Improvement for Cerclage Placement in Relation to Cervical Length in Patients Undergoing Cerclage Placement at Memorial Health and Relationship with Preterm Birth

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Background

Cerclage placement is a surgical procedure performed to treat cervical insufficiency and is associated with significant decreases in preterm birth. Indications for cerclage placement are based on history, physical exam, or ultrasonographic findings with a history of preterm birth. Cerclages aim to prevent adverse events, such as preterm prelabor rupture of membranes, preterm labor and delivery, fetal loss, and intrauterine infection by increasing the tensile strength of the cervix. The cerclage is placed distal to uterus and as far above the external os that can safely be obtained. Serial ultrasound measurements have been predictive of early warning signs of preterm birth with prophylactic cerclages. Previous studies have observed increasing absolute cerclage height and increasing cervical length after placement reduced preterm births. A static or shortened length after placement increased cervical length measurements pre- and post-placement, measurements distal and proximal to the cerclage, and relevant pregnancy complications. Statistical analysis has been performed to determine best practice of suture material and cerclage placement location that optimizes cervical length.

Objective

Our study aims to determine the best practice for placement to decrease preterm birth by analyzing prophylactic and rescue McDonald cerclages placed at our institution by assessing suture type, placement relationship to the internal and external os compared to total cervical length. The study is novel analyzing the mathematical relationship between cerclage location distally and proximally compared with total cervical length and its impact on preterm births.

Methods

494 cerclages placed at Memorial Health, a tertiary care center, have been reviewed in both Epic and Viewpoint from May 2015 to December 2021. Data includes gestational age when placed, placement indications, delivery gestational age, suture type, total cervical length measurements pre- and post-placement, measurements distal and proximal to the cerclage, and relevant pregnancy complications. Statistical analysis has been performed to determine best practice of suture material and cerclage placement location that optimizes cervical length. Ultimately, 250 patients were included in the final analysis as all cervical measurements and gestational age at delivery was present in the Epic and Viewpoint systems.

Results

<table>
<thead>
<tr>
<th>Suture Type vs Cerclage Indication</th>
<th>Prophylactic</th>
<th>Rescue</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Braided Mersilene Tape</td>
<td>43</td>
<td>95</td>
<td>138</td>
</tr>
<tr>
<td>Mersilene Tape</td>
<td>57</td>
<td>55</td>
<td>112</td>
</tr>
<tr>
<td>Totals</td>
<td>100</td>
<td>150</td>
<td>250</td>
</tr>
</tbody>
</table>

Mean Initial Pre-Cerclage Cervical Length with Green Braided Mersilene Placed: 17.71 mm

Mean Initial Pre-Cerclage Cervical Length with Mersilene Tape Placed: 24.54 mm

Mean Total Post Cerclage Cervical Length for Green Braided Mersilene: 34.31 mm

Mean Total Post Cerclage Cervical Length for Mersilene Tape: 33.51 mm

Mean Gestational Age of Time at Delivery for Green Braided Mersilene: 32 weeks 1 days of gestation (225.61 days of gestation)

<table>
<thead>
<tr>
<th>Mean Gestational Age of Time at Delivery for Mersilene Tape: 34 weeks 3 days of gestation (241.38 days of gestation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>p value = .002</td>
</tr>
</tbody>
</table>

Preterm vs Term Delivery in Relationship to Mean Post Cerclage Cervical Length Components

<table>
<thead>
<tr>
<th>Number of Patients</th>
<th>Caudal to Cerclage (Below “B”)</th>
<th>Cephalal to Cerclage (Above “A”)</th>
<th>Total Post Cerclage Length (“B”+“A”)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;37 Weeks</td>
<td>157</td>
<td>13.86 mm</td>
<td>10.70 mm</td>
</tr>
<tr>
<td>&gt;37 Weeks</td>
<td>92</td>
<td>17.42 mm</td>
<td>17.58 mm</td>
</tr>
</tbody>
</table>

P Values: <.001 <.001 <.001

Discussion

Rescue cerclages were more common in the data analyzed than prophylactic cerclages. This could be related to the fact prophylactic cerclages go on to deliver at term at outside hospitals while delivery information for pre-term deliveries is more common at a tertiary care center.

Green braided suture was used more commonly in the data analyzed than the mersilene tape. This could be due to provider preference vs need to place a smaller suture in a rescue cerclage because less cervical length is available.

Green braided suture was placed at an average gestational age later and when less cervical length available when compared to the mersilene tape. The post cerclage cervical length with mersilene tape was greater than with the green braided potentially related to above factors.

Ultimately, the mersilene tape had a mean gestational age of delivery greater to the green braided due to multifactorial components listed above.

Conclusion

When mersilene tape was used, the mean gestational age of delivery was greater, but it is important to note the mean starting cervical length was longer. Further analysis should be performed to analyze prophylactic and rescue cerclages separately at our institution to further understand how suture impacts cervical length. Further statistical analysis should be performed to investigate the ratios of the relationship of distance below and above suture placement.

References


