

# The association between dysphagia severity and survival in patients with head and neck cancer

Samantha E. Shune, MA, CCC-SLP,<sup>a</sup> Lucy Hynds Karnell, PhD,<sup>b</sup> Michael P. Karnell, PhD,<sup>a,b</sup>  
Douglas J. Van Daele, MD,<sup>b</sup> Gerry F. Funk, MD<sup>b</sup>

<sup>a</sup> Department of Communication Sciences and Disorders; <sup>b</sup> Department of Otolaryngology – Head and Neck Surgery



## Introduction

Dysphagia is a common, potentially life-threatening problem in patients with head and neck cancer (HNC). Post-treatment dysphagia occurs in an estimated 50-80% of HNC survivors, although it has been suggested that this incidence is underreported.<sup>1,2</sup>

Potential consequences of dysphagia include:<sup>3</sup>

- Malnutrition
- Compromised pulmonary function
- Prolonged enteral nutrition
- Social isolation
- Anxiety and depression

Both tumor stage and site are strong predictors of survival.<sup>4</sup>

Nutritional status has additional prognostic implications with weight loss and lack of continued oral intake predicting worse long-term survival rates.<sup>4,5</sup> Although these nutritional outcomes are related to dysphagia, whether dysphagia is directly associated with survival remains unclear.

The goal of this study was to answer the following:

- 1) what are risk factors for developing dysphagia and what risk factors are associated with dysphagia severity; and
- 2) is the severity of dysphagia associated with five-year observed survival rates?

## Methods

Eligibility criteria (N = 427 records from 416 patients):

- 1) Head and neck cancers of the upper aerodigestive tract managed at the University of Iowa Hospitals and Clinics
- 2) Diagnosis between January of 2001 and April of 2003
- 3) Primary tumors only, excluding recurrences

Electronic charts, ICD-9 coding from billing records, and swallowing evaluation records were examined to determine dysphagia status (presence/absence), severity of dysphagia (Swallowing Performance Scale scores<sup>6</sup>; SPS), and source for diagnosis of dysphagia (e.g., swallowing evaluation, patient report to physician, PEG tube placement).

## Results

407 cases were found to be eligible and included in the analyses.

**Characteristics of Patients with Dysphagia**

SPS score groupings of severity of dysphagia:

SPS 1-2: Functionally normal (including normals, n = 220).

SPS 3-4: Mild to mid/moderate (n = 47).

SPS 5-6: Aspiration (n = 37), and

SPS 7: NPO (n=65).

(The 38 patients without a severity score were excluded from all analyses that included severity.)

Rate of dysphagia: 45.9%.

187 patients were classified as having dysphagia

220 patients were assumed to have normal swallowing function

**Predictors of Dysphagia**

Table 1. P-values indicating associations of selected factors and swallowing related outcomes

Characteristic	Swallowing-related outcome		
	Presence of dysphagia	Presence of aspiration	Level of dysphagia severity
Age at diagnosis	.346	.963	.902
Sex	.033	<.001	.302
Stage	<.001	.061	<.001
Site	.370	.588	.415
Histologic type	.016	.205	.347
Radiation performed	.006	.019	.016
Surgery performed	.922	.685	.421

**Risk factors for the presence and severity of dysphagia included gender, stage, histologic type, and management with radiation therapy, as illustrated below.**

As swallow function worsened, the percentage of females increased...

Figure 1. Sex distribution of patients

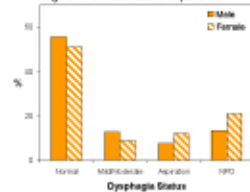
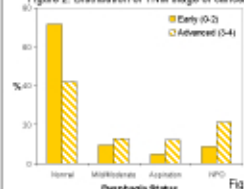
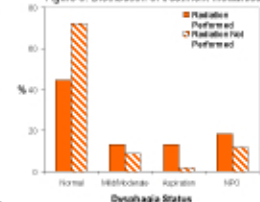


Figure 2. Distribution of TNM stage of cancer



...the percentage of patients with advanced-stage disease increased...

Figure 3. Distribution of treatment modalities

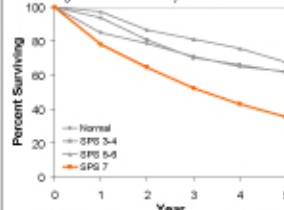


...and the percentage of patients receiving radiation increased.

## Dysphagia and Survival

Survival rates significantly differed on the basis of dysphagia severity ( $p = .001$ ), driven by the most severe group (SPS = 7).

Figure 4. Observed five-year survival rates



Patients with the most severe dysphagia had significantly worse survival rates at five years as compared to all other patient groups ( $p = .001, .005, \text{ and } .001$ , respectively)

Dysphagia, age, stage, site, histologic type, and treatment modality accounted for significant differences in survival. However, **severe dysphagia (NPO status) was the independent predictor with the greatest increased risk of dying (3.4 times more likely;  $p = .001$ ).**

## Discussion

Approximately 46% of the patients in this HNC study had dysphagia, although this percentage is likely an underestimation of the incidence rate since the assumption of "normal" swallowing function was generally not verified.

**1. What are the risk factors for dysphagia?**

Risk factors for dysphagia among patients with HNC, and independent predictors of dysphagia severity and the presence of aspiration, included female sex, advanced stage, non-adenocarcinoma histologic type, and the receipt of radiation therapy.

**2. Is the severity of dysphagia associated with 5-year, observed survival rate (death due to all causes)?**

Dysphagia, specifically severe dysphagia which includes NPO status, was the independent predictor of survival associated with the greatest risk of dying for patients with HNC, even when controlling for other known predictors of survival. Conversely, patients with moderate to severe dysphagia appear to do remarkably well.

## Conclusions

Swallowing problems should be considered when determining the aggressiveness of initial cancer-directed treatment and potential benefit of post-treatment care. Severe dysphagia should be a strong indication that patients are faring poorly. Because of dysphagia's association with survival and its frequent underestimation, a speech-language pathologist should be involved to ensure routine diagnostic and therapeutic swallowing interventions. Future research needs to determine if proactive swallowing therapy and strict oral hygiene regimens before, during, and after treatment can counteract the negative impact of dysphagia, enhancing quality and quantity of life.

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## Abstract

The goal of this study was to determine risk factors for dysphagia, a common and serious condition in patients with head and neck cancer, and the association between severity of dysphagia and survival. Billing data were used to identify which patients diagnosed with head and neck cancer between January, 2001 and April, 2003, had dysphagia diagnoses or swallowing evaluations. Regression analyses determined factors associated with dysphagia and the association between observed survival and severity of dysphagia. Almost half of the 407 patients had dysphagia. Risk factors included advanced stage, older age, female sex, and hypopharyngeal tumors. The most severe dysphagia (NPO status) was the strongest independent predictor of survival. Swallowing problems should be considered when determining appropriate cancer-directed treatment and post-treatment care. Because of dysphagia's high incidence rate and association with survival, a speech-language pathologist should be involved to ensure routine diagnostic and therapeutic swallowing interventions.

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## Contacts

samantha-shune@uiowa.edu • lucy-karnell@uiowa.edu • michael-karnell@uiowa.edu