Use of water swallowing test as a screening tool in acute stroke unit

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Presentation quote

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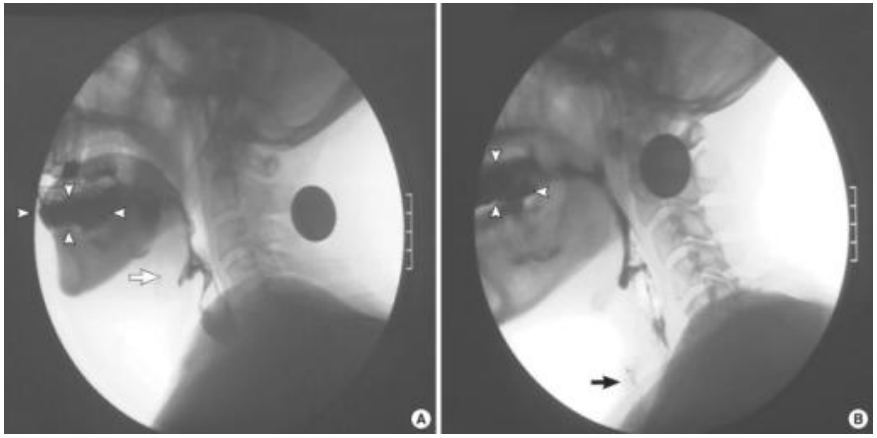
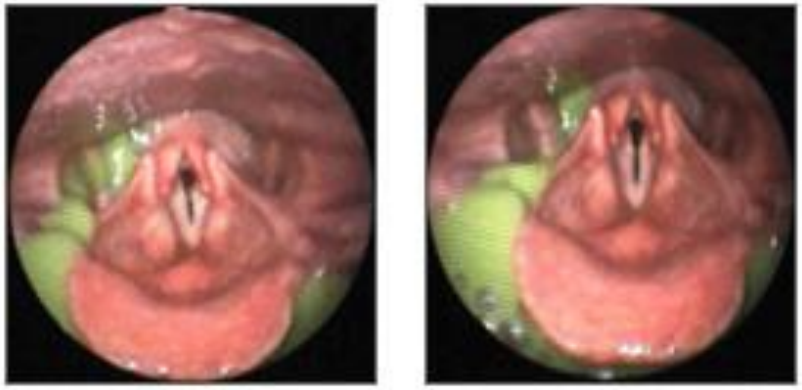
Introduction

- Stroke causes long term disabilities such as hemiparesis, urinary incontinence and dysphagia (Ramsey, Smithard, & Kalra, 2003)
- Prevalence rate of dysphagia varies from 37% to 78% in patients after stroke (Hinchey et al., 2005; Martino et al., 2005)
- Dysphagia reaches 81% in brainstem strokes (Meng et al., 2000)
- Dysphagia increases the risks of aspiration pneumonia (Martino et al., 2005; Perry & Love, 2001), dehydration and, malnutrition (Meng et al., 2000)

Detection of aspiration

- Bedside swallowing assessment
- Instrumental swallowing assessments include
  - videofluoroscopic swallowing study (VFSS)
  - fiberoptic endoscopic evaluation of swallowing (FEES)
- Water swallowing test





Water swallowing test

- Various protocols have been designed
  - Amount of water used: 30 ml / 50 ml / 90 ml of water
  - Utensils: teaspoon / cup drinking / syringe
- Detect coughing, wet voice post swallow
- Various literature documented the usefulness of water swallowing test in stroke patients (DePippo, Holas, & Reding, 1992; Nishiwaki et al., 2005; Suiter & Leder, 2008)

Water swallowing test studies

Studies	DePippo, Holas, & Redings (1992)	Nishiwaki and colleagues (2005)	Suiter & Leder (2008)
Patients recruited	44	61	3000
Sensitivity	76%	72%	96.5%
Specificity	59%	67%	48.7%
Aspiration indicators	Coughing / presence of wet voice after swallow was observed		
Conclusion	Water swallowing test was a sensitive test to detect aspiration risks in stroke patients		

Reliability of water swallowing test

- Weinhardt and colleagues (2008) compared the accuracy of a protocol-driven dysphagia screening carried out by nurses and speech therapists
  - 83 patients were recruited
  - Each patient was fed by nurse with one teaspoon of lemon ice, apple sauce and water, the same procedure was performed by speech therapist within one hour of nurses' screening
  - No coughing / presence of wet voice after swallow was observed → passed the dysphagia screening

Objective

- To compare the results of water swallowing test carried out by nurses and thin liquid swallowing assessment performed by speech therapists
- To investigate the reliability of water swallowing test to serve as a screening tool in acute stroke unit
- Hypothesis:
  - water swallowing test by nurses would have comparable results to thin liquid swallowing assessment by speech therapists
  - Water swallowing test is reliable to be used as a screening tool in acute stroke unit

Methods

- 649 participants (287 females and 362 males) were recruited
  - Aged between 23 to 98 years old
- Inclusion criteria:
  - All stroke patients who have their diagnosis confirmed by CT brain / MRI brain
  - Admitted to acute stroke unit
  - Medically fit to resume oral feeding

Methods

- Exclusion criteria:
  - Glasgow Coma Score (GCS) <13 (Hinds & Wiles, 1998)
  - have fluctuating level of consciousness
  - uncooperative, agitated
  - on tracheostomy tube / ventilator dependent
  - poor respiratory status requires frequent suctioning
  - have primitive oral reflex (e.g. bite reflex)

Methods

- Exclusion criteria:
  - have been diagnosed / suspected to have aspiration pneumonia
  - have difficulty managing own secretions

    (e.g., severe drooling, choking on saliva)
  - have known swallowing problems prior this episode of stroke (e.g., already on modified diet, on thickened liquids, require non-oral feeding)

Methods

- Materials needed for water swallowing test :
  - A medicine cup
  - 5ml teaspoon/ standard medicine spoon
  - 50ml of water in room temperature

- Procedures: **1) Water swallowing test by nurses**
  - Nurses were trained by speech therapists before carrying out the water swallowing test
  - Sit the patient in an upright position and instruct patient about the test

Experimental design

- Patient was fed by nurse with 25 ml water using a teaspoon in 5 consecutive trials
- If no choking is observed, if possible, let the patient self-feed another 25 ml water with a cup
- Observe for choking / coughing / wet voice
- DISCONTINUE the test if there is any sign of aspiration or swallowing problem

2) A full / complete bedside assessment by speech therapist within 48 hours

- The results of thin liquid trials were extracted from the complete assessment for data analysis

Data analysis

A coding system was established for comparison

Coding ‘0’ → No choking on teaspoon or cup drinking trial was observed
Coding ‘1’ → Choking was observed on teaspoon or cup drinking trial
Coding ‘2’ → Choking was observed on teaspoon trial → Terminated the cup drinking trial
Coding ‘3’ → Patient’s medical condition was not fit for any swallowing trials

Data analysis

- Sensitivity and specificity
- Inter-procedure agreement
  - Only codings ‘0’ and ‘1’ were used for analysis, excluding codings ‘2’ and ‘3’ as these codings did not involve any swallowing trials
  - 585 pairs of codings on teaspoon trial and 512 pairs of codings on cup drinking trial were obtained between nurses and speech therapist
  - Codings were categorical in nature, Cohen Kappa’s coefficient was computed statistically (Altman, 1991)

Results

- Sensitivity: 76%
- Specificity: 99%
- Moderate agreement was reached on teaspoon trial (K= 0.685) and cup drinking trial (K = 0.69) between the water swallowing test and swallowing assessment

Discussion

- High specificity (99%)
- Moderate sensitivity (76%)
  - Results compatible with previous research studies
  - Water swallowing test could not identify all patients who aspirated as it only addressed choking, other dysphagia signs were not taken into consideration
  - Water swallowing test failed to identify patients with silent aspiration

Discussion

- Moderate Kappa's agreement
  - Discrepancy in agreement between the two procedures can be explained by
    - Time difference: patients' consciousness may change when they are assessed by nurses and speech therapists

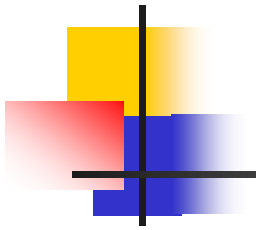
    →drowsy patients are more likely to suffer from dysphagia

    →severity of dysphagia varies within the first week of admission (Barer, 1989)

    - Neurological deterioration: common among patients who suffer from ischemic stroke, especially after thrombolytic therapy → altering the severity of dysphagia (Miyamoto et al., 2013)
    - Dysphagia symptoms: water swallowing test focused on choking, coughing and wet voice while other subtle signs of aspiration were not addressed

Conclusion

- Water swallowing test conducted by nursing staff is reliable and can serve as an initial screening tool to detect aspiration in stroke patients, especially when speech therapy service is not immediately available
- Regular and frequent training to nursing staff could help maintaining the reliability of water swallowing test
- Water swallowing test serves to complement a full swallowing assessment in stroke management, a complete swallowing assessment by speech therapist involving different food consistencies is necessary for holistic dysphagia management



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