Swallowing Post Extubation in Patients with No Premorbid Dysphagia

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Our Study

2 Aims:

- Determine incidence of dysphagia, aspiration and laryngeal pathology in pts with no preexisting dysphagia at 24 and 48 hours post-extubation

- Determine the predictors of dysphagia and aspiration from laryngeal exam or other variables
Review of the Literature

  - 20 trauma patients, intubated at least 48 hrs.
  - FEES completed 24 hrs+/- 2 hours post extubation
  - aspiration in 45% of the patients (9 of 20)
  - 44% of those were silent aspirators (4 of 9)
  - pharyngeal residue and laryngeal penetration was associated with aspiration
  - presence of NGT was not associated with aspiration
Literature review continued

- Postma, G. et al., *Laryngoscope* 2007
  - 100 patients with dysphagia were reviewed for prevalence of laryngopharyngeal abnormalities
  - 76% of subjects were previously intubated
  - 79% had LP abnormalities
  - Most prevalent laryngeal abnormalities were arytenoid edema, granuloma and vocal cord paresis, associated with increased length of intubation
  - No info on dysphagia
Barquist et al., *Critical Care Medicine*, 2001
-a randomized prospective clinical trial
-70 patients intubated at least 48 hours
- 37 evaluated with FEES
- 33 evaluated with clinical exam

- 13% (5/37) aspirated in FEES group
- 6% (2/33) aspirated in observation group
- All developed pneumonia
- 10% rate of aspiration overall
- Those that aspirated were significantly older than general
- No association with length of intubation
Literature Review cont’d

  - 48 patients w/no premorbid dysphagia, were assessed with FEES within 48 hours post extubation
  - 56% aspirated; 25% were silent aspirators

- prospective study of 80 patients
- Excluded laryngotracheal, esophageal, neuro, and muscular dx
- 62% of extubated had swallow delay with injections of saline on day of extubation
- No correlation between swallow delay and age or duration of intubation
- Swallow delay resolved 48 hours after extubation
Prospective study of 2 groups of 42 patients; matched for severity of illness, above age 65 and below age 65
- Excluded trach, HNC, CVA, and neuro pts. NGT’s removed
- FEES completed within 48 hours
- 52% aspirated in group above age 65, 36% below age 65
- No correlation with duration of intubation with aspiration
Conclusions from previous studies

- Incidence of aspiration post-extubation
  - at 24 hrs – 45% (Leder 98)
  - at 48 hrs – 36% of young; 52% of old (El Solh 03)

- Pattern of dysphagia post-extubation
  - 62% exhibited delay in swallowing on day of extubation
  - Swallow delay resolves in 48 hrs (DeLarminat 95)

- Incidence of Laryngeal pathology
  - 79% have laryngeal pathology (Postma, 07)
Inclusionary Criteria

- Intubated for > 48 hours
- Age 18 or older
- English speaking
- Alert & able to consent
Exclusionary Criteria

- History of oropharyngeal dysphagia
- Existing or co-morbid neurological disease
- History of Head & Neck Cancer
- History of Head & Neck Surgery
- Presence of a tracheostomy tube
Subjects

- Included 19 females, 24 males
- Ages 19 to 82
- 39 subjects emergently intubated
- 4 subjects electively intubated
- 10 subjects had a Dobhoff or NG tube in place
- Duration of intubation -2 to 28 days.
- # 6,7,7.5 or 8 High-Lo Evac Endotrachael tube used
Procedure

- Standard FEES protocol conducted by SLP to assess swallow function.
- Laryngeal exam performed and rated by Otolaryngologist.
- Two sprays 4% topical Lidocaine & or Oxymetazoline HCT (Afrin) if needed.
Ice chips, thin liquids, puree, masticated solid and thin barium administered as tolerated

Nectar thick liquids given if thin liquids are aspirated.

Laryngeal sensation assessed with a light touch to aeryepiglottic folds bilaterally using tip of laryngoscope.
Dysphagia Rating Scale

Parameters rated per consistency
- Spillage point
- Swallow onset time / delay before onset
- Degree of pharyngeal residue
- Penetration/Aspiration Scale

Presence of secretions rated
Laryngeal sensation rated
Spillage Point Score

- 0 = none or
- 1 = to valleculae
- 2 = to lat channels
- 3 = pyriforms
Delay before swallow onset

- 0 = 0-2 seconds
- 1 = 3-5 seconds
- 2 = 6-8 seconds
- 3 = 9+ seconds
Residue Score

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absent (coating/trace)</td>
</tr>
<tr>
<td>1</td>
<td>1/4 valleculae, lateral channels or pyriforms filled.</td>
</tr>
<tr>
<td>2</td>
<td>Nearly or completely fills valleculae, pyriforms, lateral channels or ¼ of several channels.</td>
</tr>
<tr>
<td>3</td>
<td>Nearly or completely fills 2 or more cavities</td>
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</tbody>
</table>
Penetration/Aspiration Scale

PAS Scale (Rosenbek, 1996)

1. Material does not enter airway
2. Material enters the airway, remains above the vocal folds, and is ejected from the airway.
3. Material enters the airway, remains above the vocal folds, and is not ejected from the airway.
4. Material enters the airway, contacts the vocal folds, and is ejected from the airway.
5. Material enters the airway, contacts the vocal folds, and is not ejected from the airway.
6. Material enters the airway, passes below the vocal folds, and is ejected into the larynx or out of the airway.
7. Material enters the airway, passes below the vocal folds, and is not ejected from the trachea despite effort.
8. Material enters the airway, passes below the vocal folds, and no effort is made to eject.
Final Ratings

- **Secretions**
  - **0** = none/moist
  - **1** = excess outside laryngeal vestibule
  - **2** = excess in laryngeal vestibule

- **Sensation**
  - **0** = intact
  - **1** = reduced or absent on 1 side
  - **2** = reduced or absent on both sides
4 to 6 raters viewed each study and scored Dysphagia Rating Scale.

Otolaryngologist rated vocal cord immobility, presence of ulceration, granuloma, laryngeal edema, erythema and subglottic stenosis.
A Total Swallow Score was calculated per subject by adding highest score on each swallow parameter.
-possible range 0-17

Analysis:
Variables were analyzed either as continuous or dichotomous variables
Univariate and multivariate models were used
RESULTS
Our Patients

- Age
  - Mean = 57 yrs (19- 82)
- Most Common Medical Diagnoses
  - ARDS
  - Pneumonia (community acquired)
  - Sepsis
  - Cardiac Arrest
  - Post-surgical
Intubation/Extubation Results

- Duration of intubation: mean 9.51 days
  SD 6.32

- Time post extubation until examination:
  24 hrs=30 subjects
  48 hrs= 13 subjects

- 90% (39/43) were emergently intubated
Swallowing and Laryngeal Findings

Swallowing function
- 93% had dysphagia (most were mild-moderate)
- 25% of patients aspirated
  - <1% silent

Laryngeal function
- 98% of patients had laryngeal pathology
- most common abnormality was edema, vocal fold immobility and granuloma
Characteristic Swallow Patterns for Patients with Total Swallow Score above the mean

Our pts w/ moderate to severe dysphagia

- Mean PAS score = 5.5 (5 or 6 either penetration to VC or aspiration that was expelled)
- Mild residue- in only one cavity
- Spillage to the lateral channels (not below)
- Onset time - max of 6 to 8 seconds
Pattern for our pts w/ more severe dysphagia

- Swallow was not ‘weak’ but ‘slow to begin’
  - Characteristic of reduced cortical monitoring
  - May be related to lingering sedation
Residue and Spill Points in each PAS Group

Penetration/Aspiration Scale (PAS)

Score

Highest Residue
Worst Spill Point

Normal (1) Penetration (2-5) Aspiration (6-8)
Factors NOT significantly associated with Dysphagia or Aspiration

Duration of intubation
Time from extubation until examination
Excess secretions in laryngeal vestibule
Change in Swallow over 2 Days

- Highest Residue
- Worst Spill Point
- Average PAS

Score

24 hrs 48 hrs

Time
Significant Predictors of Patients with most severe dysphagia

- VC immobility ($p = 0.0172$)
- Advanced age PLUS laryngeal edema ($p=0.0227$)
Borderline Significant Predictors of Aspiration

- Impaired laryngeal sensation to touch (p=0.062)
CONCLUSIONS
CONCLUSIONS

Intubation can impair swallowing up to 48 hrs post-extubation in about 93% of patients.

- No difference from 1 to 2 days post extubation
- Beyond 2 days .......?

Only 25% aspirated
  low compared to other studies

Duration of intubation may not affect outcome

Most important predictors are:
  advanced age, VC edema, VC immobility
Laryngeal and FEES Exams are Valuable

- With instrumental exam (FEES) you can identify the nature of the problem and make effective recommendations
- And enable patients to eat as soon as possible

- 79% of our examined patients were able to eat orally after the exam
Future Directions

- Larger sample size
- Need to consider other predictors such as mental status/level of alertness, hoarse voice (and other predictors that could be identified at bedside)
- Follow same patients over 3+ days to assess rate of recovery
THANK YOU

QUESTIONS??????
References

- Leder SB, Cohn SM, Moller BA. Fiberoptic endoscopic documentation of the high incidence of aspiration following extubation in critically ill trauma patients. Dysphagia. 1998 Fall; 13 (4): 208-12.