Project Title

The Effects of Expiratory Muscle Strength Training (EMST) on Airway Protection and Swallowing in Chronic Dysphagia after Radiation Therapy

Project Lead and Members

Project lead: Lee Yan Shan (Principal Speech Therapist)

Project members: Yee Kaisin (Principal Speech Therapist), Wong Seng Mun (Snr Principal Speech Therapist)

Organisation(s) Involved

Singapore General Hospital

Healthcare Family Group(s) Involved in this Project

Allied Health

Applicable Specialty or Discipline

Speech Therapy

Project Period

Start date: June 2018

Completed date: Sept 2021

Aims

To prospectively determine the effects of Expiratory Muscle Strength Training (EMST) program on expiratory pressure, cough and swallowing outcomes in head and neck cancer survivors with chronic dysphagia post-radiation therapy.

Background

Chronic radiation-associated dysphagia after head and neck cancer (HNC) treatment can be refractory to traditional dysphagia therapy. Expiratory Muscle Strength Training (EMST) is an exercise-based therapy involving forceful expiration into a one-way

spring-loaded valve. Previous studies in HNC, Parkinson's disease, multiple sclerosis and stroke reported mixed results in airway protection, swallowing physiology and quality of life (QOL). In this study, we prospectively investigated expiratory pressure, cough and swallowing outcomes of HNC survivors across an 8-week EMST programme.

Methods

Inclusion criteria were: chronic dysphagia post-radiation ($\geqslant$ 6 months), airway invasion on videofluoroscopy, and failure to respond to traditional dysphagia therapy. The EMST program involved home practice and weekly in-clinic adjustment to the EMST-150 device. We compared the following outcomes pre versus post-EMST: maximal expiratory pressure (MEP); voluntary cough peak expiratory flow rate (PEFR); Functional Oral Intake Scale (FOIS); Performance Status Scale for Head and Neck Cancer (PSSHN) and MD Anderson Dysphagia Inventory (MDADI).

Results

Twelve dysphagic patients completed the 8-week protocol (9 males, 3 females). Cancer sites involved the nasopharynx (n=10), tongue (n=1) and supraglottis (n=1). MEP significantly increased by 50%, indicating stronger forceful expiration ($p<.001$). Voluntary cough PEFR did not improve significantly. Median improvement in FOIS was 1 point, but there were no significant changes in PSSHN Normalcy of Diet scores nor QOL represented by composite MDADI scores.

Lessons Learnt

Recruitment and data collection were challenging due to disruption in clinical services during the Covid Pandemic period.

Conclusion

EMST treatment for the HNC population with radiation-associated dysphagia should be carefully considered, in view of its mixed clinical impact yet intensive commitment required for the programme.

Additional Information

This abstract was presented as an E-poster at the Singapore Allied Health Conference, 2022.

This study was funded by the SingHealth Foundation Research Grant Awarded to Lee Yan Shan (Principal Investigator) in April 2018.

Project Category

Applied/ Translational Research

Quantitative Research

Keywords

Dysphagia, Swallowing, Expiratory Muscle Strength Training, Rehabilitation, Head Neck Cancer, Oncology, Radiation Therapy

Name and Email of Project Contact Person(s)

Name: Lee Yan Shan

Email: lee.yan.shan@sgh.com.sg