Swallowing disorders—improving access to quality assessment in rural South Australia

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Introduction

Disorders of swallowing (dysphagia) are a common occurrence for people with acute and chronic conditions such as Traumatic Brain Injury, Head and Neck cancer, following cervical spinal surgery, Parkinson’s Disease, Chronic Obstructive Pulmonary Disease, Dementia and Huntington’s Disease. The prevalence of dysphagia for clients with common acute conditions has been reported to be as high as 65% for Acute Stroke1 and up to 100% in chronic conditions throughout the disease progression such as in Motor Neurone Disease2. Oro-pharyngeal dysphagia can arise because of muscular weakness in the oro-pharynx, poor coordination and timing of swallowing events with respiratory mechanisms and disturbances in sensation. Sensory impairments can lead to food and fluid passing into the lungs with no reflexive coughing or apparent physiological reaction from the client, known as silent aspiration. The prevalence of silent aspiration can be up 58%3 and is difficult to detect in clinical bedside assessments due to the inability to visualise the passage of food or fluids in the pharynx and upper oesophagus.

Instrumental swallowing examinations such as Modified Barium Swallow (MBS) are considered best practice4,5 in dysphagia management to ensure accurate diagnosis, appropriate dietary management and treatment planning for clients6. Other benefits include facilitation of onward referrals and trial of compensatory strategies6. Specialist Speech Pathologists play a pivotal role in the provision of instrumental assessment of oro-pharyngeal dysphagia and facilitate individually tailored treatment programs for clients aimed at reducing risk of choking and chest infections as whilst balancing considerations of quality of life. The MBS or (also known as videofluoroscopic swallow) is a real-time dynamic series of x-ray fluoroscopic images which enables visualisation of oral and pharyngeal structures and physiology during swallowing a graduated series of foods and fluids mixed with a radio-opaque contrast agent.

In Country Health South Australia, client access to MBS services by Speech Pathologists has historically been poor for a number of reasons, including staff retention difficulties7, poor access to comprehensive training opportunities, reduced staff confidence and competence in the context of a large “rural generalist caseload”. These findings are consistent with a large body of literature that suggests that in rural communities, there is shortage of health care providers and access to health services8-10 that can lead to poorer health outcomes for the population.

The purpose of this paper is to investigate the issues and barriers for access to and provision of quality Modified Barium Swallow services in rural South Australia, and then to explore how to improve the quality and access to these service in the future.

Methods

Issues of access to quality MBS studies for clients in rural and remote areas have been highlighted in the literature as a major gap in achievement of best practice guidelines for dysphagia management. Studies have highlighted issues of clients having to travel long distances for a service or client morbidity preventing access to a service when travel is needed11. Other issues identified are a lack of capacity or availability of consultant radiologists to perform the procedure12. Other studies have identified that a lack of standardised approaches in Speech Pathology practice and lack of knowledge and experience can lead to poor inter and intra rater reliability in the interpretation of VFS images13-19, increased client radiation exposure20 and potentially can lead to dangerous practice21. Solutions considered such as telemedicine are possible, but require considerable infrastructure investment and technological support to provide services remotely from specialists based in metropolitan centres22. Therefore the purpose of
this investigation was to establish an understanding of the equipment, processes and training / competency of staff undertaking the MBS procedure in CHSA.

Firstly, a baseline audit of equipment and clinical procedures was conducted by the Advanced Clinical Lead Speech Pathologist in June and July 2012 for all Country Health South Australia sites that had access to x-ray equipment with fluoroscopic capacity (N=6). The audit focused on a range of parameters (results defined mostly as a yes /no response) with a sample of the audit outlined in Table 1.

Following this audit, it became apparent that further exploration was necessary to fully capture the experience, training needs and confidence of staff in providing the specialist MBS service, as that was proving to be the greatest barrier to rural clients opportunity to accessing the service. Therefore a Speech Pathology staff survey was conducted using a Surveymonkey® questionnaire. The survey was developed and sent out to all Speech Pathologists all six Country Health South Australia (CHSA) sites that had access to x-ray equipment with fluoroscopic capacity in addition to one Speech Pathologist with overarching responsibility for all sites (n=19). The survey focused on a range of parameters some of which are outlined in Table 2.

Copies of the audit tool and questionnaire can be provided on request.

**Results**

The clinical baseline audit was conducted by the Advanced Clinical Lead Speech Pathologist in June and July 2012 for all Country Health South Australia sites that had access to x-ray equipment with fluoroscopic capacity (N=6). Table 3 represents a sample of the results from that audit.

The Speech Pathology staff survey conducted using a Surveymonkey® questionnaire was sent out to all Speech Pathologists at all six Country Health South Australia (CHSA) sites that had access to x-ray equipment with fluoroscopic capacity in addition to one Speech Pathologist with overarching responsibility for all sites (n=19). There was 100% response rate for this survey. The survey results as outlined in Table 2 are reported in two graphs. The results for frequency of involvement (Graph 1) included a 68% (13/19) response rate for this question. The results for levels of comfort (confidence) in the image collection aspects of the MBS procedure (Graph 2) included a 100% (19/19) response rate for this question.
### Table 1  Sample from baseline audit of MBS equipment and clinical procedures in CHSA

<table>
<thead>
<tr>
<th>Core service establishment</th>
<th>Core Equipment</th>
<th>Staffing</th>
<th>Protocol for doing the MBS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular clinic slots negotiated or Ad Hoc or none</td>
<td>Dynamic image recording equipment available? (DVD / VHS / PACS / None)</td>
<td>Consistent (Same) Speech Pathologists rostered into a clinic</td>
<td>Minimum of 2 Speech Pathologists (1 of whom is trained in MBS) present for image collection and analysis aspects of the study</td>
</tr>
<tr>
<td>Approximate frequency of service for clients</td>
<td>Weighing scale for standard consistency measurement available?</td>
<td>Number of SP staff performing the service</td>
<td>Standard recipes used for foods &amp; fluids</td>
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</table>

### Table 2  Sample from Speech Pathology staff survey of the experience, training needs and confidence in providing MBS services in CHSA

<table>
<thead>
<tr>
<th>SurveyMonkey® questionnaire Sample Questions</th>
<th>Possible choices of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How many times have you been involved in conducting MBS's in that 12 month period?</td>
<td>Annually or less; Few times per year; Every few months; Once a month or a couple of times a month; Weekly or more</td>
</tr>
<tr>
<td>2. How comfortable do you feel about presenting the clients medical summary &amp; rational for exam to the radiologist</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>3. How comfortable do you feel about explaining the rationale for sequence of fluid and food consistencies?</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>4. How comfortable do you feel about interpretation of images on-line during image collection in order to inform clinical decision making?</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>5. How comfortable do you feel about explaining the rationale for capturing information in different planes of view?</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>6. How comfortable do you feel about explaining the rationale for choice of swallowing rehabilitation techniques such as manoeuvres / postures?</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>7. How comfortable do you feel about directing the radiologist operating equipment in how to ensure best possible imaging of the oropharynx?</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>8. How comfortable do you feel about explaining the rationale for when it is appropriate to cease the study?</td>
<td>Not at all; A little; Moderately; Very</td>
</tr>
<tr>
<td>Audit items</td>
<td>Results</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Core service establishment          | **Regular radiology clinic slots negotiated or Ad Hoc or none**  
50% (3/6) had ad hoc clinic slots.
50% (3/6) had no regular clinic slots.  
**Approximate frequency of service for clients**  
50% (3/6) usually had 2-4 MBS’s per month.
33% (2/6) had 1-2 MBS’s per annum.
17% (1/6) had no history of providing MBS’s but new fluoroscopy equipment was available.  
**Staffing**  
Consistent (Same) Speech Pathologists rostered into the MBS clinic  
17% (1/6) had one Speech Pathologist regularly involved in all MBS’s.
66% (4/6) had inconsistent Speech path staffing.
17% (1/6) had no history of providing MBS’s but new fluoroscopy equipment was available.  
**Number of SP staff performing the service**  
33% (2/6) sites had all SP’s working on the site undertaking MBS’s.
50% (3/6) sites had the majority of SP’s working on the site undertaking MBS’s.
17% (1/6) had no history of providing MBS’s but new fluoroscopy equipment was available.  
**Core Equipment**  
Dynamic image recording equipment available! (DVD / VHS / PACS / None)  
17% (1/6) had access to DVD recorder.
33% (2/6) had access to VHS recorder.
50% (3/6) had no means of recording images.
0% had access to PACS  
Weighing scale for standard consistency / volume measurement available?  
17% (1/6) had access to a weighing scale.
83% (5/6) had no access to a weighing scale.  
Protocol for doing the MBS  
Minimum of 2 Speech Pathologists (1 of whom is trained in MBS) present for image collection and analysis aspects of the study  
17% (1/6) had no history of providing MBS’s
33% (2/6) always used 2 Speech Pathologists with one senior who had had training and another who had considerable experience in MBS.
50% (3/6) did not always use 2 Speech Pathologists or did not always use Speech Pathologists who had had training / experience in MBS  
Standard recipes used for mixing barium with foods & fluids  
0% (0/6) sites had standard recipes used for mixing barium with foods & fluids
Graph 1  Frequency of Speech Pathologist involvement in MBS in last 12 months

Graph 2  Levels of comfort (confidence) in the image collection aspects of the MBS procedure

Full results of the findings of the audit tool and staff survey can be provided on request.
Discussion
The results outlined above have prompted the enactment of a number of supports to improve the access to quality MBS services in Country Health South Australia. Using the framework of the PDSA (plan–do–study–act) cycle\textsuperscript{24}, the changes can be used to continuously improve the quality of and access to service provision. The PDSA cycle is an iterative four-step management method used in business for the control and continuous improvement of processes and products.

Diagram 1  Continuous PDSA cycles\textsuperscript{25}

When applied to the current experience of monitoring MBS service quality provision and client access in rural South Australia it can be conceptualised as in the table below.

<table>
<thead>
<tr>
<th>Cycle 1</th>
<th>Steps undertaken / completed so far...</th>
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<tbody>
<tr>
<td>Plan</td>
<td>• Clinical baseline audit.</td>
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<td>• Staff survey.</td>
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<tr>
<td>Do</td>
<td>• Successful bid to purchase 4 digital grade DVD recorders.</td>
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<td></td>
<td>• All sites have access to liquid / food weighing scales.</td>
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<td></td>
<td>• Standardised recipes for barium food &amp; fluids regularly used on all sites.</td>
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<td></td>
<td>• Identification of at least 2 members of staff (14 staff enrolled to date) on each MBS capable site participating in an evidenced based on-line training program for image analysis in MBS called MBSimp\textsuperscript{26}.</td>
</tr>
<tr>
<td></td>
<td>• Advanced Clinical Lead Speech Pathologist present regularly on the majority of sites providing MBS services since August 2012 to do clinics jointly including providing support with preparation, analysis and reporting.</td>
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<tr>
<td></td>
<td>• Standard templates produced for protocol of consistencies given and sequence of images collected in the examination, analysis frameworks and standardised reporting frameworks.</td>
</tr>
<tr>
<td>Study</td>
<td>• Improvement in a number of identified risks, particularly where there was a large deviation from best practice.</td>
</tr>
<tr>
<td></td>
<td>• Is this enough? No – further guidance needed about all aspects of the service from pre-referral to reporting and standardised equipment.</td>
</tr>
<tr>
<td>Act</td>
<td>• Commence development of a comprehensive clinical practice guideline for the MBS procedure for CHSA, to be consulted and ratified through the CHSA clinical governance mechanisms.</td>
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<tr>
<td></td>
<td>• Advanced Clinical Lead Speech Pathologist gaining access to PACS software to enable remote joint analysis of images in compliance with best practice standards for a minimum of 2 trained people interpreting images (should access to an urgent MBS be required on sites with staff turn over issues).</td>
</tr>
</tbody>
</table>
It is anticipated that further PDSA cycles will evaluate changes in client access to MBS in comparison with previous levels of access and also as a proportion of clients with dysphagia on the site caseload. Additionally future cycles could evaluate the impact of a training and competency framework for the specialist skill development of Speech Pathology staff including capturing if there better understanding of risk management aspects of the service model. In addition provision of a framework, such as a care pathway to assist referrers (such as local GP’s) understand how best to utilise the service in the context of other clinical specialties. Finally, it is anticipated that future PDSA cycles could capture the impact of a higher quality and more accessible service from the perspective of clinical effectiveness in client management.

Interestingly, to date there has been some informal feedback received regarding both the value placed on the structure and process changes for MBS services as captured in the following quotes from Speech Pathology staff:

“I really feel like I know what a good MBS clinic looks like now, it is far more comprehensive than I previously knew or did.” (Therapist with 3yrs clinical experience of which 2 years is with clients with dysphagia)

“I really like the structure, guidance and in-depth working that I have experienced in doing a joint clinic with the Advanced Clinical Lead Speech Pathologist” (Therapist with 1yr of clinical experience of mixed caseload including dysphagia)

Also some feedback about the impact of the training and support on the improved clinical effectiveness in client management as below:

“Thank you for the assistance in working out that we didn't need a repeat MBS for that client with secretion management problems and recurrent aspiration and that an ENT assessment would be more beneficial... Since then things have moved fast and the client has had an ENT review today. The ENT found the client had a left vocal fold palsy (fixed to the midline) but that he was able to get airway closure. The ENT thought that it’s probably that there was a CVA causing the changes. He said a CT neck would be done to check for a skull base lesion (as CT head and CT chest have been done) and he will consider sending the client for an MRI.” (Therapist with 8yrs clinical experience of which 6 years is with clients with dysphagia)

“I have done some sleuthing like we talked about after our last joint MBS and I found an inpatient I had seen at (an outreach site) hospital with a mild left sided facial weakness but no other medical history of neurology. I spoke with the medical officer and she has now arranged for the client to have a CT head.” (Therapist with 4yrs clinical experience of which 1 year is with clients with dysphagia)

Conclusions

The findings of this paper give insight into the challenges that rural Speech Pathology staff experience in the provision of specialist MBS services in the context of a rural generalist caseload. This study demonstrated that issues with infrastructure, equipment and clinical pathway were equally as complex as the anticipated challenges of training and confidence of Speech Pathology staff. This, in turn means that access to these services has historically been considerably less frequent than potentially would be available in larger metropolitan centres. However, using standard tools such as the PDSA cycle it is possible to continuously improve the quality of and access to this form of specialist service provision.

At a national level in Australia, strategic plans are in place to bring more health care closer to home for rural communities. This will ensure that the issues highlighted in this paper are repeated in a number of clinical specialities provided by Allied Health Professionals. The mapping of the need for and access of clients to clinical specialities provided by Allied Health Professionals in rural areas will need to be considered as a means of ensuring that all the resources (infrastructure, equipment and staffing) are in place to support the provision of high quality care closer to home for rural communities.
References


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6. Martin-Harris B; Logemann JA; McMahon S; Schleicher M; Sandidge J, Clinical utility of the modified barium swallow. Dysphagia 2000 Summer; Vol. 15 (3), 136-141


