Effect of Nasogastric Tubes on Incidence of Aspiration

Table 1. Aspiration Status of Liquid and Puree Consistencies Based upon Presence of an NGT

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Liquid Aspiration</th>
<th>Puree Aspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>153 (24.3%)</td>
<td>91 (14.4%)</td>
</tr>
<tr>
<td>No</td>
<td>477 (75.7%)</td>
<td>539 (85.6%)</td>
</tr>
</tbody>
</table>

Table 2. Independent Variables of NGT Status and Age (Decade) with the Dependent Variable of Liquid Aspiration

<table>
<thead>
<tr>
<th>Age Decade</th>
<th>Liquid Aspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-29</td>
<td>677 (70.6%)</td>
</tr>
<tr>
<td>30-79</td>
<td>487 (77.3%)</td>
</tr>
</tbody>
</table>

Table 3. Independent Variables of NGT Status and Age (Decade) with the Dependent Variable of Puree Aspiration

<table>
<thead>
<tr>
<th>Age Decade</th>
<th>Puree Aspiration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-29</td>
<td>81 (14.8%)</td>
</tr>
<tr>
<td>30-79</td>
<td>93 (14.8%)</td>
</tr>
</tbody>
</table>

Background & Purpose

- Nasogastric tube (NGT) feeding is the most widely used non-oral feeding method in patients who are incapable of taking oral alimentation or who require additional nutrition to supplement inadequate oral intake (DiSario, 2002; Finnucane et al., 1991).
- Aspiration coinciding with NGT use is both common and a major complication (DiSario, 2002; Gomes et al., 2003; McClave et al., 2002). However, due to the multifactorial nature of aspiration pneumonia, no causation has been documented among presence of an NGT, aspiration, and development of aspiration pneumonia.
- Despite widespread use, there is a paucity of data concerning the impact an NGT has on the incidence of aspiration during swallowing. This is due to small sample sizes, non-comparable population samples, and differing methodologies that preclude a definitive answer as to whether or not an NGT affects swallowing success.
- Purpose: To determine what effect, if any, an NGT has on incidence of aspiration during objective evaluation of swallowing using liquid and puree bolus consistencies.

Methods

- In a prospective manner, from December 1999 to September 2006, 1,260 consecutive inpatients from a large urban, tertiary care, teaching hospital referred for dysphagia evaluations participated.
- Group 1 (N = 630; 346M; 248F) had an NGT
  - 61% had small-bore tubes (8Fr., 2.55mm diameter)
  - 39% had large-bore tubes (18Fr., 6.0mm diameter)
- Group 2 (N = 630; 360M; 270F) did not have an NGT.
- Fiberoptic endoscopic evaluation of swallowing (FEES) (Langmore et al., 1988; 1991) was used to determine aspiration status. The protocol consisted of:
  - 3 5cc boluses each of puree (yellow pudding) followed by
  - 3 5cc boluses cc each of thin liquid (white milk)
- Aspiration was defined as entry of material into the airway below the level of the true vocal folds (Logemann, 1998).

Results

- No significant differences were found for gender based on NGT status.
- No significant differences were found for age based on NGT status, but subjects between 30-79 years of age had a greater percentage of NGT placements than both younger (0-29 years) and older (80-99 years) subjects.
- Some differences in percentage of NGT use dependent upon diagnostic category were noted.
  - iatrogenic causes, i.e., surgery, accounted for the highest percentage of NGT use (70.6%); followed by idiopathic, i.e., medical and pulmonary (81.8%); and neurologic, i.e., strokes (41.6%).
  - A Pearson’s chi-square indicated no significant differences for aspiration of either liquid (X²[1, N=1,260] = .442, p = .506) or puree (X²[1, N=1,260] = .025, p = .873) food consistencies dependent upon presence of an NGT.
  - A binomial logistic regression analysis examined the independent variables of NGT status and age (decade) with the dependent variables of liquid and puree aspiration (See Tables 2 & 3).
  - No significant differences were found (p > .05).

Discussion

- For the first time with an adequately large and heterogeneous population sample and objective determination of aspiration during ingestion of liquid and puree food consistencies, it has been shown that the presence of an NGT did not affect swallowing success, i.e., the incidence of aspiration for both liquid and puree food consistencies was the same with or without an NGT in place.
- Because no statistical differences in aspiration status were found for both liquid and puree bolus consistencies, it does not appear that an NGT impacts negatively on pharyngeal sensitivity, irritates the pharyngeal mucosa, or alters pharyngeal transit times enough to influence overall swallowing success (Wang et al., 2006).
- Consistent with previous research, NGT size, i.e., small- or large-bore tubes, did not affect swallowing function (Huggins, 1999).
- Because an objective swallowing evaluation can be performed with an NGT in place, it is not necessary to remove an NGT to evaluate dysphagia.
- Similarly, there is no contraindication to leave an NGT in place to supplement oral alimentation.