

New insights into the diagnostic workup of oropharyngeal dysphagia in head and neck cancer patients

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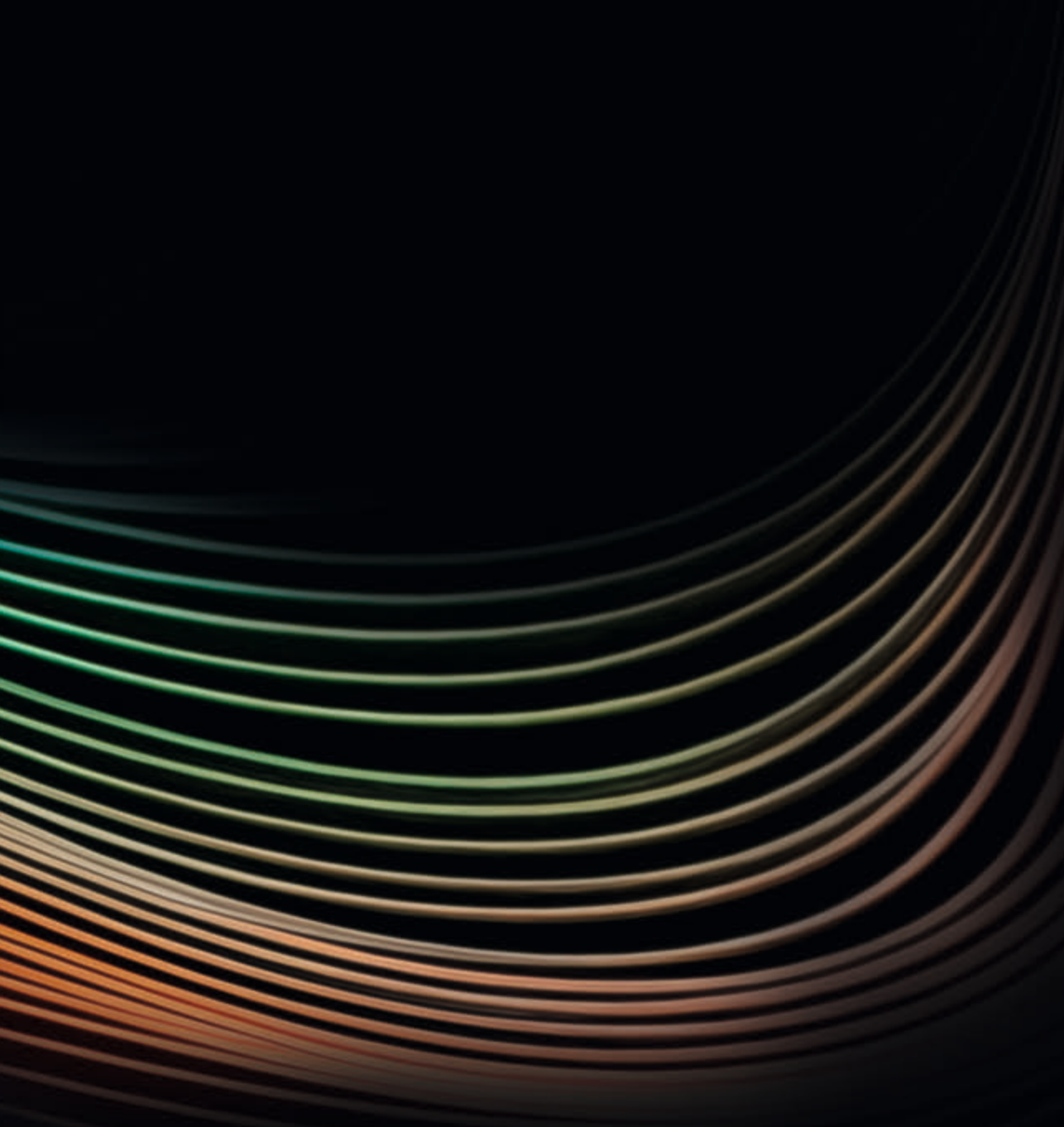
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CHAPTER 10

SUMMARY



This thesis provides new insights into the diagnostic workup of oropharyngeal dysphagia (OD) in head and neck cancer (HNC) patients by exploring and integrating different dimensions of OD namely patient-reported outcome measures (PROMs) on swallowing impairment and on OD-related consequences and clinician-reported outcome measures (CROMs) on swallowing using instrumental imaging techniques. The integration of information on the actual nature and severity of OD and the patient's perspective on swallowing and on OD-related consequences will lead to a more holistic view of the extent and impact of swallowing impairment.

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During fiberoptic endoscopic evaluation of swallowing (FEES), methylene blue is frequently administered to enhance visualization of bolus transit in the pharynx and/or larynx, yet there is no consensus whether it is safe and feasible to use small amounts of methylene blue during FEES. A systematic literature review to investigate the evidence on the safety of using certain amounts of methylene blue as food dye during FEES is presented in **chapter 3**. Seventeen studies were included resulting in a pooled population of 1902 patients who received oral methylene blue for various indications including malaria, psychiatric disorders, and during colonoscopy to aid visualization of mucosal abnormalities. In three children, serious adverse events related to oral administration of methylene blue were reported, i.e., repeated vomiting, anemia, and hemolysis. Serious adverse events due to oral administration of methylene blue were rare (0.16%), and were related to a high dose of methylene blue. Only one serious coincident adverse event, i.e., gastro-intestinal hemorrhage was reported in adults, but was deemed unrelated to methylene blue. Methylene blue-related non-serious adverse events showed a dose-related trend and were usually mild and self-limiting. This systematic literature review indicates that it is safe to use small amounts of methylene blue as a food dye during swallowing examinations in children and adults.

The presence of postswallow pharyngeal residue after swallowing may be a risk factor for aspiration of residue, however limited research is available on this potential association in HNC patients. The cross-sectional study described in **chapter 4** investigates the association between postswallow pharyngeal residue and aspiration in dysphagic HNC patients. Ninety dysphagic HNC patients underwent FEES. During FEES, three ordinal visuoperceptual measures were scored per swallow: postswallow vallecular residue, postswallow pyriform sinus residue, and aspiration. The results showed no significant association between vallecular residue and aspiration of thin liquid bolus consistency. However, severe postswallow vallecular residue of thick liquid bolus consistency was significantly associated to aspiration. Severe pyriform sinus residue was significantly associated to aspiration of thick liquid bolus consistency. The results of this study indicate that location of pharyngeal residue (valleculae versus pyriform sinuses), type of bolus consistency, and amount of postswallow pharyngeal residue have an influence on the probability of aspiration in dysphagic HNC patients. This study emphasizes the need to carefully consider the presence of pharyngeal residue, even in the absence of aspiration during FEES.

The Dynamic Imaging Grade of Swallowing Toxicity (DIGEST) is a multi-component visuoperceptual scale to grade the overall severity of pharyngeal dysphagia during videofluoroscopic swallowing study (VFSS) or FEES in HNC patients.

Reproducibility of measurements concerns an important aspect of the quality of measurement scales for OD, yet there is little evidence in the literature with regard to the reproducibility and external validity of the DIGEST in FEES. **Chapter 5** focuses on observer agreement on visuoperceptual measures of the DIGEST in FEES. This study also explores the challenges of reaching agreement among observers. Twenty-seven dysphagic HNC patients were enrolled, and two novice observers completed a training program for DIGEST in FEES. Observer agreement on visuoperceptual measures of the DIGEST was determined for ordinal measures including the Penetration-Aspiration Scale, percentage of pharyngeal residue, and the multi-component final DIGEST grade. During the first measurement attempt, overall observer agreement levels on several bolus consistencies were insufficient. Sufficient agreement on the DIGEST was only reached after additional observer-tailored training following a detailed analysis of the discrepancies between observers. Thereafter, a manual with detailed descriptions of the visuoperceptual measures was elaborated. To evaluate criterion validity of the DIGEST-FEES, the study also calculated the correlation between the results of the DIGEST-FEES measures and the results of various criterion measures. A significant correlation was found between swallowing efficiency (DIGEST efficiency grade) and the dysphagia-specific symptom questionnaire Eating Assessment Tool (EAT-10), suggesting that patients with more severe pharyngeal residue experience a higher level of self-perceived symptom severity on the EAT-10. To conclude, the DIGEST showed to be a reproducible measurement for FEES in terms of observer agreement. The study findings also indicate that observer-tailored training combined with a manual with well-defined descriptions can optimize the reproducibility of DIGEST measurements during FEES.

Patient-reported outcome measures in the diagnostic workup of oropharyngeal dysphagia

As it is hypothesized that dysphagic HNC patients present a higher risk of malnutrition, a cross-sectional cohort study examining the risk of malnutrition in patients with OD secondary to HNC is presented in **chapter 6**. The study also investigates the relationship between the risk of malnutrition versus patient and tumor characteristics. Seventy-five dysphagic HNC patients were included. All patients underwent malnutrition screening using the Short Nutritional Assessment Questionnaire (SNAQ) and a standardized FEES. This study emphasizes the relevance of early malnutrition screening in dysphagic HNC patients, as almost half of patients (48%) presented a high risk of malnutrition. In this study, body mass index (BMI) did not appear to be a reliable measure to screen for malnutrition as a normal BMI was often accompanied by an increased risk of malnutrition. In contrast, patients who were underweight did not show an association with a high risk of malnutrition. With the exception of BMI, no other patient and tumor characteristics were found to be associated with risk of malnutrition. Thus, malnutrition screening using SNAQ can identify dysphagic HNC patients who are at risk of malnutrition. Risk of malnutrition remains a sustainable point of attention

in HNC patients, even after oncological treatment and during long term follow-up in all HNC survivors, especially when OD is present.

The recognition and treatment of the psychosocial burden in HNC patients is important as psychological distress may interfere with their ability to cope with the disease and its treatment. An impaired swallowing function as a result of HNC such as aspiration of food and liquids into the airway, is assumed to negatively influence a patient's affective state, i.e., psychological distress. To this end, the association between the presence of aspiration and clinically relevant symptoms of anxiety and depression, i.e., affective symptoms in dysphagic HNC patients was investigated in the cross-sectional cohort study presented in **chapter 7**. This study also explored the association between aspiration versus patient and tumor characteristics. Eighty-four HNC patients with OD completed the Hospital Anxiety and Depression Scale (HADS) and underwent a standardized FEES. More than half of all dysphagic HNC patients (61.9%) presented clinically relevant symptoms of anxiety or depression on the HADS. Forty-eight patients (57.1%) presented aspiration during FEES. Surprisingly, a significant negative association was found between the presence of aspiration and affective symptoms, implying that the presence of aspiration was accompanied by significantly lower scores on affective symptoms. Gender was also significantly associated with affective symptoms, as male patients presented significantly lower symptom scores for anxiety compared to female patients. These study findings show that clinically relevant symptoms of anxiety and depression are common in HNC patients with OD, and these symptoms are associated with both aspiration and gender. The high prevalence of clinically relevant symptoms of anxiety and depression in dysphagic HNC patients justifies the recommendation of a systematic screening for affective symptoms.