

# Handgrip strength is associated with treatment modifications during neo-adjuvant chemo-radiation in patients with esophageal cancer

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## Rationale

Malnutrition is frequently observed in patients with esophageal cancer (EC). In these patients, it has been shown that early nutritional intervention improves nutritional status (NS) and treatment tolerance. Therefore, all patients treated for EC at the VU medical center (Vumc), receive intensive nutritional support throughout their treatment. So far, it remains unknown whether baseline parameters of NS are associated with treatment modifications (TM) during neo-adjuvant chemo-radiation (CR).

## Methods

All outpatients with EC who were scheduled for CR at the VUmc between 2006-2015 were included; there were no exclusion criteria. As part of the routine nutritional and medical work-up, patient characteristics and data on nutritional status were prospectively collected before start of the neo-adjuvant chemo-radiation. Pre-treatment NS was assessed by:

- Body mass index (BMI, kg/m<sup>2</sup>),
- Weight loss in the past 6 months (WL, kg),
- Fat- mass index (FMI, kg/m<sup>2</sup>),
- Fat-free mass index (FFMI kg/m<sup>2</sup>),
- Handgrip strength (HGS, kg),
- Energy- and protein intake (percentage of requirements (WHO(+30-50%)).

These prospectively collected data were retrospectively completed with data on the course of chemo-radiation from medical charts. TM were defined as: delay (>1 week), dose reduction or discontinuation of chemotherapy and/ or radiotherapy, hospitalization or mortality.

Both an univariate as a multivariate logistic regression analyses was used to examine the associations between the different parameters of NS as continuous parameters and TM (yes/no).

## Results

A total of 162 patients (73% male; mean age 65 (± 9) years) were included. Mean BMI was 25.1 (± 4.5) kg/m<sup>2</sup>, mean WL in the past 6 months was 4.8 (± 5.1) kg. In 29 (18%) patients the HGS and in 37 (23%) patients the FFMI were below the 10<sup>th</sup> percentile of reference values.

In 35 (22%) patients at least one TM occurred during CR. Unplanned hospitalization (n=18, 11%) was the most prevalent, followed by dose reduction of chemotherapy (n=15, 9%). None of the patients died during the treatment.

Table 1 shows the association between the different parameters of NS and TM, after adjustments for possible confounders (age, gender, previous tumour, ASA performance score, TN classification).

Table 1: Association nutritional status and treatment modifications

Parameter NS	OR (95% CI)
BMI (kg/m <sup>2</sup> )	0.98 (0.91; 1.07)
FFMI (kg/m <sup>2</sup> )	1.11 (0.90; 1.38)
FMI (kg/m <sup>2</sup> )	1.00 (0.96; 1.05)
HGS (kg)	0.94 (0.88; 1.00)
WL 6 months (kg)	1.00 (0.91; 1.09)
Energy intake (%)*	1.00 (0.98; 1.02)
Protein intake (%)*	1.00 (0.98; 1.02)

## Conclusion

Handgrip strength was the only parameter that was marginally associated with treatment modifications during CR in patients with esophageal cancer. Due to intensive support, nutritional status was of little influence on occurrence of treatment modifications in this specific group.