CLINICAL BOTTOM LINE: This study concluded that aspirators showed a decline in SpO2 during swallowing, but pulse oximetry monitoring was adequately sensitive or specific to predict aspiration. Other events, such as breath-holding, posture change, coughing and compromised pulmonary function, may also be related to oxygen desaturation.

Clinical Question [patient/problem, intervention, (comparison), outcome]: In patients with neurogenic dysphagia is pulse oximetry a reliable assessment tool for identifying episodes of aspiration?


Design/Method: Case control study.

Participants: 204 subjects, age 24-91yrs. 143 males, 61 females.

Experimental Group:
Arterial oxygen saturation (SpO2) was continuously measured during and after videofluoroscopy examination (MBS). Thin and thick barium liquids was trialled on MBS. Lateral, anteroposterior and oblique views were obtained. MBS findings (including aspiration) and SpO2 levels during and after the MBS were compared and correlated.

Group 1: 63 subjects with no oropharyngeal swallowing disorder, but required examination via Barium Swallow for oesophageal disease (e.g. tumours).
Group 2: 110 subjects with symptoms of oropharyngeal dysphagia; causes included cerebrovascular disease, neuromuscular disease, laryngeal paresis, head and neck tumours, and ‘other’ unspecified causes.
Group 3: 9 patients with dysphagia (as above) with cuffed tracheostomy tube insitu.

Group 4: 22 subjects with laryngectomy

Control Group:

Results: Aspirators showed a decline in SpO2 during swallowing procedures, but this change was not statistically significant to predict or detect aspiration. Lowest SpO2 measurement was significantly different for controls and subjects with oropharyngeal dysphagia, however the change in SpO2 was not consistent in temporal relation to aspiration on MBS.

Group 1 had no episodes of aspiration. There was a mean decline of 1% for the group.
In group 2, 57 subjects showed no change in SpO2 level. 3 subjects who did not aspirate demonstrated reduction in SpO2 of >7%, while two subjects who did aspirate showed no change in SpO2 levels.
In group 3, 3 subjects aspirated, and showed varying declines in SpO2 (0%, 4%, 7%). One patient showed an initial increase in SpO2 due to hyperventilation.
In group 4, SpO2 decline of 2-9% was seen for all subjects (obviously without aspiration).

Overall, 84.6% of aspirators showed SpO2 declines of 2% or more, however the declines were seen during and after the swallowing period. Other events, such as breath-holding, posture change, coughing and compromised pulmonary function, may have been related to oxygen desaturation.
Comments
- Control groups included
- Measurement of SpO2 was done during and after swallowing procedures on MBS, to assess immediate and delayed effect of swallowing procedures etc on SpO2
- No detail of subjects’ pulmonary function/disease, which may also affect SpO2
- No randomisation

Level of Evidence (NH&MRC): III (2)

Appraised By:
Adult Swallowing EBP Group

Date: August 2009
Guidelines for completion of the CAP

Clinical Bottom Line
The consensus of the reviewers on implications of the paper on clinical practice. Whilst this may be somewhat subjective, it is hoped that robust discussion, the Level of Evidence and your comments on the design will enable you to produce a practical/realistic 'bottom line'. Many of the papers in Speech Pathology may have limitations, but the Clinical Bottom line should be aimed to help clinicians apply what evidence there is.

Clinical Question
This should ideally include four components:
- the patient or problem
- the intervention (or diagnostic test or prognostic factor)
- the comparison intervention or test (optional)
- the outcome

Design
Refer to pages 12 to 15 of the EBPIG Resource Package for guidance in reviewing the design used.

Comments on Design
Pages 12 to 15 of the Resource Manual should again assist here. You may also find it useful to refer to the forms 'Evaluating case studies/case series' and 'Critical appraisal sheet' adapted from Dr Lil Mikuletic's (see 'Critiquing/Appraising the Evidence).

Level of Evidence
It is recommended that the paper you are reviewing be rated against the NH&MRC Levels of Evidence, as reproduced here. The levels may be updated from time to time by the NH&MRC, but use of the ratings listed here will ensure consistency across CATs and groups. These levels are listed with comments on pages 15 and 16 of the Resource Package.

<table>
<thead>
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<th>LEVEL</th>
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<tr>
<td>I. Evidence obtained from a systematic review of all relevant controlled trials</td>
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<tr>
<td>II. Evidence obtained from at least one properly designed randomised controlled trial</td>
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| III. 1 Evidence obtained from well-designed pseudo-randomised controlled trials  
(alternate allocation or some other method) |
| 2 Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies, or interrupted time series with a control group |
| 3 Evidence obtained from comparative studies with historical control, two or more single-arm studies or interrupted time series without a parallel control group |
| IV. Evidence obtained from case series, either post-test or pre-test and post-test |