

Adult FEES

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Introduction

- Established evidence
- Recent FEES research
- Clinical findings
- Future directions



FEES

- Fiberoptic Endoscopic Evaluation of Swallowing
- Evaluates laryngopharyngeal structures, secretions, sensation and swallowing ability on oral trials of real food/drinks
- Patient selection based on clinical indications from bedside assessment
- Performed by 2 trained SLT's, ENT collaboration



Endoscopic view of a normal swallow



Established evidence

- Procedure remains largely unchanged
- Sensory threshold testing FEESST (Aviv 1998)
- 60 FEES articles published to date
- Good agreement with VFS on detection of residue, penetration, aspiration and silent aspiration
- Penetration and aspiration more frequently identified on FEES (Wu 1997)



FEES is highly sensitive

- Amount / location of pooling and residue visualised clearly
- Residue, penetration and aspiration rated more severely on FEES (Kelly 2006, 2007)
- Impacts decisions about safety of oral feeding
- Perception of dysphagia severity influenced by type of instrumental exam (FEES or VFS)
- Is it assessment tool used, timing, patient variability, improvement or deterioration in swallow function?



Additional insights provided by FEES

- Pharyngeal transit of solids and liquids differs, epiglottic edge most sensitive swallow trigger zone (Dua 1997)
- Secretion status predicts aspiration and dysphagia severity (Secretion Rating Scale, Murray 1996)
- Laryngopharyngeal sensory deficits coupled with motor dysfunction increase risk of aspiration (Aviv 2002)
- Mucosal changes detected e.g. arytenoid oedema (Aviv 2000)
- Laryngopharyngeal abnormalities common e.g. granuloma, vf paresis (Postma 2007)



Pneumonia outcomes

- No significant difference in pneumonia outcome whether managed by FEESST or VFS, except CVA patients:
 - 29% developed pneumonia following VFS
 - 4% following FEESST (Aviv 2000)
- No reduction in aspiration pneumonia rates in post-intubation patients in ICU (Barquist 2001)
- Introduction of FEES correlated with reduction in pneumonia in Nursing Home (Doggett 2001)
- Inconclusive



Recent research - Nasogastric tubes

Leder 2008

- 1,260 dysphagia patients
- Presence of NG tube did not affect aspiration status
- 3 previous studies
- But NGT associated with colonisation and aspiration of secretions and gastric contents, and high incidence of respiratory infection



Clinical utility of 3oz water swallow test

Suiter & Leder 2008

- Used FEES as benchmark
- 3000 in-patients
- 96.5% sensitive for aspiration seen on FEES
- Water test falsely identified aspiration in 51%
- Needless NBM status and over referral to SLT

- 71% who failed water test were safe for oral diet
- Failure does not indicate inability to eat safely



Critical care

Hafner 2008

- 553 ICU patients at risk of aspiration
- 56% extubated and 86% tracheostomised patients aspirated (silent aspiration more common in trache)

Hales 2008

- 25 cuff deflated trache patients
- Penetration or aspiration in a third not detected on CBA
- Laryngeal abnormalities in 44% e.g. oedema

- Routine FEES for safety of oral feeding and trache weaning decisions in ICU



Validity of 'pharyngeal squeeze manoeuvre'

Fuller 2009

- Routinely used to assess medial contraction of pharyngeal walls

- Important in predicting risk of aspiration of food residue

- 28 dysphagia patients, simultaneous FEES / VFS, compared VFS 'pharyngeal constriction ratio'

- Reliable indicator of pharyngeal motor integrity

- Rate Normal or Abnormal



Normal swallow

Butler 2009

- Benchmark for FEES interpretation
- 352 swallows, 23 young 21 older healthy adults
- Longer bolus dwell time and more residue in older adults
- Penetration in 11% and trace silent aspiration in 6% of older swallows
- Higher incidence than VFS studies
- Higher PAS scores for milk than water
- Not all aspiration is pathologic

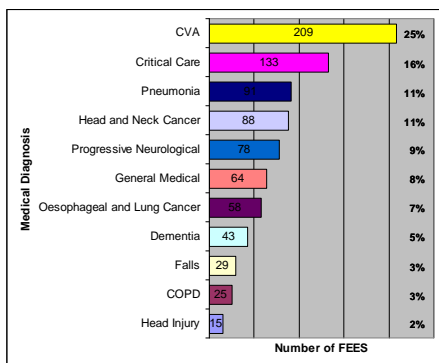


FEES clinical findings from UHSM

- Large acute teaching hospital
- 10 dysphagia SLT's, weekly VFS clinic, FEES as needed
- Data on 833 FEES, 7 year period (2002-2009)
- 93% in-patient bedside FEES
- Age range 24-94 yrs, half >75 yrs
- 22% required ENT opinion



Medical diagnosis of FEES patients



Aspiration findings

- Aspiration in 46% of FEES - 44% overt, 56% silent (penetration in 23%)
- Silent aspiration in 26% (Leder 1998, silent aspiration in 28% of 400 hospitalised dysphagia patients)
- No penetration or aspiration in 31%
- Clinical bedside assessment over-estimated aspiration risk in a third



Changes to feeding recommendations

- 62% of FEES resulted in a change
- 46% resulted in progression
 - NBM patients commenced oral feeding in 28%
 - Modified diet / thickened fluids upgraded in 18%
- 16% downgraded (placed NBM or diet/fluids modified further)
- FEES makes significant contribution, enabling earlier return to or progression with oral feeding



Impact in CVA and critical care patients

CVA

- 58% commenced oral feeding or diet/fluids upgraded
- Put NBM or on thickened fluids when chest deteriorates, FEES demonstrates aspiration not responsible

Critical care

- 30% FEES resulted in downgrades
- ICU medical staff keen to commence oral feeding, FEES highlights aspiration risk
- FEES enables rapid reversal of decisions, visualising aspiration enlists staff compliance

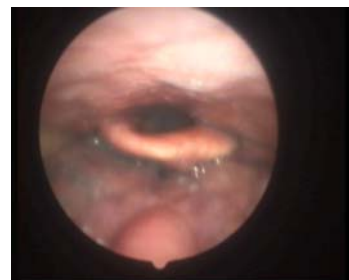


Tracheostomised / ventilated cuff inflated patients

- Alert and desperate to eat/drink, CBA unreliable, no VFS
- 21 FEES
- Tracheostomised 3-100 days (mean 25 days)
- Pooled secretions common (19)
- 50% aspirated silently
- 9 on oral fluids were placed NBM
- 6 were safe to commence sips of water (?younger)
- FEES determines which cuff inflated patients are safe, avoids holding back until cuff deflation / speaking valve



FEES in cuff inflated patient



Burns patients

- 14 FEES
- 6-73% burns, inhalation injury, tracheostomised
- Laryngeal trauma (oedema, mucosal damage, vocal fold paralysis) and dysphonia in 100%
- 7 aspirated, remained unsafe for oral intake until decannulated

- Repeat FEES visualises effect of inhalation injury on swallow as it heals and enables optimum timing of oral feeding



FEES in Burns patient



Future directions

- Chip tip nasendoscopes provide superior image quality
Increase sensitivity of FEES, over-reporting of sub-clinical trace aspiration?
- Transnasal oesophagoscopy (TNO)
Rapid, safe evaluation of oesophageal phase in clinic setting without sedation by ENT
Extended FEES procedure, clinical usefulness unclear (Belafsky 2009)



Areas for further research

- Large-scale studies, multi-centre collaboration needed
- Normative endoscopic data
 - Health outcomes
 - Services with no access to FEES
 - Relative impact on pneumonia rates of using bedside assessment alone or using FEES to manage dysphagia



Areas for further research

- Does FEES reduce need for NG tubes and impact on nutrition / hydration status due to earlier return to oral feeding?
- FEES enables timely, specific dysphagia management decisions
 - improve SLT efficiency?
 - impact on patient QOL?



Further research in ICU

Gather convincing evidence that aspiration matters to patient outcomes

- Impact of FEES on tracheostomy / ventilation weaning, pneumonia and LOS
- Clinical predictors of retained swallow function in slow wean patients



Acknowledgements

Thank you for listening

Any questions? (not hard ones!)

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