A New Simulation Model for Teaching Neonatal Circumcision.

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Citation

Abstract
Objective:
The objective of this paper is to present a new model for simulation of neonatal circumcision and to present data verifying the utility of the model as a tool in residency surgical-skills training.

Methods:
Forty-seven academic obstetricians at the March 2010 CREOG/APGO Annual Meeting watched an instructional DVD, assembled the model and performed a circumcision on the model using their usual techniques. After performing the circumcision, they completed a brief survey about the model.

Results:
Of the 47 responding physicians, 42 reported that the model simulated infant circumcision well. All 47 physicians felt that residents would benefit from practicing on this model before performing an actual circumcision and were at least considering adding the model to their residency training program. The instructional DVD was found to be helpful in teaching the assembly of the model by 34 of the 40 physicians who viewed it.

Discussion:
Overall, respondents found this model of circumcision to be a promising tool in training residents outside the procedure room. The model is inexpensive, easily constructed with common materials, and allows trainees to practice neonatal circumcisions in a safe setting.

INTRODUCTION
MATERIALS AND METHODS
THE MODEL
Table 1 and the accompanying picture show the materials needed to build the model. The accompanying photos and legends show the step-by-step assembly of the model. The model can be secured via the tape to a table top or may be attached to a baby mannequin in a circumcision restraint bed if more realism is desired. A linked DVD shows a demonstration of building the model and performing a circumcision with the model.
A New Simulation Model for Teaching Neonatal Circumcision.

**Building the Model**

**Figure 2**
1. Cut a 2-3 mm hole in the outer balloon

**Table 1**

<table>
<thead>
<tr>
<th>Materials</th>
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<tbody>
<tr>
<td>1. 2 small balloons</td>
</tr>
<tr>
<td>2. 1 scissor</td>
</tr>
<tr>
<td>3. 1 hemostat (not shown)</td>
</tr>
<tr>
<td>4. 1 probe</td>
</tr>
<tr>
<td>5. aluminum foil (2.5” x 1.5” piece)</td>
</tr>
<tr>
<td>6. suture tie (~12”)</td>
</tr>
<tr>
<td>7. surgical tape, 3-5mm thickness (3.5” x 2.5” piece)</td>
</tr>
<tr>
<td>8. ultrasound gel (bottle with spout)</td>
</tr>
</tbody>
</table>

**Figure 3**
2. Place the outer balloon over the inner balloon using the probe

**Figure 4**
3. Fill the inner balloon with ultrasound gel to the desired size and turgor and squeeze out any air bubbles

**Figure 5**
4. Use the hemostat to occlude the neck of the balloons
5. Tie the suture proximal to the hemostat

6. Remove the hemostat leaving the neck occluded via the suture

7. Cut a 5-8 mm hole in the center of the 3.5 X 2.5 inch piece of surgical tape

8. Use the hemostat to push the neck of the balloons and the sutures through the hole to the sticky side of the tape and pull the sutures through the hole

9. Secure the balloons by splaying the strings to either side of the balloon, overlying the adhesive
Figure 11
10. Center the aluminum foil on the adhesive side of the tape, covering the balloon ends

Figure 12
11. The completed model from the side to be secured to a firm surface

Figure 13
12. Both surfaces of the completed model are shown

THE SURVEY

We surveyed 47 academic obstetricians at the March 2010 CREOG/APGO Annual Meeting in Orlando, Florida. After watching the instructional DVD about the model, assembling the model and performing a circumcision on their model, they completed a written survey.

RESULTS

The questions in the survey, the allowed responses and the tabulated responses can be seen in Table 2.

Figure 14

Table 2

The survey provided the opportunity to write free text comments. Positive comments included: “Used Mogen, worked well. Will add it to intern orientation,” “Very good model to use to teach,” “Excellent, low cost,” “Best I’ve seen!” “Very ingenious model,” “Inexpensive model and good feel of instrument. I will use it to teach residents to teach.” Negative comments for those who responded ‘somewhat simulates’ category included: “The plastic balloons stick to each other – very difficult to cut,” “No release of foreskin adhesions. Can’t simulate the ring block,” “Cutting the balloon is not easy. Otherwise, very good,” “Doesn’t simulate freeing adhesions below foreskin.”

DISCUSSION

The model of the neonatal penis presented overcomes some problems encountered with previous models. This model
A New Simulation Model for Teaching Neonatal Circumcision.

allows a more realistic appearance and feel compared to previous models. It can be adopted by all the current instrumental methods of circumcision although may not be applicable to free hand circumcisions. It also allows practice in anesthetic injection. The balloon model is inexpensive, has minimal storage problems and the materials are easily obtained. There is minimal chance of injury in this purely in vitro model compared to the use of a person’s finger in a previous model [3].

Task trainers may decrease time to master a procedure while providing for the standardization of instruction, feedback, and evaluation [5, 6]. Instrumentation proficiency may be learned on such a model so that in an actual circumcision, the challenge is not deciding which instruments to use and how to handle them, but instead focuses on the intrinsic technique of the procedure itself. We feel that practicing on a physical model decreases the time to learn the procedure as well as increases the chance of a first trial successful outcome, but these hypotheses were not explored in this study.

The validation survey has strengths and weaknesses. In terms of strengths, the model was tested on a large number of subjects. Because of their attendance at the CREOG/APGO meeting, the subjects can be expected to be active in resident teaching and to be leaders in their institution. The subjects gave their opinions immediately after using the model. There were also weaknesses. The model was tested on a self-selected group of academic obstetricians who may differ from the general population of those who teach residents. The survey used broad categories of experience on circumcision and did not determine the experience of the participants in teaching neonatal circumcision.

While we believe that this model improves on previous efforts, the model has limitations. It does not accurately model the breaking of adhesions or bleeding. The balloons are more fragile than skin and tearing can be a problem. We are working on improving the model to allow simulation of adhesiolysis and hemorrhage in addition to damage to the glans.

References
A New Simulation Model for Teaching Neonatal Circumcision.

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