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Author: Lisa Story Andrew Shennan

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**An assessment of mode of delivery in history indicated versus ultrasound indicated
vaginally placed cervical cerclage.**

Lisa Story¹, Andrew Shennan²

1 Perinatal Imaging Group, Centre for the Developing Brain, King's College London, St
Thomas's Hospital, London, SE1 7EH, United Kingdom

2 Women's Health Clinical Academic Centre, King's College London, St Thomas's Hospital,
London, SE1 7EH, United Kingdom

Address of Corresponding Author

Dr Lisa Story

Perinatal Imaging Group

Centre for the Developing Brain

King's College London

St Thomas's Hospital

London

SE1 7EH

UK

lisa.story@kcl.ac.uk

Tel: +44 (0) 2071889145

Fax: +44 (0) 2071889154

Condensation Cervical cerclage and mode of delivery.

Abstract

Objective

Treatment modalities to reduce the incidence of preterm birth are currently limited. Cerclage, is a common and established intervention in most obstetrics units worldwide, however, many questions regarding its efficacy, with respect to pregnancy outcomes remain unanswered. This study aims to investigate whether an antenatal placed cerclage affects the subsequent mode of delivery in women at high risk of preterm birth who labour.

Study Design

A retrospective case controlled study was performed at St Thomas's Hospital London. Women who had undergone cervical cerclage were identified using a pre-existing database (n=152). Cases were excluded where a C-section had been performed prior to labour (n=26), datasets were incomplete (n=5) or a rescue cerclage was performed (n=2). Remaining cases were categorised into those who had: history indicated (n=68) or ultrasound indicated (n=51) cerclage. Control cases were obtained from the same database who also laboured but had not undergone cerclage, matched according to gestational age at delivery and parity (n=114).

Demographic details and outcome data were recorded. Groups were compared using Chi Squared analysis for discrete variables and t-test for continuous variables using IBM SPSS Statistics version 22.

Results

There was no statistical difference in the emergency C-section rate between history indicated and ultrasound indicated cerclage, or between patients who received cerclage and those who had not ($p=0.592$). The emergency C-section rate for each group was: history indicated, 25%, ultrasound indicated 18% and no cerclage 18%.

Conclusions

Women at risk of preterm birth have high rates of emergency C-section despite the fact that the majority were multiparous. However, they can be reassured that cervical cerclage does not increase this risk.

Key words

Cervical cerclage, caesarean section, history indicated cerclage, ultrasound indicated cerclage.

Introduction

Preterm birth, occurring prior to 37⁺⁰ weeks gestation, is a common obstetric condition affecting up to 8% of pregnancies in the United Kingdom[1] and is a significant cause of both morbidity and mortality[2]. Treatment modalities to reduce the incidence of preterm birth are currently limited but include the administration of progesterone, pessaries and cervical cerclage[3].

Cerclage, the insertion of a suture into the cervix either abdominally, or vaginally, in an attempt to maintain its competence, has been used since the 1960s or is now a common and established intervention in most obstetric units worldwide. Vaginal cerclage, the most commonly performed procedure, can be divided into three groups: history indicated, ultrasound indicated and rescue. History indicated cerclages are inserted as a result of risk factors identified in a woman's obstetric or gynaecological history, which increase the risk of preterm delivery or spontaneous late miscarriage, women are typically asymptomatic and the suture is placed electively at approximately 12-14 weeks gestation. Ultrasound indicated cerclages are inserted therapeutically as a consequence of a short cervical length identified on transvaginal ultrasound. Ultrasonographic screening is performed on asymptomatic women who do not have exposed membranes in the vagina. Ultrasound indicated cerclages are typically placed between 14 and 24 weeks gestation. A rescue cerclage is inserted when premature dilatation with exposed fetal membranes has already occurred. This may be identified by ultrasound assessment of the cervix or as a result of a speculum performed for symptoms including vaginal discharge or bleeding.

Although cervical cerclage is an established intervention, its efficacy with regards to pregnancy outcomes such as the impact of the indication of cerclage on the subsequent mode of delivery has not been fully elucidated. This study therefore aims to assess the effect of insertion of history indicated and ultrasound indicated vaginal cervical cerclage on the subsequent mode of delivery, if women labour, compared with a group of women at high risk of delivery who did not have a cervical cerclage.

Materials and Methods

A retrospective, multicentre, case controlled study was performed between October 2010- and July 2016. Ethical approval had been obtained from the South East London Research Ethics Committee.

Women who had undergone cervical cerclage were identified from a pre-existing database: Preterm Clinical Network Database. Additional data collected included: maternal age, height, weight, ethnicity, parity, previous Caesarean Section, Previous cervical surgery, indication for cerclage, type of cerclage, gestation at delivery and mode of delivery. Multiple pregnancies were excluded and cases where a Caesarean section had been performed prior to labour, a rescue cerclage or transabdominal cerclage was inserted or datasets were incomplete. Remaining cases were categorised into those who had: history indicated or ultrasound indicated cerclage.

A third group of control cases were obtained from the same database. These were women, classified as being at high risk of preterm birth, due to a previous delivery $<37^{+0}$ weeks gestation, previous late miscarriage or previous cervical surgery, who also laboured but had not undergone cerclage, matched according to gestational age at delivery and parity.

Statistical analysis was performed using IBM SPSS version 22. A t-test was used to compare continuous variables and Chi squared for categorical data.

Results

152 women were identified from the database, who had undergone cerclage during the pregnancy. 152 women were obtained from the database who had laboured but had not undergone cerclage who were matched according to gestation at delivery and parity.

Of the women who underwent cerclage, 26 cases were excluded where a Caesarean section had been performed prior to labour, 5 cases due to incomplete data and 2 women who had undergone a rescue cerclage. 68 women had undergone a history indicated cerclage and 51 an ultrasound indicated cerclage. Of the matched control cases, 38 were excluded where a Caesarean section had been performed prior to labour.

The demographics of all women in the study and their previous history can be seen in table 1. Delivery parameters can be seen in table 2.

There was no statistical difference in the emergency Caesarean section rate between history indicated and ultrasound indicated cerclage or no cerclage ($p=0.592$). The overall Caesarean section rate in women who had a history indicated cerclage was 36 %, 34% in those who had ultrasound indicated cerclage and 37% in women with no cerclage.

Comment

Despite the high rate of multiparous woman in this study, (66%) it has been demonstrated that women at high risk of preterm birth have a high rate of Caesarean section in labour regardless of whether a cervical cerclage was placed or not. This was irrespective of whether they had an ultrasound indicated, history indicated or no cervical cerclage (25% for history indicated cerclage, 18% for ultrasound indicated cerclage and 18% where no cerclage was present). The emergency Caesarean section rates for all three groups are higher than the national average for 2014-2015 (15.4%) [4]. However, where a cervical cerclage was sited, whether the suture was placed electively as a result of the patient's previous history or as a result of shortening identified on ultrasound imaging, the mode of delivery was not affected.

Other studies have also showed no affect in the subsequent mode of delivery following a cervical cerclage. The insertion of a 'rescue' cerclage, whereby the suture is inserted after the process of cervical dilatation has already begun to occur, has not be shown to affect the subsequent mode of delivery[5]. However, this is distinctly different group from the asymptomatic women that underwent cerclage as part of this study.

Berghella et al, did find that the rate of emergency Caesarean Section was not increased by the insertion of a cervical cerclage during pregnancy, although their analysis did not distinguish between history and ultrasound indicated cerclage[6]. They compared 323 women who with a cervical cerclage in situ with 492 women at high risk of preterm labour with no cervical cerclage, finding no difference in the Caesarean section rate between the two groups, even when the analysis was limited to women who underwent a Caesarean section secondary to failure to progress in labour. Although this study did use a control group, who had not undergone cervical cerclage but did have risk factors, they did not match for gestational age at delivery.

Previous data has suggested an increased risk of Caesarean section associated with the placement of a cervical cerclage during pregnancy. The Cochrane review in 2012 ‘Cervical stitch (cerclage) for preventing preterm birth in singleton pregnancy’ reported that there was an increased rate of Caesarean Section rates in labour associated with women who had undergone cerclage earlier in the pregnancy, however, they did not distinguish between history and ultrasound indicated stitches. The exact mechanism for this was not known but it is highly plausible that damage to the cervix may have occurred as a consequence of the stitch, thereby attesting cervical integrity and increasing the risk of subsequent Caesarean Section[7]. However, women at high risk of preterm labour, regardless of whether a cerclage has been placed have often experienced a poor obstetric history: preterm birth or second trimester miscarriage. This may result in a biased diagnosis of failed induction of labour or failure to progress when clinicians were aware that the woman had undergone cerclage earlier in the pregnancy and a lower threshold for surgical intervention where fetal compromise was suspected.

Limitations

This study is retrospective in nature and although there was no difference in the proportion of women who had undergone a previous Caesarean Section, it was not possible to control for additional risk factors for Caesarean delivery and specifically identify women who had undergone a Caesarean Section for failure to progress in labour or other indications.

Conclusion

Women at risk of preterm birth have high rates of emergency and elective Caesarean section despite the fact that the majority were multiparous. However, they can be reassured that cervical cerclage does not increase this risk.

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Table 1: Maternal Demographics

	History Indicated Cerclage (n=68)	Ultrasound Indicated Cerclage (n=51)	No Cerclage (n=114)	Significance
Maternal Age (years)				
<i>Median</i>	33	27	33	Not significant
<i>Range</i>	19-45	18-41	20-46	
Maternal BMI				
<i>Median</i>	27	26	25	0.032
<i>Range</i>	17-45	18-41	17-42	
Ethnicity				
<i>Unclassified</i>	1 (1%)	2 (4%)	2 (1.5%)	0.001
<i>European</i>	22 (33%)	12 (23%)	72 (62%)	
<i>Indian</i>	1 (1%)	0	2 (1.5%)	
<i>Pakistani</i>	5 (7%)	0	2 (1.5%)	
<i>Bangladeshi</i>	2 (3%)	0	1 (1%)	
<i>AfroCaribbean</i>	11 (16%)	10 (20%)	8 (7%)	
<i>African</i>	24 (35%)	24 (47%)	24 (21%)	
<i>Far East Asian</i>	1 (1%)	1 (2%)	1 (1%)	
<i>South East Asian</i>	2 (3%)	2 (4%)	2(1.5%)	

Parity				
<i>0</i>	21 (31%)	19 (37%)	38 (34%)	Not significant
<i>1</i>	27 (39%)	17 (33%)	41 (36%)	
<i>2</i>	11 (16%)	9 (18%)	24 (22%)	
<i>3</i>	5 (7%)	5 (10%)	6 (5%)	
<i>4</i>	5 (7%)	1 (2%)	1 (1%)	
<i>5</i>	0	0	1 (1%)	
<i>6</i>	0	0	1 (1%)	
Previous				
Caesarean section	6 (9%)	4 (8%)	19 (17%)	Not significant
Previous Cervical Surgery	7 (10%)	7 (14%)	25 (22%)	Not significant

Table 2: Delivery parameters

	History Indicated Cerclage (n=68)	Ultrasound Indicated Cerclage (n=51)	No Cerclage (n=114)	Significance
Gestation at Delivery (weeks)				
<i>Median</i>	38+3	38+2	38+2	Not significant
<i>Range</i>	24+6-41+5	25+1-41+5	26+4-42+3	
Birthweight (Grams)				
<i>Median</i>	3150	3030	3100	Not significant
<i>Range</i>	600-4340	800-4316	860-4300	
Caesarean Section in Labour	17 (25%)	9 (18%)	20 (18%)	Not significant