ST. VINCENT'S UNIVERSITY HOSPITAL
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UCD DUBLIN

# Assessment of Fasting Times and Energy and Protein Provision in Patients Requiring Elective Tracheostomy Placement to Facilitate Weaning from Mechanical Ventilation During Their Critical Care Stay.

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## Introduction

Underfeeding in Intensive Care Units (ICU) is associated with negative outcomes, yet remains commonplace, particularly in mechanically ventilated patients.

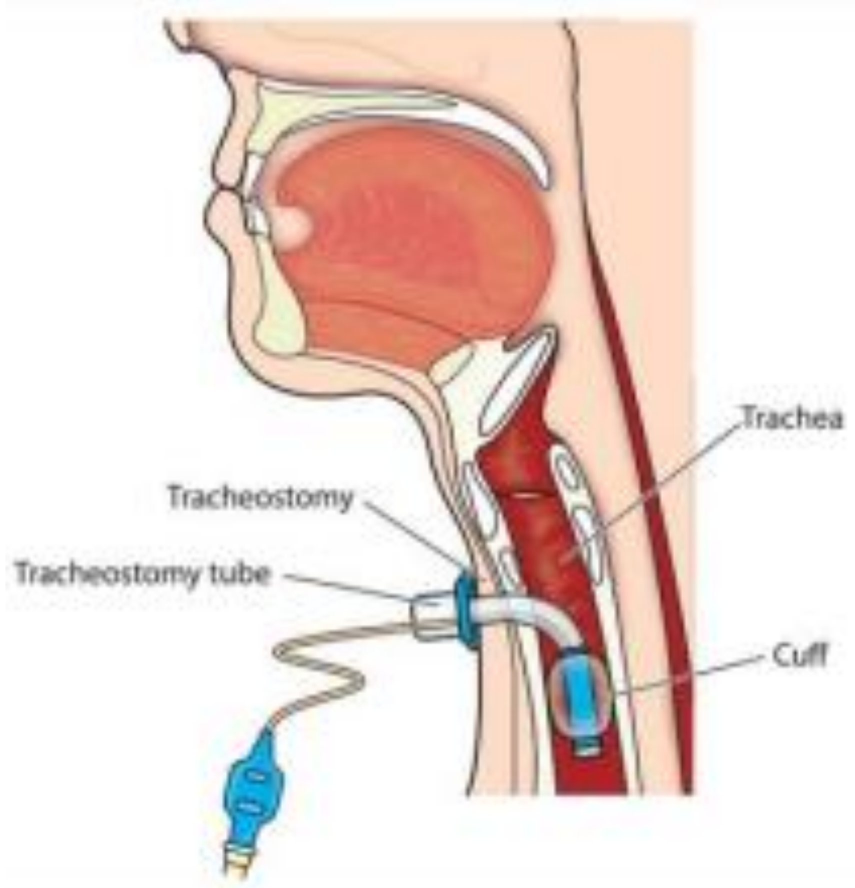
Tracheostomy insertion aims to promote weaning from mechanical ventilation; however, it has been associated with longer enteral feed interruptions, which are associated with nutrition deficits.

Aim: to assess enteral feed interruptions and energy & protein provision in ICU in St Vincent's University Hospital, Dublin.

## Methods

Information including baseline characteristics, fasting hours, and energy & protein requirements and delivery was collected for consecutive patients who required tracheostomy insertion and received enteral nutrition during their ICU stay between 2019-2022.

Fasting hours, and energy & protein achieved were compared to standard reference values using one sample t-test and non-parametric one sample test.




## Results

Of 192 patients identified from a prospectively maintained database, 105 met the inclusion criteria and comprised the study cohort. Their baseline and clinical characteristics are summarised in table 1. Fasting times for tracheostomy insertion, and nutritional adequacies are outlined in table 2 and figure 1.

**Table 1: Patient Characteristics**

| | N (%) or Mean (SD) / Median (IQR) |
|---|---|
| Age (years)[a] | 63.57 (12.08) |
| Male gender | 61 (58%) |
| Weight (kgs)[b] | 78.5 (66.14-96.55) |
| Height (m)[a] | 1.704 (0.087) |
| BMI (kg/m$^2$)[b] | 26.95 (23.43-33.13) |
| **Admission source** | |
| Ward | 60 (57%) |
| Emergency Department | 32 (30.5%) |
| Other hospital | 11 (10.5%) |
| Theatre | 2 (2%) |
| **Reason for ICU admission** | |
| Respiratory support | 73 (69.5%) |
| Multi-organ support | 27 (25.7%) |
| Cardiovascular support | 3 (2.9%) |
| Sepsis | 1 (0.95%) |
| Renal replacement therapy | 1 (0.95%) |
| Apache II score[b] | 21 (16-26.5) |
| Covid positive | 25 (24%) |
| **Medical history** | |
| Cardiovascular disease | 61 (58%) |
| Diabetes | 26 (25%) |
| Cancer | 22 (21%) |
| Renal disease | 11 (10%) |
| **Surgery on this admission** | 15 (14%) |
| Elective {transplant – liver} | 2 (2%) {1 (1%)} |
| **Organ supports during first 24 hours in ICU** | |
| 2 or more | 87 (83%) |
| Mechanical ventilation | 89 (85%) |
| Sedation | 86 (82%) |
| Vasopressors | 79 (75%) |
| CVVH | 13 (12%) |
| **Organ supports at tracheostomy insertion** | |
| 2 or more | 103 (98%) |
| Mechanical ventilation | 105 (100%) |
| Sedation | 102 (97%) |
| Vasopressors | 60 (57%) |
| CVVH | 26 (25%) |
| Duration of mechanical ventilation (days)[b] | 10.42 (7.65-15.42) |
| Duration of mechanical ventilation (hours)[b] | 249 (183.5-370) |
| Hospital LOS (days)[b] | 79 (45.5-126) |
| ICU LOS (days)[b] | 35 (24-49.5) |
| Alive at 30 days | 102 (97%) |
| Alive at 90 days | 83 (79%) |

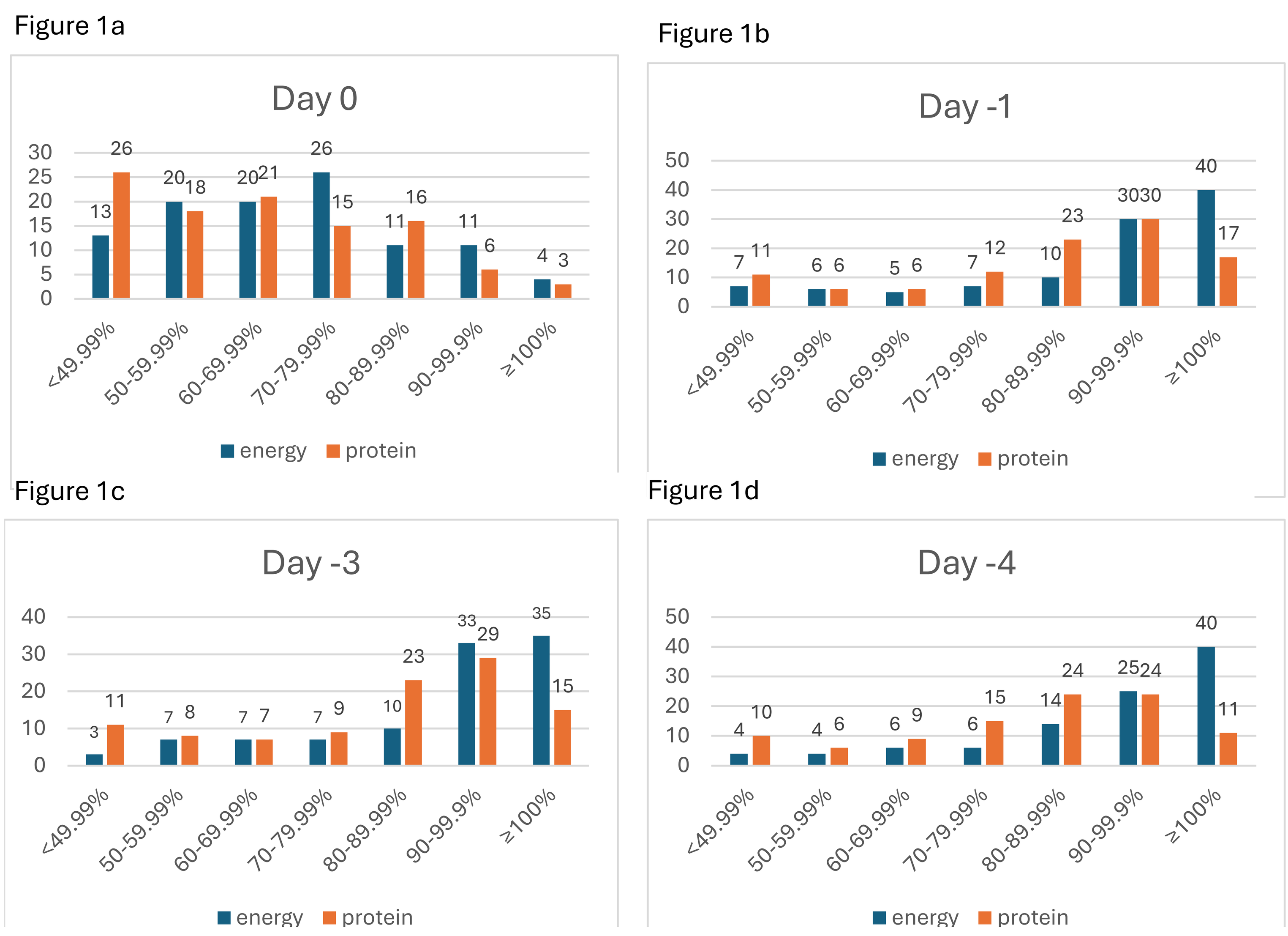
[a] Mean (SD), [b] Median (IQR).

**Table *2*: Fasting hours and energy and protein balances and percentages achieved.**

| | Mean (SD) / Median (IQR) | Comparison to recommendation |
|---|---|---|
| Actual fasting times (hours)[b] | 8.5 (4.5-11.5) | P<0.001[c] |
| 10-day cumulative fasting (hours)[b] | 21.5 (13.75-35) | |
| Cumulative energy balance (kcal)[b] | -1673.5 (2821 - -826.8) | |
| Cumulative protein balance (g)[b] | -194.25 (-311 - -114.25) | |
| Day 0 energy achieved (%)[a] | 67.87 (19.15) | P<0.001[d] |
| Day 0 protein achieved (%)[a] | 63.22 (21.03) | P<0.001[d] |
| Day -1 energy achieved (%)[b] | 96.5 (80.5-103.75) | P<0.001[c] |
| Day -1 protein achieved (%)[b] | 88.15 (73.13-96.35) | p=0.032[c] |
| Day -4 energy achieved (%)[b] | 96.5 (83.25-102) | P<0.001[c] |
| Day -4 protein achieved (%)[b] | 84.6 (69.55-94.23) | p=0.424[c] |

[a] Mean (SD), [b] Median (IQR). [c]Non-parametric Wilcoxon signed rank test, significance level .050. [d]One sample t-test.

Figure 1: Number of patients reaching percentiles of target energy and protein requirements




## Conclusion

Unlike comparative studies, median energy and protein provision in the days preceding tracheostomy insertion were adequate in this study for the majority. This may be reflective of adequate dietetic staffing levels and expertise in this site.

However prolonged fasting times on day of tracheostomy, associated with negative energy and protein balance, could be reduced through increased ICU staff education on guidelines, auditing the implementation of the volume-based feeding protocol, or further investigation into a "no-fast" approach.

## Key References:

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