NSW Speech Pathology
Evidence Based Practice Interest Group

Critically Appraised Paper (CAP)

CLINICAL BOTTOM LINE: The study demonstrated that pulse oximetry reliably predicts aspiration/non-aspiration in 81.5% of dysphagic stroke patients, by combining SpO2 measurements taken during and after the swallow on MBS. Pulse oximetry should, however, be used cautiously in older patients and those with chronic lung disease. Small subject numbers in this study meant that differences in results between males and females could not be explained.

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

Citation: M. J. Collins, A. M. O. Bakheit, Does Pulse Oximetry Reliably Detect Aspiration in Dysphagic Stroke Patients? *Stroke* 1997, 28; 1773-5

Design/Method: Prospective, controlled, single-blind design.

Participants: 54 subjects (28 male, 26 female; age range 28-86 years; mean age 65 years) diagnosed with stroke and had swallowing difficulties. All subjects were referred for a videofluoroscopy from both inpatient and outpatient populations. 13 patients had a history of obstructive airway disease and 1 patient was a smoker at the time of the study.

Experimental Group: Pulse oximetry was measured simultaneously with videofluroscopy. Oxygen saturation measurements were taken using Minola Pulsox 7 monitor (De Vilbiss Heathcare), via use of a finger probe, 5 min before videofluroscopy, on swallowing and continuously 2 minutes after swallowing (lowest reading recorded), and at 10 minutes later. These measurements were repeated during videofluoroscopy with thin fluids, pudding, and a biscuit. On completion of the trial the independent researcher reviewed the videofluroscopy to establish time at which aspiration occurred. A drop of >or =2% arterial oxygen saturation was considered clinically significant.

Control Group: Nil

Results:

- **In the study sample as a whole, 44 participants (81.5%) were accurately predicted as aspirators or non-aspirators, using 2% change in SpO2 as significant.**
- **Specificity = 87%; Sensitivity = 73%.**
- Videofluroscopy confirmed 22 subjects aspirated (13 male, 9 female). 8 of the total 22 showed silent aspiration.
- In males that aspirated there was an arterial oxygen desaturation of 3.1% at 2 minutes after swallowing. In females the maximum desaturation recorded was 1.6% at point of aspiration.
- There was variable improvement in saturation 10 minutes after videofluroscopy with least recovery of SpO2 in males who aspirated.
- 55% of aspirators had a significant degree of desaturation at point of aspiration. None of the non-aspirators desaturated at the time of swallow. These results, combined with SpO2 measurement at 2 minutes after swallowing, identified 73% of aspirators, however also identified 4 non-aspirators with significant oxygen desaturation.

- The prediction rate in males <65 years was 100%. The prediction rate in females <65 years was 67%.

Comments – Strengths/weaknesses of paper :

- Small number of patients
- No control group
- No screening at 2 and 10 min post swallow when pulse oximetry was measured again - ?false negative results
- The study did not control for patients with underlying medical illness or other potentially influencing factors on SpO2 such as pulmonary disease

Level of Evidence (NH&MRC): Level 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.

LEVEL

I. Evidence obtained from a systematic review of all relevant controlled trials

II. Evidence obtained from at least one properly designed randomised controlled trial

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