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ORIGINAL ARTICLE

Evaluation of current feeding practices in the critically ill: A retrospective chart review

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Summary
Background: Worldwide, malnutrition is an important issue in the care of the critically ill which is associated with increased costs of care and poor patient outcomes.
Objectives: To evaluate the current state of enteral nutrition in the critically ill in the U.S. in comparison to international practices.
Research methodology/design: A retrospective chart audit was performed utilising a 10% random sample of patients admitted to the Pulmonary Medicine Service at an academic medical center in the U.S. from 1/1/11 to 12/31/11. A total of 69 charts were audited.
Outcome measures: Outcome measures included time to initiation of feeds, prescribed versus received protein and energy on day three, prokinetic use and markers of nutritional status.
Results: Delayed time to feeding, greater than 48 hours after ICU admission, was present in 66.7% of the sample. On day three only 9% of the sample was receiving 80% or more of the prescribed protein or energy. These findings are similar to those found internationally.
Conclusion: Critically ill patients continue to experience delays in enteral feeding initiation and are frequently not meeting nutrition targets. Interventions aimed at improving nutrition delivery in the intensive care unit should be a focus of quality care both in the U.S. and internationally.

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Implications for Clinical Practice

- Inadequate protein and energy delivery and delays in initiation of enteral nutrition (EN) delivery are present in the critically ill adult population.
- Nutrition support protocols have been shown to decrease time to feeding and increase protein and energy delivery.
- Technology such as computerised order sets for EN may also reduce the time to feeding initiation.

Introduction

Malnutrition is reported in approximately 22—43% of hospitalised patients internationally (Lazarus and Hamlyn, 2005; Pirlich et al., 2005; Imoberdorf et al., 2010). Critically ill patients are at increased risk for the development of malnutrition due to alterations in protein and energy metabolism displayed in response to sepsis, burns, trauma and major surgery (Gramlich and Kutsogiannis, 2002). Malnutrition is an important issue in the care of the critically ill which is associated with increased costs of care and poor patient outcomes.

Risk for malnutrition identified at admission and worsening nutritional status during hospitalisation have been found to be strongly associated with prolonged length of stay (Caccialanza et al., 2010). In Singapore, Lim et al. (2012) found that malnourished patients are more likely to be readmitted within 15 days of discharge. Additionally a Portuguese study found the cost of treating a nutritionally at-risk patient to be 20% higher than average (Amaral et al., 2007). Malnutrition leads to not only increased economic burden, but to poor patient outcomes.

Globally, malnutrition in the critically ill has been found to be associated with poor patient outcomes including nosocomial bloodstream infections (Rubinson et al., 2004), pressure ulcer development (Banks et al., 2010; Eman et al., 2010) and increased mortality (Alberda et al., 2009; Sorensen et al., 2008; Lim et al., 2012). In the Netherlands, Weijs et al. (2012) found that reaching protein and energy targets in the critically ill, mechanically ventilated patient was associated with a 50% decrease in 28-day mortality, whereas only reaching energy targets was not. In support of these findings, an international study including 37 countries, Alberda et al. reported a Body Mass Index (BMI)-dependent effect between increased protein and energy intake and improved clinical outcomes in the critically ill in patients with a BMI less than 25 or greater than or equal to 35. The provision of parenteral and/or enteral nutrition provides a method to reach protein and energy targets in the critically ill.

Literature review

Enteral nutrition (EN) is recognised internationally as the feeding method of choice in the critically ill patient who is not able to receive oral nutrition (Bankhead et al., 2009; Kreymann et al., 2006; Heyland et al., 2003). Administration of EN assists in the restoration of intestinal motility, maintains gastrointestinal integrity and function, minimises translocation of bacteria and other organisms, improves wound healing and has been associated with a decreased incidence of infection (Heyland, 1998). Cangelosi et al. (2011) performed a meta-analysis which evaluated American Society of Parenteral and Enteral Nutrition (ASPEN) guidelines recommending the use of EN in critically ill patients requiring nutrition support. EN was compared to alternative therapies including parenteral nutrition (PN). EN was found to reduce infection risk, length of hospital stay, ICU length of stay and length of nutritional treatment. Cost savings were seen among the EN group and were associated with a reduction in adverse events and length of stay.

Studies performed in the U.S., Australia and New Zealand have shown that early enteral feeding, within 24—48 hours of admission, has been shown to be associated with decreased mortality in the critically ill population (Artinian et al., 2006; Doig et al., 2009; Khalid et al., 2010). Early enteral feeding has also been associated with fewer ventilator days, a decreased incidence of pneumonia (Woo et al., 2010) and the maintenance of intestinal mucosal integrity (Nguyen et al., 2012). Despite strong evidence that early enteral feeding is beneficial to critically ill patients, the average time to enteral feeding remains high internationally (Cahill et al., 2010).

Previous studies examining enteral feeding practices in the critically ill have consistently failed to meet both prescribed goals for energy and protein and guidelines for time to initiation of enteral feeding (Table 1). Cahill et al. (2010) conducted an international, prospective, observational, cohort study of mechanically ventilated adults across 20 countries including Latin America, the UK, the U.S., Europe and Asia. The average time to the start of EN was 46.5 hours and the average nutritional adequacy for protein and energy were 60.3% (range 18.6—152.5%) and 59% (range 20.5—94.4%) respectively across a 12-day time span. While Cahill et al. looked at time to feeding initiation, they did not examine reasons for the delay in enteral nutrition therapy. This study also included surgical patients which may alter applicability when comparing findings to studies of medical patients. In another international cohort study Alberda et al. (2009) analysed critically ill subjects from 37 countries and also reported a BMI-dependent effect between increased protein and energy intake and improved clinical outcomes in critically ill patients with a BMI less than 25 or greater than or equal to 35. Work by Van den Broek et al. (2009) in the Netherlands also reported that administered enteral feeding amounts were significantly lower than prescribed in 40% of all patients, but the authors did not examine the time to receipt of enteral feeding. This sample included hospitalised patients housed in non-intensive care unit areas possibly limiting applicability to the critically ill population. Further confirmation was provided by O'Meara et al. (2008) who reported that patients in a U.S. sample received approximately 50% of their prescribed caloric needs and detailed reasons for interruption of enteral nutrition including

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