Short Communication

Effectiveness of delayed absorbable monofilament suture in emergency cerclage

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A B S T R A C T

Objective: To determine the sustained effects of emergency cerclage using slowly absorbing monofilament sutures, changes in cervical length after cerclage were evaluated in six cases.

Materials and methods: A delayed absorbable monofilament suture (1 PDS-Plus; Ethicon, Inc., Somerville, NJ, USA) has been used for emergency cerclage after 20 weeks of gestation at Juntendo University Hospital since January 2011. A retrospective chart review was conducted including all of the patients undergoing emergency cerclage between January 2011 and August 2013. The patients’ characteristics, perinatal outcomes, cervical length, and obstetric data were collected.

Results: Six cases were identified from our medical records. Their characteristics and perinatal outcomes are shown in Table 1. Of the six cases, four had an extremely short cervix, with an average cervical length of 7.85 ± 3.38 mm, and two had prolapsed membranes. Fig. 1 shows the cervical length and the time elapsed after cerclage. There were no cases with shortening of the cervical length below the levels at the cerclage.

Conclusion: This absorbable monofilament suture appears useful for emergency cerclage.

Introduction

Cervical cerclage is a surgical procedure that is carried out during pregnancy to position a suture around the neck of the cervix. The cervix sometimes starts to shorten and dilate too early, causing either late miscarriage or preterm birth. In the absence of uterine contractions, the cause of this pathological condition is considered to be cervical insufficiency. To prevent miscarriage or preterm birth, cervical cerclage has been used for pregnant women with a high risk for preterm labor or miscarriage [1] with emergency cerclage performed for women with imminent risk. However, the efficacy of cerclage for reducing poor pregnancy outcomes has long been controversial [2]. A recent meta-analysis identified that cerclage significantly prevented preterm birth with a prior preterm birth and a short cervix [3]. Subsequently, the latest systematic review revealed that emergency cerclage is also associated with a longer latency period compared with bed rest alone [4]. Although emergency cerclage, under ideal circumstances, can significantly prolong pregnancy and increase the chance of a viable pregnancy outcome [5], this rescue procedure may increase the risk of chorioamnionitis, with the associated risk of foetal inflammatory brain injury [6]. Reduction of chorioamnionitis after emergency cerclage would contribute to reducing fetal morbidity associated with fetal inflammatory response syndrome, as well as miscarriage or preterm birth. Nonabsorbable braided sutures or woven tapes have been widely used for cerclage [7]. Monofilament macroporous polypropylene has been reported to be an appropriate material for transvaginal surgery [8]. However, the prosthetic material may cause infection following cerclage with a nonabsorbable polypropylene tape [9]. In addition, whether the tension of slowly absorbable suture is maintained in this procedure until term is uncertain. To determine the sustained effects of emergency cerclage using slowly absorbable monofilament sutures for prevention of preterm labor, changes in cervical length after cerclage were investigated in six cases.

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Materials and methods

A delayed absorbable monofilament suture (1 PDS-Plus; Ethicon, Inc., Somerville, NJ, USA) has been used for emergency cerclages after 20 weeks of gestation at Juntendo University Hospital since January 2011. A retrospective chart review was conducted including all of the patients undergoing emergency cerclage between January 2011 and August 2013. The patients’ characteristics, perinatal outcome, cervical length, and obstetric data were collected. These cases in which cerclage was performed were all singleton pregnancies with no past history of conisation, previous preterm birth, exposure to diethylstilbestrol in utero, or uterine anomaly. All cases had been followed up regularly, and no abnormalities were identified at prior examinations. The indications for the emergency cerclage were sharp decline of cervical length \(<10\) mm or prolapsed membranes after 20 weeks of gestation. Cases of bacterial cervicitis that were elastase-positive or clinical chorioamnionitis were excluded. All cases in this series were screened for Chlamydia trachomatis as part of routine obstetric care, and none were positive. In addition, no pathogens were found on bacterial cultures of vaginal specimens at admission. A double cervical cerclage procedure was performed in addition to McDonald cerclage [10]. After the first stitch was placed and tied, a second stitch was placed in a similar fashion proximal to the first suture, closer to the internal os. At the time of cerclage, 2 g of cefazoline sodium and 50 \(\mu\)g/min of ritodrine hydrochloride were given to all cases, and ritodrine hydrochloride was continued until regular contractions ceased. Subsequently, vaginal washing with insertion of chloramphenicol vaginal tablets was performed for 1 week. Cervical length was measured using transvaginal ultrasonography every week after cerclage. Prior to the emergency cerclage, the method of the cerclage was carefully explained, as was the risk for cervical laceration, and informed consent was obtained in every case. No ethical approval was required for this study since it was a retrospective chart review.

Results

Six cases were identified from our medical records. Their characteristics and perinatal outcomes are shown in Table 1. Of the six cases, four had an extremely short cervix, with a cervical length of 7.85 ± 3.38 mm, and two had prolapsed membranes. The mean gestational age at cerclage was 23.0 ± 0.9 weeks. The average latency period between cerclage and delivery was 13.4 ± 2.1 weeks, which allowed for no infants to be born before 30 weeks. All infants were born weighing over 1.5 kg. Two cases were delivered before 34 weeks because of preterm premature rupture of the membrane (PROM), and four cases were delivered beyond 36 weeks. There were no cases with shortening of the cervical length below the levels of the cerclage.

Discussion

PDS-Plus, which is a monofilament, triclosan-coated, absorbable surgical suture, retains its tensile strength for a relatively long time. This material retains 60% of its original strength for 6 weeks [11]. A PubMed search for reports published using the search terms “McDonald cerclage” and “absorbable sutures” identified only one report. Abdelhak et al [12] reported that McDonald cerclage using delayed absorbable sutures in four cases obtained comparable outcomes to that with non-absorbable sutures. To the best of our knowledge, this is the first report describing the changes in cervical length after cerclage using absorbable monofilament sutures. In the current protocol, all six cases prolonged their pregnancies more than 4 weeks and obtained favorable perinatal outcomes without any serious complications.

Because bacteria may be trapped in braided sutures or woven tapes, monofilament sutures are assumed to be appropriate for transvaginal surgery. Additionally, the triclosan-coated suture decreases surgical site infection [13]. Thus, triclosan-coated sutures are assumed to be suitable for transvaginal cerclage [14]. Because prosthetic material may increase the risk for infection and inflammation, absorbable suture may also have the advantage of prolonging pregnancies. However, wound support by this material has been reported to be maintained for up to 6 weeks. Figure 1 shows the cervical length and the time elapsed after cerclage.

![Figure 1. Cervical length and time elapsed between immediately before and after cerclage.](image)

### Table 1

Clinical characteristics and outcomes in 6 cases undergoing emergency cerclage.

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Prolapse of membranes</th>
<th>Parity</th>
<th>Cervical length at cerclage (mm)</th>
<th>GA at cerclage</th>
<th>GA at delivery</th>
<th>Mode of delivery</th>
<th>Interval from cerclage to delivery</th>
<th>Indications for CS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No</td>
<td>0P</td>
<td>6.7</td>
<td>22w2d</td>
<td>40w3d</td>
<td>FD</td>
<td>18w1d</td>
<td>PROM &amp; breech presentation</td>
</tr>
<tr>
<td>2</td>
<td>No</td>
<td>0P</td>
<td>10</td>
<td>20w5d</td>
<td>33w2d</td>
<td>CS</td>
<td>12w4d</td>
<td>Repeat CS</td>
</tr>
<tr>
<td>3</td>
<td>No</td>
<td>1P</td>
<td>8</td>
<td>23w1d</td>
<td>37w2d</td>
<td>CS</td>
<td>14w1d</td>
<td>PROM</td>
</tr>
<tr>
<td>4</td>
<td>Yes</td>
<td>1P</td>
<td>0</td>
<td>27w5d</td>
<td>31w5d</td>
<td>CS</td>
<td>4w</td>
<td>Repeat CS</td>
</tr>
<tr>
<td>5</td>
<td>No</td>
<td>1P</td>
<td>7</td>
<td>22w5d</td>
<td>36w6d</td>
<td>CS</td>
<td>14w1d</td>
<td>PROM</td>
</tr>
<tr>
<td>6</td>
<td>Yes</td>
<td>1P</td>
<td>0</td>
<td>21w3d</td>
<td>39w2d</td>
<td>ND</td>
<td>17w6d</td>
<td>Repeat CS</td>
</tr>
</tbody>
</table>

*CS = cesarean section; FD = forceps delivery; GA = gestational age; ND = normal delivery; PROM = preterm premature rupture of membranes.*
Interestingly, no significant decrease in cervical length was seen more than 6 weeks after the cerclage. Mechanical support to the cervix may depend on the residual suture tension or scar of the cerclage. Otherwise, cervical stiffness itself may recover after emergency cerclage. In any case, the emergency cerclage using this triclosan-coated absorbable suture, protecting against bacterial infection [13], may have kept the cervix closed until term. Because this study was unable to clarify the cause of these processes, inflammatory cytokine levels of intracervical fluid will be measured in our next study.

Although further investigation is necessary to confirm the safety and effectiveness of this suture, this study suggests the usefulness of this absorbable monofilament suture for emergency cerclage.

Conflicts of interest

The authors have no conflicts of interest relevant to this article.

References