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Can a feeding protocol improve clinical outcomes in critically ill patients?

Submission date
20/11/2017

Recruitment status
No longer recruiting

Registration date
24/11/2017

Overall study status
Completed

Last Edited
22/09/2025

Condition category
Injury, Occupational Diseases, Poisoning

[X] Prospectively registered
[X] Protocol
[X] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Current plain English summary as of 15/01/2020:

Background and study aims
In the intensive care unit (ICU), nutritional therapy is one of the most crucial treatment for critically ill patients which may significantly influence the clinical outcomes. There is a large body of evidence showing that malnutrition is associated with significantly increased risk of death. Besides, ICU patients are at increased risk of underfeeding, which could further exacerbate the existing gap between energy demand and intake. The route of nutrition delivery is another important issue when starting nutritional therapy for ICU patients. Enteral feeding has been repeatedly proven to be superior over parenteral nutrition (PN) with respect to the clinical outcomes such as nosocomial infection and mortality.
China has one of the largest critically ill population in the world, and the clinical practice of EN feeding varies massively. Previous small studies have shown that the proportion of EN was as low as 40% on day 2, which could be improved with the implementation of EN feeding protocol. However, to the best of our knowledge, there is a lack of large-scale data on the practice of enteral nutrition in ICUs. Cluster randomized method can effectively control the confounding factors between groups to obtain more reliable conclusions. In addition, patient-level randomization would inevitably lead to pollution effect as the feeding protocol in the study group would always affect the clinical practice in the controls. Randomization at the hospital level and stratification could help avoid pollution.
Therefore, we conduct a multi-centered, cluster-randomized, parallel-controlled trial to assess the effect of a feeding protocol on nutritional therapy and clinical outcome in critically ill patients.

Who can participate?
Patients aged 18 years and older who are expected to stay in the ICU for more than 7 days.

What does the study involve?
The R language will be used for randomization for this study. All the participating centers will be stratified according to the nature of its hospital (regional and tertiary) and ICU (emergency, medical, surgical, and general). Randomization will occur in a 1:1 fashion for the participating centers within the same category with computer-generated random numbers and all the

randomization will be once completed. Allocation concealment was maintained by conducting randomization after consent to participate was obtained.
Arm#1 feeding protocol group: Implementation of enteral nutrition feeding protocol.
Arm#2 Control group: No adherence to uniform protocol and without any change to current clinical practice.

What are the possible benefits and risks of participating?
All patients will be cared for by the local treating team in each participating ICU, including monitor of vital signs, harvesting necessary blood samples for laboratory measurement, fluid therapy, and so on. As the feeding protocol used in this study has been tested in a pilot study without significant adverse effects, the application of this protocol should be largely safe. No specific monetary compensation available for each participant in this study.

Where is the study run from?
Jinling Hospital of Nanjing University (China)

When is the study starting and how long is it expected to run for?
December 2016 to December 2019

Who is funding the study?
Jinling Hospital of Nanjing University (China)

Who is the main contact?
Dr Lu Ke

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Previous plain English summary:
Background and study aims
There is a large body of evidence showing that enteral nutrition feeding (providing food or nutrition through a feeding tube) is of vital importance for the management of critically ill patients with multiple organ dysfunctions. Although there are many guidelines and protocols to improve the enteral feeding in critically ill patients, such protocols are not uniformly adopted in many Chinese hospitals, partly because the unawareness of the importance of enteral feeding protocol. Although many studies have reported improved outcome with standard enteral feeding protocol, others failed to identify benefits in patient-important outcomes such as mortality. The aim of this study is to explore the effectiveness of enteral feeding protocol in critically ill patients.

Who can participate?
Patients aged 18 and older who are expected to stay in the ICU for over three days.

What does the study involve?
Study participants are randomly allocated to one of two groups. Those in the first group receive the standardised feeding protocol. Participants are monitored closely for the occurrence of gastrointestinal adverse events and enteral feeding is adjusted in stadardised way. Those in the second group receive the conventional enteral feeding protocol. They receive enteral feeding by the judgement of the treating physician and are not under the standardised protocol.

What are the possible benefits and risks of participating?
There are no direct benefits or risks for patients participating in the study. Conventional medical intervention will not be influenced by the study. The benefits and harms of the intervention are not known currently.

Where is the study run from?
Nanjing Central Hospital (China)

When is the study starting and how long is it expected to run for?
November 2017 to September 2019 (updated 17/06/2019, previously: August 2019)

Who is funding the study?
Nanjing Central Hospital (China)

Who is the main contact?
Dr Juan Xing

Contact information

Type(s)
Public

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Type(s)
Scientific

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Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
Version 2.0

Study information

Scientific Title
EffectiveNess of feEding protocol on nutritional thErapy and clinical outcomes in critically ill patients: a multi-centered, cluster-ranDomized, parallel-controlled trial

Acronym
NEED

Study objectives
Current study hypothesis as of 15/01/2020:
A feeding protocol, compared to routine clinical practice, could reduce 28-day mortality in critically ill patients admitted to ICUs in China.

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Previous study hypothesis:
The enteral feeding protocol is able to reduce nosocomial infection in critically ill patients.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Ethics committee of Nanjing central hospital, 2017/11/18, ref: 22017NZKY-019-02

Study design
Multi-centered cluster-randomized parallel-controlled trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Critically ill patients

Interventions
Current interventions as of 15/01/2020:

The R language will be used for randomization for this study. All the participating centers will be stratified according to the nature of its hospital (regional and tertiary) and ICU (emergency, medical, surgical, and general). Randomization will occur in a 1:1 fashion for the participating

centers within the same category with computer-generated random numbers and all the randomization will be once completed. Allocation concealment was maintained by conducting randomization after consent to participate was obtained.

Arm#1 feeding protocol group: Implementation of enteral nutrition feeding protocol.
Arm#2 Control group: No adherence to uniform protocol and without any change to current clinical practice.

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Previous interventions:
Study participants are randomly allocated to one of two groups using cluster randomisation. Those in the first group receive the standardised feeding protocol. Participants are monitored closely for the occurrence of gastrointestinal adverse events and enteral feeding is adjusted in standardised way. The enteral feeding is standardized to accelerate the increment of enteral nutrition intake. The intervention is given for the whole ICU stay. Those in the second group receive the conventional enteral feeding protocol. They receive enteral feeding by the judgement of the treating physician and are not under the standardised protocol.

Intervention Type
Procedure/Surgery

Primary outcome(s)
Current primary outcome measure as of 15/01/2020:
All-cause mortality at day 28 after randomization (the day of randomization will be set as day 1)

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Previous primary outcome measure:
28-day mortality is measured using the vital status at 28 days after enrollment

Key secondary outcome(s))
Current secondary outcome measures as of 15/01/2020:

Process measures:
1. Time to start EN
2. Time to start PN
3. Mean nutrition support days within the first 7 days after enrollment
3.1 Mean nutritional support (either EN or PN or both) days within the first 7 days after enrollment
3.2 Mean EN support days within the first 7 days after enrollment
3.3 Mean PN support days within the first 7 days after enrollment
4. Target-reaching rate of EN on day 3 and day 7 after enrollment
5. EN tolerance score in the first 7days after Enrollment
6. Days requiring prokinetic agents within the first 7 days after enrollment
7. Proportion of patients receiving PN prescription within the first 7 days after enrollment
8. Mean energy per day over the first 7 days for patients who were fed
9. Proportion of patients never fed during the first 7 days after enrollment
10. Proportion of patients fed within 24 h after enrollment
11. Mean energy delivered for patients who were fed within the first 7 days after enrollment
11.1 Mean energy delivered from EN within the first 7 days after enrollment

11.2 Mean energy delivered from PN within the first 7 days after enrollment
12. Proportion of patients who received a post-pyloric feeding tube (patients receiving EN) within the first 7 days after enrollment

Organ dysfunction-related outcomes:
1. New onset organ failure within the first 7 days
1.1 New-onset respiratory failure;
1.2 New-onset cardiovascular failure;
1.3 New-onset renal failure
2. New receipt of organ support therapy within the first 7 days
2.1 New receipt of mechanical ventilation (non-invasive included)
2.2 New receipt of renal replacement therapy
2.3 New receipt of vasoactive agents
2.4 Days requiring CRRT within the first 7 days after enrollment
2.5 Days requiring insulin within the first 7 days after enrollment
2.6 Days requiring MV within the first 7 days after enrollment

Additional outcomes:
1. Incidence of secondary infection in the ICU
2. Length of ICU stay

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Previous secondary outcome measures:
1. Mechanical ventilation is measured using the duration of mechanical ventilation at 28 days
2. Nosocomial infection is measured using infection diagnosed 48 hours after enrollment
3. Proportion of enteral feeding is measured using the calories of enteral nutrition intake at 3, 5 and 7 days

Completion date
28/12/2019

Eligibility

Key inclusion criteria
Current inclusion criteria as of 15/01/2020:
1. Informed consent form obtained from the patient or next of kin
2. Aged 18 years or older
3. Within 24 h of ICU admission
4. With one or more organ failure (SOFA for any single organ system≥2)
5. Expected to stay in ICU more than 7 days
6. Oral diet is not likely to be restored within 3 days

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Previous inclusion criteria:
1. All patients expected to stay in the ICU for over 3 days
2. Aged 18 years and older

Participant type(s)
Patient

Healthy volunteers allowed

No

Age group
Adult

Lower age limit
18 years

Sex
All

Total final enrolment
2772

Key exclusion criteria
Current exclusion criteria as of 15/01/2020:
1. Received EN in the past 3 days
2. Receiving palliative treatment or expected to die within 48 hours
3. Women in pregnancy
4. Long-term use of steroids or immunosuppressive agents
5. Patients with malignant diseases receiving radiotherapy or chemotherapy.

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Previous exclusion criteria:
1. Subjects receiving EN in previous 7 days
2. Contraindications for nasogastric or nasoenteric tube placement
3. Subjects who have already undergone percutaneous endoscopic jejunostomy (PEJ), percutaneous endoscopic gastrostomy (PEG) and surgical jejunostomy
4. Age younger than 18 years old
5. Women who are pregnant or undergo breast feeding
6. Burn patients

Date of first enrolment
26/03/2018

Date of final enrolment
04/07/2019

Locations

Countries of recruitment
China

Study participating centre
Nanjing Central Hospital
305 East Zhongshan Rd
Nanjing
China
210002

Sponsor information

Organisation
Nanjing Central Hospital

Funder(s)

Funder type
Hospital/treatment centre

Funder Name
Nanjing Central Hospital

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are not publicly available but are available from the corresponding author on reasonable request.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		02/09/2022	20/09/2022	Yes	No
Results article		16/02/2022	20/12/2023	Yes	No
Results article	Post hoc analysis	20/01/2024	22/01/2024	Yes	No
Results article	Secondary analysis	03/02/2025	10/02/2025	Yes	No
Results article	Secondary analysis	23/07/2025	07/08/2025	Yes	No
Results article	Post hoc analysis	01/09/2025	22/09/2025	Yes	No
Basic results		14/01/2021	14/01/2021	No	No
Other publications	Secondary analysis	31/10/2022	20/12/2023	Yes	No
Other publications	Secondary analysis	27/05/2022	20/12/2023	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes
Protocol (other)		16/02/2022	20/12/2023	No	No
Statistical Analysis Plan		16/02/2022	20/12/2023	No	No

Study website	Study website	11/11/2025	11/11/2025	No	Yes