Anesthetic Management of MRI-OR Guided Laparoscopic Anorectoplasty

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Background

- Pre and post-operative MRI is an established tool in evaluating the efficacy of anorectoplasty in the setting of imperforate anus.
- Intraoperative MRI guided laparoscopic anorectoplasty is an emerging technique in the management of congenital imperforate anus.
- Adapting the MRI environment into an Operating Room entails numerous challenges and hazards.

Case Series

- We present a case series of seven patients, aged 7-16 months (Table 1), and describe the unique anesthetic implications of this approach.
- The anesthetic and surgical course in each case was standardized and is described below
- The variation in length and number of MRI scans performed is presented in Table 1

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight</th>
<th>Total Magnet Deployments</th>
<th>Surgical Time (hrs:min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 months</td>
<td>9.2 kg</td>
<td>8</td>
<td>8:04</td>
</tr>
<tr>
<td>12 months</td>
<td>8.5 kg</td>
<td>8</td>
<td>6:23</td>
</tr>
<tr>
<td>8 months</td>
<td>7.6 kg</td>
<td>4</td>
<td>6:15</td>
</tr>
<tr>
<td>10 months</td>
<td>8.2 kg</td>
<td>2</td>
<td>3:03</td>
</tr>
<tr>
<td>16 months</td>
<td>11.8 kg</td>
<td>3</td>
<td>6:18</td>
</tr>
<tr>
<td>9 months</td>
<td>8.1 kg</td>
<td>2</td>
<td>6:53</td>
</tr>
<tr>
<td>7 months</td>
<td>9.9 kg</td>
<td>3</td>
<td>7:21</td>
</tr>
</tbody>
</table>

Table 1. Age, weight demographics, number of scans performed and total surgical time.

Anesthetic Technique

- Anesthesia was induced in an induction bay adjacent to the MRI-OR.
- Inhalational inductions were performed, followed by peripheral IV placement and intubation with a cuffed endotracheal tube.
- A second IV and a Foley catheter were placed.
- A post-induction time-out was performed.
  - During this time-out, examinations were performed to confirm the patients were free of metal.
- The patients were then transported to the MRI-OR on an MRI compatible stretcher ventilated via AMBU bag.
  - All oxygen tanks were secured to the stretcher.
  - No needles were transported with the patients.
- The patients were connected to the MRI-compatible anesthesia machine and monitors.
- The patients were placed in the lithotomy position using a custom-made MRI compatible “Jarboe” frame (Figure 1).

Figure 1. - Patient positioned in custom “Jarboe” frame

- The OR ambient temperature was maintained at 76° F.
- Anesthesia was maintained with isoflurane.
- No muscle relaxation was given
  - Pena nerve stimulator was utilized to facilitate identification of the anus.
- The surgeon inserted a needle to guide the anorectoplasty (Figure 2).

Figure 2. - Surgeon placing needle

Conclusion

- The MRI-OR is a unique operating environment that requires multiple modifications to the anesthetic technique to ensure patient safety.
- Constant vigilance must be maintained throughout the anesthetic to ensure the operating environment remains free of hazards.

References