Group

The urgent group comprises low risk women with transvaginal ultrasound findings suggestive of cervical insufficiency, including short cervix (<2.5 cm).

Emergency Group

The emergency group comprises women who presented with cervical dilatation <3 cm, with intact membranes, and without evidence of labor, or with visible amniotic membrane at or beyond the external cervical os.

Cerclage placement at our hospital is performed by specialist or consultant gynaecologist. Before commencing the procedure, a high vaginal swab is taken for culture and sensitivity, and active infections are treated with antibiotics.

Cerclage placement with a McDonald technique is performed under general anesthesia. Discharge from the hospital is generally within 24–48 h of the procedure.

In the emergency group, where there was funneling of membranes, the bulging membranes were reduced by inserting a Foley’s catheter with a 30-ml balloon transcervically. If membranes rupture during procedure, the procedure was abandoned.

Cervical cerclages are removed at 37 weeks of gestation, unless patients presented with progressing premature labor, in which case the cerclage is removed at the presenting time. Treatment with steroids and tocolytics is given if indicated. Preterm premature rupture of membranes >24 weeks of gestation is treated with antibiotics, steroids, and expectant management as per standard protocols according to RCOG guidelines. If rupture of membranes occurred at <24 weeks of gestation, the pregnancy is not conserved.

Analysis was performed on data obtained from patients’ medical records. One-way analysis of variance (ANOVA) was used to determine differences in continuous variables between the three groups. χ^2 analyses were performed to evaluate differences in categorical variables between the three groups. $p < 0.05$ was considered to be statistically significant.

Outcomes of Interest

Primary outcome of interest was prolongation of pregnancy >36 weeks.

Secondary outcomes were premature rupture of membranes, birth weight $<1,500$ g, and neonatal death.

Results

One hundred and forty-five patients underwent cerclage over the period from the beginning of 2004 to the end of 2008. There were 112 patients in the elective group, 16 patients in the urgent group, and 17 patients in the emergency group. Maternal demographic and obstetric characteristics for the study population sample are presented in Table 1.

Pregnancy outcomes of 135 patients are summarized in Table 2. Delivery data of 10 women who did not deliver at our hospital and could not be contacted were not collected. Mean gestational age at delivery was statistically different in the emergency group as compared with elective and urgent groups ($p = 0.037$). Similarly, prolongation of pregnancy to >36 weeks was higher in the elective and urgent cases as

compared with the emergency (79.4 and 73.3 vs. 47.1 %, respectively, $p = 0.011$). The interval between placement of cerclage and delivery was the highest for elective group, followed by urgent and emergency groups (22.3 ± 5.1 , 16.9 ± 4.8 , 11.7 ± 8.2 weeks, respectively, $p = 0.00$). Neonatal birth weight was lower for the emergency group as compared with elective and urgent groups ($p = 0.011$). Incidence of birth weight lower than 1,500 g which tended to be higher in the emergency group compared with urgent and elective groups (33.3 vs. 13.3 and 9.8 %, respectively, $p = 0.06$). Apgar scores at 5 min were comparable between the three groups (8.9 ± 0.4 vs. 8.9 ± 0.3 and 8.9 ± 0.4 , respectively, $p = 1.00$).

Multivariate regression analysis identified women with vaginal infection as being more likely to deliver before 36 weeks ($p = 0.005$, odds ratio 7.19).

Table 1 Maternal demographics

	Elective group (<i>n</i> = 112)	Urgent group (<i>n</i> = 16)	Emergency group (<i>n</i> = 17)
Age (years) avg.	30.63 $\pm$ 5.21	29.12 $\pm$ 4.22	30.76 $\pm$ 5.39
Parity (avg.)	1.18 $\pm$ 1.09	1.25 $\pm$ 1.53	0.94 $\pm$ 0.90
Indications for cerclage			
One prev 2nd trim loss	51 (45.5 %)	4 (30.8 %)	6 (35.3 %)
>1 prev 2nd trim loss	11 (9.8 %)	1 (7.7 %)	0
Short cervix	13 (11.6 %)	5 (38.5 %)	7 (41.2 %)
H/o preterm birth	30 (26.8 %)	2 (23.1 %)	4 (23.5 %)
Previous cerclage			
Yes	50 (44.6 %)	5 (31.3 %)	0
No	62 (55.4 %)	11 (68.8 %)	17 (100 %)
Positive HVS	11 (9.8 %)	3 (18.8 %)	3 (17.7 %)

Prev previous, Trim trimester, HVS high vaginal swab

Table 2 Pregnancy outcomes

	Elective group (<i>n</i> = 112)	Urgent group (<i>n</i> = 16)	Emergency group (<i>n</i> = 17)
GA of cerclage placement (weeks)	13.7 $\pm$ 1.7	18.6 $\pm$ 3.7	20.7 $\pm$ 4.0
Intra-op complication very short cervix	34 (30.4 %)	5 (31.3 %)	5 (29.4 %)
Complications till delivery			
None	71 (63.4 %)	10 (62.5 %)	9 (52.9 %)
Contractions	24 (21.4 %)	5 (31.3 %)	5 (29.4 %)
PROM	8 (7.1 %)	1 (6.3 %)	3 (17.7 %)
Prolongation of pregnancy (weeks)	22.28 $\pm$ 5.06	16.87 $\pm$ 4.84	11.65 $\pm$ 8.16
Mean GA at delivery (weeks)	36.0 $\pm$ 5.1	35.7 $\pm$ 5.1	32.4 $\pm$ 7.1
No. of cases delivered at >36 weeks	81 (79.4 %)	11 (73.3 %)	8 (47.1 %)
Avg. Baby weight (grams)	2836 $\pm$ 844	2637 $\pm$ 994	2111 $\pm$ 903
Baby weight <1500 g	10 (9.8 %)	2 (13.3 %)	5 (33.3 %)
Mode of delivery			
Vaginal	82 (73.2 %)	13 (81.3 %)	14 (82.4 %)
LSCS	30 (26.8 %)	3 (18.8 %)	3 (17.7 %)
APGAR at 1 min	7.7 $\pm$ 0.8	7.6 $\pm$ 0.5	7.2 $\pm$ 1.7
APGAR at 5 min	8.9 $\pm$ 0.4	8.9 $\pm$ 0.3	8.9 $\pm$ 0.4

GA gestational age, PROM premature rupture of membranes, LSCS lower segment caesarean section

We also report that in one of the patients cervical cerclage was performed for the second of twin, 24 h after the delivery of Twin 1 at 26 + 1 weeks: 720 g, alive. There was PPRM at 29 + 5 weeks, which was conservatively managed. Cerclage was removed at that time. The patient went into spontaneous labor at 32 weeks, to deliver a live male baby of 1,500 g, after an interval of 5 weeks and 2 days.

Discussion

The aim of this study was to evaluate the benefit of placing a cervical cerclage in prolonging pregnancy to 36 weeks, in each of elective, urgent, and emergency cases.

Among the various etiological factors, 9 % had two or more incidences of recurrent mid-trimester pregnancy loss (RMTP), 19 % had a short cervix, whereas 18.4 % gave history of preterm labor, and two had uterine anomalies. Shamshad et al. [9] demonstrated a very high incidence of 65 % for RMTP in their studies. This maybe because they have studied only cases with previous history of repeated pregnancy losses or with previous preterm deliveries.

The highest success rate was in the elective and urgent cases, with prolongation of pregnancy to 36 weeks or beyond occurring in only 47 % of women who had undergone emergency cerclage. Using data collected retrospectively, and in the absence of control groups (with bed rest and expectant management) [10], it is not possible to predict what proportion of pregnancies would have reached the same end without the intervention. Other authors have also reported emergency cerclage to prolong pregnancy to beyond 28 weeks in 10 of 13 cases [11].

Prolongation of pregnancy in our study was the longest in the elective group (22 weeks) followed by the urgent and emergency groups (17 and 12 weeks, respectively). Kurup and Goldkrand [12] reported prolongation of 20.2, 12.2, and 8.3 weeks in elective, urgent, and emergency groups, respectively. Nelson et al. [4] found that cerclage placement prolonged pregnancy by 21 ± 5.2 weeks, 14 ± 6.8 weeks, and 8.0 ± 6.7 weeks in elective, urgent, and emergency groups, respectively.

One concern is that, by putting an emergency cerclage in place, the pregnancy is pushed from being non-viable to viable state with extreme prematurity. In our study, the gestational age at delivery in the emergency group ranged from 20 to 40 weeks. There were five neonatal deaths. While a randomized control study design would give the best evidence, such a study is difficult to do because of the ethical problem of denying high risk patients a possibly beneficial treatment. Larger scale multi-centre observational studies are needed to shed light on this issue.

One topic that has been controversial in the literature has been the benefit of placing a cervical cerclage in

patients with no history, based on incidental ultrasound findings suggestive of cervical incompetency. To et al. [13] compared pregnancy outcomes in elective cerclage compared with ultrasound-indicated cerclage in high risk pregnancies, and found the latter to be associated with a lower incidence of preterm delivery. A later randomized controlled trial by the same author found no benefit on pregnancy outcomes on placement of a Shirodkar suture versus expectant management in women with a cervical length <15 mm at 22–24 weeks gestation [14]. Another study reported that placement of cerclage based on ultrasound findings reduced preterm delivery (<35 weeks) only in women with a cervical length <15 mm [15]. In contrast, Incerti et al. [10] found placement of cerclage did not improve pregnancy outcome in low risk women with cervical length <25 mm, as compared with bed rest alone. There is a possibility that some urgent cerclages are unnecessary. However, as Kurup and Goldkrand [12] suggest, there is also a possibility that some asymptomatic cases identified by ultrasound, will require emergency cerclage at a later date if left untreated. Pregnancy outcomes of urgent cerclages in our study were intermediate between elective and emergency, with gestational age at delivery being comparable with the elective group. However we found a higher incidence of premature rupture of membranes in the emergency group as compared with the elective and urgent groups, (7.14 % in elective group, 6.25 % in urgent group, and 17.6 % in emergency group). This is comparable to the findings of Kurup et al. [12] who found spontaneous PROM in 18 % of elective cerclage, 44 % in urgent group, and 51 % in emergency group.

The highest incidence of fetal birth weight <1,500 g was found in the emergency group (33 %), followed by 13.3 % in urgent group, and 9.8 % in elective group. These findings are comparable to the findings of Nelson et al. [4] (emergency group—56.3 %, urgent group—26.9, and 14 % in elective group).

In this study, we had only five neonatal deaths, but 10.3 % of babies required NICU admission. This is in contrast to the high incidence of neonatal deaths in all the groups reported by Nelson et al. [4].

Hence, we conclude that emergency cerclage does confer some benefit to patients with evidence of cervical incompetence (based on history, symptoms, signs, and ultrasound), although the outcomes are better if the cerclage is performed electively before the start of the process of preterm labor (elective group) and in the early phase of cervical changes (urgent group), rather than when the process of incompetence has already begun (emergency group), both in terms of complications (Premature Rupture of Membranes, Preterm Labor) and fetal weight >1,500 g.

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