Reducing the Complication Rate of Feeding Tube Placements
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Between July 2010 and October 2010 we received reports of three patients who received a feeding tube that was placed in the lungs, resulting in an iatrogenic pneumothorax. Two of these patients died, and in the two cases the misplacement of the feeding tube hastened the patient’s death.

Findings:
• Tubes were placed by experienced nurses
• 15 different types of 8 Fr or greater tubes stocked in PYXIS
• No major changes to the way the tubes were manufactured
Literature Review:

Feeding tube placement with stylet:

- 1.2% - 1.8% airway placements per attempt
- 0.4% - 0.6% pneumothorax per attempt
- 0.2% - 0.3% risk of death per attempt!
- For comparison, incidence of common complications at TNMC include pressure ulcers 0.16%, blood stream infections 0.14%, post-op DVT/PE 1.1%!
- This complication is far more common than wrong site surgery or retained sponges (estimated incidence 0.001% and 0.01%)


Retrospective Review:

Reviewed x-ray reports with an indication for feeding tube placement/Dobhoff placement from January 2010-February 2011:

- 960 reports reviewed
- 31 reports were found to have tubes placed in the lungs.
- Eight resulted in pneumothorax
- Average of 2.5 X-rays were obtained to confirm placement
- Approximate complication rate = (31/960)/2.5 = 1.3%
Prospective Review: 6 Neuro

9 tubes placed in 6 different patients
Average Attempts: 1-7
Average Time to place: 5-70 min
Average Time to confirm: 30-115 min
  Fluoro=2
  Xrays=8

Average cost per placement: $536.05
  (tube cost + fluoro + xrays/6 = total avg. cost)

Literature Review Solutions:

- It’s possible to identify ‘high-risk’ patients (diminished gag reflex, intubated, abnormal mental status, etc.), but airway placement and pneumothorax happens even in patients who have no risk factors
- Modification of insertion technique (e.g. insert up to x cm, then do imaging, etc.) has never shown to reduce complication rate
Retrospective comparison high-risk patients with blind feeding tube insertion in 2005 versus high-risk patients with Cortrak guided feeding tube placement in 2007:

<table>
<thead>
<tr>
<th></th>
<th>before</th>
<th>after</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway placement per tube</td>
<td>1.5%</td>
<td>0%</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Pneumothorax per tube</td>
<td>0.6%</td>
<td>0%</td>
<td>0.009</td>
</tr>
<tr>
<td>Fluoro needed</td>
<td>11%</td>
<td>2.1%</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Xrays/tube</td>
<td>1.49</td>
<td>1.07</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

6 feeding tubes placed house wide by 3 Leads from AICU 800 / 850

- Airway placement=0
- Required Fluoro=0
- # Xrays/tube placement=1
- Complications=0
Solution

- Adoption of the CorTrak System
- Go live date August 1, 2011.
- Standardization of feeding tubes from 15 to 4

Results

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Pyloric placements</td>
<td>16%</td>
<td>72%</td>
</tr>
<tr>
<td>Gastric placements</td>
<td>80%</td>
<td>27%</td>
</tr>
<tr>
<td>Lung placements</td>
<td>2.4%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Xrays taken</td>
<td>2.5</td>
<td>1.06</td>
</tr>
<tr>
<td>Cost per tube placement</td>
<td>$536.05</td>
<td>$216.44</td>
</tr>
</tbody>
</table>
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Key Take Away:

FOR ALL:

- Feeding tube placement complications exceed pressure ulcers, blood stream infections and post-op DVT/PEs
- The cost savings by standardizing products and eliminating multiple radiology procedures outweighs the increased cost of the tubes.