Effect of cyclic versus continuous enteral nutrition on circadian rhythms in critical illness: the CIRCLES study

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Ethical review	Approved WMO
Status	Completed
Health condition type	Other condition
Study type	Interventional

Summary

ID

NL-OMON51811

Source
ToetsingOnline

Brief title
CIRCLES

Condition

- Other condition

Synonym
Enteral Nutrition, Intensive Care

Health condition

alle aandoeningen met een Intensive Care indicatie

Research involving
Human

Sponsors and support

Primary sponsor: Leids Universitair Medisch Centrum
Source(s) of monetary or material Support: Veni beurs van dr. L. (Laura) Kervezee (grant nummer 09150161910128)

Intervention

Keyword: Circadian Rhythm, Enteral nutrition, Intensive Care, Trial

Outcome measures

Primary outcome

Main study parameters are the 24-h rhythm in core body temperature at day 3 of the study period, assessed by amplitude and acrophase of cosinor fits

Secondary outcome

Secondary study parameters are the difference between daytime and night-time melatonin levels at day 3 of the study period, 24-h rhythms in systolic blood pressure, heart rate and heart rate variability, 24-hour rhythms in circulating metabolites, peripheral clock gene expression, depth of sleep, mean daily rate of hyperglycaemia/hypoglycaemia, mean daily glucose variability, mean daily insulin administration, compliance to study protocol, mean daily caloric intake, daily rates of gastric residual volume > 200 mL, 28-day mortality, days on mechanical ventilation and ICU length of stay

Study description

Background summary

Patients in the intensive care unit (ICU) are subjected to an environment presenting weak and conflicting timing cues to the circadian clock, including continuous enteral feeding. Multiple lines of evidence show that circadian rhythms and sleep/wake cycles are severely disrupted in critically ill patients

and that this contributes to worse clinical outcomes. Rhythmic feeding-fasting cycles provide a potent synchronizing cue for the circadian clock and can restore dampened circadian rhythms in physiological and metabolic processes.

Study objective

The primary objective is to evaluate whether cyclic daytime enteral feeding can decrease the disruption of circadian rhythms in critically ill patients compared to continuous enteral feeding. Secondary objectives are to evaluate the effect of cyclic feeding on depth of sleep, glucose dysregulation, insulin administration, feeding intolerance and clinical outcomes.

Study design

Investigator-initiated randomized-controlled trial

Intervention

Patients will be allocated to either the *cyclic feeding* or *continuous feeding* group. Patients in the *cyclic feeding* group will receive continuous enteral feeding in a 12 hour period during daytime, between 8.00h to 20.00h. Patient in the *continuous feeding* group will receive continuous enteral feeding over 24 hours. Standard of care protocols with regard to daily nutritional goals, initiation scheme, treatment of gastric retention and glucose regulation are followed for both groups and are thus equal between them.

Study burden and risks

Potential risks for the patient in the cyclic daytime feeding group are gastrointestinal intolerance, potentially leading to lower caloric intake, and glucose dysregulation. However, increased dosing rates of enteral nutrition have repeatedly been shown to be safe, effective and feasible. Nevertheless, the glucose regulation and gastric retention protocols will be closely followed to minimize the risks. No risks are related to the additional measurements performed on the study subjects (electro-encephalography and blood sampling). Potential benefits for study participants is the close monitoring of glucose levels and gastric retention. The study is group-related as it investigates the effects of daytime feeding on the circadian rhythm in the critically ill patients population.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Age 18 years or older
Receiving of or intention to start enteral nutrition via nasogastric or nasoduodenal tube
Arterial line
Expected duration of ICU admission > 48 hours

Exclusion criteria

• Receiving parenteral nutrition
• Oral intake
• Prior night-time (20.00h - 8.00h) enteral or parenteral nutrition within the same hospitalization before study inclusion
• Readmission to ICU with prior study inclusion
• Chronic enteral tube feeding prior to current admission
• Presence of one or more contraindications of enteral feeding and/or at

significant risk for gastrointestinal tolerance according to standard protocol (including but not limited to gastrointestinal haemorrhage, intestinal ischemia or necrosis, impaired digestive tract integrity due to obstruction or perforation, gastrectomy, enterectomy, history of gastroparesis or oesophageal dysmotility or expected surgery within 24 hours)
• Patients with glycaemic emergency (including but not limited to hyperglycaemic hyperosmolar nonketotic coma, diabetic ketoacidosis, severe hypoglycaemia resulting in ICU admission) or patients controlling their glucose levels and insulin dosing via continuous glucose monitoring
• Treatment with extracorporeal membrane oxygenation
• Severe neurological damage (significant neurological abnormalities such as bleeding, ischemia, neurotrauma or severe encephalopathy with Glasgow Coma Scale <= 8)
• Suspected or confirmed pregnancy

Study design

Design

Study type:	Interventional
Intervention model:	Parallel
Allocation:	Randomized controlled trial
Masking:	Open (masking not used)

Primary purpose: Treatment

Recruitment

NL

Recruitment status:	Completed
Start date (anticipated):	19-06-2023
Enrollment:	60
Type:	Actual

Ethics review

Approved WMO

Date:	09-12-2022
Application type:	First submission

Review commission:	METC Leiden-Den Haag-Delft (Leiden) metc-ldd@lumc.nl
Approved WMO Date:	15-07-2024
Application type:	Amendment
Review commission:	METC Leiden-Den Haag-Delft (Leiden) metc-ldd@lumc.nl
Approved WMO Date:	27-11-2024
Application type:	Amendment
Review commission:	METC Leiden-Den Haag-Delft (Leiden) metc-ldd@lumc.nl

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL81929.058.22