An evidence based algorithm for nutritional support accompanied by a multifaceted implementation strategy improved some outcomes in critically ill patients

Martin CM, Doig GS, Heyland DK, *et al* for the Southwestern Ontario Critical Care Research Network. Multicentre, cluster-randomized clinical trial of algorithms for critical-care enteral and parenteral therapy (ACCEPT). *CMAJ* 2004;**170**:197–204.

Q In critically ill patients, does implementation of an evidence based algorithm for nutritional support improve the provision of nutritional support and patient outcomes?

METHODS

Design: cluster randomised controlled trial.

Allocation: {concealed}*.

Blinding: {unblinded}*.

Follow up period: until hospital discharge.

Setting: intensive care units (ICUs) of 11 community and 3 teaching hospitals in Ontario, Canada.

Patients: 499 patients aged ⩾16 years (mean age 66 y, 61% men) with an expected ICU stay of ⩾48 hours. Exclusion criteria: expected to be receiving sufficient oral nutrition within 24 hours after ICU admission, admitted for palliative care, moribund and not expected to survive >6 hours, or suspected brain death.

Intervention: 7 intervention ICUs were allocated to an evidence-based algorithm for nutritional support, with a multifaceted implementation strategy including opinion leader led education sessions, educational outreach visits, and audit and feedback. The algorithm emphasised early nutrition, preference for the enteral route, frequent re-evaluation; and management of adverse outcomes. 7 ICUs were allocated to the control arm, which included care by a dietitian who had not been given specific guidance on provision of feedback.

Outcomes: hospital mortality, length of hospital stay, length of ICU stay, and receipt of nutritional support.

Patient follow up: 99% (intention to treat analysis).

*Information provided by author.

MAIN RESULTS

The intervention ICUs did not differ from control ICUs for hospital mortality rates (27% *v* 37%, p = 0.06). Patients in intervention ICUs had a shorter mean length of hospital stay than those in control ICUs (25 *v* 35 d, p = 0.003), but the groups did not differ for mean length of ICU stay (10.9 *v* 11.8 d, p = 0.7). Patients in intervention ICUs received more days of enteral nutrition than those in control ICUs (6.7 *v* 5.4/10 patient d, p = 0.04).

CONCLUSION

In critically ill patients, multifaceted implementation of an evidence-based algorithm for nutritional support improved provision of enteral nutrition and reduced length of hospital stay.

For correspondence: Dr C M Martin, Department of Medicine, Faculty of Medicine, University of Western Ontario, London, Ontario, Canada. claudio_m_martin@hotmail.com

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Commentary

The algorithm developed by Martin *et al* provides a clear path to early initiation of enteral nutrition. Early enteral nutrition has been shown to be beneficial for patients in the ICU who are seriously ill.[1 2] The main findings of the study by Martin *et al* were a greater number of days of feeding in the intervention group, an important reduction in length of hospital stay, and, although not statistically significant, a 10% mortality reduction.

There must be some indication that these effects (ie, reduced length of hospital stay and mortality) are actually the result of improvements in feeding practice (eg, protein and energy intake) that follow from effective implementation of an evidence based algorithm. Small, but non-significant, differences between groups were seen in feeding delay, protein and energy intake, and time from admission until 80% of the feeding target was achieved. However, it is difficult to explain how these small effects could result in such impressive outcomes. Early feeding has been shown to improve protein and energy intake but not mortality.[3] A systematic review of early enteral feeding also found a reduction in length of hospital stay of 2.2 days (95% CI 0.81 to 3.6 d) but no significant difference in mortality.[2]

Implementation of early feeding would clearly benefit patients in the ICU who are seriously ill, and an algorithm can assist nurses to improve nutritional support and efficiency of care by reducing practice variation. Although multifaceted implementation strategies may be considered too costly for many hospitals, the potential for wider societal benefit should outweigh such a narrow view.

Jan M Binnekade, RN, MS
Academic Medical Center, University of Amsterdam
Amsterdam, The Netherlands

1 Kompan L, Kremzar B, Gadzijev E, *et al*. Effects of early enteral nutrition on intestinal permeability and the development of multiple organ failure after multiple injury. *Intensive Care Med* 1999;**25**:157–61.
2 Marik PE, Zaloga GP. Early enteral nutrition in acutely ill patients: a systematic review. *Crit Care Med* 2001;**29**:2264–70.
3 Ibrahim EH, Mehringer L, Prentice D, *et al*. Early versus late enteral feeding of mechanically ventilated patients: results of a clinical trial. *JPEN J Parenter Enteral Nutr* 2002;**26**:174–81.