

Comparing Quality of Life Scores To Objective Measures of Swallowing Function After Chemoradiation Therapy For Oropharyngeal Carcinoma

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Abstract

Objectives:

To compare objective measures of swallowing function with patient reports of swallowing-related Quality of Life, one year after treatment of oropharyngeal cancer with chemoradiation therapy.

Study Design:

Patients seen for follow-up at least one year after treatment of oropharyngeal carcinoma with chemoradiation therapy were sequentially approached and asked to participate in the study.

Methods:

Maximum pharyngeal constriction, hyoid elevation, upper esophageal sphincter (UES) opening size, bolus pharyngeal transit time and airway closure relative to arrival of the bolus at the UES, were measured from modified barium swallowing studies in a group of 31 patients at least one year after chemoradiation therapy for the treatment of oropharyngeal carcinoma. Measures were made for a liquid 1cc, 3cc and 20cc bolus. Objective measure results were compared to scores from the MD Anderson Dysphagia Inventory and The University of Washington Swallowing Quality of Life Questionnaire scores from the same patients.

Results:

No strong correlation was identified between any of the objective measures of swallowing physiology and quality of life scores.

Conclusion:

Patient perception of the impact of swallowing function on quality of life does not correlate well with actual physiologic functioning.

Introduction

The assessment of quality of life and functional outcomes in patients after treatment of head and neck cancer is important, as multiple treatment modalities are now available. Treatment cure rates are similar, so treatment decisions are likely to be determined by which modality can offer the patient the best functional outcome. In this study, two commonly used quality of life instruments, the MD Anderson Dysphagia Inventory (MDADI)¹ and the University of Washington Disease Specific Quality of Life Questionnaire (version 3) (UW-QOL)² were completed by a group of 31 male patients at least one year after the completion of chemoradiation therapy for oropharyngeal carcinoma. The MDADI and the UW-QOL are limited to head and neck-related functional domains, are quick and simple for patients to complete and correlate well with other quality of life measures. Modified barium swallowing studies were also performed for each patient. Objective measures of swallow timing and structural displacements, considered to be crucial to a functional swallow, were made from each study. This type of analysis improves the interpretation of swallowing studies by enabling the identification of subtle changes in swallowing function. Individual quality of life scores for this group of oropharyngeal cancer patients were compared to the objective measures of swallowing function from their swallowing studies to determine if the QOL scores are an accurate reflection of swallowing functional abilities.

Methods and Materials

Swallowing study recordings were made for liquid swallows of two 1cc, two 3cc and one 20 cc bolus. Timing information in 1/100 of a second increments was available for each frame, allowing detailed timing measurements. Spatial measurements were made after calibration of the digitized image to the size of a 1.8-cm-diameter radiopaque disc, taped to the chin of the study subject. All measures were obtained from lateral views and included **bolus pharyngeal transit time, airway closure relative to arrival of the bolus at the UES, maximal hyoid displacement, upper esophageal sphincter opening size, and pharyngeal area at maximum constriction.** At the time of study enrollment, each subject was asked to complete both the **MD Anderson Dysphagia Inventory** and the **University of Washington Quality of Life Questionnaire (version 3).** To assess associations between life quality and individual measures of swallowing function, Spearman correlation coefficients were calculated for the MDADI global score and each swallowing function variable. Pearson correlation coefficients were calculated for the MDADI, the MDADI physical domain, and the UW-QOL and each swallowing function variable. In order to quantify the overall swallowing function for each patient, the bolus pharyngeal transit timing and displacement measures from each individual swallowing study were compared to the mean and standard deviation measured from a group of 21 gender-matched and age-matched control subjects with no complaints of swallowing problems. A composite **swallowing function score** was calculated based on how the patient compared to the controls on each measure. Pearson correlation coefficients were calculated for each of the quality of life scores and the composite swallowing function scores of each individual patient.

Results

Subject age range: 51 to 78 years old. Stage III N=4, stage IV N=27. Tumor location = tongue base (10), tonsil (13), supraglottis (3), pharynx (2) and 3 patients had radiation to Waldeyer's ring for an unknown primary. Maximum radiation dose: 4000 to 7000 Gray.

The analysis of how each swallowing measure correlated to that patient's QOL scores showed no correlation of QOL scores and any individual measure of swallowing function. (Table 1-3) The analysis of the composite swallowing function scores relative to the QOL scores showed no correlation between overall swallowing function and any element of the QOL scores. The Correlation Coefficient for the **UWQOL** score and the **swallowing function score** was **-0.216**. The Correlation Coefficient for the **MDADI** score and the **swallowing function score** was **-0.03**, the Correlation Coefficient for the **MDADI global** score and the **swallowing function score** was **0.058**, and the Correlation Coefficient for the **physical sub-score of the MDADI** and the **swallowing function score** was **-0.49** (r=0.43) (Figure 1). When airway closure information was added to the overall swallowing function score, there was no better correlation. Patient reported diet and composite swallowing function scores also showed no correlation.

	Pharyngeal Area	Hyoid Elevation	UES Opening Size	Bolus Transit Time
MDADI*	-0.35	0.11	0.29	-0.32
UW-QOL*	-0.24	0.28	0.14	-0.12
MDADI global**	0.07	0.005	0.14	-0.08
MDADI physical*	-0.384	0.044	0.137	0.172

Table 1: Correlation Coefficients for 1cc bolus. *Pearson's correlation coefficients. **Spearman's correlation coefficients.

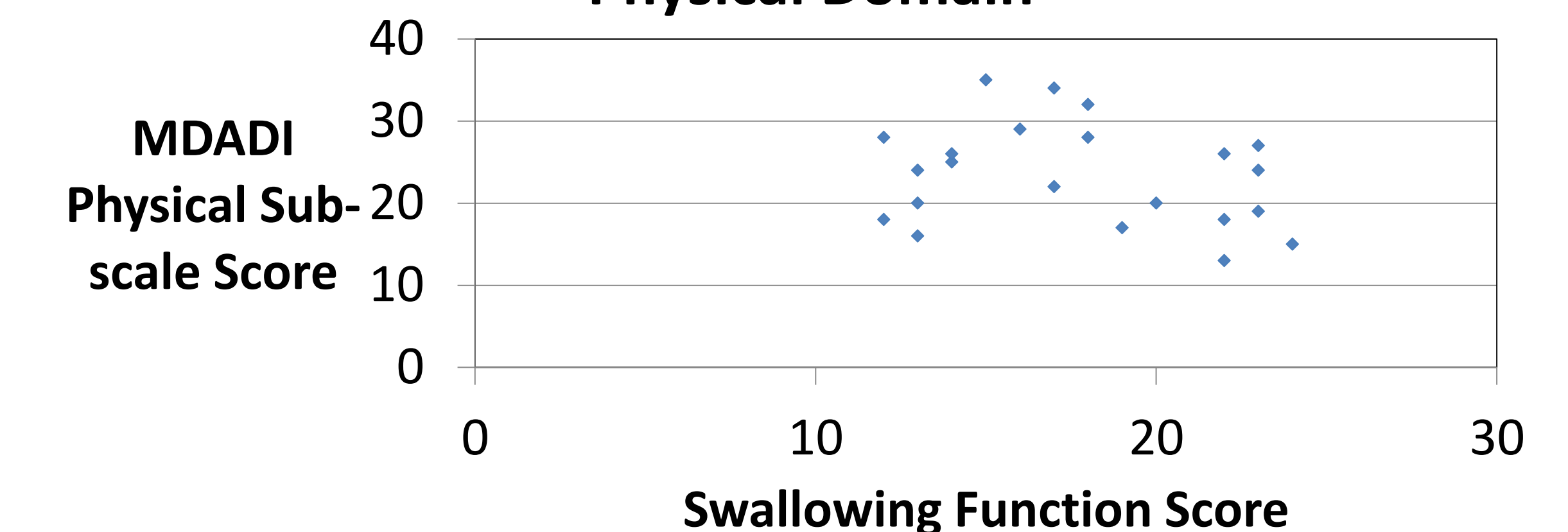
	Pharyngeal Area	Hyoid Elevation	UES Opening Size	Bolus Transit Time
MDADI*	-0.14	0.25	-0.07	-0.21
UW-QOL*	-0.03	0.36	-0.18	-0.05
MDADI global**	0.25	0.15	-0.21	-0.02
MDADI physical*	-0.05	0.318	-0.164	0.256

Table 2: Correlation Coefficients for 3cc bolus. *Pearson's correlation coefficients. **Spearman's correlation coefficients.

	Pharyngeal Area	Hyoid Elevation	UES Opening Size	Bolus Transit Time
MDADI*	-0.135	0.39	0.18	-0.40
UW-QOL*	0.32	0.39	-0.24	-0.24
MDADI global**	0.25	0.125	-0.01	-0.24
MDADI physical*	-0.231	0.415	0.253	-0.224

Table 3: Correlation Coefficients for 20cc bolus. *Pearson's correlation coefficients. **Spearman's correlation coefficients.

Figure 1: Swallowing Function Score vs. MDADI Physical Domain



Discussion/Conclusion

The study of outcomes in oropharyngeal cancer patients has employed many surrogate measures for physiologic function including diet, weight loss, PEG dependence, and Quality of Life Surveys. However, as was done in this study, objective measures of swallowing physiology can be made from modified barium swallow studies, allowing the direct assessment of physical functioning. Many of the measures are clinically valid and can be correlated to the risk of developing aspiration pneumonia.³ Although patient perception of quality of life is important to healing and recovery from both the diagnosis and treatment of head and neck cancers, the results of this study indicate that it may not correlate to physical swallowing function. In order to evaluate a complete picture of treatment results, including both the emotional and functional elements, outcomes studies in this patient population should include objective measures of swallowing function. The results from QOL instruments, even when isolated to physical sub-scores, may not accurately reflect swallowing ability in a given patient.

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