Radiation exposure, reduction techniques, and standardization of swallow study evaluations

Mason Brown
Advocate Aurora Health, mason.brown@aah.org

Shelly Reimer
Advocate Aurora Health, shelly.reimer@aah.org

Leah Presper
Advocate Aurora Health, leah.presper@aah.org

Theresa Ackerman
Advocate Aurora Health

William MacDonald
Advocate Aurora Health, william.macdonald@aah.org

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Radiation Exposure, Reduction Techniques, and Standardization of Swallow Study Evaluations

Mason A. Brown, MD¹, Shelly Reimer, MD¹, Leah Presper², Theresa Ackerman², and William MacDonald, MD¹
Aurora St. Luke’s Medical Center, ¹Department of Radiology, ²Department of Speech Pathology, Milwaukee, WI
Q1. What did you hope to accomplish?

- Retrospectively establish a fluoroscopic radiation exposure baseline
  - Analyze past swallow study procedures performed by a single resident as proxy measure for interprofessional team exposure rates

- Interventions
  - Provide proper radiation safety equipment for all team members
  - Implement a standardized swallow study evaluation flowchart to promote efficiency and organization

- Monitor prospective radiation exposure reduction techniques
  - Analysis of swallow study procedures performed by that same resident after implementations
  - Compare retrospective and prospective data in order to assess relative success of implementations
Q2. What were you able to accomplish?

- **Baseline:** Obtained and analyzed retrospective radiation exposure data
  - Calculations for patient radiation exposure (time, dosage, # of imaging runs)
  - Resident radiation exposure data over a 4-week rotation extrapolated (time, dosage)

- **Interventions:** Proper equipment provided to all team members
  - Shared radiation safety glove for speech pathology
  - Shared radiation safety goggles with cleaning supplies for fluoroscopic techs

- **Findings:**
  - Protective equipment unused by interprofessional team members
  - Identified safety issues with badge-dosimetry monitoring
    - Deficient collection/reporting by the physics department
    - Inconsistent usage
    - Incorrect monthly badge updates/turn-ins
Swallow Study Flowchart and Results

### Swallow Study Flowchart

- **Nectar-thick liquids** (teaspoon, cup, straw)
- **Honey-thick liquids** (teaspoon, cup, straw)
- **Thin-consistency liquids** (teaspoon, cup, straw)
- **Puree** (teaspoon)
- **Barium-coated cracker**

### Prior to Implementations

<table>
<thead>
<tr>
<th>Patient Radiation Exposure</th>
<th>Time (minutes)</th>
<th>Radiation (mGy)</th>
<th>Runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>1.9</td>
<td>7.9</td>
<td>13.5</td>
</tr>
<tr>
<td>Median</td>
<td>1.8</td>
<td>7.2</td>
<td>13</td>
</tr>
<tr>
<td>Range</td>
<td>0.3 – 4.3</td>
<td>1.5 – 24.3</td>
<td>1 – 26</td>
</tr>
</tbody>
</table>

### After Implementations

<table>
<thead>
<tr>
<th>Resident Radiation Exposure</th>
<th>Time (minutes)</th>
<th>Radiation (mGy)</th>
<th>Runs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extrapolated Exposure per 4-week Rotation</td>
<td>183.7</td>
<td>21.2</td>
<td></td>
</tr>
</tbody>
</table>

| Time (minutes) | 174 ↓ | 22.3 ↑ |

<table>
<thead>
<tr>
<th>Time (minutes)</th>
<th>1.8 ↓</th>
<th>8.3 ↑</th>
<th>14.1 ↑</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median</td>
<td>1.9 ↑</td>
<td>7.8 ↑</td>
<td>15.5 ↑</td>
</tr>
<tr>
<td>Range</td>
<td>0.4 – 3.3 ↓</td>
<td>1.9 – 21.8 ↓</td>
<td>4 – 27 ↑</td>
</tr>
</tbody>
</table>
Q3. Knowing what you know now, what might you do differently?

- **Interventions:**
  > Educate team re: repeated radiation exposure effects on their long term health (*just because do not immediately experience it...*)
  > Periodic reinforcement essential

- **Metrics**
  > Obtain proper badge-dosimetry data – it’s standardized radiation exposure reporting system
  > Compare baseline results with badge-dosimetry data
Q4. What surprised you and why?

- Assumed providing radiation safety goggles to fluoroscopic technologists and gloves for speech pathologists would result in their use
- Team members rarely if ever chose to wear them - “inconvenient”
Q5. Cohort Five – Sustainability and next steps

- What does your CEO need to know to help keep your work sustainable?
  > Need to improve badge-dosimetry reporting/documentation
  > Proper use of radiation safety equipment needs to be hospital priority