

## Contribution of Video-fluoroscopic Swallow Evaluation to Dysphagia Control in Lung Cancer

Anna Behaghel\*

Institute of Phonetics and Speech Processing, Ludwig-Maximilians-Universität München, Germany

### Abstract

Dysphagia is a frequent complication in lung cancer patients, significantly impacting their nutritional intake, hydration status, and overall quality of life. Video-fluoroscopic swallow evaluation (VFSE) has emerged as a pivotal diagnostic and therapeutic tool in the management of dysphagia associated with lung cancer. This imaging technique utilizes real-time fluoroscopy to assess the swallowing function, providing detailed insights into oropharyngeal and esophageal phases. The diagnostic role of VFSE involves identifying specific swallowing impairments such as aspiration risk and guiding personalized treatment strategies. Therapeutically, VFSE facilitates the recommendation of targeted interventions, including swallow exercises and dietary modifications, aimed at improving swallowing function and minimizing aspiration risk. Repeat VFSE assessments enable clinicians to monitor treatment efficacy and adjust interventions accordingly. While VFSE involves radiation exposure, the benefits of accurate diagnostic information typically outweigh the associated risks when performed judiciously. Patient-centered care emphasizes education on safe swallowing practices and personalized dysphagia management plans tailored to individual patient needs. Looking forward, future research should explore advanced imaging techniques and personalized medicine approaches to further enhance VFSE's role in optimizing dysphagia management in lung cancer patients. Ultimately, VFSE stands as a cornerstone in a multidisciplinary approach to dysphagia care, striving to improve outcomes and quality of life for individuals battling lung cancer.

**Keywords:** Dysphagia; Video-fluoroscopy; Lung cancer; swallowing assessment; Therapeutic interventions

### Introduction

Dysphagia, the impairment of swallowing function, represents a significant challenge in the management of patients with lung cancer. It not only affects their nutritional status and quality of life but also poses risks of aspiration pneumonia and dehydration [1,2]. Effective management of dysphagia in this population requires precise diagnostic tools and tailored therapeutic strategies. Video-fluoroscopic swallow evaluation (VFSE) has emerged as a crucial modality in the assessment and treatment of dysphagia in lung cancer patients [3,4]. By employing real-time fluoroscopy, VFSE allows clinicians to visualize the swallowing process dynamically, providing detailed insights into the mechanisms of oropharyngeal and esophageal swallowing [5]. This imaging technique enables the identification of specific impairments such as aspiration risk and facilitates the development of personalized treatment plans [6]. The role of VFSE extends beyond diagnosis, encompassing therapeutic interventions such as swallow exercises and dietary modifications aimed at enhancing swallowing function and minimizing aspiration risk. Furthermore, VFSE supports ongoing monitoring of treatment efficacy, enabling adjustments to interventions based on objective data. Despite its utility, VFSE necessitates careful consideration of radiation exposure and patient safety measures. Balancing these concerns with the benefits of accurate diagnostic information underscores the importance of judicious application in clinical practice [7,8].

Dysphagia, or difficulty in swallowing, is a common complication among patients with lung cancer. It significantly impacts their quality of life by affecting their ability to eat and drink comfortably, leading to nutritional deficiencies, dehydration, and even aspiration pneumonia. Managing dysphagia effectively is crucial in improving patient outcomes and overall well-being. In recent years, video-fluoroscopic swallow evaluation (VFSE) has emerged as a vital tool in the assessment and management of dysphagia in lung cancer patients

[9]. This imaging technique allows healthcare providers to visualize the swallowing process in real-time, providing detailed insights into the anatomy and function of the oropharyngeal and esophageal phases of swallowing [10].

### Understanding video-fluoroscopic swallow evaluation (VFSE)

VFSE involves fluoroscopy, a type of X-ray imaging that captures dynamic images of the swallowing process. During the procedure, the patient swallows various textures and volumes of contrast material (e.g., barium) while being monitored by a radiologist or a speech-language pathologist. These professionals analyze the images to assess for abnormalities such as aspiration (when food or liquid enters the airway) or penetration (when food or liquid enters the laryngeal vestibule but does not pass below the vocal cords).

### The benefits of VFSE include

**Accurate Assessment:** VFSE provides detailed and precise information about the specific nature and severity of dysphagia, helping clinicians tailor treatment plans accordingly.

**Real-time Observation:** Unlike static imaging, VFSE allows healthcare providers to observe the entire swallowing process in

\*Corresponding author: Anna Behaghel, Institute of Phonetics and Speech Processing, Ludwig-Maximilians-Universität München, Germany, E-mail: annabehaghel@gmail.com

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motion, identifying subtle abnormalities that may not be evident in other types of evaluations.

**Objective Data:** The objective data obtained from VFSE helps in establishing baseline function, monitoring progress over time, and determining the effectiveness of interventions.

### Dysphagia management in lung cancer

Dysphagia in lung cancer patients can arise due to various factors, including direct tumor invasion into the swallowing mechanism, radiation therapy affecting the oral cavity or esophagus, chemotherapy-induced mucositis, or generalized weakness from the disease itself. Effective management typically involves a multidisciplinary approach, including oncologists, radiologists, speech-language pathologists, dietitians, and nurses.

### Role of VFSE in dysphagia management

**Identifying swallowing impairments:** VFSE helps in identifying specific impairments such as delayed initiation of the swallow reflex, reduced tongue base retraction, or impaired pharyngeal contraction, which can guide treatment strategies.

**Determining aspiration risk:** By visualizing the timing and extent of contrast material entering the airway, VFSE assists in determining the risk of aspiration, guiding decisions on dietary modifications and positioning during meals.

### Therapeutic role

**Guiding therapy:** Based on VFSE findings, speech-language pathologists can recommend specific swallowing exercises (e.g., tongue strengthening exercises, swallow maneuvers) aimed at improving swallowing function.

**Assessing treatment efficacy:** Repeat VFSEs can assess the effectiveness of interventions, providing objective data to modify treatment plans as needed.

### Clinical considerations

#### Patient safety

**Radiation exposure:** Although VFSE involves exposure to radiation, the benefits of obtaining critical diagnostic information usually outweigh the risks, especially when performed judiciously and with proper shielding techniques.

#### Patient-centered care

**Patient education:** Educating patients and caregivers about dysphagia management strategies, including safe swallowing techniques and dietary modifications, is crucial for optimizing outcomes and enhancing patient independence.

### Conclusion

Video-fluoroscopic swallow evaluation plays a pivotal role in the comprehensive management of dysphagia in lung cancer patients. By providing detailed anatomical and functional insights, VFSE helps clinicians accurately diagnose swallowing impairments, tailor interventions, and monitor treatment efficacy over time. As part of a multidisciplinary approach, VFSE contributes significantly to improving patient outcomes, enhancing quality of life, and promoting safe and effective swallowing in this vulnerable population. Continued research and clinical innovation in VFSE hold promise for further advancing dysphagia care in lung cancer and other oncological settings. VFSE facilitates ongoing assessment of treatment efficacy, allowing for timely modifications to intervention plans based on objective data. While considerations regarding radiation exposure and patient safety are paramount, the benefits of VFSE in optimizing dysphagia management generally outweigh these risks when applied judiciously and with appropriate safeguards. Looking ahead, future research efforts should continue to explore advancements in imaging technology and personalized medicine approaches to further refine the role of VFSE in lung cancer care. By enhancing diagnostic accuracy and therapeutic outcomes, VFSE holds promise in improving quality of life and reducing complications associated with dysphagia in this vulnerable patient population.

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