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**FRESENIUS KABI**

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Introduction

Welcome to the Fresenius Kabi’s Quarterly Abstract Bulletin for enteral nutrition. We have reviewed the following journals over the past three months, and selected any nutrition support related articles:

- Age and Aging
- Ageing Research Reviews
- American Journal of Clinical Nutrition
- Archives of diseases in Childhood
- BMJ
- British Journal of Community Nursing
- British Journal of Nursing
- British Journal of Nutrition
- Clinical Nutrition
- Complete Nutrition
- Critical Care Medicine
- Current Opinion in Clinical Nutrition and Metabolic Care
- Dysphagia
- European Journal of Clinical Nutrition
- Gastrointestinal Nursing
- GUT
- International Journal of Palliative Nursing
- Intensive Care Medicine
- Intensive and Critical Care Nursing
- Journal of Community Nursing
- Journal of Human Nutrition and Dietetics
- Journal of Parenteral and Enteral Nutrition
- Journal of the American Geriatric Society
- Journal of Woundcare
- The Lancet
- Nursing and Residential Care
- Nursing Children and Young People
- Nursing in Practice
- Nursing Older People
- Nursing Standard
- Nursing Times
- Nutrition
- Nutrition in Clinical Practice
- Proceedings of the Nutrition Society

We do recommend that the original article is used for the full details and results.

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This publication and previous editions are also available online at www.fresenius-kabi.co.uk under the nutrition service section.
The effect of interventions to prevent and treat malnutrition in patients admitted for rehabilitation: a systematic review with meta-analysis

J Collins and J Porter

Abstract

BACKGROUND: Malnutrition occurs frequently among patients in rehabilitation, leading to poorer outcomes. Evidence of the effects of interventions to prevent or treat malnutrition is required to guide clinical practice in this setting. This systematic review aimed to determine the effect of oral nutrition interventions implemented in rehabilitation on nutritional and functional outcomes.

METHODS: Five databases were searched to identify relevant publications; intervention trials of oral nutrition interventions (such as oral nutrition supplements, foodservice interventions, clinical care processes, enhanced eating environments) conducted with patients admitted for rehabilitation, reporting dietary intake, anthropometric, biochemical or functional outcomes. The reviewers determined study eligibility and assessed the included studies for risk of bias. Outcome data were combined narratively and by meta-analyses.

RESULTS: From 1765 publications, 10 studies trialling oral nutrition supplements, foodservice interventions and clinical care processes (of neutral or positive quality) were identified. Compared to meals alone, oral nutritional supplements significantly improved energy and protein intake, with some evidence for improvements in anthropometry and length of stay. There was little evidence that speciality supplements were beneficial compared to standard versions. Meta-analyses demonstrated significantly greater energy (weighted mean difference (WMD) = 324 kcal, 212-436 kcal 95% confidence interval (CI)) and protein (WMD = 9.1 g, 0.2-17.9 g 95% CI) intake with energy dense meals. Opposing results were reported in studies investigating enhanced clinical care processes.

CONCLUSIONS: The provision of oral nutrition supplements and energy dense meals improved energy and protein intake and therefore may comprise effective strategies for addressing malnutrition in rehabilitation. The effect of these strategies on other nutritional and functional outcomes should be explored further.

Rates of adult acute inpatients documented as at risk of refeeding syndrome by dietitians

E L Owers, A I Reeves, S Y Ko, A K Ellis, S L Huxtabel, S A Noble, H E Porteous, E J Newman, C A Josephson, R A Roth, C E Byrne and M A Palmer

Abstract

BACKGROUND & AIMS: Identification of Refeeding Syndrome (RFS) is vital for prevention and treatment of metabolic disturbances, yet no information exists that describes identification rates by dietitians in acute care. We aimed to describe rates and demographics of inpatients identified by dietitians as at-risk of RFS and factors associated with electrolyte levels post-dietetic assessment.

METHODS: Eligible participants were adult (≥ 18 yrs) acute care inpatients reviewed by dietitians between March 2012-February 2013 and not admitted to intensive care prior to first dietetic assessment. Patient information was sourced from medical charts. Chi-squared, t-tests and linear regression analyses were conducted.

RESULTS: Of 1661 eligible inpatients (55%F, 65 ± 18 yrs), 9% (n = 151) were documented as at-risk of RFS in the first dietetic medical chart entry. On average, patients identified with RFS-risk had four days greater hospital stay, were 13 kg lighter, more likely classified SGA C (36% vs. 7%), and on a modified diet (52% vs. 35%) than non-RFS patients (p < 0.05). Very low and low electrolyte values occurred within seven days post-dietetic assessment in 7% and 52%, respectively, of inpatients with RFS-risk. Regression analysis showed that electrolyte supplementation was positively associated (β = 0.145-0.594), and number of RFS-related risk factors negatively associated (β = -0.044-0.122), with potassium, magnesium and phosphate levels within seven days post-dietetic assessment (p < 0.05).

CONCLUSION: Nine percent of adult inpatients were documented as at-risk of RFS by dietitians. Identification of at-risk patients was in accordance with RFS guidelines. Electrolyte supplementation was positively associated with electrolyte levels post-assessment. Consistency of RFS-risk identification between dietitians requires determination.
Healthy subjects experience bowel changes on enteral diets: addition of a fiber blend attenuates stool weight and gut bacteria decreases without changes in gas

K J Koecher, W Thomas and J L Slavin

Abstract
BACKGROUND: Tube-fed patients frequently suffer from abnormal bowel function that affects intestinal bacteria and quality of life. Dietary fiber affects laxation and can be fermented by gut bacteria to metabolites that influence gut health and fecal moisture. The aim of this study was to compare the effects of a fiber-blend fortified enteral formula (FB, 15 g/L), a fiber-free formula (FF), and habitual diet on bowel function, fecal bacteria, and quality of life.
MATERIALS & METHODS: In a randomized, double-blind, crossover design, 20 healthy subjects consumed both FF and FB for 14 days with a 4-week washout. A 5-day fecal collection was used to assess stool output, whole-gut transit time (WGT), total bacteria, bifidobacteria, lactobacilli, clostridia, and bacteroides. Subject gastrointestinal quality of life index (GIQLI) and side effects were also measured.
RESULTS: On formula diets, 5-day fecal output decreased by >55% from habitual diet, but was 38% higher on FB than FF (P = .0321). WGT was approximately 1.5 times longer on formula diets than habitual diet (P < .0004). Total bacteria declined from habitual diet on FF (P < .004), but not on FB. Numbers of bifidobacteria and lactobacilli declined from habitual diet on both formula diets, but bifidobacteria was higher on FB compared with FF (P < .0001). Bacteroides and clostridia numbers did not change between diets. GIQLI and incidence of gas symptoms did not differ between formulas.
CONCLUSIONS: Addition of a fiber blend moderated changes in bowel function and gut bacteria observed in healthy subjects consuming FF. These results support adding mixed fiber sources to enteral nutrition if no contraindication exists.

Routes for early enteral nutrition after esophagectomy: a systematic review

T J Weijs, G H K Berkelmans, G A P Nieuwenhuijzen, J P Ruurda, R V Hillegersberg, P B Soeters and M D P Luyer

Abstract
BACKGROUND: Early enteral feeding following surgery can be given orally, via a jejunostomy or via a nasojejunal tube. However, the best feeding route following esophagectomy is unclear.
OBJECTIVES: To determine the best route for enteral nutrition following esophagectomy regarding anastomotic leakage, pneumonia, percentage meeting the nutritional requirements, weight loss, complications of tube feeding, mortality, patient satisfaction and length of hospital stay.
DESIGN: A systematic literature review following PRISMA and MOOSE guidelines.
RESULTS: There were 17 eligible studies on early oral intake, jejunostomy or nasojejunal tube feeding. Only one nonrandomized study (N = 133) investigated early oral feeding specifically following esophagectomy. Early oral feeding was associated with a reduced length of stay with delayed oral feeding, without increased complication rates. Postoperative nasojejunal tube feeding was not significantly different from jejunostomy tube feeding regarding complications or catheter efficacy in the only randomised trial on this subject (N = 150). Jejunostomy tube feeding outcome was reported in 12 non-comparative studies (N = 3293). It was effective in meeting short-term nutritional requirements, but major tube-related complications necessitated relaparotomy in 0-2.9% of patients. In three non-comparative studies (N = 135) on nasojejunal tube feeding only minor complications were reported, data on nutritional outcome was lacking. Data on patient satisfaction and long-term nutritional outcome were not found for any of the feeding routes investigated.
CONCLUSIONS: It is unclear what the best route for early enteral nutrition is after esophagectomy. Especially data regarding early oral intake are scarce, and phase 2 trials are needed for further investigation.
Ultrasound-guided nasogastric feeding tube placement in critical care patients

F Gök, A Kılıçaslan and A Yosunkaya


Abstract

**BACKGROUND:** Nasogastric feeding tube (NGT) placement is a common practice performed in intensive care units (ICUs). Complications due to the improper placement of NGT are well known. In this prospective descriptive study, the effectiveness of ultrasound (US)-guided NGT placement was investigated. **MATERIALS & METHODS:** Fifty-six mechanically ventilated patients monitored in the ICU were included. A linear US probe was transversely placed just cranial to the suprasternal notch, and the concentric layers of the esophagus were attempted to be viewed on the posterolateral side of the trachea (generally left) by shifting the probe. If the esophagus can be seen, an attempt was made to insert the NGT under real-time visualization of ultrasonography. Furthermore, gastric placement of the NGT tip was confirmed with abdominal radiograph. **RESULTS:** A total of 56 patients were included in the study. For 52 (92.8%), the NGT image was obtained during placement within the esophagus. For 3 (5.3%), the esophagus could not be seen by US, and NGT was placed blindly. For 1 patient, we could not detect passing of the NGT into the stomach despite the successful visualization of esophagus. In this patient, NGT was radiographically detected in the trachea after the procedure. **CONCLUSIONS:** This study revealed that passing of the NGT through the esophagus could be visualized at a high rate in real-time US among ICU patients. These data suggest that ultrasonographic visualization of the upper esophagus during NGT insertion can be used as an adjuvant method for confirmation of correct placement.

Implications of sarcopenia in major surgery

J Friedman, A Lussiez, J Sullivan, S Wang and M Englesbe


Abstract

**BACKGROUND:** Sarcopenia, defined as a decrease in skeletal muscle mass and strength, is an important risk factor in clinical medicine associated with frailty, mortality, and worse surgical and nonsurgical outcomes. Conventional measures of sarcopenia rely on the subjective "eyeball test" and do not adequately describe risk. Computed tomography (CT) imaging studies may be used to objectively measure sarcopenia and may be used for surgical risk stratification and identification of patients for inclusion in a novel clinical remediation program. **METHODS:** We describe results observed in the general, vascular, and liver transplant surgery populations determined by analytic morphomics—an analysis of CT scans in a semiautomated process using MATLAB v13.0. A perioperative optimization program has been implemented with the objective of remediating sarcopenia through improvement of patient mental and physical status prior to surgery. **RESULTS:** Using analytic morphomics, we have noted significantly higher cost and increased rates of mortality and surgical complications among sarcopenic patients. The training program shows initial success, and among participating patients, we have observed reductions in payer and hospital costs and a decrease in length of hospital stay for patients following surgery. **CONCLUSIONS:** Through analytic morphomics, we are able to quantify markers of sarcopenia and identify patients at risk for increased mortality and poor surgical outcomes. Early identification of patients offers us the opportunity to remediate sarcopenia through perioperative training and support. Participating patients spend less time in the hospital and have lower healthcare costs. This program has the potential to improve the perioperative patient experience and ease financial burdens.
Sarcopenia and critical Illness: a deadly combination in the elderly

J S Hanna

Abstract

Sarcopenia is the age-associated loss of lean skeletal muscle mass. It is the result of multiple physiologic derangements, ultimately resulting in an insidious functional decline. Frailty, the clinical manifestation of sarcopenia and physical infirmity, is associated with significant morbidity and mortality in the elderly population. The underlying pathology results in a disruption of the individual's ability to tolerate internal and external stressors such as injury or illness. This infirmity results in a markedly increased risk of falls and subsequent morbidity and mortality from the resulting traumatic injury, as well as an inability to recover from medical insults, resulting in critical illness. The increasing prevalence of sarcopenia and critical illness in the elderly has resulted in a deadly intersection of disease processes.

The lethality of this combination appears to be the result of altered muscle metabolism, decreased mitochondrial energetics needed to survive critical illness, and a chronically activated catabolic state likely mediated by tumor necrosis factor-α. Furthermore, these underlying derangements are independently associated with an increased incidence of critical illness, resulting in a progressive downward spiral. Considerable evidence has been gathered supporting the role of aggressive nutrition support and physical therapy in improving outcomes. Critical care practitioners must consider sarcopenia and the resulting frailty phenotype a comorbid condition so that the targeted interventions can be instituted and research efforts focused.

Calorie intake of enteral nutrition and clinical outcomes in acutely critically ill patients: a meta-analysis of randomized controlled trials

E Y Choi, D-A Park and J Park

Abstract

BACKGROUND: The appropriate calorie intake to be provided to critically ill patients via enteral nutrition (EN) remains unclear. We performed a meta-analysis of randomized controlled trials to compare the effect of initial underfeeding and full feeding in acutely critically ill patients. MATERIALS & METHODS: We searched the Medline, EMBASE, and Cochrane Central Register of Controlled Trials databases to identify randomized controlled trials that compared underfeeding with full feeding in critically ill patients. The primary outcome was overall mortality. The secondary outcomes included length of hospital stay, length of intensive care unit (ICU) stay, duration of mechanical ventilation, incidence of pneumonia, Clostridium difficile colitis, other infectious complications, and gastrointestinal intolerance. RESULTS: In total, 4 studies were included in this meta-analysis. There was no significant difference in overall mortality between the underfeeding and full-feeding groups (odds ratio [OR], 0.94; 95% confidence interval [CI], 0.74-1.19; I² = 26.6%; P = .61). Subgroup analysis of the underfeeding subgroup that was fed <33.3% of the standard caloric requirement indicated that overall mortality was significantly lower in this underfeeding subgroup than in the full-feeding group (OR, 0.63; 95% CI, 0.40-1.00; I² = 0%; P = .05). In contrast, no difference in overall mortality was noted between the underfeeding subgroup that was fed <33.3% of the standard caloric requirement and the full-feeding group. The length of hospital stay and length of ICU stay did not differ between the 2 groups. Moreover, no differences in other secondary clinical outcomes were noted. CONCLUSIONS: None of the analyzed clinical outcomes for the acutely critically ill patients were significantly influenced by the calorie intake of the initial EN.
Use of 3 tools to assess nutrition risk in the intensive care unit

A Coltman, S Peterson, K Roehl, H Roosevelt and D Sowa

Abstract

BACKGROUND: Identifying patients at nutrition risk proves difficult in the intensive care unit (ICU) due to the nature of critical illness. No consensus exists on the most appropriate method to identify these patients. Traditional screens and assessments are often limited due to their subjective nature. The purpose of the quality improvement project was to compare proportions of ICU patients deemed at nutrition risk using 3 different tools.

MATERIALS & METHODS: A convenience sample of 294 patients admitted to the ICU was used. Patients were assessed using the institution's routine nutrition screening method, the Subjective Global Assessment (SGA), and the NUTrition Risk in Critically ill (NUTRIC) score. Information was collected on demographics, severity of illness, hospital and ICU length of stay (LOS), and disposition. Descriptive statistics were used to examine counts/proportions of risk categories; means ± SD were used to summarize demographic and clinical variables. RESULTS: A total of 139 patients (47%) were deemed at nutrition risk or malnourished by at least 1 tool. Patients identified were older and had a lower body mass index, more weight loss, more fat and muscle wasting, more fluid accumulation, and lower average handgrips than those not at nutrition risk; they also had longer hospital and ICU LOS, higher rates of requiring further rehabilitation upon discharge, and higher mortality during hospitalization.

CONCLUSIONS: Traditional screening and assessment tools did not uniformly identify patients as malnourished or at nutrition risk in the ICU and therefore may be inappropriate for use in this population. Inclusion of physical assessment, functional status, and severity of illness may be useful in predicting nutrition risk in the ICU.

Causes and consequences of interrupted enteral nutrition: a prospective observational study in critically ill surgical patients

M P Peev, D D Yeh, S A Quraishi, P Osler, Y Chang, E Gillis, C E Albano, S Darak and G C Velmahos

Abstract

BACKGROUND: Malnutrition and underfeeding are major challenges in caring for critically ill patients. Our goal was to characterize interruptions in enteral nutrition (EN) delivery and their impact on caloric debt in the surgical intensive care unit (ICU). MATERIALS & METHODS: We performed a prospective, observational study of adults admitted to surgical ICUs at a Boston teaching hospital (March–December 2012). We categorized EN interruptions as “unavoidable” vs “avoidable” and compared caloric deficit between patients with ≥1 EN interruption (group 1) vs those without interruptions (group 2). Multivariable logistic regression was used to investigate the association of EN interruption with the risk of underfeeding. Poisson regression was used to investigate the association of EN interruption with length of stay (LOS) and mortality. RESULTS: Ninety-four patients comprised the analytic cohort. Twenty-six percent of interruptions were deemed “avoidable.” Group 1 (n = 64) had a significantly higher mean daily and cumulative caloric deficit vs group 2 (n = 30). Patients in group 1 were at a 3-fold increased risk of being underfed (adjusted odds ratio, 2.89; 95% confidence interval [CI], 1.03–8.11), had a 30% higher risk of prolonged ICU LOS (adjusted incident risk ratio [IRR], 1.27; 95% CI, 1.14–1.42), and had a 50% higher risk of prolonged hospital LOS (adjusted IRR, 1.53; 95% CI, 1.41–1.67) vs group 2. CONCLUSIONS: In our cohort of critically ill surgical patients, EN interruption was frequent, largely “unavoidable,” and associated with undesirable outcomes. Future efforts to optimize nutrition in the surgical ICU may benefit from considering strategies that maximize nutrient delivery before and after clinically appropriate EN interruptions.
Intensive nutrition in acute lung injury: a clinical trial (INTACT)

C A Braunschweig, P M Sheean, S J Peterson, S Gomez Perez, S Freels, O Lateef, D Gurka and G Fantuzzi

Abstract

BACKGROUND: Despite extensive use of enteral (EN) and parenteral nutrition (PN) in intensive care unit (ICU) populations for 4 decades, evidence to support their efficacy is extremely limited. METHODS: A prospective randomized trial was conducted evaluate the impact on outcomes of intensive medical nutrition therapy (IMNT; provision of >75% of estimated energy and protein needs per day via EN and adequate oral diet) from diagnosis of acute lung injury (ALI) to hospital discharge compared with standard nutrition support care (SNSC; standard EN and ad lib feeding). The primary outcome was infections; secondary outcomes included number of days on mechanical ventilation, in the ICU, and in the hospital and mortality. RESULTS: Overall, 78 patients (40 IMNT and 38 SNSC) were recruited. No significant differences between groups for age, body mass index, disease severity, white blood cell count, glucose, C-reactive protein, energy or protein needs occurred. The IMNT group received significantly higher percentage of estimated energy (84.7% vs 55.4%, P < .0001) and protein needs (76.1 vs 54.4%, P < .0001) per day compared with SNSC. No differences occurred in length of mechanical ventilation, hospital or ICU stay, or infections. The trial was stopped early because of significantly greater hospital mortality in IMNT vs SNSC (40% vs 16%, P = .02). Cox proportional hazards models indicated the hazard of death in the IMNT group was 5.67 times higher (P = .001) than in the SNSC group. CONCLUSION: Provision of IMNT from ALI diagnosis to hospital discharge increases mortality.

Achieving energy goals at day 4 after admission in critically ill children; predictive for outcome?

C T I de Betue, W N van Steenselen, J M Hulst, J F Olieman, M Augustus, S H Mohd Din, S C A T Verbruggen, D Tibboel and K F M Joosten

Abstract

BACKGROUND & AIMS: Adequate nutritional intake is essential during pediatric intensive care admission. We investigated whether achievement of energy intake goals at day 4 after admission and route of nutrition were associated with improved outcome. METHODS: Observational study using prospectively acquired data. Patients receiving enteral and/or parenteral nutrition were included. The energy intake target range at day 4 after admission was 90-110% of resting energy expenditure +10%. Acute malnutrition was defined as weight-for-age < -2 SD. Clinical outcome measures were length of stay, days on ventilator, duration of antibiotics and number of new infections. Data as median (min-max). RESULTS: Of 325 subjects (age 0.04 (0.0-18.0) year), 19% were acutely malnourished upon admission. Median 86% of energy goals were administered via the enteral route. With enteral energy intake, 7% of patients were fed within the target range, 50% were fed below and 43% were fed above the target range. In a subgroup (n = 223) the acutely malnourished proportion at discharge (26%) was not significantly different from that upon admission (22%). Whether the energy intake was below, within or above the target range did not affect changes in clinical outcome, nor did the route of nutrition. CONCLUSIONS: Acute malnutrition was highly prevalent upon admission and at discharge. With our nutritional protocol we achieved high rates of (enteral) energy intake. A high percentage of our population received enteral energy above the target energy range. However, there was no association between the amount of energy intake or route of nutrition and clinical outcome.
Disease associated malnutrition correlates with length of hospital stay in children


Abstract

BACKGROUND & AIMS: Previous studies reported a wide range of estimated malnutrition prevalence (6–30%) in paediatric inpatients based on various anthropometric criteria. We performed anthropometry in hospitalised children and assessed the relationship between malnutrition and length of hospital stay (LOS) and complication rates.

METHODS: In a prospective multi-centre European study, 2567 patients aged 1 month to 18 years were assessed in 14 centres in 12 countries by standardised anthropometry within the first 24 h after admission. Body mass index (BMI) and height/length <-2 standard deviation scores (SDS, WHO reference) were related to LOS (primary outcome), frequency of gastrointestinal (diarrhoea and vomiting) and infectious complications (antibiotic use), weight change during stay (secondary outcomes) and quality of life.

RESULTS: A BMI < -2 SDS was present in 7.0% of the patients at hospital admission (range 4.0–9.3% across countries) with a higher prevalence in infants (10.8%) and toddlers aged 1-2 years (8.3%). A BMI < -2 to ≥ -3 SDS (moderate malnutrition) and a BMI < -3 SDS (severe malnutrition) was associated with a 1.3 (CI95: 1.01, 1.55) and 1.6 (CI95: 1.27, 2.10) days longer LOS, respectively (p = 0.04 and p < 0.001). Reduced BMI < -2 SDS was also associated to lower quality of life, and more frequent occurrence of diarrhoea (22% vs 12%, p < 0.001) and vomiting (26% vs 14%, p < 0.001).

CONCLUSION: Disease associated malnutrition in hospitalised children in Europe is common and is associated with significantly prolonged LOS and increased complications, with possible major cost implications, and reduced quality of life.

Consensus statement of the Academy of Nutrition and Dietetics/ American Society for Parenteral and Enteral Nutrition: indicators recommended for the identification and documentation of pediatric malnutrition (undernutrition)


Abstract

The Academy of Nutrition and Dietetics (the Academy) and the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.), utilizing an evidence-informed, consensus-derived process, recommend that a standardized set of diagnostic indicators be used to identify and document pediatric malnutrition (undernutrition) in routine clinical practice. The recommended indicators include z scores for weight-for-height/length, body mass index-for-age, or length/height-for-age or mid-upper arm circumference when a single data point is available. When 2 or more data points are available, indicators may also include weight gain velocity (<2 years of age), weight loss (2-20 years of age), deceleration in weight for length/height z score, and inadequate nutrient intake. The purpose of this consensus statement is to identify a basic set of indicators that can be used to diagnose and document undernutrition in the pediatric population ages 1 month to 18 years. The indicators are intended for use in multiple settings (eg, acute, ambulatory care/outpatient, residential care). Several screening tools have been developed for use in hospitalized children. However, identifying criteria for use in screening for nutritional risk is not the purpose of this paper. Clinicians should use as many data points as available to identify and document the presence of malnutrition. The universal use of a single set of diagnostic parameters will expedite the recognition of pediatric undernutrition, lead to the development of more accurate estimates of its prevalence and incidence, direct interventions, and promote improved outcomes. A standardized diagnostic approach will also inform the prediction of the human and financial responsibilities and costs associated with the prevention and treatment of undernutrition in this vulnerable population and help to further ensure the provision of high-quality, cost-effective nutritional care.
Finding the right balance: an evaluation of the adequacy of energy and protein intake in childhood cancer patients

A Brinksm a, P F Roodbol, E Sulkers, E S de Bont, J G Burgerhof, R Y Tamminga, H Jager-Wittenaar and W J Tissing

Abstract

BACKGROUND & AIMS: Despite a widespread belief that adequate dietary intake is needed to maintain weight during childhood cancer treatment, conclusive data about adequacy of intake are lacking. Therefore, we aimed to assess the adequacy of energy and protein intake in a heterogeneous childhood cancer population against 3 different norms. METHODS: We conducted a prospective cohort study of 115 children diagnosed with cancer and assessed dietary intake after diagnosis and at 3, 6, and 12 months. Intake was assessed against recommended daily allowances (RDA), intake in healthy controls, and calculated individual requirements; and subsequently related to changes in nutritional status. RESULTS: Energy intake was lower than RDA and lower than in healthy controls at all measurement points; whereas energy intake matched individual requirements at 2 of the 4 measurement points. Protein intake in childhood cancer patients was lower than in healthy children. However, protein intake was almost twice the RDA and one and a half times the individual requirements. During the study period, weight and fat mass (FM) increased significantly while fat free mass (FFM) remained low. Energy intake was negatively associated with weight and FM, and protein intake was not associated with FFM. CONCLUSIONS: The patients’ weight increased; whereas their energy intake was lower than RDA and lower than in healthy controls. This indicates that the average intake was more than adequate. Percentage intake of individual requirements matched with increased weight. Therefore, the use of this norm is preferable to RDA or intake in healthy controls when determining the adequacy of dietary intake in both clinical practice and futures studies.

A comparison of the malnutrition screening tools, MUST, MNA and bioelectrical impedance assessment in frail older hospital patients

A Slee, D Birch and D Stokoe

Abstract

BACKGROUND & AIMS: This cohort study aimed to investigate and compare the ability to predict malnutrition in a group of frail older hospital patients in the United Kingdom using the nutritional risk screening tools, MUST (malnutrition universal screening tool), MNA-SF(®) (mini nutritional assessment-short form) and bioelectrical impedance assessment (BIA) of body composition. METHODS: MUST and MNA-SF was performed on 78 patients (49 males and 29 females, age: 82 ± 7.9, body mass index (BMI): 25.5 kg/m(2) ± 5.4), categorised by nutritional risk, and statistical comparison and test reliability performed. BIA was performed in 66 patients and fat free mass (FFM), fat mass (FM) and body cell mass (BCM) and index values (kg/m(2)) calculated and compared against reference values. RESULTS: MUST scored 77% patients ‘low risk’, 9% ‘medium risk’ and 14% ‘high risk’, compared to MNA-SF categorisation: 9%, 46% and 45%, respectively (P < 0.000001). Reliability assessment found poor reliability between the screening tools (coefficient, r = 0.4). Significant positive correlations were found between most variables (P < 0.05<0.001); although females exhibited greater variation. FFM index analysis found 40% of males low/depleted, 21% borderline/at risk with 96% categorised by MNA-SF as either malnourished or at risk (MUST-35%), 29% males had low FM index and all appropriately classified by MNA-SF. 30% females had low FFM index or borderline, MNA-SF screening appropriately categorised 86% (compared to MUST-29%). CONCLUSION: This preliminary data may have significant clinical implications and highlights the potential ability of the MNA-SF and BIA to accurately assess malnutrition risk over MUST in frail older hospital patients.
**Evaluation of muscle and fat loss as diagnostic criteria for malnutrition**

M Fischer, A JeVenn and P Hipskind  

**Abstract**

According to the American Society for Parenteral and Enteral Nutrition and Academy of Nutrition and Dietetics criteria, the diagnosis of malnutrition includes an evaluation of muscle and fat. The role of inflammation not only enhances the catabolism of muscle and fat loss but also interferes with anabolism. Dietitians and other nutrition professionals need to understand techniques to appropriately identify losses of muscle and fat to incorporate them into a malnutrition diagnosis. Proper training is imperative to correctly identify muscle and fat wasting in a consistent and reliable manner. Nutrition clinicians should begin incorporating these practices into patient assessments and care plans. The application of these techniques and assessment tools is challenging and continues to be a work in progress. Various scenarios do not allow for clearly defined methods that would lead to a reliable conclusion for diagnosing malnutrition indicating the need for further research.

**Handgrip strength and associated factors in hospitalized patients**

R S Guerra, I Fonseca, F Pichel, M T Restivo and T F Amaral  

**Abstract**

**BACKGROUND:** Handgrip strength (HGS) is a marker of nutrition status. Many factors are associated with HGS. Age, height, body mass index, number of diagnoses, and number and type of drugs have been shown to modify the association between undernutrition and HGS. Nevertheless, other patient characteristics that could modify this association and its joint modifier effect have not been studied yet. **OBJECTIVE:** To evaluate the association of inpatients’ HGS and undernutrition considering the potential modifier effect of cognitive status, functional activity, disease severity, anthropometrics, and other patient characteristics on HGS. **METHODS:** A cross-sectional study was conducted in a university hospital. Sex, age, abbreviated mental test score, functional activity score, Charlson index, number of drugs, Patient-Generated Subjective Global Assessment (PG-SGA) score, body weight, mid-arm muscle circumference, adductor pollicis muscle thickness, body height, wrist circumference, hand length, and palm width were included in a linear regression model to identify independent factors associated with HGS (dependent variable). **RESULTS:** The study sample was composed of 688 inpatients (18-91 years old). All variables included in the model were associated with HGS ($\beta$, $-0.16$ to $0.38$; $P \leq .049$) and explained $68.5\%$ of HGS. Age, functional activity decline, Charlson index, number of drugs, PG-SGA score, body weight, and wrist circumference had a negative association with HGS. All other studied variables were positively associated with HGS. **CONCLUSION:** Nutrition status evaluated by PG-SGA was still associated with HGS after considering the joint effect of other patient characteristics, which reinforces the value of HGS as an indicator of undernutrition.
Resting metabolic rate and anthropometry in older people: a comparison of measured and calculated values

D P Reidlinger, J M Willis and K Whelan

Abstract

BACKGROUND: Accurate assessment of energy expenditure and anthropometry in older people is important for targeted nutritional support. The present study aimed to compare measured and calculated resting metabolic rate (m-RMR and c-RMR) and measured, calculated and estimated weight and height in older people aged ≥70 years. METHODS: Participants were healthy older people aged ≥70 years. Indirect calorimetry using a ventilated hood calorimeter was performed for 30 min on fasted participants, and was compared with c-RMR, as calculated using six commonly used equations. Measured, calculated and estimated height and weight were compared. RESULTS: Subjects comprised 14 males and 20 females and mean (SD) m-RMR was 5243 (845) kJ day(−1) [1253 (202) kcal day(−1)]. The Mifflin St-Jeor equation was the most consistently accurate, with the smallest mean difference between m-RMR and c-RMR of 58 (553) kJ day(−1) [14 (132) kcal day(−1)] and c-RMR was within 10% of m-RMR in the greatest number of participants (n = 24; 70%). The Schofield equation was among the least accurate in this age group. In older males, self-reported height and weight were accurate, whereas, in females or those unable to self-report height, ulna length was the most accurate alternative to measured height. CONCLUSIONS: Current equations used to calculate RMR in older people have inaccuracies, although the Mifflin St-Jeor equation was most accurate. Future studies should investigate the validity, reliability, cost and practicality of using fat free mass as an item in novel equations to calculate RMR in this age group. Self-reported height and weight in males, and height calculated from ulna length in females, were the most accurate alternatives to measured values in the present study.

Interrelations of immunological parameters, nutrition, and healthcare-associated infections: prospective study in elderly in-patients

M Laurent, S Bastuji-Garin, A Plonquet, P N Bories, A Le Thuaut, E Audureau, P O Lang, S Nakib, E Liuu, F Canoui-Poitrine and E Paillaud

Abstract

BACKGROUND & AIMS: Healthcare-associated infections [HAI] are common in elderly individuals and may be related to both nutritional deficiencies and immunosenescence. Here, we assessed whether overall malnutrition and/or specific nutrient deficiencies were associated with HAI via alterations in immune parameters. METHODS: Prospective observational cohort study in patients aged ≥70 years admitted to the geriatric rehabilitation unit of a teaching hospital in France between July 2006 and November 2008. Clinical and laboratory parameters reflecting nutritional status and immune function were collected at baseline. Flow cytometry was used to assess blood lymphocyte subsets including the naïve CD4 T-cell count, naïve and memory CD8 T-cell counts, effector CD8 T-cell count, and CD4/CD8 ratio. Patients were monitored for HAI for 3 months or until discharge from the geriatric unit or death. RESULTS: Of 252 consecutive in-patients aged ≥70 years [mean age, 85 ± 6.2 years], 181 (72%) met French National Authority for Health criteria for malnutrition and 97 (38%) experienced one or more HAI. Patients who subsequently experienced HAI had significantly lower baseline values for energy intake [odds ratio (OR), 0.76; 95% confidence interval (95%CI), 0.59-0.99], serum albumin [OR, 0.43; 95%CI, 0.32-0.58], serum zinc [OR, 0.77; 95%CI, 0.62-0.97], selenium [OR, 0.76; 95%CI, 0.61-0.95], and vitamin C [OR, 0.71; 95%CI, 0.54-0.93]. Associations linking these five variables to HAI were not significantly changed by adjusting for flow cytometry T-cell subset values. CONCLUSIONS: Our results suggest a direct effect of nutritional parameters on HAI rather than an indirect effect mediated by immune parameters.
**Decreased tongue pressure is associated with sarcopenia and sarcopenic dysphagia in the elderly**

K Maeda and J Akagi
Dysphagia (2015) 30 (1): 80-87

**Abstract**

The aim of this study was to clarify the association between tongue pressure and factors related to sarcopenia such as aging, activities of daily living, nutritional state, and dysphagia. One-hundred-and-four patients without a history of treatment of stroke and without a diagnosis of neurodegenerative disease (36 men and 68 women), with a mean age of 84.1 ± 5.6 years, hospitalized from May 2013 to June 2013 were included in this study. Maximum voluntary tongue pressure against the palate (MTP) was measured by a device consisting of a disposable oral balloon probe. Nutritional and anthropometric parameters such as serum albumin concentration, Mini-Nutritional Assessment short form (MNA-SF), body mass index, arm muscle area (AMA), and others and presence of sarcopenia and dysphagia were analyzed to evaluate their relationships. Correlation analysis and univariate or multivariate analysis were performed. Simple correlation analysis showed that MTP correlated with Barthel index (BI), MNA-SF, serum albumin concentration, body mass index, and AMA. Univariate and multivariate analysis showed that sarcopenia, BI, MNA-SF, and age were the independent explanatory factors for decreased MTP, and the propensity score for dysphagia, including causes of primary or secondary sarcopenia, and the presence of sarcopenia were significantly associated with the presence of dysphagia. Decreased MTP and dysphagia were related to sarcopenia or the causes of sarcopenia in the studied population. Furthermore, the clinical condition of sarcopenic dysphagia may be partially interpreted as the presence of sarcopenia and causal factors for sarcopenia.

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**Nasogastric feeding for stroke patients: practice and education**

C Mahoney, A Rowat, M Macmillan and M Dennis

**Abstract**

**BACKGROUND &AIMS:** Dysphagia is common after stroke, so feeding through a nasogastric (NG) tube may be necessary. These tubes are frequently dislodged, causing interruption to feeding and hydration, and potential aspiration of feed or fluids into the lungs. Interventions to prevent this may include taping tubes to the face; the application of hand mittens or bandaging patients’ hands; inserting the NG tube into the nostril on the stroke-affected side; and nasal bridles. The aims of this survey were to investigate the management of NG feeding for stroke patients, including current tube confirmation and securing techniques, and associated nurse education. This was part of a three-phased sequential mixed-methods study. This paper reports on the second quantitative phase. **METHODS:** A quantitative postal survey, based on initial qualitative findings, was sent to registered nurses working on stroke units within the local health board. **RESULTS:** The overall response rate was 59% (n=314/528). Tape was the most commonly used method for securing tube position, followed by inserting the tube on the stroke-affected side. Hand mittens were used more frequently than the nasal bridle; bandaging hands was reported once. Taping was considered to be more acceptable and safer than hand mittens or the nasal bridle, but less effective. Training in inserting NG feeding tubes was received by 56% (n=176/314). Methods used for confirming tube position included aspiration and X-ray. Provision of training in confirmation techniques varied. **CONCLUSIONS:** This study shows that the management of NG feeding for dysphagic stroke patients requires standardisation, as does the education for nurses to ensure that this intervention is carried out safely, effectively and acceptably.
Dysphagia - a common, transient symptom in critical illness polyneuropathy: a fiberoptic endoscopic evaluation of swallowing study

M Ponfick, R Linden and D A Nowak

Abstract

OBJECTIVES: Critical illness polyneuropathy is a common disorder in the neurological ICU. Dysphagia is well known to deteriorate outcome in the ICU. The prevalence of dysphagia in critical illness polyneuropathy is not known. The aim of this study was to evaluate the prevalence of dysphagia in critical illness polyneuropathy using fiberoptic endoscopic evaluation of swallowing.

DESIGN: Prospective, cohort study.

SETTING: Neurological rehabilitation ICU.

PATIENTS: Twenty-two patients with critical illness polyneuropathy.

INTERVENTIONS: Clinical swallowing examination and serial fiberoptic endoscopic evaluation of swallowing (days 3, 14, and 28 after admission).

MEASUREMENTS & MAIN RESULTS: Swallowing of saliva, pureed consistencies, and liquids was tested using fiberoptic endoscopic evaluation of swallowing at three different time points. The penetration-aspiration scale by Rosenbek et al and the secretion severity rating scale by Murray et al were used for grading. Functional outcome after rehabilitation was assessed using the functional independence measure.

Pathologic swallowing was found in 20 of 22 patients (91%). Hypesthesia of laryngeal structures was found in 17 of 22 patients (77%) during the first fiberoptic endoscopic evaluation of swallowing. Over the 4-week follow-up period, laryngeal hypesthesia resolved in 75% of affected cases. Pureed consistencies were swallowed safely in 18 of 22 cases (82%), whereas liquids and saliva showed high aspiration rates (13 of 17 [78%] and 10 of 22 [45%], respectively). Swallowing function recovered completely in 21 of 22 (95%) within 4 weeks.

CONCLUSIONS: Dysphagia is frequent among patients with critical illness polyneuropathy treated in the ICU. Old age, chronic obstructive pulmonary disease, the mode of mechanical ventilation, the prevalence of tracheal tubes, and behavioral "learned nonuse" may all be contributing factors for the development of dysphagia in critical illness polyneuropathy. Complete recovery occurs in a high percentage of affected individuals within 4 weeks.

A systematic review of self-reported swallowing assessments in progressive neurological disorders

M Keage, M Delatycki, L Corben and A Vogel

Abstract

Dysphagia experienced as a consequence of neurodegenerative disease can have severe consequences on a patient's health and well-being. Regular assessment of swallowing function can assist to achieve adequate nutrition and hydration. Here we review subjective swallowing assessments currently available are suitable for use in people with neurodegenerative disease. Measurement properties were reviewed for each tool and coverage of the World Health Organization's International Classification of Functioning, Disability and Health (WHO ICF) was considered. Assessments were identified following a review of the published literature instruments were reviewed on the basis of reliability and validity, as well as administrative properties, such as interpretability, acceptability, and feasibility. Tools were also evaluated according to the WHO ICF framework. In total, 19 studies were identified for full-text review from 13,315 abstracts. Nine self-reported dysphagia assessment tools suitable for use in progressive neurological disorders were identified. The Swallowing Quality of Life Questionnaire (SWAL-QOL) yields the strongest combination of reliability (including internal consistency and test-retest reliability) and convergent validity while simultaneously covering all WHO ICF domains. Lengthy administration time was identified as a limitation of the SWAL-QOL. The review highlights a relative lack of well-validated self-report questionnaires in dysphagia for people with progressive neurological disease. Additional validation and evaluation of the clinical utility of the tools currently available is required to further promote an informed selection of available assessments.
Further references for nutrition support articles and studies published in the last quarter:

  The present study assessed whether the ingestion of food or drink had any biologically significant effect on bioimpedance measurements and body composition by the foot-to-foot method.

  This prospective cohort study aimed to determine in which period of childhood cancer treatment changes in nutritional status occurred and which factors contributed to these changes.

  This review considers the research regarding use of specialty formulas in relation to patient population, clinical endpoints and cost.

  This article shares details of implementing a nutrition pathway for acute stroke patients, along with audit data and practice improvements.

  This prospective multicentre hospital-based cohort study evaluated the impact of nutritional risk on length of stay and in-hospital weight loss in elderly patients (≥65yrs).

  This review aims at integrating the most recent clinical data on muscle weakness and nutrition therapy in order to answer the important clinical question, whether nutrition therapy in ICU can prevent or attenuate complications.

  This study investigates the effect of aging on nitrogen accretion during critical illness.

- Dokken M et al (2015) Indirect calorimetry reveals that better monitoring and the provision of nutrition in the critically ill.
  The aims of this study were to examine the prevalence of underfeeding, adequate feeding, and overfeeding in mechanically ventilated children and to identify barriers to the delivery of nutrition support.

  This study aims at comparing for the first time simultaneously, two new ic, the CCM express® (Medgraphics) and the Quark RMR® (Cosmed) with the Deltatrac II® to assess their potential use in intensive care unit patients.

  This article outlines the Nutrition-Focused Physical Assessment and how to determine physical findings related to micronutrient deficiencies, which can have a profound impact on overall nutrition status.

  This article focuses on how severe physiological stress affects patients who are critically ill and impacts on their nutritional requirements.

  This article shares experience of implementing a food first approach in care homes.

  This study was undertaken to evaluate differences in protein intake in women with or without sarcopenia and verify the intake level that is related to a better bone and muscle mass.

  This study assesses the reliability and study to evaluate their estimations resulted in similar classifications of body composition.

  This review provides an overview of nutrition assessment with focus on the nutrition-focused physical examination and aspects unique to the pediatric patient.

  This prospective observational study compares two BIA devices, a single-frequency BIA device and a bioimpedance spectroscopy approach, to evaluate their reliability and to study whether their estimations resulted in similar classifications of body composition.

  The objective of this study was to identify the most predictive and efficient screening tool for frailty which may help to prevent adverse outcomes in hospitalised older adults.

  This article explains the importance of multi-professional working to tackle malnutrition in the community.

  This article discusses the role of nutrition in supporting the Huntington’s disease patient.

  This 12-month observational multi-modal intervention study, using the top-down and bottom-up principle, assessed the impact on energy and protein intake in at risk patients as well as the affect on good nutritional practice.

  This article highlights the important role of food and drink play in maintaining the health and wellbeing of care home residents.

  This randomized clinical trial assesses the role of nutritional interventions to limit respiratory complications.
The aim of this study was to identify reasons for and quantify time spent without nutrition in a mixed medical-surgical/pediatric intensive care unit.

This article provides an overview of the most common causes of growth failure/growth retardation that affect children with a number of chronic diseases. It also briefly reviews the nutrition considerations and treatment goals.

This study aimed to establish a method of quantifying the effect of enteral protein feeding on whole-body protein turnover and studied critically ill patients receiving early enteral nutrition.

This paper reviews the mechanistic evidence for early enteral nutrition in critically ill patients within the first week of ICU admission.

This article details the new ‘Care Certificate’ in addition to the new e-learning training developed by the Focus on Undernutrition team to support the launch.

• McManamon R (2015) Sarcopenia: what every dietitian needs to know. CN focus 7 (1):51-54
This article discusses sarcopenia and what dietitians need to know whether they work in the community or acute setting, with young or older adults, or those with long-term conditions.

Using metabolic data from mechanically ventilated children less than 18 years of age, this study aimed to examine the accuracy of a simplified equation for predicting REE using carbon dioxide elimination (VCO₂) values.

This update reviews the 3 primary types of commercially available bioimpedance devices. It also addresses limitations and potential opportunities for using these devices at the bedside for clinical assessment.

This study aimed to identify nutrition-related health outcomes that are important to patients with liver disease.

This article aims to review the unique ways in which enteral feed, ancillary items and pumps are procured in the UK and to evaluate whether these are inhibiting innovation and reducing the choices of patients.

This project evaluated microbial growth in 3 enteral feeding systems: closed, open, and open with modular additives (modular tube feeding) exposed to 2 different environments.

These recommendations written by the ESPEN ‘home artificial nutrition and chronic IF’ and “acute IF” special interest groups comprise the definition of IF, a functional, and a pathophysiological classification, for both acute and chronic IF and a clinical classification of chronic IF.

The aim of this study was to compare the use of trained volunteer mealtimes assistants with usual care on female medicine for older people wards.

The aim of this article is to review the complications associated with enteral feeding tubes and discuss their prevention and management for stroke patients.

This article distinguishes between GOR and GORD and discusses their symptoms, risk factors and management strategies.

This article explores the nutritional issues faced by palliative patients and the ethical considerations.

This evaluation examined radio-opacity, reason for repeat X-ray and overall cost in consecutive patients having tubes confirmed by X-ray when using polyvinylchloride versus polyurethane tubes.

This study looks at the validity and reliability of nutritional risk screening (named NRS-2002) in hospitalized patients with chronic heart failure.

This study used action research, underpinned by the ‘participatory world view’, to address the theory-practice gap to inform nursing practice in the management of undernutrition.

The aim of this study was to investigate whether providing a lower volume of ONS at a higher frequency during medication rounds would improve the intake of the supplements.

This opiating review focuses on the latest information and the consequences for the use of glutamine and antioxidants in critically ill patients.

This study aimed to determine the fat free mass index and body fat percentage of preschool-aged children with cerebral palsy and investigate differences according to functional ability and compared to typically developing children.

The purpose of this study was to assess differences in GI side effects between hematopoietic stem cell transplant patients who consumed adequate calories compared with those who did not.

This study aimed to validate the accuracy, reproducibility, and use of the Vmax Encore metabolic cart across a wide range of simulated metabolic conditions.

The aim of this review was to summarise recent research developments relating omega-3 polyunsaturated fatty acids and chronic obstructive pulmonary disease.
Fresenius Kabi is delighted to announce the launch of two new Freka® enteral feeding tubes to the range.

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For further information, please contact your local Fresenius Kabi representative.
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References


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