Complete Summary

GUIDELINE TITLE

Evidence-based guidelines for nutritional support of the critically ill: results of a Bi-National Guideline Development Conference.

BIBLIOGRAPHIC SOURCE(S)

Doig GS. Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Carlton (Australia): Australian and New Zealand Intensive Care Society (ANZICS); 2005. 282 p. [387 references]

GUIDELINE STATUS

This is the current release of the guideline.

COMPLETE SUMMARY CONTENT

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SCOPE

DISEASE/CONDITION(S)

Critical illness that would normally or usually require care in an intensive care unit

GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness
Management

CLINICAL SPECIALTY

Critical Care
Nutrition

INTENDED USERS

Advanced Practice Nurses
Dietitians
Nurses
Physician Assistants
Physicians

GUIDELINE OBJECTIVE(S)

To develop or update and validate an evidence-based feeding guideline for critically ill patients

TARGET POPULATION

Critically ill patients who would normally or usually be cared for in an intensive care unit for two days or longer

INTERVENTIONS AND PRACTICES CONSIDERED

1. Enteral nutrition vs. standard care
2. Early enteral nutrition (<24 hours) vs. delayed enteral nutrition
3. Parenteral nutrition compared to standard care
4. Parenteral nutrition compared to enteral nutrition
5. Parenteral nutrition compared to early enteral nutrition (<24 hours)
6. Parenteral nutrition compared to delayed enteral nutrition
7. Gastric vs. post-pyloric enteral nutrition.
8. Use of prokinetics
9. Enteral nutrition and parenteral nutrition compared to enteral nutrition alone
10. Enteral nutrition supplemented with arginine compared to standard enteral nutrition *(considered but no recommendation made)*
11. Enteral nutrition supplemented with arginine vs parenteral nutrition *(considered but no recommendation made)*
12. Parenteral nutrition with glutamine vs. standard parenteral nutrition
13. Enteral nutrition with glutamine vs. standard enteral nutrition
14. Hypocaloric (Dose) of parenteral nutrition
15. Parenteral nutrition composition - Branched Chain Amino Acid (BCAA) content: High BCAA (>40%) vs. Low (<27%) content *(considered but no recommendation made)*

MAJOR OUTCOMES CONSIDERED

Mortality

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

An extensive literature search was conducted for controlled trials of feeding interventions conducted in critically ill patients. Terms were also specified to identify methodologically rigorous guidelines, overviews, and meta-analyses. A complete listing of search terms is available from the guideline developer on request. On-line searching of Medline and EMBASE, and hand searching the reference lists of retrieved review papers, was undertaken. Recognised experts and industry were contacted for additional references. The final close-out date for this search process was April 2003.

Medline was searched using the PubMed search engine from 1966 to April 2003. EMBASE was searched using OVID from 1980 to April 2003.

The reference lists of several review articles were hand searched. For a complete list see the original guideline document.

Although the literature search itself was not limited to the identification of non-English language publications, the review process focused on English language publications only. Similarly, only studies published full-paper format that could be adequately critically appraised were considered for review.

NUMBER OF SOURCE DOCUMENTS

The Medline/EMBASE search retrieved 2,287 abstracts. Independent review of all abstracts identified approximately 465 papers that may have been controlled trials or review papers on the topic of interest. All 465 papers were retrieved. Review of these 465 papers identified 337 primary studies that evaluated feeding interventions. Detailed review or critical appraisal of the 337 identified primary studies revealed 111 primary feeding studies that were conducted in critically ill patients and reported clinically meaningful outcomes. All 111 were appraised in detail to determine validity.

In addition the literature search identified one evidence-based guideline for nutritional support in the intensive care unit that had previously been validated in a cluster randomised trial.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level I: adequately powered* (low false +ve or false -ve), well conducted trials

Level II: small, under-powered (high false +ve and false -ve), well conducted trials

Level III**: non-randomised concurrent (contemporary) controls

Level IV**: non-randomised historical controls

Level V**: case series without controls

*The guideline developers defined power as a measure of the probability that a clinical trial will detect a treatment effect of a given magnitude (X), under the assumption that the treatment effect actually exists. To qualify as a Level I trial (adequately powered), the trialists must have established that it was plausible to assume that the treatment effect of magnitude X actually existed. Data from earlier trials is the best way to establish the plausibility of the magnitude of the expected treatment effect (Halpern, S.D., Karlawish, J.H., and Berlin, J.A. [2002]. The continuing unethical conduct of underpowered clinical trials. *JAMA* 288, 358-362).

** These Levels of Evidence were not considered at this guideline conference.

METHODS USED TO ANALYZE THE EVIDENCE

Meta-Analysis of Randomized Controlled Trials
Review of Published Meta-Analyses
Systematic Review

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Fixed effects meta-analysis using the odds ratio metric. Heterogeneity was assessed using the I^2 method.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The evidence-based guidelines development meeting was conducted in accordance with the methodology outlined in Browman's Practice Guideline Development Cycle (PGDC). The PGDC is an explicit process that has been validated for the generation, implementation, and evaluation of evidence-based clinical practice guidelines (see Table 1 in the original guideline document). The PGDC process is employed by Cancer Care Ontario (www.cancercare.on.ca) to develop patient and practitioner-level evidence-based guidelines.

In short, the PGDC requires the generation of a series of *systematic reviews* covering optimally effective approaches to the diagnosis and treatment of a specific condition. These reviews are synthesised from the best available evidence and then graded to result in *evidence-based recommendations* (EBRs). The EBRs are formally augmented with expert opinion and customised to local settings before being implemented as guidelines.

In advance of the meeting: an extensive literature review was undertaken; all randomized controlled trials were critically appraised for methodological quality; overviews of focused clinical questions were compiled leading to evidence-based recommendations for optimally effective techniques; reprints and summaries of each trial were circulated.

At the meeting; evidence-based recommendations were reviewed and ratified and guideline statements compiled.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Grades of Recommendations

A+: More than one well conducted, adequately powered randomized controlled trial (RCT) with consistent results between studies (no heterogeneity), Level of Evidence Required: I

A: At least one well conducted, adequately powered RCT, Level of Evidence Required: I

A-: More than one well conducted, adequately powered RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: I

B+: More than one well conducted RCT with consistent results between studies, Level of Evidence Required: II

B: At least one well conducted RCT, Level of Evidence Required: II

B-: More than one well conducted RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: II

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Clinical Validation-Pilot Testing

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

The final ratified guideline was evaluated in a 27 hospital cluster randomised trial conducted in Australia and New Zealand.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

The levels of evidence (I-IV) and grades of recommendations identifying the type of supporting evidence (A+, A, A-, B+, B, B-) are defined at the end of the "Major Recommendations" field.

The following evidence-based recommendations were ratified at the guideline development conference.

- **Enteral Nutrition (EN) in preference to Standard Care (nothing by mouth [NPO]), Grade B+ recommendation**

  5 Level II randomized controlled trials (RCTs). Ratified by positive meta-analysis and validated evidence-based guideline (Algorithms for Critical Care Enteral and Parenteral Therapy [ACCEPT]).

- **Early EN (<24 hours) in preference to delayed EN, Grade B recommendation**

  3 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Parenteral Nutrition (PN) in preference to Standard Care (Intravenous [IV] Glucose), Grade B recommendation**

  5 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Early EN (<24 hours) in preference to PN, Grade B recommendation**

  6 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Early PN (**

  5 Level II RCTs. Ratified by positive meta-analysis and validated evidence-based guideline (ACCEPT). The results of the meta-analysis supporting this evidence-based recommendation (EBR) have been published elsewhere.

- **Post-pyloric feeding when gastric feeding not tolerated, Grade B recommendation**

  8 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Use of prokinetics when gastric feeding not tolerated, Grade B recommendation**

  5 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **EN supplemented with PN if 80% of goals not met with EN alone (after attempts at postpyloric feeding and use of prokinetics) by 72 hours, Grade B recommendation**

  4 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **PN with glutamine vs. standard PN, Grade B- recommendation**

  4 Level II RCTs. Ratified by meta-analysis, **heterogeneity present**.

  Glutamine *may* be beneficial in select patients. To identify which patients *may* benefit, each constituent RCT should be reviewed and clinical judgement should be exercised.

- **Management of diarrhoea, Grade B recommendation**

  Ratified by validated evidence-based guideline (ACCEPT).

- **Gastric residual values and tolerance, Level B evidence**

  Ratified by validated evidence-based guideline (ACCEPT).

Definitions:

Levels of Evidence

Level I: adequately powered* (low false +ve or false -ve), well conducted trials

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Level V**: case series without controls

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** These Levels of Evidence were not considered at this guideline conference.

Grades of Recommendations

A+: More than one well conducted, adequately powered randomized controlled trial (RCT) with consistent results between studies (no heterogeneity), Level of Evidence Required: I

A: At least one well conducted, adequately powered RCT, Level of Evidence Required: I

A-: More than one well conducted, adequately powered RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: I

B+: More than one well conducted RCT with consistent results between studies, Level of Evidence Required: II

B: At least one well conducted RCT, Level of Evidence Required: II

B-: More than one well conducted RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: II

CLINICAL ALGORITHM(S)

Algorithms are provided in the original guideline document for:

- Intensive care unit feeding
- Addressing tube feeding associated diarrhea

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

When evaluated in a cluster randomised trial including 499 patients from 14 hospitals, the adoption of this guideline resulted in a 10% reduction in mortality ($p = 0.058$) and an average decrease in hospital stay of 10 days ($p = 0.003$).

POTENTIAL HARMS

Not stated

CONTRAINDICATIONS

CONTRAINDICATIONS

Expected intensive care unit (ICU) length of stay less than 2 days. Expected or scheduled return to oral intake in less than 2 days.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

Some of the critical appraisal summaries included in the original guideline document in the section titled "randomized controlled trials (RCTs) excluded due to major methodological flaws" may appear incomplete. In these randomized controlled trials, the major flaw that was detected was considered so significant that it precluded the trial from consideration in the guidelines development process and thus the appraisal of other issues was considered unnecessary.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

A detailed implementation strategy is available from the guideline developer (see the "Availability of Companion Documents" field in this summary).

IMPLEMENTATION TOOLS

Clinical Algorithm
Slide Presentation
Wall Poster

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Doig GS. Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Carlton (Australia): Australian and New Zealand Intensive Care Society (ANZICS); 2005. 282 p. [387 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2005

GUIDELINE DEVELOPER(S)

Australian & New Zealand Intensive Care Society - Private Nonprofit Organization

SOURCE(S) OF FUNDING

Australian & New Zealand Intensive Care Foundation

GUIDELINE COMMITTEE

ANZICS CTG Feeding Investigators Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Evidence Based Decision-Making Web site.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Doig GS. Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Implementation strategies. 2005. 81 p. Available in Portable Document Format (PDF) from the Evidence Based Decision-Making Web site.
- Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Clinical algorithms. 2005. 2 p. Available in Portable Document Format (PDF) from the Evidence Based Decision-Making Web site.
- Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Wall poster. 2005. 1 p. Available in Portable Document Format (PDF) from the Evidence Based Decision-Making Web site.

PATIENT RESOURCES

None available

NGC STATUS

This NGC summary was completed by ECRI on October 11, 2005. The information was verified by the guideline developer on October 18, 2005.

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